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CMA FINAL EXAMINATION

PAPER 20A

STRATEGIC PERFORMANCE MANAGEMENT & BUSINESS VALUATION

📘 Complete Revision Notes

Syllabus 2022 | Exam-Ready Content

📚 COMPLETE COVERAGE – 9 MODULES

- ✅ Module 1: Introduction to Performance Management
- ✅ Module 2: Performance Measurement Tools
- ✅ Module 3: Economic Efficiency of the Firm
- ✅ Module 4: Enterprise Risk Management
- ✅ Module 5: Fundamentals of Business Valuation
- ✅ Module 6: Laws & Compliance in Valuation
- ✅ Module 7: Valuation Methods & Approaches
- ✅ Module 8: Valuation of Assets & Liabilities
- ✅ Module 9: Valuation in Mergers & Acquisitions

9	100%	300+	60+
MODULES	SYLLABUS	MCQS	ILLUSTRATIONS

📖 Revision Edition 2026

FOR DECEMBER 2026 EXAMINATION

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MASTER INDEX

CMA Final Paper 20A – Strategic Performance Management & Business Valuation

Complete Topic-Wise Coverage | Syllabus 2022 | December 2026 Examination

SECTION A: STRATEGIC PERFORMANCE MANAGEMENT (50% Weightage)

1 Introduction to Performance Management

Weightage: 10%

1. Performance, Productivity & Efficiency
2. Performance Management vs. Performance Appraisal
3. Objectives & Elements of Performance Management
4. Productivity – Formula, Types
5. Efficiency – Definition, Differences
6. Financial Performance Analysis
7. Components of Financial Statements
8. Tools of Financial Statement Analysis
9. FCFF and FCFE (Formulas + Illustrations)
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11. HDFC Ltd Solved Case Study
12. Procure-to-Pay (P2P) Process – 3 Phases
13. Vendor Relationship Management (VRM)
14. Supply Chain Management – 4 Flows, 5 Decisions
15. Strategy Maps – 4 BSC Perspectives
16. Traditional vs. Reverse Mapping
17. Chik Shampoo – Solved Case
18. Business Analytics – 4 Types
19. Order to Cash (O2C) – 7 Steps, 3 KPIs
20. CRM – 3 Types, 3 Models
21. Customer Profitability Analysis – 6 Steps
22. Decision Grid Analysis – 4 Segments
23. Lotus LLP – Solved Illustration
24. Credit Rating vs. Credit Scoring
25. 7 Credit Rating Agencies in India
26. CRISIL Rating Scale
27. CIBIL Score – 4 Factors, FICO Ranges
28. MCQs (10) + Descriptive Questions

2 Performance Measurement, Evaluation & Improvement Tools

Weightage: 15%

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2. BSC Evolution – Kaplan & Norton
3. Nine Steps to Success (BSI Model)
4. Benefits & Limitations of BSC
5. DuPont Analysis – 2, 3, 5-Component
6. ROA, ROE, RONA
7. Retailer A vs. Retailer B – Solved Case
8. Lotus Inc vs. ASA Inc – Solved Case
9. Sulekha Ltd – Krishna LLP – Solved Case
10. Benchmarking – Definitions
11. 4 Types of Benchmarking
12. 4 Process-Based Types
13. 3 Phases of Benchmarking
14. Bench Trending vs. Benchmarking
15. Six Sigma – 6σ Concept, DPMO Table
16. DMAIC and DMADV Methodologies
17. 7 Six Sigma Belts
18. Six Sigma vs. TQM
19. Lean Management – 3M's, 7 Wastes
20. 5 Principles of Lean
21. 5S of Lean
22. Lean Six Sigma (LSS)
23. Statistical Quality Control (SQC)
24. 8 Dimensions of Quality (Garvin)
25. Control Charts – X-Bar, R, p, c
26. p chart and c chart Illustrations
27. Acceptance Sampling
28. PDCA Cycle – Evolution
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30. 12 Types of MIS Reports
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35. TQM – 5 Perspectives, Quality Costs
36. 7 Quality Gurus
37. 7 Essentials of TQM
38. 3 Core Concepts (QC, QA, QM)
39. 8 Steps of TQM Implementation
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41. Efficient Frontier
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43. Four Firms (A, B, C, D) – Value Added
44. Two Inputs/One Output, One Input/Two Outputs
45. Input & Output Oriented Models
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3 Economic Efficiency of the Firm – Performance Analysis

Weightage: 10%

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4. Pareto Improvement
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6. Procyclic, Countercyclic, Acyclic Indicators
7. Leading, Lagging, Coincident Indicators
8. Santos & Brito Model – 7 Measures
9. 39 Economic Performance Indicators
10. Key Performance Indicator (KPI)
11. KPIs vs. Critical Success Factors (CSF)
12. 7 Principles for KPI Implementation
13. SMART Goals
14. 18 KPIs under 4 Perspectives
15. Concept of Profit – 2 Measurements
16. Formula: $\pi = (Q \times P) – (TVC + TFC)$
17. Market – Definitions (Kotler, Cournot, Jevons)
18. Elements of Market (9)
19. Market Structure – Classification
20. Perfect Competition – 2 Definitions, 8 Features
21. Price Determination – Equilibrium Price
22. Imperfect Competition – 6 Types
23. Monopoly – 5 Indian Examples
24. Monopolistic Competition, Oligopoly, Duopoly
25. Monopsony and Oligopsony
26. Price Discrimination – 2 Conditions, 3 Kinds
27. Price Discrimination – 3 Degrees
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29. Profit Optimization – Maxima and Minima
30. First & Second Order Conditions
31. Optimization Illustration 1, 2, 3
32. Profit Maximisation in Perfect Competition
33. Short-run and Long-run Equilibrium
34. Profit Maximisation in Monopoly
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36. Traditional vs. Modern Theories of Firm
37. Baumol's Theory – Sales Revenue Maximisation
38. Marris's Model – Growth Rate Maximisation
39. Williamson's Model – Managerial Discretion
40. Cyert & March – Behavioural Model
41. 4 Pricing Methods
42. Full Cost, Marginal Cost, Perceived Value, Differential
43. Going Rate, Sealed Bid, Trade Association, Customary
44. Penetration Pricing (Reliance Jio)
45. Skimming Pricing
46. Internal Factors (4) & External Factors (4)
47. MCQs (30) + Descriptive Questions

4 Enterprise Risk Management

Weightage: 15%

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2. Risk vs. Uncertainty (Knight, 1921)
3. Tinkuji's Decision – Expected Value
4. 4 Decision Criteria
5. Classification of Financial Risk
6. Systematic Risk – 5 Subtypes
7. Unsystematic Risk – 3 Subtypes
8. 5-Step Risk Management Process
9. Key Terms – Likelihood, Impact, Risk Exposure
10. CIMA Generic Framework – 5 Aspects
11. Risk Responses – 4 Types
12. Objectives of Risk Management (5)
13. Traditional (Silo) Risk Management
14. 5 Limitations of Traditional Risk Management
15. ERM – 5 Elements
16. COSO Framework – 2004
17. 2017 Clarifications – 5 Misconceptions
18. ERM Definition – 6 Fundamental Aspects
19. 8 Interrelated Components of ERM
20. 4 Categories of Entity Objectives
21. Risk Pooling – Insurance (2 Benefits)
22. Risk Pooling – Supply Chain (4 Applications)
23. Diversification – Markowitz's Theory
24. Mr Awasthi's Portfolio – 3 Correlation Cases
25. Risk Analysis – 3 Methods
26. Risk Analysis Methods (Bow Tie, Risk Matrix, Risk Register, SWIFT, Monte Carlo)
27. Risk Mapping – 4 Quadrants
28. 4 Risk Responses based on Risk Map
29. Importance of Risk Mapping
30. Risk Heat Map
31. Disadvantages of Risk Mapping (4)
32. Key Risk Indicators (KRIs)
33. KRIs vs. KPIs – 3 Examples
34. 3 Features of KRIs
35. 3 Types of KRIs
36. COBIT Framework – 1996-2019 Timeline
37. ERM to REPM Transformation
38. Risk Retention vs. Risk Reduction
39. Value at Risk (VaR) – Concept
40. 5 Advantages and 5 Limitations of VaR
41. VaR Calculation – 3 Methods
42. VaR Solved Cases (Satyam, HDFC, Portfolio)
43. Diversification Benefit = ₹2,19,369
44. Basel I, II, III – Capital Adequacy Norms
45. Basel II – 3 Pillars
46. Basel III – Capital, Leverage, Liquidity Ratios
47. CAR Calculation – XYZ Bank
48. Corporate Failure – 3 Indicators
49. 5 Causes of Financial Distress
50. Mitroff (2001) – 7 Basic Causes
51. Endogenous & Exogenous Causes
52. 4 Generic Terms
53. Altman Z-Score – Model and Zones
54. Lotus Inc and Woodex Inc – Solved Case
55. Beneish M-Score – 8 Variables
56. Pelikan Inc – Solved Case
57. NCAER Model – 3 Parameters
58. MCQs (40) + Descriptive Questions

SECTION B: BUSINESS VALUATION (50% Weightage)

5 Fundamentals of Business Valuation

Weightage: 5%

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2. 3 Points to Remember (Estimation, Value ≠ Price)
3. 5 Areas of Understanding
4. 6 Key Terms (Market Value, Liquidation, Investment, Fair, Fair Market, Equitable)
5. 15 Common Purposes of Business Valuation
6. 4 Regulations Requiring Valuation
7. Valuation Premises – 5 Types
8. When to Use Each Premise
9. 3 Principal Valuation Approaches
10. Market Approach – 3 Methods
11. Income Approach – DCF (5 Key Steps), PECV
12. Cost Approach – Replacement, Reproduction, NAV
13. Fundamentals of Valuation – Risk & Return
14. Markowitz's 2 Assumptions
15. Rate of Return – Formula
16. Risk = Standard Deviation
17. Diversification of Risk
18. 8 Types of Risk
19. Beta – Definition, Calculation
20. Beta Illustration – A Ltd vs. S&P 500
21. Limitations of Beta (2)
22. Financial Statement Analysis – 6-Step Framework
23. Ratio Analysis – 6 Categories
24. Performance Ratios – 4
25. DuPont Analysis
26. Liquidity Ratios – 2
27. Solvency Ratios – 2
28. Market Value Ratios – 6
29. Activity Ratios – 5
30. Financial Leverage Ratios – 2
31. Capital Structure Analysis – 3 Ratios
32. Credit Analysis – DSCR
33. Cash Flow Analysis – 5 Points
34. Market Value – 9-Element Conceptual Framework
35. Enterprise Value – Formula, 5 Components, Significance
36. Parth Das – Solved Case Study
37. MCQs + Short Answers

6 Laws and Compliance in Business Valuation

Weightage: 5%

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2. Objective of IBC 2016
3. Insolvency Resolution Process – Stages
4. Liquidation Priority (Section 53)
5. Voluntary Liquidation – Procedure
6. Registered Valuer Role – Reg. 35
7. Section 192 – Non-Cash Transactions with Directors
8. Section 230(1), (2), (3) – Compromise/Arrangement
9. Section 231 – Tribunal Enforcement
10. Section 232 – Merger & Amalgamation
11. Merger by Absorption vs. Formation
12. Section 247 – Valuation by Registered Valuers
13. Penalties under Section 247
14. Section 281(1) – Liquidator Report
15. Registered Valuers Rules, 2017
16. Rule 2 – 4 Definitions
17. Rule 3 – Eligibility (Individual & Entity)
18. Rule 4 – Qualifications for 3 Asset Classes
19. Rule 5 – Valuation Examination
20. Rule 6 – Application for Certificate
21. Rule 7 – 10 Conditions for Registration
22. Rule 8 – Conduct of Valuation (12 Report Contents)
23. Other Rules (13 items)
24. SARFAESI Act, 2002 – Introduction, Objectives
25. 3 Methods for NPA Recovery
26. Key Terms (8) – Borrower, Debt, Default, NPA
27. Securitization and Asset Reconstruction
28. Enforcement of Security Interests – 60 days Notice
29. Rights of Borrower – 45 days, 50% Deposit
30. Central Registry – 30 Days Filing
31. Need for Central Registry – 7 Advantages
32. Section 31 – Exclusions from SARFAESI
33. Key Sections of SARFAESI Act
34. IVS Core Principles – 14 Principles
35. IVS 101 – Scope of Work
36. IVS 102 – Investigations & Compliance
37. IVS 103 – Reporting (10 Contents)
38. IVS 104 – Bases of Value
39. Premise of Value – 4 Types
40. Entity Specific Factors & Synergies
41. IVS 105 – Approaches & Methods
42. Asset Standards – 8 (IVS 200 to 500)
43. Rule 11UA – FMV of Shares
44. Rule 11UAB – Inventory FMV
45. Ind AS 113 – Fair Value Measurement
46. Pankaj – Fair Value Illustration
47. Human Resources Management Ltd – Solved Case
48. MCQs + Descriptive Questions

7 Business Valuation Methods and Approaches

Weightage: 10%

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2. 3 Approaches (Income, Market, Cost)
3. Discount Rates – Concept
4. Cost of Capital (WACC) – Formula
5. Alpha Ltd – WACC Illustration
6. Cost of Debt – Post-Tax
7. Cost of Equity – CAPM
8. Example 3 – Required Return on Equity
9. Unsystematic vs. Systematic Risk
10. Beta – Calculation
11. Example 4 – Beta of Company A
12. Build-up Model
13. Adjusted Cost of Equity – 7 Additional Risk Factors
14. Dividend Discount Model (DDM)
15. Disadvantages of DDM
16. Perpetual Dividend – Formula + Example 5
17. Gordon Growth Model – Formula + Example 6
18. Advantages & Limitations of Gordon Growth Model
19. Multi-stage Model – 3 Phases
20. Two-Stage DDM and H-Model
21. Python Ltd – Illustration 1
22. Discounted Cash Flow Models
23. FCFF – Formula, Components
24. Capital Expenditure Calculation
25. Working Capital Investment
26. FCFE – Formula, Components
27. Terminal Value – No Growth & Stable Growth
28. Super Ltd – Illustration 4
29. Relative Value Multiple
30. Ashiana Ltd – Illustration 5
31. FCF vs. DDM – Difference
32. Adjustment for Cash & Non-Operating Assets
33. Panther Ltd – Illustration 6
34. Earnings Multiples – Market Approach
35. Market Price Method – VWAP
36. Aditya – Illustration 7
37. Comparable Companies Multiple Method
38. Price-Earnings (P/E) Ratio
39. Turtle Ltd – Illustration 8
40. Fundamental P/E (Justified P/E)
41. Jack Ltd – Illustration 9
42. Price to Book Value (P/BV) Ratio
43. Price to Sales (P/S) Ratio
44. PAS Steel – Illustration 10
45. Price to Cash Flow (P/CF) Ratio
46. EV/EBITDA Ratio
47. Infolink Ltd – Illustration 11
48. EV/Sales Ratio
49. Comparable Transactions Method
50. Sector Specific Multiples
51. Monika – Illustration 12 (ChatApp)
52. Book Value Multiples
53. Liquidation Value, Replacement Cost
54. Arvind – Illustration 13
55. Value Added, EVA, MVA
56. A Ltd – Illustration 14
57. Market Value Added (MVA)
58. Contingent Claim Valuation
59. Solved Cases (TMI, NewMarket, Raj Prakash, Strip Fund, Parvati Tiwari)
60. MCQs + Descriptive Questions

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Weightage: 15%

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2. IFRS Definition (IAS 16)
3. 3 Approaches – Cost, Market, Income
4. Illustration 1 – Equipment Valuation
5. 3 Types of Depreciation
6. Direct Market Comparison Approach
7. Income Approach – Direct Capitalization, DCF
8. Inventory Valuation – 2 Major Aspects
9. Costs of Purchase (4)
10. Costs of Conversion
11. Other Costs
12. 4 Costs Excluded from Inventory
13. Investment in Shares – Cost of Investments
14. Quoted Securities – VWAP
15. Illustration 2 – RIL VWAP
16. Unquoted Shares – NAV Method
17. Illustration 3 – Panda Ltd/AMGI Ltd
18. Valuation of Bonds – Terminology (7 terms)
19. Bond Valuation – Annual Interest
20. Bond Valuation – Semi-annual Interest
21. Current Yield
22. Yield to Maturity (YTM) – Interpolation
23. Illustration 7 – YTM Calculation
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25. Realised Yield
26. Zero Coupon Bond
27. Price-Yield, Price-Time Relationships
28. Duration – Definition
29. Macaulay Duration – Formula
30. Modified Duration – Formula
31. 11 Bond Risks
32. Convertible Bonds – Callable, Puttable
33. Warrants – Minimum Price, Premium
34. Illustration 9 – HDC Ltd Warrant
35. Preference Shares – Value Formula
36. Preferred Stock Characteristics
37. Intangibles – Ind AS 38 Recognition
38. Valuation Methods – 5 Income-based Methods
39. Relief from Royalty, MEEM, WWM, Greenfield, Distributor
40. Cost Approach for Intangibles
41. Copyrights – Cost, Amortization
42. Illustration 10 – V. Goel Copyright
43. Goodwill – IFRS Definition, Formula
44. Super Profits Method
45. Illustration 11 – ST Ltd
46. Brand – Market, Cost, Income Approach
47. Brand Valuation – Relief from Royalty
48. Illustration 12 – Logos Ltd
49. Trademarks, Trade Names, Leaseholds
50. Franchise, License, Concessional Rights
51. R&D and Computer Software Costs
52. Illustration 13 – JDM Ltd ROU Asset
53. Human Resource Valuation – Cost & Income Approach
54. Flamholtz's Stochastic Model
55. Lev & Schwartz Model
56. Illustration 14 – Mr D
57. Real Estate – 10 Principles of Valuation
58. Cost Method – Formula, Example
59. Market Method – GRM
60. Income Method – Cap Rate
61. Value Added, EVA, MVA
62. Illustration 16 – A Ltd
63. Relationship between EVA and MVA
64. Liabilities – Definition, 5 Determinants
65. Valuation Bases
66. Types of Liabilities
67. Contingent Liability – FASB Criteria
68. Contingent Claim Valuation
69. MCQs (40+) + Descriptive Questions

9 Valuation in Mergers and Acquisitions

Weightage: 15%

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2. 5 Types of Mergers
3. Acquisition Examples
4. 5 Motives for M&A
5. Acquisition Pricing – Introduction
6. Cash vs. Stock Offering
7. Value Creation – Formula
8. 5 Value Concepts
9. Premium Analysis
10. Illustration 1 – Aruna/Mani Ltd
11. Illustration 2 – Yasmin/HBR Ltd
12. Value of Target to Acquirer
13. Illustration 3 – Ace Ltd/Base Ltd
14. Accretion/Dilution Analysis
15. Illustration 4 – Acquirer Ltd
16. Earnings Multiples
17. P/E Multiple, EV-EBITDA Multiple
18. Enterprise Value – Formula
19. Price to Book Value, Price to Sales
20. Illustration 5 – Co. A, B, C
21. Choosing Right Comparables – 5 Principles
22. Normalization Adjustments
23. Valuing the Assets
24. Strategic vs. Financial Acquisitions
25. Acquisition Outcome – 43% Destroy Value
26. Friendly Mergers
27. Hostile Mergers – Tender Offer, Proxy Fight
28. Takeovers – 5 Defences
29. Managerial Entrenchment – 3 Strategies
30. Anti-trust & Security – HHI
31. Illustration 6 – HHI Calculation
32. Post-Transaction Value – Formula
33. Illustration 7 – Combined Entity Value
34. Valuing Control – Formula
35. Valuing Synergy – 4 Steps
36. Exit Strategies – 4 Types
37. Tax Implications
38. Section 47 – Capital Gains Exemptions
39. Amortisation of Expenditure
40. Set off & Carry Forward
41. Indirect Taxes and Stamp Duty
42. Financial Modelling – Introduction
43. 7 Attributes of Good Financial Models
44. 5 Key Steps in Forecasting
45. Common-Size Statements
46. Independent & Dependent Variables
47. Balance Sheet Plug Figure
48. C2D Software Ltd – Solved Case
49. Royal Pvt Ltd, Aero Pvt Ltd – Merger Case
50. Share Exchange Ratio
51. Net Shares Issued to Aero = 4,000
52. MCQs (47) + Descriptive Questions

📊 SYLLABUS WEIGHTAGE SUMMARY

Module-Wise Weightage Distribution

Module	Topic	Weightage	Coverage
	SECTION A: STRATEGIC PERFORMANCE MANAGEMENT (Total: 50%)		
1	Introduction to Performance Management	10%	~20 pages
2	Performance Measurement, Evaluation & Improvement Tools	15%	~45 pages
3	Economic Efficiency of the Firm – Performance Analysis	10%	~30 pages
4	Enterprise Risk Management	15%	~55 pages
	SECTION B: BUSINESS VALUATION (Total: 50%)		
5	Fundamentals of Business Valuation	5%	~35 pages
6	Laws and Compliance in Business Valuation	5%	~45 pages
7	Business Valuation Methods and Approaches	10%	~50 pages
8	Valuation of Assets and Liabilities	15%	~55 pages
9	Valuation in Mergers and Acquisitions	15%	~50 pages
	TOTAL	**100%**	**~385 pages**

📖 **How to Use These Revision Notes:**

- **Step 1:** Begin with the Module-wise Revision Summary for a quick overview.
- **Step 2:** Study each module's HTML file thoroughly covering all sub-points, illustrations, and MCQs.
- **Step 3:** Focus on the Solved Illustrations marked with 📝 for exam pattern understanding.
- **Step 4:** Practice all MCQs (300+) with their answers for objective paper preparation.
- **Step 5:** Use the Revision Checklist at the end of each module for final revision before the exam.
- **Step 6:** Pay special attention to formulas highlighted in yellow boxes.

🎯 **December 2026 Exam Preparation Strategy:**

- **Section A (50%):** Focus on numericals (DuPont, OEE, VaR, Altman Z-Score, Beneish M-Score) and conceptual frameworks (BSC, COSO, Basel).
- **Section B (50%):** Master DCF/FCFF/FCFE calculations, M&A valuations (Swap Ratio, Synergy, HHI), and regulatory frameworks (IBC, Companies Act, SARFAESI, IVS).
- **Time Management:** Allocate equal time to both sections as they carry 50% weightage each.
- **MCQ Practice:** Aim to solve 300+ MCQs in these notes for objective-type question readiness.
- **Illustrations First:** Prioritize understanding solved illustrations as they form the backbone of numerical questions.

🎓 END OF MASTER INDEX

Complete Coverage of All 9 Modules | Syllabus 2022 | Exam-Ready Content

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CMA FINAL PAPER 20A

Strategic Performance Management & Business Valuation

MODULE 1 – Introduction to Performance Management

Complete Coverage as per ICMAI Study Material (Syllabus 2022)

For December 2026 Examination | CMA Knowledge Series – cmaknowledge.in

Table of Contents

1. Performance, Productivity and Efficiency
2. Financial Performance Analysis
3. Procurement to Pay & Vendor Relationship Management
4. Supply Chain Management (SCM)
5. Reverse Mapping of Business Strategies from Market Place using Data Analytics
6. Order to Cash & Customer Relationship Management (CRM)
7. Customer Profitability Analysis
8. Improvement of Corporate Credit Rating Score
9. Key Takeaways & Revision Checklist

1.1 Performance, Productivity and Efficiency

1.1.1 Introduction to Performance Management

It is observed by researchers that the key to success for an organisation is the simple issue of possessing more (quantitatively and qualitatively) resources at its disposal. The other aspect of the success story also lies on the efficient and effective utilisation of these resources. This is applicable for long-standing organisations and start-ups, irrespective of their size, and it does not matter whether they are for profit or not for profits organisations. Complications arise as in today's world almost all the organisations within an industry have similar resources - particularly tangible and technological resources - or can acquire that as and when they deem fit. It is easy to comprehend that there must be some key differentiating resources between the successful and unsuccessful firms. One of the most important differentiating resource is 'people' which the traditional accounting system often fails to identify as an integral part of a financial statement.

In this respect, evaluation of the productivity of 'people' and their contribution to organisational success is prioritized as a significant aspect of being successful. This is a key aspect of 'performance management'.

Definition of Performance Management (Aguinis, 2009): "Performance management is a continuous process of identifying, measuring and developing the performance of individuals and aligning performance with the strategic goals of the organization."

Close read of the definition point the following two issues:

- **(a) Continuous Process** – Performance management is a continuous process. It is a loop which starts with setting of objectives and ends with measuring performances, training and feedback.
- **(b) Alignment with strategic goals** – Performance management provides a linkage between performance of the employee and the organisational goals. Thus a well-defined performance management system actually helps the management to understand the contribution of the employer to the organisation.

Thus the two main features of performance management are, its continuous nature and it being aligned to the overall strategic goal of the organisation.

Performance Management vs Performance Appraisal

In order to understand the issue of performance management, it is important to understand what it is not. It is not a performance appraisal. Though the terms 'performance management' and 'performance appraisal' are sometimes used interchangeably, they have significantly different connotations.

Basis	Performance Management	Performance Appraisal
Nature	Continuous process	One-time annual process
Scope	Bigger whole; guiding philosophy	Subset of performance management
Responsibility	All managers	Immediate upper-level manager
Purpose	Strategic alignment	Promotion/transfer decisions
Communication	Two-way	Top-down feedback

Performance appraisal is a one-time process, being carried out by the immediate upper level manager in order to evaluate the performance of the subordinate on a year to year basis, which is linked to the promotion or transfer of the staff. Superiors have a responsibility of providing a systematic description of the employees' performance during a particular year which is a part of the feedback and coaching mechanism. Performance management is a bigger whole and performance appraisal, often connoted as performance measurement is a subset of that bigger whole.

Performance management as such is the guiding philosophy which needs to be communicated throughout the organisation. Performance management acts as a linkage between employees' performance and the organisational goal which is set up at the top of the organisation and this establishes a shared understanding about what is to be achieved and the way it is to be achieved. An understanding of the strategic purpose of the organisation is percolated throughout the organisation when Objectives of Performance Management system is at place.

Objectives of Performance Management

1. With a proper performance management system in place, employees can strive for superior performance which, linked to a compensation package, aids them in attaining their goal.
2. Employees are able to identify proper knowledge and skills required for performing the task.
3. Performance management assists the implementation of an effective reward mechanism.
4. The feedback and coaching mechanism provides a two-way communication system between the supervisors and the employees.
5. Performance management creates an environment where the strategic purpose of the organisation is suitably purported throughout the organisation.
6. Performance management aids personal growth and advancement of the employee as they are acquainted with the desired knowledge and skills for the particular job which is also aligned to the strategic purpose of the organisation.

Elements of Performance Management

In order to get a better insight into the nature of performance management, the elements of the same need to be discussed. Though a universal approach is yet to be accepted as a model of performance management, researches have discussed the elements of performance management cycle, which are as follows:

1. **Setting of objectives**
2. **Measuring the performance**
3. **Feedback mechanism**
4. **Reward system based on performance outcomes**
5. **Amendment objectives and activities**

The above mentioned five elements of performance management is a loop, unless the loop is completed, a successful performance management system cannot be said to be in operation.

Fig 1.1: The Performance Management Cycle

1.1.2 Productivity

Productivity, as such, provides insight into the relationship between input and output in a particular production process. It not only defines the volume of output, but also defines the resources employed for arriving at the output. Thus productivity is expressed as a ratio of input to output.

Productivity = Output ÷ Input

Illustration (ICMAI Study Material): Student Productivity

Two students A and B secured 65% and 72% marks in the Paper 20 A of the Final Examination of the ICMAI. They put in 200 hours and 300 hours respectively for preparation of the examination. Though student B has secured more marks, student A can be said to be more productive as he puts in relatively less time to achieve his score. The productivity measures of student A and student B are calculated as follows:

Solution (ICMAI Standard):

Particulars	Student A	Student B
Marks Secured	65%	72%
Hours Put In	200 hours	300 hours
Productivity = Output ÷ Input	**65% ÷ 200 hours = 32.5%**	**72% ÷ 300 hours = 24%**

Two Measures of Productivity

- **Total Productivity (Total Factor Productivity)** – A measure of the change in output relative to change in quantity of all or more than one input. This is referred to as total factor productivity.
- **Partial Factor Productivity** – Refers to a change in output brought about by a change in one particular input.

Important Note: It is important to note that being productive doesn't necessarily mean being efficient. For example, if a window cleaner cleans 20 windows in the first week and 25 windows in the second week then he is more productive in the second week. In this simple analogy it is assumed that he is scheduled to work a standard 40 hours a week. But the matter of quality of work and all other issues are kept abeyance in this analogy, for example the quality of his cleaning. It is in this parlance that the issue of efficiency can be introduced as it is often said that being productive doesn't mean being efficient.

1.1.3 Efficiency

Definition: "Achieving maximum productivity with minimum wasted effort or expense."

Thus efficiency is related to maintaining the quality of work and focuses less on mere increase of output. Point wise clarification of the two terms; productivity and efficiency is discussed in the following lines:

Point-wise Differences

- **(a) Cost as an input** – Measures of productivity doesn't account for the cost incurred in the process of output maximisation, though it is the most important factor. The simple connotation of productivity is maximisation of output, relative to the input. But in this simplicity, the issue of cost is ignored. The measure of efficiency considers the cost of securing the input. Thus an efficient mind-set may consider the issue of outsourcing so that cost is reduced, quality of the output is ensured and this will lead the organisation to an efficient production system.
- **(b) Quality and Quantity as output** – In commerce there is a long standing debate between quality and quantity. In efficiency, quality is prioritized, while in productivity quantity is prioritized. The embedded logic is simple. All organisations propose to maximise the input - output ratio, but in order to do that failing to attain quality standards is regarded as strategic failure. Thus productivity is important, but without considering efficiency, it is meaningless.
- **(c) Refinement** – From the discussion made in point number (a) and (b) above it is reasonable to deduce that the measure of efficiency is a refinement of the concept of productivity.

Basis	Productivity	Efficiency
Focus	Quantity of output	Quality of output
Cost Consideration	Ignores cost	Considers cost of inputs
Quality	Secondary	Primary
Scope	Maximisation of output	Optimal resource utilisation
Relationship	Broader concept	Refinement of productivity

Performance measurement, as such, is a traditional concept and is based on information derived from financial statements and is thus dependent on financial information, which are historical in nature. Thus, performance management is of little use in improving the current financial performance of the organisation. Concepts of productivity and efficiency add key linkages to this aspect of performance management.

Multiple Choice Questions – 1.1

1. When goal setting, performance appraisal, and development are consolidated into a single, common system designed to ensure that employee performance supports a company's strategy, it is called:

(a) Strategic organisational development (b) Performance management (c) Performance Appraisal (d) Human Resource management

Answer: (b) Performance management

2. Aligning and evaluating employee's performance with company's set goals is called:

(a) appraisal management (b) performance management (c) hierarchy of management (d) off-the-job training

Answer: (b) performance management

3. Steps involves in employer's movement for performance management is:

(a) total quality (b) appraisal issues (c) strategic planning (d) all of above

Answer: (d) all of above

4. In performance management, main feature of performance management is to:

(a) increase salary (b) planning incentives (c) comparing performance with goals (d) comparing sales figures from last year

Answer: (c) comparing performance with goals

5. The actions that employees do not do or must do, in a job is classified as:

(a) profitability (b) productivity (c) performance (d) development

Answer: (c) performance

6. Performance management' is always:

(a) goal oriented (b) performance oriented (c) sales oriented (d) none of above

Answer: (a) goal oriented

7. Preventive maintenance improves:

(a) Material productivity (b) Labour productivity (c) Machine productivity (d) Capital productivity

Answer: (c) Machine productivity

8. Performance management combines performance appraisal with _____ to ensure that employee performance is supportive of corporate goals.

(a) Goal setting (b) Incentive systems (c) Training (d) All of the above

Answer: (d) All of the above

9. Mostly employees' promotion decision is based on:

(a) performance appraisal (b) training results (c) hiring tests (d) in-house development

Answer: (a) performance appraisal

10. Performance evaluation can be defined as a process of evaluating:

(a) Past Performance (b) Present Performance (c) Future Performance (d) Past and Present Performance

Answer: (d) Past and Present Performance

1.2 Financial Performance Analysis

1.2.1 Financial Statements

In the previous section, performance is being discussed from the point of view of the most important resource a company possess - human being. The word 'performance' has a wider connotation. Before proceeding further on the issue of strategic performance it is prudent to delve into the most common parlance of the word - the financial facet of the organisation at large. The financial performance of an organisation is captured in the financial statement of the entity.

Financial statement of an organisation is the end product of the accounting process which initiates with a financial transaction. The financial statement contains financial information which is intended for the 'users' of the financial statement. Section 2 (40) of the Companies Act 2013, read with schedule III defines a financial statement in relation to a company, so as to include the following:

1. A balance sheet as at the end of the year.
2. A profit and loss account for the financial year (income and expenditure account for a company carrying on activities not for profit).
3. A cash flow statement for the financial year (a One Person Company, a small company and dormant company may not include cash flow statement).
4. A statement of changes in equity and
5. Explanatory notes.

Amongst the above five mentioned, the first three are considered to be at the core of a financial statement.

Balance Sheet

The balance sheet, referred as the position statement at the year end, summarizes the assets (resources owned by the enterprise) and the liabilities (obligations of the enterprise) as on a particular date. Thus the balance sheet which is a summary of the assets and liabilities of the enterprise, reflects the financial health of the enterprise as on a particular date. The accounting equation, given as assets = liabilities + equities, is reflected in the balance sheet.

Income Statement

The income statement, referred as the profit and loss statement or profit and loss account, is a summary statement which is based on matching of expenses with the income for a particular financial year. The principle is to adjust the expenses (alias services and benefits received) against the income (alias services and benefits rendered) for a particular financial year. Thus the income statement reflects the financial performance of the enterprise during that particular financial year. Profit is the excess of income (services and benefits rendered) over and above expenses (services and benefits received). Financial performance, measured in terms of profit, of an enterprise is bettered as and when the excess of services and benefits rendered (income) towards the society over the services and benefits received (expense) from the society is maximized.

Cash Flow Statement

The cash flow statement underscores the quality of profit earned. Profit, which is the residual from the income statement discussed previously is accretion to the working capital of an enterprise. Thus profit earned is represented in terms of the components of working capital. In order to understand the cash component of the profit, the cash flow statement is prepared, which details the inflow and outflow of cash and cash equivalents.

Statement of Changes in Equity

This statement refers to the reconciliation of the opening and closing balances of equity in a company during a particular reporting period. It explains the connection between a company's income statement and balance sheet.

Explanatory Notes

These are point wise explanation to the various entries of the income statement, balance sheet and the cash flow statement.

Solved Case 1 (ICMAI Study Material): HDFC Ltd Financial Analysis

The annual report of HDFC Ltd for the year ended 31/03/2023 is taken up as a Case to understand the issue of earning and its quality.

Balance Sheet Extract (₹ in crores)

Metric	2023	2022	Change
Net Profit	₹5,990.14 Cr	₹5,440.24 Cr	+10.11%
Cash and Bank Balance	₹3,364.65 Cr	₹7,715.52 Cr	−56.39%

Cash Flow Statement Extract (₹ in crores)

Activity	Amount (₹ Cr)
Net Cash from Operations	5,002.44
Loans Disbursed (net)	(30,964.16)
Corporate Deposits (net)	492.49
Net Cash used in Operating Activities	**(25,469.23)**

Analysis (ICMAI Standard):

Though the net profit has increased by 10.11%, the cash and bank balance has decreased by 56.39% during the period 2022-2023. The cash flow statement substantiates this discrepancy by providing details about the various inflows and outflows of cash of the company during the year. The cash and bank balance decreased from ₹7,715.52 crores (31/03/2022) to ₹3,364.65 crores (31/03/2023).

Key Insight: Profit ≠ Cash. Loans disbursed exceeded collections, causing cash outflow despite profitability.

1.2.2 Analysis of Financial Performance

The financial information needs of the 'users' of financial statements are varied. Though the financial statements contain much financial information, it often falls short of the expectation of the users'. The financial statements give two important perspectives of performance (measured in terms of profitability) and financial health (measured in terms of financial state of affairs). Analysis of financial statements is an important aspect for the 'users' as more important information is generated from the same set of financial statements.

Analysis of financial statements is a process of evaluating the relationship between component parts of financial statements to obtain a better understanding of the firm's position and performance. Financial statement analysis helps managers identify the financial strengths and weaknesses of the firm, on the basis of which strategies are built.

1.2.3 Tools and Techniques of Financial Statement Analysis

Of the various tools and techniques used for financial statement analysis there are four basic types which are discussed below:

(a) Comparative Statement and Trend Analysis

Comparative statements, also known as horizontal analysis, are statements showing financial position & profitability at different periods of time. These statements provide comparative analysis of the financial position of the enterprise over two or more periods. It is important to note that such comparison is feasible only when the same accounting principles are over the time frame.

Trend analysis, also known as the pyramid method, is an extension of horizontal analysis. In this case the comparison of the operational results and financial position is made over a number of years. The simple perspective is that unless the trend of accounting over a sufficient number of years is made, the usefulness of the financial information is moot.

(b) Common Size Analysis

Common size statements are also known as Vertical analysis. Financial statements, when read with absolute figures, can be misleading. Therefore, a vertical analysis of financial information is done by considering the percentages of various elements of the Income Statement and the Balance Sheet. A balance sheet is converted into percentage form by expressing each asset as a

percentage of total asset (considered as one hundred) and by expressing each liability as a percentage of total liabilities (considered as one hundred). Such a converted balance sheet is known as a common-size balance sheet.

Similarly, an income statement is converted into a common-size income statement by expressing each element of income as a percentage of total income and each element of expense as a percentage of total expense.

Alternatively, the elements of income and expense may also be considered as a percentage of annual turnover and a common size income statement may be prepared. This provides standardized statement.

(c) Cash Flow Statement and Its Analysis

Preparation of the cash flow statement is the first step in cash flow analysis. In a cash flow statement, the actual movement of cash into (cash inflow) and out (cash outflow) of a business is analyzed. Cash flows are categorized as cash flow from operating activities, cash flow from financing activity and cash from investing activities. Net cash flows (sum of cash flow from operating activities, cash flow from financing activity and cash from investing activities) added to opening cash and bank balances reconciles with the closing cash balance.

In cash flow analysis, free cash flow (FCF) is an important measure. It is derived by deducting the capital expenditure undertaken during the year from the company's operating cash flows. The Free Cash Flow to the Firm (FCFF) and Free Cash Flow to Equity (FCFE) are two precise measures of the Free Cash Flow (FCF) as they specifically identify for whom cash is available to. FCFF is cash that is available to equity and debt holders after the company has met all its operating expenses and satisfied its capital expenditure and working capital requirements.

$$\mathbf{FCFF = NI + NCE + [Int \times (1 - t)] - WC_{inv} - FC_{inv}}$$

where: NI = Net income; NCE = Non Cash Expenses; FC_{inv} = Fixed capital investment (net capital expenditure); WC_{inv} = Working capital investment; Int = Interest expense

$$\mathbf{Alternative: FCFF = CFO + [Int \times (1 - t)] - FC_{inv}}$$

Example 1 (ICMAI Study Material): FCFF Calculation

The following information regarding ASA LLP: (assume tax rate = 40%)

Particulars	Amount (₹)
CFO (Cash Flow from Operations)	2,050
Interest expense	300
Fixed capital investment (the company sold non-current assets for ₹500)	−500

Solution (ICMAI Standard):

FCFF = CFO + Interest expense (1 − Tax rate) − FC_{inv}

FCFF = 2,050 + 300 (1 − 0.4) − (−500) = 2,050 + 180 + 500

FCFF = ₹2,730

The other important measure is the free cash flow to equity (FCFE). FCFE refers to cash that is available only to common shareholders.

$$\mathbf{FCFE = CFO - FC_{inv} + Net\ Borrowing}$$

Example 2 (ICMAI Study Material): FCFE Calculation

Particulars	Amount (₹)
CFO	2,050
Fixed capital investment (the company sold non-current assets for ₹500)	−500
Net borrowing (the company repaid ₹600 worth of debt)	−600

Solution (ICMAI Standard):

We know, FCFE = CFO − FC_{inv} + Net Borrowing

FCFE = 2,050 − (−500) + (−600)

FCFE = ₹1,950

(d) Ratio Analysis (Relational Analysis of Financial Variables)

Ratio Analysis is an important tool of financial statement analysis and satisfies most of the financial information needs of the financial analyst and other users of the financial statement. Ratio analysis is the quantitative analysis of information contained in a company's financial statements. It describes the significant relationship which exists between various items of a balance sheet and a statement of profit and loss of a firm.

Ratio Analysis – Five Perspectives

Category	Ratio	Formula	Purpose
i. Profitability	Gross Profit Margin	(GP / Revenue) × 100	Core profitability
	Net Profit Margin	(NP / Revenue) × 100	Overall profitability
	Return on Assets (ROA)	(NP / Total Assets) × 100	Asset efficiency
	Return on Equity (ROE)	(NP / Equity) × 100	Shareholder return
	ROCE	(EBIT / Capital Employed) × 100	Capital efficiency
ii. Activity	Inventory Turnover	COGS / Average Inventory	Stock efficiency
	Debtors Turnover	Credit Sales / Average Debtors	Collection efficiency
	Asset Turnover	Sales / Total Assets	Asset utilisation
	Fixed Asset Turnover	Sales / Net Fixed Assets	Fixed asset efficiency
iii. Liquidity	Current Ratio	CA / CL	Short-term solvency (Ideal 2:1)
	Quick Ratio	(CA − Inventory) / CL	Acid test (Ideal 1:1)
	Cash Ratio	Cash / CL	Cash position
iv. Solvency	Debt-Equity Ratio	Total Debt / Equity	Financial leverage
	Interest Coverage	EBIT / Interest	Debt servicing
v. Investment	EPS	PAT / No. of Shares	Per share earning
	P/E Ratio	MPS / EPS	Market valuation
	Dividend Yield	DPS / MPS	Dividend return

(e) Trend or Horizontal Analysis

Trend or Horizontal analysis over a period of time using common size FS.

(f) Inter-firm and Intra-firm Comparison

Inter-firm comparison involves comparison with competitors, while intra-firm comparison involves comparison across divisions of the same company.

Multiple Choice Questions – 1.2

1. Which of the following explains the significance of financial analysis?

(a) Ignores qualitative aspect (b) Judges operational efficiency (c) Suffers from the limitations of financial statements (d) It is affected by personal ability and bias of the analysis

Answer: (b) Judges operational efficiency

2. _____ is not a limitation of financial statement analysis.

(a) To measure the financial strength (b) Affected by window-dressing (c) Do not reflect changes in the price level (d) Lack of qualitative analysis

Answer: (a) To measure the financial strength

3. Balance sheet provides information about the financial position of the enterprise:

(a) At a point of time (b) Over a period of time (c) For a period of time (d) None of the above

Answer: (a) At a point of time

4. Which report gives a review on the profitability of a business?

(a) Statement of changes in equity (b) Cash flow statement (c) Balance sheet (d) Income statement

Answer: (d) Income statement

5. A method used in a comparative analysis of financial statement is:

(a) Returning analysis (b) Common size analysis (c) Preference analysis (d) Graphical analysis

Answer: (b) Common size analysis

6. Which statement shows the flow of cash and cash equivalents during the financial period?

(a) Statement of changes in equity (b) Cash flow statement (c) Balance sheet (d) Income statement

Answer: (b) Cash flow statement

7. Which ratio is considered as safe margin of solvency?

(a) Liquid ratio (b) Quick ratio (c) Current ratio (d) Solvency ratio

Answer: (c) Current ratio

8. Debt-equity ratio is a sub-part of:

(a) Short-term solvency ratio (b) Long-term solvency ratio (c) Debtors turnover ratio (d) None of the above

Answer: (b) Long-term solvency ratio

9. In the cash flow statement if the company invests more in fixed assets and short term financial investments, it would result to:

(a) decreased cash (b) increased cash (c) increased equity (d) increased liability

Answer: (a) decreased cash

10. The cash flow statement will define the cash flow concerning which of the following?

(a) The operating and non-operating flows (b) The outflow and inflow (c) The investing and non-operating floors (d) The investing, operating, and financing activities

Answer: (d) The investing, operating, and financing activities

11. The financial statements will include which of the following entities?

(a) The balance sheet and the income statement (b) The statement regarding the equity of shareholders (c) The statements of the cash flow (d) All of the above

Answer: (d) All of the above

12. Which of the following are the objectives of the cash flow statement?

(a) The cash basis of the accounting (b) The credit basis of the accounting (c) The accrual basis of the accounting (d) None of the above

Answer: (a) The cash basis of the accounting

13. The cash flow statement is prepared from which of the following?

(a) By making use of the balance sheet (b) The profit and loss account is used (c) Additional information (d) All of the above

Answer: (d) All of the above

14. Inventory ratio is a relationship between:

(a) Cost of goods purchased and cost of average inventory (b) Cost of goods sold and cost of average inventory, and cost of goods purchased and cost of average inventory (c) Cost of goods sold and cost of average inventory (d) None of the options is correct

Answer: (c) Cost of goods sold and cost of average inventory

15. Equity or Shareholders fund is equal to:

(a) Equity share capital + Preference share capital (b) Equity share capital + Revenues and Surplus (c) Equity share capital + Preference share capital + Revenues and Surplus (d) None of the options are correct

Answer: (c) Equity share capital + Preference share capital + Revenues and Surplus

1.3 Procurement to Pay & Vendor Relationship Management

1.3.1 Procure to Pay

Financial statements discussed in the previous section are the end result of the accounting process which ensues with recording of a transaction. And financial statement analysis helps the interpretation of financial information embedded in the financial statement. Thus both of them do not directly assist in creating value and reducing cost. In this section, few issues are discussed which directly contributes to bettering the financial health of the enterprise. One such is the procure-to-pay (P2P) process which assists in building value and reducing costs and is therefore foundational to building the financial health of the enterprise.

The procure-to-pay (P2P) process, also referred to as the purchase-to-pay process or procure-to-pay cycle, is how an organization purchases the raw materials and services needed to do business. It provides linkages between the procurement function and the accounts payable department. A well-defined P2P process helps build a better bottom line as it helps develop better vendor relationships and maximize buying power. A P2P process may be initiated through a strong procurement plan which is supported by customized software.

A procurement plan is a detailed map that outlines the purchase procedure with contingencies. This helps in prevention of delays and stock out and helps in minimizing wastes. The procurement plan defines the purchase order approval process for each type of requisition, and establishes workflows to minimize delays, waste, and inefficiencies. With a well-established procurement plan the emphasis on supply chain is substantially reduced. Vendor management is an important aspect of the P2P process. It is important to note that the procurement process works in tandem with the accounts payable department.

Three Primary Perspectives of P2P Process

The P2P process comprises of three primary perspectives which are organized in a loop. In an ideal situation the process makes an improvement with every iteration. The three phases are:

1. Purchase Order

During this phase the following issues are taken care of:

- (i) Creation and approval of purchase requisitions.
- (ii) Evaluation and selection of vendors.
- (iii) Issuance of purchase orders.

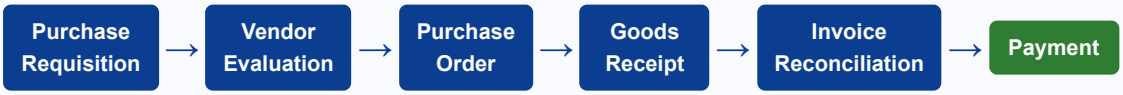
2. Receiving Process

During this phase (a) Goods and services are received and (b) documents are reviewed, tallied and documented.

3. Invoicing Process

This phase is documentation related. Invoices received are reconciled with the original purchase order and/or the goods received note. Errors, if any, are recorded and corrected. Only after approval, the invoices are forwarded to the accounts payable department for payment.

Fig 1.2: P2P Process Flow



1.3.2 Vendor Relationship Management

Sheth and Sharma (1997) suggested that under the new paradigm of competitive environment of a business, relationships with suppliers is one of the most critical aspects for successful functioning of a firm. They forwarded four specific issues in favour of their argument. These are:

1. Increased cost efficiency
2. Increased effectiveness
3. Ever changing technologies
4. Increased competitiveness

Researchers argue that in today's competitive business environment companies should evaluate their strategic vendor relationship as a favourable relationship will reduce cost associated with transaction. Researchers have used the transaction

cost theory to explain the increase in efficiencies associated with supplier relationships. Much depends on the financial credibility of the strategic partner in the overall development of the organization.

Entering into a contract with a vendor is merely the start of a long standing relationship and the success of the organization depends much on the management of the process before and after signing the outsourcing contract.

Vendor Relationship Management (VRM), as such, is an extension of the buyer-supplier relationship, which establishes mutual trust and mutually benefits both the enterprises.

> **Gartner's Definition:** "Vendor Management as a discipline that enables organizations to control costs, drive service excellence and mitigate risks to gain increased value from their vendors throughout the deal life cycle."

Important Aspects of VRM

- Select the right vendors;
- Categorize vendors to ensure the right contract, metrics and relationship;
- Determine the ideal number of vendors;
- Mitigate risk when using vendors; and
- Establish a vendor management organization that best fits the enterprise.

When a proper vendor management is at place the organization builds a stronger and successful relationship with the suppliers of goods and service providers. Thus there is a need for identification and management of strategic partners or vendors. These partnerships, in the long run, strengthens both the businesses and helps build a strong competitive environment.

Good vendor management allows your organization to build a successful and stronger relationship with your suppliers or service providers. These partnerships not only strengthen both businesses, but also facilitates organizations to focus on delivering quality products and services at the right time which ensure value creation. Thus, efficiently managed vendor relationship process enable quality increments and improves Total Cost of Ownership (TCO) and ensures smoother flow of data.

Multiple Choice Questions – 1.3

1. Maintaining and improving the growth of the customer-supplier relationship is known as:

(a) Relationship Development (b) Customer Development (c) Supplier Development (d) Customer Satisfaction

Answer: (c) Supplier Development

2. Proper training in quality, team work, and other management aspects is necessary for:

(a) Customers (b) Suppliers (c) Customers and suppliers (d) It is not necessary

Answer: (a) Customers

3. _____ is continuing relationship between a buying firm and supplying firm.

(a) Supplier partnering (b) Supplier characteristics (c) Supplier (d) Supplier traits

Answer: (a) Supplier partnering

4. The process of moving the raw materials from the place of the suppliers to the place of the producers is known as:

(a) Inbound logistics (b) Outbound logistics (c) Inventor management (d) Acquisition of raw materials

Answer: (a) Inbound logistics

5. _____ is an element of material control.

(a) Purchase Control (b) Material Control (c) Cost Control (d) Sales Control

Answer: (a) Purchase Control

6. An account payable is posted to accounting upon creation of the following document:

(a) Purchase Requisition (b) Purchase Order (c) Good Receipt (d) Invoice verification

Answer: (d) Invoice verification

7. The purchasing view of the material master is relevant at what organizational level?

(a) Company code (b) Client (c) Storage location (d) Plant

Answer: (d) Plant

8. Which of the following is function of the purchasing organization?

(a) Negotiate general conditions of purchase with vendors (b) Set pricing conditions (c) Represents an independent accounting unit (d) Responsible for purchasing for a specific group of materials

Answer: (a) Negotiate general conditions of purchase with vendors

9. Which of the following statements is false?

(a) The central purchasing department (as the purchasing organization) of a corporate group is not assigned to a company code. (b) The central purchasing organization needs to be assigned to a plant even if it does not create any orders.

Answer: (b) The central purchasing organization needs to be assigned to a plant even if it does not create any orders.

10. What statements are true about prepayment requests?

(a) Advance payments are subject to a maximum prepayment of 90 days. (b) When requesting prepayment for the hotel/motel deposits, it is limited to a one-night deposit. (c) If the payment request is not clearly noted as a prepayment, it will be processed as a net-30 payment (d) All of the above

Answer: (d) All of the above

1.4 Supply Chain Management (SCM)

Globalization, vertical competition, increased customer awareness, rapid change in technology and geographical factors have rapidly changed the business environment. In the new business horizon, traditional management approaches often fail to deliver. Managers, today, must understand that the businesses are a mere part of a bigger whole, the supply chain. Thus we have a situation where the success of an organization depends not only on the growth of the organization but also on the efficiency and effectiveness of the whole supply chain. The new norm of competition is moved away from 'organisation against organisation' to 'supply chain against supply chain'. Organisation, today, or rather interconnected and interdependent on the supply chain. The simple rule of survival and success is 'sink or swim with the supply chain'.

The term 'supply chain management' is first noted in an article written by Oliver and Weber in 1982 which appeared in the Financial Times. The authors used the term to describe a whole array of activities performed by the organisation in procuring and managing supplies.

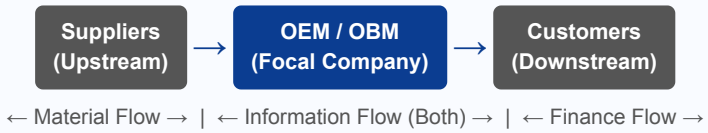
1.4.1 Supply Chain

In order to conceptualize supply chain management, it is imperative to note down the definition and understanding of supply chain. A supply chain may be defined as a group of interconnected companies which depend on each other for supplies of goods and other services. The participating companies add value to the manufacturing process which initiates with inputs from the suppliers and terminates as end products that are demanded by the end-consumers.

Definition (Ganeshan and Harrison, 1995): A supply chain as a "a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers."

In a supply chain, the 'links' are the participating companies. These are also referred as the supporting companies. This can either on the upstream side of the material flow and are referred to as a supplier or can be on the downstream side of the material flow and is referred to as the customer. The Original Equipment Manufacturer (OEM) is sometimes also referred to as the Original Brand Manufacturer (OBM) is in the middle and are also referred to as the 'focal company'.

Fig 1.3: Supply Chain Structure



Four Flows in Supply Chain

1. **Material flow:** For all manufacturing entities, materials flow from the beginning of the supply chain and flows to the customers as finished products, who are at the end of the supply chain.
2. **Information flow:** Unlike material flows, information flows both upstream and downstream. It is important to note that information requirement and flow is specific to a supply chain and differs from requirement in another supply chain.
3. **Finance flow:** Finance is the lifeblood of business and therefore smooth finance flow is an important aspect of the supply chain. Without smooth finance flow supply chains falters and becomes ineffective. Finance flows downstream and ultimately adds value to the supply chain.
4. **Commercial flow:** Most supply chains represent a transactional commercial flow. This means that the material flow that runs through the supply chain changes its ownership. This transactional commercial flow will only take place in a supply chain where there are more than one company in the supply chain.

1.4.2 Objective of Supply Chain Management

1. Supply chain Management takes into consideration every facility that has an impact on cost and plays a role in making the product conform to customer requirements: from supplier and manufacturing facilities through warehouses and distribution centres to retailers and stores.
2. The supply chain management is to be efficient and cost-effective across the entire system; total system wide.
3. Finally, supply chain management revolves around efficient integration of suppliers, manufacturers, warehouses and stores; it encompasses the firm's activities at many levels, from the strategic level through the tactical to the operational

level.

1.4.3 Components of Supply Chain Management

It is imperative to distinguish between supply chain management and the traditional concepts of logistic management as they seem to be similar concepts. While logistics refer to activities within the boundaries of the organisation (for the purpose, the OEM), supply chain refers to a network of companies that work as strategic partners and coordinate their activities with the objective of delivering quality products to the customers. Supply chain management is much broader in its scope and as such logistics is a subset.

Customer satisfaction in terms of quality products and timely delivery and internal operating efficiencies of the companies in the supply chain are the two aspects of effective supply chain management. Internal operating efficiency is measured in terms of the rate of return on investments in inventory and other assets and lower than average operating expenses. As such, companies in the supply chain - referred as 'links' - have to make effective decisions regarding the five specific areas.

Five Specific Areas of SCM Decisions

1. Production

Producing as per requirements of the market is the primary requirement of supply chain management. It needs immaculate planning. Master production schedules have to be in place which takes into account plant capacities, workload balancing, quality control and equipment maintenance scheduling.

2. Inventory

In supply chain management, decisions regarding inventory to be held at each stage of the supply chain is crucial as a wrong decision has a cascading effect. Inventory often acts as a buffer against uncertainty in the supply chain. However higher the inventory, higher is the cost of holding. Thus optimal inventory levels need to be fixed which will have a positive impact on all the links of the supply chain.

3. Location

The next important decision making issue, in supply chain management, is the selection of location for production and storage of inventory. The underlying issue is cost efficiency. These decisions facilitate products to flow through the supply to the final customer.

4. Transportation

Decision regarding inventory, discussed previously, is related to the mode of transportation. Cost effective mode of transportation results in delayed movement of products and uncertainty in transportation. The uncertainty may be countered with higher stock levels which will increase the cost of investment in inventory. Thus deciding upon the mode of transportation is critical to the success of the supply chain.

5. Information

Smooth flow of information is the key to successful implementation of supply chain and its management. With good information, people can make effective decisions about what to produce and how much, about where to locate inventory, and how best to transport it.

Effective and efficient deliberation of the above mentioned issues are the key ingredient of an effective supply chain. An OEM - targeting cost leadership to address the mass market - would create and manage a supply chain, based on optimization of cost. If the OEM targets a niche market, it would have created a supply chain optimized on the basis of customer satisfaction and responsiveness. Thus a supply chain and its management creates an identification of the company and the market it serves.

Multiple Choice Questions – 1.4

1. The initial stage of the supply chain process is the:

(a) Sourcing Stage (b) Organizing Stage (c) Planning stage (d) Directing Stage

Answer: (c) Planning stage

2. The term supply chain management was first coined by:

(a) Frankel & Paulraj (b) Peter Drucker (c) Keith Oliver (d) Philip Kotler

Answer: (c) Keith Oliver

3. In Supply Chain Management, ATP stands for:

(a) Acquire Track & Perform (b) Available To Promise (c) Active Transport Protocol (d) Access To Point

Answer: (b) Available To Promise

4. The purpose of supply chain management is to:

(a) increase the production level (b) manage and integrate supply and demand management (c) enhance the quality of a product and services (d) provide satisfaction to the customer

Answer: (b) manage and integrate supply and demand management

5. _____ is mainly deals with all activities associated with the flow and transformation and information of goods from the stage of raw material to the end user i.e. consumption.

(a) Production Line (b) Supply Chain (c) Inventory management (d) Marketing Channel

Answer: (b) Supply Chain

6. In supply chain management, Inspection, scrap and repair are examples of:

(a) Societal Costs (b) External Costs (c) Costs of dissatisfaction (d) Internal Costs

Answer: (d) Internal Costs

7. Organisations or companies manage their supply chains through:

(a) Transportation modes (b) The internet (c) Information (d) Competitors

Answer: (c) Information

8. The concept and philosophy of supply chain management evolved or emerged in:

(a) The 1960s (b) The 1970s (c) The 1980s (d) The 1990s

Answer: (c) The 1980s

9. The concept of supply chain management originated in _____ discipline.

(a) Production Management (b) Logistics Management (c) Marketing Management (d) Operations Management

Answer: (b) Logistics Management

10. Supply chain management is the management of the:

(a) Storage Raw Materials (b) Flow of goods and services (c) Fulfillment of order (d) Satisfaction of customer

Answer: (b) Flow of goods and services

11. _____ involve the transformation, movement, and storage of goods and materials.

(a) Virtual Flow (b) Physical Flow (c) Title Flow (d) Information Flow

Answer: (b) Physical Flow

12. When suppliers, distributors, and customers partner with each other to improve the performance of the entire system, they are participating in a:

(a) Channel of Distribution (b) Value Delivery Network (c) Supply Chain (d) Supply and Demand Chain

Answer: (c) Supply Chain

13. Which of the following is not a part of supply chain management system?

(a) supplier (b) manufacturer (c) information flow (d) competitor

Answer: (d) competitor

14. A supply chain is essentially a sequence of linked:

(a) customer and prospects (b) supplier and manufacturer (c) manufacturer and customer (d) all of the above

Answer: (d) all of the above

15. Cooperative supply chain relationships developed to enhance the overall business performance of both parties is a definition of:

(a) third-party logistics (b) supply chain collaboration (c) dovetailing (d) relationship marketing

Answer: (b) supply chain collaboration

1.5 Reverse Mapping of Business Strategies from Market Place using Data Analytics

1.5.1 Strategy Maps – A Conceptual Note

An organization, in order remain profitable and sustain in the long run, defines its vision and mission. The company defines all its strategies, which are basically long term plans, in terms of the mission and vision laid down by the top management. In an interesting study the authors observed that the understanding of strategy varied from perspective to perspective. They posited that some managers labelled strategy by their financial plans; others by the quality of the products and services; others customer orientation and some others from the perspective of human resources or learning perspective. The study noted that few managers approached it from a holistic perspective and this led to strategic failure. In 2000, Kaplan and Norton posits the five crucial doctrines for building a holistic strategy-focused organizations which ultimately leads organizations to achieve strategic performance improvements.

Five Crucial Doctrines (Kaplan & Norton, 2000)

1. Translation of strategy into operational terms,
2. Alignment of the whole organization in terms of the strategy,
3. Transforming strategy into an everyday perspective for all employees.
4. Strategy should be a continual process, and
5. Mobilize change through operative leadership.

In earlier works the authors developed the Balanced Score Card (BSC) and opined that unless an organization develops its overall strategy on the basis of four perspectives; namely financial perspective, customer perspective, internal perspective and learning and growth perspective. A strategy map is developed on the basis of the four perspectives of the BSC. A strategy map is visualization of the entire strategy of the organization. It shows the cause and effect relationship between the components of an organizational strategy. Designing of a strategy map along with systematic implementation of the same assists managers with a holistic view and creates a strategy-focused organization. It helps develop highly effective strategies that can actually be implemented. A Strategy map represents how the organization creates value. Strategy maps connects different performance targets into a mutually supportive fundamental chain which aids attainment of strategic objectives.

Fig 1.4: Strategy Map – Four BSC Perspectives

Perspective	Key Question
Financial	"To succeed financially, how should we appear to shareholders?"
Customer	"To achieve vision, how should we appear to customers?"
Internal Process	"What processes must we excel at?"
Learning & Growth	"How will we sustain ability to change and improve?"

1.5.2 Strategy-forward or Reverse?

Hayes (1985), after years of research of the American industry, posited that the traditional strategic planning process along with the organizational attitudes often fails to deliver and the effect is strategic failure which impair a company's ability to compete. The author argues that the problem rests with the ends-ways-means model of traditional strategic planning. The model is to:

1. establish corporate objectives (ends)
2. develop a strategy (ways) for attaining corporate objectives established in point one and
3. assimilate and put to use resources (means) necessary to implement the strategy.

Though there are robust arguments of the traditional model yet it suffers some uncertainties in the ever changing business environment. There are as such some inherent deterrent issues in the model, the most important being the issues of choosing ends. Given the fact the customers are at the end of the value chain often the traditional strategic management process fails to appreciate this end; the customer's preferences and habits which differ across geographical and economical boundaries. Reverse mapping is an alternative model to the traditional ends-ways-means model which counters the simple logic of the traditional model; the world of competition is predictable and straightforward paths can be laid across the road to attain the strategic objectives.

1.5.3 Reverse Mapping

Literature on reverse mapping is not yet shaped and there is wide range of understanding regarding the issue of reverse mapping in business strategy. In this study note a particular aspect of the aspect is highlighted; reverse mapping of business strategy is considered as an alternative to the traditional ends-ways-means of strategy formulation which is a top down approach. On the other, reverse mapping is a bottom up approach where the feed received from the customers is the epitome of strategy formulation.

Solved Case 2 (ICMAI Study Material): Chik Shampoo

In 1978, Shri R. Chinnikrishnan, an agriculturist by profession in Cuddalore, Tamil Nadu envisioned that 'whatever the rich man enjoys, the common man should be able to afford'. This observation was based on his personal experience as an agriculturist. He experienced that for an agriculturist, regular products like talcum powder and shampoo and body oil were often beyond affordability as they used to come in 100 ml and 200 ml bottles and thus were highly priced. Thus he started packing talcum powder into small sachets and started selling them to nearby shops. Later he started selling shampoos in sachets. His vision was to make these regular products affordable for the use of the financial weaker section namely coolies, rickshaw pullers and other daily wage earners.

After his passing away in 1982, his sons took over the business and later his son CK Ranganathan started the brand Chik Shampoo and sold them in sachets priced at Rs 0.75 each. In the first month itself the company sold 20000 sachets. By 2003, 'chik' had become the second largest national brand in India with 22% market share, only behind Hindustan Unilever Ltd's 'clinic plus'.

> **Analysis (ICMAI Standard):**
>
> This success story of the brand is surely a very good example of reverse mapping as the feed from the customers who are at the end of the value chain is being incorporated at the strategic formulation level. Strategy is formed on the basis of the customer preference which is in contradiction to the ends-ways-means of strategy formulation.

1.5.4 Use of Business Analytics in Reverse Mapping

This inverted strategy map referred as reverse mapping upgrades leaps and bound when business analytics is used to capture the feed from the market. Business analytics is the buzzword for companies around the world. Every organisation, irrespective of its size, is in the lookout for making sense of the capturing data and using them for the purpose of performance improvement. Data speaks. There is some inherent meaning in the data which becomes observable when it is processed and information is got. Business analytics is the faculty of extracting information from the raw data at the disposal of the business. The main goal of business analytics is to extract meaningful insights from data that an organization at its disposal. This the business uses for strategy formulation which enable organisations to reach its strategic goal. Thus business analytics is used to extract meaningful insights from data that can drive decision making and strategy formulation.

Business analytics is used for:

- **Budgeting and forecasting:** By assessing a company's historical revenue, sales, and costs data alongside its goals for future growth, an analyst can identify the budget and investments required to make those goals a reality.
- **Product development (or research and development):** By understanding how customers reacted to product features in the past, an analyst can help guide product development, design, and user experience in the future.
- **Marketing and sales:** By understanding key metrics, such as lead-to-customer conversion rate, a marketing analyst can identify the number of leads their efforts must generate to fill the sales pipeline.
- **Risk management:** By understanding the likelihood of certain business risks occurring—and their associated expenses—an analyst can make cost-effective recommendations to help mitigate them.

Four Types of Analytics

Type	Question	Description
Descriptive	What happened?	Examines the data and after conceptualisation describes things that has already happened.
Diagnostic	Why did it happen?	Goes deeper than descriptive analytics by seeking to understand the "why" behind what happened.
Predictive	What will happen?	Relies on historical data, past trends, and assumptions to answer questions about what will happen in the future.
Prescriptive	What should we do?	Identifies specific actions an individual or organization should take to reach future targets or goals.

Of the above four, prescriptive analytics is specifically relatable to achievement of strategic goal. But the four issues of business analytics are, as such, packaged together to capture data from the business environment including the market and translate them into meaningful insights so that strategic management process is aided.

Multiple Choice Questions – 1.5

1. An organisation strategy:

(a) Remains set in place longer than the mission and objectives (b) Generally forms over a period of time as events unfold (c) Trends to be formed at the same time the mission is developed (d) None

Answer: (b) Generally forms over a period of time as events unfold

2. _____ plans are designed to achieve strategic goals.

(a) Strategic (b) Technical (c) Operational (d) Short-term

Answer: (a) Strategic

3. What type of strategy is stability strategy?

(a) Corporate level (b) Functional level (c) Strategic level (d) Business level

Answer: (a) Corporate level

4. Which statement best applies to emergent strategies. Emergent strategy...

(a) Implies an ability to react to the events (b) Implies strategizing (c) Implies no deviation from plans (d) Implies constant evaluation of the bigger picture

Answer: (a) Implies an ability to react to the events

5. Organizations require good people with appropriate skills and abilities to work together effectively to be successful. Which are the characteristics is not seen as critical for this?

(a) Competent (b) Committed (c) Cost-effective (d) Capable

Answer: (c) Cost-effective

6. What statement below best describes why we do data analytics in business?

(a) Analytics improve our understanding of how the business works (b) We must show a return on the investment we make in data & analytical resources (c) We need specific insights to make business decisions (d) We have to calculate & report financial results to owners / shareholders

Answer: (c) We need specific insights to make business decisions

7. Balanced Scorecard measures with benchmark for performance in:

(a) Financial areas (b) Nonfinancial areas (c) Development areas (d) Structural areas

Answer: (b) Nonfinancial areas

8. Important dimensions of communicating and learning includes communicating and educating, setting goals and:

(a) Gaining consensus (b) Link stakeholders (c) Link reward to performance (d) Strategic feedback

Answer: (c) Link reward to performance

1.6 Order to Cash & Customer Relationship Management

1.6.1 Order to Cash (O2C)

An efficiently operated O2C process creates a seamless value chain between the customer and the business. The main perspective is that O2C involves customer interactions in the supply chain which is discussed in a previous section. It is noted that the customer is the last link in the supply chain and is a major link in the value chain. It is on the quality of customer satisfaction and the customer base that the success or failure of the enterprise is dependent upon. In this section and in the next section an in depth analysis is taken up which brings about operational efficiency and creates competitive advantage for the enterprise. In this section the concept of order-to-cash, also referred as O2C, therefore, may be considered as an aspect of customer relationship management which is taken up for discussion.

The O2C is an end-to-end business process that initiates with receiving and fulfilling customer orders for goods and/or services. It covers all activities regarding customer order and initiates with receipt of order and ends with receipt of payment for the customer. It ensues with the customer order and includes customer credit, fulfilment of order, invoicing of order and terminates with payment from the customer. And optimized O2C increases operational efficiency and helps the company achieve competitive advantage.

Fig 1.6: The O2C Process

Key Performance Indicators (KPIs) of O2C

The efficacy of process optimization is measured through certain Key Performance Indicators (KPIs). Researchers referred the following as the top KPIs, in case of O2C:

1. Process cycle time
2. Day sales outstanding (DSO)
3. On-time delivery performance.

It may be noted that the O2C process has become a strategic priority in the new competitive business environment. In addition to the KPI discussed above, order fulfillment performance in terms of order accuracy, shipment accuracy, and on-time shipping and financial performance in terms of reduction of receivables, collection management costs, and Days of Sales Outstanding, or DSOs are the major attributes on which the efficiency of the O2C process depends.

Importance of O2C

In the previous paragraph the KPIs of O2C are discussed. A well-managed O2C cycle is of strategic importance to the business and the business is able to reap the following benefits:

1. Increase of cash flow and reduction of operating costs
2. Smoother and improved customer relations
3. Ability to devote more time to strategic function

Best Practices which Optimize the O2C Process

1. **Automation of administrative tasks:** With the level of technological development available today, automation of office and administration has become a basic requirement. Manual processing of administrative tasks is error prone. Automation increases efficiency and accuracy of administrative tasks. Automation increases efficiency of repetitive tasks like billing, invoice collection, payment collection, and credit management.
2. **Standardization of the O2C process for the entire company:** The company should be able to standardize the O2C process for all the product lines irrespective of the size of the company. Standard measures would include efforts to decrease the O2C cycle time. Even a small diminution of the O2C cycle time would result in increased release of working capital that would relieve financial stress on the day to day activities.
3. **Preparation of electronic invoices:** It is already noted that manual processing is error prone and may create inefficient operations. Electronic invoices are important aspect of the automation process and would ultimately lead to increased customer satisfaction.

4. **Re-evaluation of credit policies:** According to a survey 21% of the surveyed companies make adjustments to their credit policies to minimise outstanding accounts receivables (AR) and bad debt. It is important that companies re-evaluate the credit policies in order to optimise resources, reduce credit risk, and improve cash flow. This is an important measure for ensuring a optimised O2C cycle time.
5. **Efficiency in billing process:** Automated billing system along with real time billing improves customer satisfaction and improves O2C process efficiency. This is a crucial aspect in the service industry. For example, in a hospital, automated real time billing procedure facilitates quick discharge of patients and leads to customer satisfaction. Quick mitigation of any discrepancies in the billing is also an important best practice in the O2C process.
6. **Automated accounts receivable:** Automated accounts receivable (AR) is the order of the day and many organisations are taking up the route as it benefits the organisation in managing repetitive tasks like scheduling payment reminders, archiving customer responses, enabling online payments and settling disputes.
7. **Data management:** Various data management software are being used by organisations which brings in consistency across all the sub processes of the O2C cycle. Availability of data creates a transparent environment which improves the decision making process and helps the credit management.

1.6.2 Customer Relationship Management (CRM)

Traditional market segmentation strategy, divided the customers into subgroups or segments based on their needs, based on which standardized products and services were designed and readied for a particular segment and delivered to that segment. However, the issue of individual customer preference took a back seat. This was the preferred norm as consumer level data was not available or was too costly which made the products and services too expensive.

CRM is information technology dependant and is built around software that enable an enterprise manage customer relationships in an organised way. It is a business strategy that builds around customer satisfaction to maximise profitability. It fosters customer centric processes. CRM is becoming an important business strategy and companies are spending billions of dollars on CRM software the world over. On the basis of a report generated by Gartner Inc. In 2012, the estimated annual spending on CRM technology was $14 billion in 2013, and would become approximately $18.4 billion in 2016.

There is, as such, a debate between managerial and technological issues in implementing a CRM. The managerial approach to CRM emphasises a disciplined approach to customer relationship for maintaining profitable customers may be developed with or without involvement of technology. On the other, the technological school emphasises that in a large organisation the notion of dealing with millions of customers across multiple channels is incomprehensible without systemised and upgraded information technology.

Types of CRM

There are, as such, three main forms of CRM; strategic, operational and analytical.

1. Strategic CRM

This is specifically a managerial concept and CRM is defined as a customer centric business strategy for attracting new customers and retaining old profitable customers. The main issue is development of a customer-centric business culture which is mainly reflected in leadership behaviours and the design of formal systems of the company.

2. Operational CRM

This advocates partial automation of those aspects which are interfaces with the customer such as selling, marketing and after sales service. Some applications of operational CRM are:

- **Marketing automation:** Campaign management, Event-based (trigger) marketing, Marketing optimization
- **Sales force automation:** Account management, Lead management, Opportunity management, Pipeline management, Contact management, Quotation and proposal generation, Product configuration
- **Service automation:** Case (incident or issue) management, Customer communications management, Queuing and routing, Service level management

3. Analytical CRM

This is a technology driven definition, applicable mainly for larger organisations. All possible data related to the customer are captured and extracted from various sources, stored in a centralised database, distributed and interpreted as and when required to enhance customer value. A repository is created which stores purchase, sales data, financial data and marketing data, which is retrieved in accordance.

Big Data

The emergence of 'big data' is a big thing in the business environment. Though the same arose to prominence during early 2000, it is only since 2010 that big data coupled with IT enabled analytics, became a novelty. Big data extends beyond

structured data, including unstructured data of all varieties: text, audio, video, click streams, log files and more. The tools for searching, making sense of, and acting on unstructured data differ from those available for data-mining structured datasets. With the advent of big data and business data analytics analytical CRM gained superior strategic importance.

Models of CRM

A number of comprehensive models have been developed over the years. In the next few lines four models of CRM are discussed:

(a) The IDIC Model

This was developed by Don Peppers and Martha Rogers in their book. This model suggest that companies should take four actions in order to build closer one-to-one relationships with customers:

- **Identify** who your customers are and build a deep understanding of them.
- **Differentiate** your customers to identify which customers have most value now and which offer most for the future.
- **Interact** with customers to ensure that you understand customer expectations and their relationships with other suppliers or brands.
- **Customise** the offer and communications to ensure that the expectations of customers are met.

(b) The CRM Value Chain

This model was introduced by Francis Buttle in his book which was published in 2004. The model constitutes five primary stages and four supporting conditions. Fulfilment of the primary stages and the supporting conditions leads a company towards enhanced customer profitability. The five primary stages are sequenced to create value propositions to create and retain profitable customers. The supporting conditions enable the CRM strategy to function efficiently.

Primary Stages	Supporting Conditions
Customer Portfolio Analysis	Leadership and culture
Customer Intimacy	Data and information technology
Network Development (SCOPE)	People
Value Proposition Development	Processes
Manage The Customer Lifecycle	

(c) The Gartner Competency Model

Component	Elements
1. CRM Vision	Leadership, social worth, value proposition
2. CRM Strategy	Objectives, segments, effective interactions
3. Valued Customer Experience	Understand requirements, Monitor expectations, Satisfaction vs Competition, Collaboration and Feedback
4. Organisational Collaboration	Culture and Structure, Customer understanding, People Skills, Competencies, Employee Communication, Partners and Suppliers
5. CRM Process	Customer Lifecycle, Knowledge Management
6. CRM Information	Data analysis
7. CRM Technology	Applications and architecture
8. CRM Metrics	Cost to serve, satisfaction, loyalty, social costs

📝 Multiple Choice Questions – 1.6

1. Customized products and services for customers and interaction to individual customers are part of:

(a) company relationship management (b) retailer's management (c) supplier management (d) customer relationship management

Answer: (d) customer relationship management

2. Company's 'customer relationship capital' is another name of:

(a) customer conversion (b) customer retention (c) dissatisfied customers (d) satisfied customers

Answer: (b) customer retention

3. CRM technology can help in:

(a) processing transactions faster (b) developing new pricing models (c) designing direct marketing efforts (d) All of the above

Answer: (d) All of the above

4. _____ hinges on the assumption that employee satisfaction and customer satisfaction are inextricably linked.

(a) External marketing (b) Internal marketing (c) Macro marketing (d) Target marketing

Answer: (b) Internal marketing

5. A person or company that yields a revenue more than incurred costs of selling and serving is called:

(a) profitable customers (b) satisfied customers (c) dissatisfaction (d) superior value

Answer: (a) profitable customers

6. A _____ is an organized collection of detailed information about individual customers or prospects that is accessible, actionable and current for marketing purposes such as lead generation and others.

(a) business database (b) customer mailing list (c) customer database (d) none of the above

Answer: (c) customer database

7. Number of customers or potential customers who will help in company's growth is classified as:

(a) retailer base (b) distributors base (c) customer base (d) marketers base

Answer: (c) customer base

8. Process of building, organizing and using databases of customers to build customer relationship is classified as:

(a) customer database (b) database marketing (c) company database (d) detailed database

Answer: (b) database marketing

9. Perceived monetary value of all benefits which customers expect from a given product because of brand image is called:

(a) total customer benefit (b) total functional cost (c) total economic cost (d) total customer cost

Answer: (a) total customer benefit

10. The main drawback of CRM is:

(a) rolling out CRM before changing the organization to match (b) implementing CRM before creating a customer strategy (c) stalking, not wooing, customers (d) All of the above

Answer: (d) All of the above

11. Difference between customers evaluation including all costs incurred and benefits is called:

(a) company market value (b) customer affordability (c) customer reliability (d) customer perceived value

Answer: (d) customer perceived value

12. _____ is any occasion on which the brand or product is used by end customers.

(a) company touch point (b) customer touch point (c) retailers touch point (d) None of the above

Answer: (b) customer touch point

13. _____ is the study of how individuals, groups and organizations select, buy, use and dispose off goods, services, ideas or experiences to satisfy their needs and wants.

(a) purchase behavior (b) consumer behavior (c) product cycle (d) All of above

Answer: (b) consumer behavior

14. _____ is defined as the caring and individualized attention the firm provides to its customers.

(a) Reliability (b) Responsiveness (c) Assurance (d) Empathy

Answer: (d) Empathy

15. _____ involves breaking down each of the activities of a firm into its various activities, and showing where value is added for its customers.

(a) Storyboarding. (b) Value Chain analysis. (c) Blueprinting. (d) Perceived service.

Answer: (b) Value Chain analysis.

1.7 Customer Profitability Analysis

One of the very basic parameters of the financial performance of a company is customer profitability. The profit generated by an organisation is dependent on the market share (quantity sold) which is directly related to the customer base. An organisation is hugely benefited by a comprehensive knowledge of customers. One the one hand the organisation would leave no stones unturned to retain an existing profitable customer. But its primary strategy is to lure in new customers as that would have a positive impact on the market share of the organisation. Another perspective is to segregate the profitable customer from the other kind and focus all the efforts towards these customers. In today's competitive business environment, the loss of a customer which negatively impacts the cash inflows are the first signs of financial distress of the company.

The customer profitability analysis model (CPA) and strategically oriented customer lifetime value model (CLTV) are two models used to evaluate the financial performance of an organisation in the marketing and selling phases of the business. While CPA has tactical orientation, CLTV has a strategic orientation.

1.7.1 An Overview

> **Key Statistic (Seldon and Colvin, 2004):** The top 20% of customers generate more than 120% of an organisation's profits. Meanwhile, the bottom 20% generate losses equalling more than 100% of profits. This one liner suggests the dependency of the companies on their valued customers. It is also crucial for the companies to identify the profitable customers. It is also important for the companies to identify the least profitable customers as they actually destroy value.

1.7.2 CPA – An Approach Road

Segmentation of the customer base on the basis of revenue generated and the costs attributable to each segment is the starting point of the analysis. Segmentation of the customer base is dependent on the database of customers along with the revenue generation and cost incurred for the said segments. Thus the analysis has to be combined with activity-based costing (ABC). Once the profitable and non-profitable segments are identified, profitable segments are maximised while non-profitable segments are reduced or eliminated. The stages for successful implementation of CPA are:

Step 1 – Customer Segmentation

There are two basic approaches to customer segmentation that may be used by a company:

- (i) **Demographic segmentation** is based either on geographic location of the customer or age, sex and income level of the customer.
- (ii) **Psychographic segmentation** is based on the need and behaviour of the customer which are noted through the attitudes and interests of the customers.

Step 2 – Revenue Attributable to Each Segment

Once segments have been identified, the annual revenue is calculated per segment with specific reference to the products and services offered by the company. Cash discount, bulk discounts and service fees must be adjusted to the revenue before consideration of the same. This step would result in segment wise revenue generation which will make the customer analysis meaningful.

Step 3 – Calculation of Profit of Each Segment

For the purpose of calculation of profit, costs need to be apportioned to each segment. For this purpose, activity based costing (ABC) is used to calculate the annual cost of each segment. This will involve both directly attributable product or service costs and also customer costs, including allocation of overheads, marketing, sales and distribution costs. In respect to customers, there are some costs that are not directly calculable like quality control cost, inspection cost, cost of order picking and delivery and cost of order fulfilment. ABC, which depends on cost drivers for allocation of costs, is an effective tool of assigning these costs to a particular segment.

Step 4 – Analysis of Profitability of Customers

Completion of step 3 implies that the customer database is complete. In this step the customer database is ranked on the basis of profitability. The profitable customers are those whose annual revenues exceed annual costs. Identification of less profitable customers or value destroying customers is the most important aspect and is the main issue which gets visible in this step.

Step 5 – Development of Strategies

Once the customer database is arranged according to profitability, the next step is to develop strategies to maximise profits from the top profitable customers and eliminate non profitable customers because they are value destroyers. Strategies need to be developed to retain less profitable customers through loyalty programmes. Researchers posit two main strategies for the company to deal with the least and the non-profitable customers.

- (i) **Elimination of the customers** – The non-profitable customers are value destroyers and needs to be eliminated from the database. For this the company may take various routes like raising prices and/or making them unsuitable by changing the product design and/or otherwise.
- (ii) **Inclusion of customers** – Though the non-profitable customer groups are value destroying, they may be turned around either by increasing revenue or decreasing costs attributable to these groups, or both. Product re-engineering is one such strategy to achieve the turnaround. Modification of packaging or changes in product design are other such strategies for the turnaround.

Step 6 – Review of Strategy

The implementation of any new strategy, for example, changes in pricing, cost reduction or customer service, should be reviewed after an appropriate period to determine the impact on customer profitability.

1.7.3 Analysis of the Customer Profitability Database

In the previous section the steps suitable for creation of a customer profitability database are discussed. Strategy formulation (based on customer profitability database) is discussed in step 5 and step 6 was all about review of strategies formulated in step 5. The customer profitability database tends to be large in case of larger organisation and the strategies mentioned in step 5 above is too simplistic especially in case of a large organisation where the customer profitability database is large. In all such cases a powerful technique referred as decision grid analysis (DGA) is used.

The DGA is a graphic tool in which profitability of the customer is graphed against the volume of business. This is a major tool as it questions and provides answers to what really customer profitability is. The DGA offers the first explanation about what characterises a profitable and a non-profitable customer. For this purpose, DGA uses two particular parameters, volume of sales and contribution as a percentage of sales. Four particular segments may be identified based on the two parameters.

Fig 1.7: Decision Grid Analysis Matrix

	HIGH Contribution	LOW Contribution
HIGH Volume	**WINNER** • Retain • Grow	**PROBLEM** • Turnaround • Eliminate
LOW Volume	**POTENTIAL** • Develop • Upsell	**LOSER** • Eliminate

Four Segments of DGA

1. **Loser** – This is a segment where the sales volume generated by a customer is low and along with this the contribution as a percentage of sales is also negative. This is the segment identified as the least profitable and the strategy is surely elimination of customers who fall in this segment.
2. **Problem** – This segment comprises customers who generate negative percentage contribution but the sales volume is on the higher side and thus a turnaround strategy may be recommended. But the customers also destroy value and the company sometimes prefer a elimination strategy especially when the company is optimistic about acquisition of new customers.
3. **Potential** – This segment comprises of group of customers who generate positive contribution and are thus classified as profitable but their contribution to the total sales volume is low and thus they are referred as potential as various promotional schemes including loyalty programmes would help increase the volume of sales to these customers which would make them winners (fourth segment).
4. **Winner** – This segment comprises customers who generate positive contribution as well the sales volume is the highest. These are the top profitable customers and the company strategy is to retain customers.

Illustration 1 (ICMAI Study Material): Lotus LLP – Customer Profitability Analysis

The following information on four segments of customers is extracted from the customer database of Lotus LLP.

Given Data

Sl. No.	Particulars	A	B	C	D
a	No. of units sold	60,000	80,000	1,00,000	70,000
b	Selling Price (₹)	2	3	1	2
c	No. of sales visits	3	3	5	10
d	No. of purchase orders	20	60	50	40
e	No. of deliveries	12	16	25	15
f	Kilometres per journey	20	35	10	50
g	No. of rush deliveries	3	1	2	0

Cost of Each Activity (₹)

Sl. No.	Activity	Cost
h	Sales visit	₹2,100 per visit
i	Order Placing	₹600 per order
j	Product Handling	₹0.3 per item
k	Normal delivery Cost	₹20 per kilometre
l	Rushed Delivery Cost	₹2,000 per delivery

Solution: Statement showing segment wise customer profitability (ICMAI Standard)

Particulars	Computation	A (₹)	B (₹)	C (₹)	D (₹)
Revenue net of discount	(a × b)	1,20,000	2,40,000	1,00,000	1,40,000
Less: Cost					
Sales Visit	(c × h)	6,300	6,300	10,500	21,000
Order Processing	(d × i)	12,000	36,000	30,000	24,000
Product Handling	(a × j)	18,000	24,000	30,000	21,000
Normal Delivery Cost	(e × f × k)	4,800	11,200	5,000	15,000
Rushed Delivery Cost	(g × l)	6,000	2,000	4,000	0
Total Cost		**47,100**	**79,500**	**79,500**	**81,000**
Profit		**72,900**	**1,60,500**	**20,500**	**59,000**

Conclusion (ICMAI Standard):

- Customer **B** is the most profitable (₹1,60,500) – Category: **Winner**
- Customer **A** is next profitable (₹72,900) – Category: **Winner**
- Customer **D** has moderate profit (₹59,000) – Category: **Problem**
- Customer **C** has lowest profit (₹20,500) – Category: **Problem**

Multiple Choice Questions – 1.7

1. Which of the following is an example of a value-added-activity?

(a) Storing excess inventory for future sales (b) Manual data entry (c) Making customer contacts and sales (d) Reworking faulty products

Answer: (c) Making customer contacts and sales

2. In customer cost hierarchy, the costs of all activities incurred to sell group of units to end consumers are classified as:

(a) customer sustaining costs (b) customer output unit-level costs (c) customer batch-level costs (d) corporate sustaining costs

Answer: (c) customer batch-level costs

3. As per Customer Lifetime Value, the most profitable customers result in as much as _____ of the profits of the company; the least profitable lose _____ of the profits.

(a) 20%, 100%, 20%, 150% (b) 20%, 50%, 20%, 50% (c) 20%, 150%, 20%, 100% (d) None

Answer: (c) 20%, 150%, 20%, 100%

4. As per the customer profitability analysis, the customers can be categorised as:

(a) Platinum customers, gold customers, Iron customers and lead customers (b) Platinum and gold customers (c) Platinum and lead customers (d) None

Answer: (a) Platinum customers, gold customers, Iron customers and lead customers

5. Customer lifetime value concepts should consider the short-term, brand-building marketing activities that assist in increasing customer loyalty.

(a) True (b) False

Answer: (a) True

6. _____ is the process of cautiously managing comprehensive information about individual customers and touch points to maximize customer loyalty.

(a) Management information system (b) Customer Relationship Management (c) Customer lifetime value (d) None

Answer: (b) Customer Relationship Management

7. A _____ is an organized collection of detailed information about individual customers or prospects.

(a) Customer database (b) Customer mailing list (c) Business database (d) None

Answer: (a) Customer database

8. The marketing messages committed to customers wishes is a part of:

(a) Permission marketing (b) Activity marketing (c) Supplier marketing (d) None

Answer: (a) Permission marketing

9. _____ is any occasion on which the brand or product is used by end customers.

(a) Customer touch point (b) Retailers touch point (c) Company touch point (d) None

Answer: (a) Customer touch point

10. The _____ comprises the whole pack of benefits the firm promises to deliver.

(a) Value proposition (b) Value creation (c) Value delivery (d) None

Answer: (a) Value proposition

11. _____ is a person's feelings of disappointment or pleasure that result from evaluating a product's perceived performance to their expectations.

(a) Customer loyalty (b) Customer satisfaction (c) Customer value (d) Customer retention

Answer: (b) Customer satisfaction

12. The link between the customer loyalty and customer satisfaction is:

(a) Proportional (b) Non-proportional (c) Unaffected (d) None

Answer: (a) Proportional

13. _____ is the totality of characteristics and features of a service or product that bear on its ability to satisfy implied or stated needs.

(a) Quality (b) Satisfaction (c) Value (d) Loyalty

Answer: (a) Quality

14. Rural area lacks infrastructure and technology; therefore companies cannot apply Customer Relationship Management in rural regions.

(a) True (b) False

Answer: (b) False

15. CRM technology can help in:

(a) Designing direct marketing efforts (b) Developing new pricing models (c) Processing transactions faster (d) All of the above

Answer: (d) All of the above

1.8 Improvement of Corporate Credit Rating Score

1.8.1 Corporate Credit Rating Score – An Overview

It is a natural instinct of an entity to showcase an overestimate of its financial health for which it uses various facets of 'creative accounting'. This makes the projected financial health less trustworthy. The simple process of letting a third party gauge the credit worthiness of the entity improves the overall financial environment as it brings in trustworthiness in the financial projection. This assessment of credit worthiness by an authorized third party is referred as credit rating or credit scoring. Though the two terms are often used interchangeably, there are some important differences between the two concepts which are summarized in the following lines:

- In credit rating, mathematical expression is not used whereas a credit score is resultant of a mathematical model. Thus, credit score is expressed as a number, while credit rating is expressed using alphabets.
- Credit rating is based on experience and judgment by the credit rating agency but credit score is based on mathematical modelling.
- In measurement of credit score, historical data pertaining to the payback structure is analyzed; however, credit rating shows the ability of pay back in the future, based on the past, present and some predictable future data.
- In finance literature, the term credit score is often used in respect to individual loan seekers and credit rating is used in case of corporate borrowers.

1.8.2 Credit Rating Agencies in India (CRA)

In India, there are seven credit rating agencies, Credit Rating Information Services of India Limited (CRISIL), Investment Information and Credit Rating Agency (ICRA), Cooperative for Assistance and Relief Everywhere (CARE), India Ratings and Research Pvt Ltd, Acuite Ratings & Research, Brickwork Ratings India Pvt. Ltd. and Infometrics Valuation and Rating Pvt. Ltd., authorized by SEBI to assess credit ratings of corporates. In India around 57000 corporate entities are currently being rated regarding their credit worthiness by these seven rating agencies.

CRISIL - a division of S&P Global, an American corporation - offers corporate debt rating services along with other services in the zone of financial risk analysis. It was India's first credit rating body, founded in 1988 by ICICI & UTI. In April 2005, US-based credit score firm S&P bought the bulk of the company's shares. The company controls the market for rating corporate debt and enjoys a market share of 60%.

Table 1.1: CRISIL's Rating Scale

Long-term rating scale	Short-term rating scale	Structured Finance rating scale	Credit Enhancement Rating Scale	Corporate Credit Rating Scale	Fixed Deposit rating Scale
CRISIL AAA	CRISIL A1	CRISIL AAA (SO)	CRISIL AAA (CE)	CCR AAA	FAAA
CRISIL AA	CRISIL A2	CRISIL AA (SO)	CRISIL AA (CE)	CCR AA	FAA
CRISIL A	CRISIL A3	CRISIL A (SO)	CRISIL A (CE)	CCR A	FA
CRISIL BBB	CRISIL A4	CRISIL BBB (SO)	CRISIL BBB (CE)	CCR BBB	FB
CRISIL BB	CRISIL D	CRISIL BB (SO)	CRISIL BB (CE)	CCR BB	FC
CRISIL B		CRISIL B (SO)	CRISIL B (CE)	CCR B	FD
CRISIL C		CRISIL C (SO)	CRISIL C (CE)	CCR C	
CRISIL D		CRISIL D (SO)	CRISIL D (CE)	CCR D	

1.8.3 Improvements in Corporate Rating

It is important to note that credit rating/credit scoring is a continuous process and terminates only when the company withdraws or prematurely closes its contract with the rating agency or with the redemption of the financial instrument being rated. For example, CRISIL considers its rating as a continuous surveillance over the life of the rated facility. Factually all ratings assigned by CRISIL evaluates the credit risk associated with particular instrument till it is fully redeemed and is taken off the balance sheet of the entity. There are continual changes in the financial profile of the issuer company. Thus there cannot be fixed validity of the corporate rating reports. Any change in rating is published by the rating agency on its website and is also communicated to the issuer company on a real time basis.

On the basis of the change in the financial profile of the issuer entity there is either improvement in rating also known as upgradation or decline in credit worthiness represented through a degradation of corporate rating. Since credit rating signifies the credit worthiness of an enterprise an expansion of financial risk (especially credit risk) management in the entity leads to an improvement in credit rating.

1.8.4 A Brief Note on Credit Score

A discussion on corporate credit rating is incomplete without a brief note on a similar issue; credit score, which is often used in respect to individual loan seekers. Credit score is a 3-digit number which signifies a summary of the customers' credit history. The score is derived from data available with credit bureaus and ranges between 300 to 900.

Table 1.2: FICO Score Ranges

Score Range	Rating	Description
Less than 580	Poor	Score of less than 580 implies that the Your score is well below the average score of U.S. consumers and demonstrates to lenders that you are a risky borrower.
580-669	Fair	Your score is below the average score of U.S. consumers, though many lenders will approve loans with this score.
670-739	Good	Your score is near or slightly above the average of U.S. consumers and most lenders consider this a good score.
740-799	Very Good	Your score is above the average of U.S. consumers and demonstrates to lenders that you are a very dependable borrower.
800+	Exceptional	Your score is well above the average score of U.S. consumers and clearly demonstrates to lenders that you are an exceptional borrower.

In India, CIBIL Score was introduced in 2007 as the country's first risk scoring model for financial institutions by Trans Union CIBIL Limited. The company was set up in 2000 in pursuant to recommendations of RBI. The CIBIL Score, designed on similar lines as the FICO, is a 3-digit number which signifies a summary of the customers' credit history. The score is derived from data available with CIBIL Report and ranges between 300 to 900. A higher score signifies higher chances of loan application of the customer getting approved. Also the customer gets better terms for her/his loan from the financial institutions. The credit score depends on four aspects:

1. **Payment History:** Payment records of the potential borrowers are analyzed to find any defaults or delayed payments. These negatively impacts the credit score.
2. **High credit card balance:** Higher outstanding balance in credit card implies higher credit availed by the customer. This negatively impacts the credit score.
3. **Credit mix:** A proportionate mix between secured loans (auto loans and housing loans) and unsecured loans (personal loans and credit card loans) have a positive impact on the score.
4. **Increase in debt burden:** More and more loans queries by the potential borrower increases the debt burden of the potential borrower which negatively impacts the credit score.

Multiple Choice Questions – 1.8

1. Which of the following is not a credit rating agency in India?

(a) CRISIL (b) ICRA (c) RBI (d) CARE

Answer: (c) RBI

2. The Majority shareholder in CRISIL is:

(a) Standard and Poors' (b) Fitch Ratings Inc. (c) Moody's (d) Dun and Bradstreet

Answer: (a) Standard and Poors'

3. Which of the following is the Regulator of the credit rating agencies in India?

(a) RBI (b) SBI (c) SIDBI (d) SEBI

Answer: (d) SEBI

4. First Credit Rating Agency of India is:

(a) CRISIL (b) CARE (c) ICRA (d) Moody's Investor Service

Answer: (a) CRISIL

5. Investment Information and Credit Rating Agency of India (IICRA) is a:

(a) Private company (b) Public Company (c) Govt. Company (d) Statutory Company

Answer: (b) Public Company

6. Which of the following is not a Credit Rating Agency?

(a) CRISIL (b) ICRA (c) SEBI (d) Fitch Ratings

Answer: (c) SEBI

7. The overarching purpose of credit risk analysis is to:

(a) Quantify potential credit losses (b) Determine a company's optimal capital structure (c) Identify credit opportunities (d) Provide information to banks about credit losses

Answer: (a) Quantify potential credit losses

8. Where does the headquarters of CRISIL situated?

(a) Mumbai (b) Delhi (c) Haryana (d) Kolkata

Answer: (a) Mumbai

📌 Key Takeaways – Module 1

Section	Key Takeaway
1.1	Performance management is continuous & strategic; productivity ≠ efficiency; productivity = Output ÷ Input
1.2	Financial analysis tools: comparative, common size, ratio analysis; profit ≠ cash; FCFF = CFO + [Int × (1−t)] − FC_inv; FCFE = CFO − FC_inv + Net Borrowing
1.3	P2P (3 phases: Purchase Order, Receiving Process, Invoicing Process) and VRM are critical for supply chain efficiency
1.4	SCM involves 4 flows (Material, Information, Finance, Commercial) and 5 key decisions (Production, Inventory, Location, Transportation, Information)
1.5	Reverse mapping uses customer feedback; business analytics enhances this; 4 types: Descriptive, Diagnostic, Predictive, Prescriptive
1.6	O2C process (7 steps) and CRM are essential; 3 types of CRM: Strategic, Operational, Analytical; CRM Models: IDIC, Value Chain, Gartner
1.7	CPA 6 steps; DGA 4 segments: Winner, Potential, Problem, Loser
1.8	Credit rating (alphabets) vs credit score (numbers); 7 CRAs in India; CIBIL Score range 300-900

📐 Important Formulas – Module 1

Formula	Description
Productivity = Output / Input	Basic productivity measure
Efficiency = (Output / Input) × 100	Efficiency measure
FCFF = NI + NCE + [Int × (1−t)] − WC_inv − FC_inv	Free Cash Flow to Firm
FCFF = CFO + [Int × (1−t)] − FC_inv	Alternative FCFF
FCFE = CFO − FC_inv + Net Borrowing	Free Cash Flow to Equity
Current Ratio = CA / CL	Liquidity measure (Ideal 2:1)
Quick Ratio = (CA − Inventory) / CL	Acid test ratio (Ideal 1:1)
DSO = (Receivables / Credit Sales) × 365	Days Sales Outstanding
ROE = (NP / Equity) × 100	Return on Equity
ROA = (NP / Total Assets) × 100	Return on Assets
GP Margin = (GP / Revenue) × 100	Gross Profit Margin
NP Margin = (NP / Revenue) × 100	Net Profit Margin
EPS = PAT / No. of Shares	Earnings Per Share
P/E = MPS / EPS	Price-Earnings Ratio
Debt-Equity = Total Debt / Equity	Solvency Ratio
Interest Coverage = EBIT / Interest	Debt Servicing Ratio

✅ Revision Checklist – Module 1

- □ Define performance management and its features (continuous process, strategic alignment)
- □ Distinguish between performance management and performance appraisal
- □ List objectives and elements of performance management
- □ Distinguish between productivity and efficiency (3 point-wise differences)
- □ Solve Student Productivity illustration (ICMAI method)

- □ List and explain the 5 components of financial statements
- □ Solve FCFF and FCFE illustrations (ICMAI method)
- □ Explain 6 tools and techniques of financial statement analysis
- □ Explain 5 perspectives of ratio analysis with formulas
- □ Describe P2P process phases and its 3 primary perspectives
- □ Explain Vendor Relationship Management (VRM) and its 5 aspects
- □ Describe 4 flows in supply chain and 5 key SCM decisions
- □ Explain reverse mapping with Chik Shampoo example
- □ Describe 4 types of business analytics
- □ Describe O2C process (7 steps) and KPIs (3 KPIs)
- □ Explain 3 types of CRM and 3 CRM models (IDIC, Value Chain, Gartner)
- □ Solve Lotus LLP Customer Profitability Analysis (ICMAI method)
- □ Describe 6 steps of CPA and Decision Grid Analysis (4 segments)
- □ Differentiate credit rating and credit scoring
- □ List 7 credit rating agencies in India
- □ Explain CIBIL score factors (4 aspects) and FICO score ranges

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Disclaimer: These revision notes are for educational purposes only. Students are advised to refer to the official ICMAI study material and latest amendments for comprehensive preparation.

Next Module: Module 2 – Performance Measurement, Evaluation and Improvement Tools

CMA FINAL PAPER 20A

Strategic Performance Management & Business Valuation

MODULE 2 – Performance Measurement, Evaluation and Improvement Tools

Complete Coverage as per ICMAI Study Material (Syllabus 2022)

For December 2026 Examination | CMA Knowledge Series – cmaknowledge.in

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Module Learning Objectives

- Identify the emerging tools and techniques of performance measurement.
- Conceptualize the importance of Balanced Score Card as a performance management technique.
- Appreciate emerging issues in quality management and their linkage with performance management.
- Gather fundamental knowledge of the technique of Data Envelopment Analysis (DEA) and its linkage with performance management.

Introduction to Performance Measurement

In order to sustain for a long period, it is essential for an organisation to outgrow its competitors. This specific goal is referred as the strategic goal. Performance management assists organizations to move along the strategic direction towards its specified strategic goal. It creates an enabling environment where everyone in the organisation acts in a holistic manner and this helps organizations to gain competitive advantage.

The discipline of performance management comprises of two specific viewpoints:

- **People Performance Management (PPM)** – The employees are one of the most important stakeholders of the organisation and contributes handsomely to the strategic goal. Alignment of performance of employees and improvement of corporate performance is crucial and provides the organisation with its much desired strategic direction.
- **Corporate Performance Management (CPM)** – This focusses on performance of the entire organisation and is also referred as Enterprise Performance Management (EPM) or Strategic Performance Management (SPM). It is defined as a set of management processes that help the organisation define and execute its strategy.

Various tools and techniques of SPM include Balanced Scorecards, KPIs, analytics, budgeting and forecasting, benchmarking, business excellence models, statistical quality control, Six Sigma, Lean, total quality management, total productive maintenance enterprise risk management, project or programme management, and performance reporting.

2.1 Balanced Score Card (BSC)

2.1.1 Introduction

In 1984, R. Edward Freeman's book, 'Strategic Management - A Stakeholder Approach' brought in a new paradigm in the business environment. In his book, Freeman observed inconsistencies between the traditional models of businesses practice and the rapid changes that was occurring in the business environment in the 1980s. The author propagated a new conceptual framework, the 'stakeholder theory'. This was in sharp contrast to the 'stockholder approach' which premised on the agency theory and propagated the traditional Shareholder Wealth Maximisation (SWM) as the sole responsibility of the firm. Thus there was a consensus amongst the corporations and the researchers that the traditional performance-measurement approaches, based on financial accounting measures, were becoming outmoded.

In 1990, the Nolan Norton Institute undertook a one-year study, on the basis of data available from twelve companies, primarily because of inconsistencies in traditional business practice advocated in the stockholder approach. The study, "Measuring Performance in the Organization of the Future", was headed by David Norton, CEO of Nolan Norton, and Robert Kaplan acted as the academic consultant. The study was based on a unanimous argument that excessive reliance on traditional financial performance measures were deterring the value creation process of organizations. This is inevitable as the traditional stockholder approach considers the shareholder as the protagonist for whom value is created by the firm, but the stakeholder approach argued that the modern firm has to create value for a number of stakeholders in addition to the investors (shareholders) in order to become relevant in the new business paradigm.

2.1.2 Evolution of Balanced Scorecard (BSC)

In order to develop a new performance measurement model, the study group met frequently with various industry experts throughout 1990. The genesis of the BSC is the 'Corporate Scorecard' which was first used by Analog Devices Inc. The company used a scorecard which in addition to the traditional financial measures, used various non-financial measures.

2.1.3 Four Questions and Four Perspectives of BSC

Four Questions	Four Perspectives
How do customers see us?	Customer perspective
What must we excel at?	Internal business perspective
Can we continue to improve and create value?	Learning and growth perspective
How do we look to shareholders?	Financial perspective

Though the BSC model stresses on a handful of critical measures within each perspective, addition of new measures is encompassed in the model whenever a worthwhile suggestion is acknowledged.

2.1.4 Four Perspectives of BSC (Detailed)

BSC provides CEOs with a comprehensive framework that translates a company's vision and strategy into a coherent set of performance measures. Organisations adopt mission statements to communicate fundamental values and beliefs to the stakeholders. In BSC, traditional financial measures based on past performance are retained. In order to encompass new drivers of future financial performance, BSC introduces customer, internal-business-process, and learning and growth perspectives for translation of the organization's strategy into tangible objectives and measures.

1. Financial Perspective

The financial perspective serves as the focus for the objectives and measures in the other scorecard perspectives. This perspective is concerned for profit of the enterprises. Under this perspective the focus will be on financial measures like operating profit, ROI, residual income, economic value added concept, revenue growth, cost reduction, asset utilization etc. These financial measures will provide feedback on whether improved operational performance is being translated into improved financial performance.

2. Customer Perspective

This perspective captures the ability of the organization to provide quality goods and services, the effectiveness of their delivery, and overall customer service and satisfaction. Needs and desires of customers have to be attended properly because customer

pay for the organization's cost and provided for its profits. This perspective typically includes several core or generic measures that relate to customer loyalty and the result of the strategy in the targeted segment. They include market share, customer retention, new customer acquisition, customer satisfaction and customer profitability.

3. Internal Business Processes Perspective

This perspective focuses on the internal business results that lead to financial success and satisfied customer. To meet organizational objectives and customers' expectations, organizations must identify the key business processes at which they must excel. Key processes are monitored to ensure that outcomes will be satisfactory.

The principal internal business processes include the following:

- (a) Innovation processes for exploring the needs of the customers.
- (b) Operation processes with a view to providing efficient, consistent and timely delivery of product/service.
- (c) Post service sales processes.

4. Learning and Growth Perspective

This perspective looks at the ability of employees, the quality of information systems, and the effects of organizational alignment in supporting accomplishment of organizational goals. Processes will only succeed if adequately skilled and motivated employees, supplied with accurate and timely information, are driving them. In order to meet changing requirements and customer expectations, employees may be asked to take on dramatically new responsibilities, and may require skills, capabilities, technologies, and organizational designs that were not available before. The learning and growth perspective identifies the infrastructure that the business must build to create long-term growth and improvement. There will be focus on factors like employee capability, employee productivity, employee satisfaction, employee retention.

Fig 2.1: Translating Vision and Strategy: Four Perspectives of BSC

Perspective	Key Question	Focus Areas
Financial	"To succeed financially, how should we appear to our shareholders?"	Operating profit, ROI, EVA, Revenue growth, Cost reduction
Customer	"To achieve our vision, how should we appear to our customers?"	Market share, Retention, Acquisition, Satisfaction, Profitability
Internal Business Process	"To satisfy shareholders and customers, what processes must we excel at?"	Innovation, Operations, Post-sales service
Learning & Growth	"To achieve our vision, how will we sustain our ability to change and improve?"	Employee capability, Productivity, Satisfaction, Retention

2.1.5 Benefits of BSC

Research has shown that organizations that use a Balanced Scorecard approach tend to outperform organizations without a formal approach to strategic performance management. The key benefits of using a BSC include:

1. **Better Strategic Planning:** The Balanced Scorecard provides a powerful framework for building and communicating strategy. This communication process is undertaken through a strategy map.
2. **Improved Strategy Communication & Execution:** Having a one-page picture of the strategy allows companies to easily communicate strategy internally and externally. We have known for a long time that a picture is worth a thousand words.
3. **Better Alignment of Projects and Initiatives:** The BSC help organizations map their projects and initiatives to the different strategic objectives.
4. **Better Management Information:** The BSC approach helps organizations design key performance indicators for their various strategic objectives.
5. **Improved Performance Reporting:** The BSC can be used to guide the design of performance reports and dashboards.
6. **Better Organizational Alignment:** The BSC enables companies to better align their organizational structure with the strategic objectives.
7. **Better Process Alignment:** Well implemented Balanced Scorecards also help to align organizational processes such as budgeting, risk management and analytics with the strategic priorities.

2.1.6 Limitations of BSC

BSC is subject to following limitations:

- There is no clear relation between BSC and shareholder value.
- It does not lead to a single aggregate summary of control.
- The measures may give conflicting signals and confuse management.
- It involves substantial shifts in corporate culture.

2.1.7 Nine Step Guide for Implementation of BSC

The Balanced Scorecard Institute (BSI) is an educational institute of international repute. The institute facilitates research in the arena of implementation of BSC. Their consultancy services are customised and targets the following:

- Develop a balanced strategic plan and scorecard that will deliver results
- Develop meaningful performance measures or key performance indicators (KPI).
- Align work with strategy
- Create a strategic plan as part of an annual cycle.

BSI developed the Nine Steps to Success™ is a comprehensive approach to developing a strategic planning and management system based on the BSC. The nine steps for successful implementation of the BSC are detailed below:

Program Launch

The program is launched by project champion(s) and key stakeholders (working on their own or with BSI consultants). Existing strategic material and results are examined, a strategic gap analysis is completed, key stakeholders are interviewed, and other assessment activities are completed to customize workshops to incorporate work done to date.

Step 1: Assessment

It is important that an organisation critically evaluates its current foothold before exploring strategic maps for its future. For the purpose, an analysis of the current internal and external environments has to be undertaken. The organisation is required to re-validate its strategic elements before any strategy formulation.

Step 2: Strategy

On the basis of the assessment carried on in the previous step, organizations formulate strategy. The development of the strategy includes developing or clarifying customer's value proposition, visualization of strategy using a Strategy Profile and decomposing the high-level strategic direction into three to four Strategic Themes (or goals). Strategic Themes are those focus areas in which the organization must excel in order to achieve its vision and mission. The names of the four perspectives of the BSC will deviate from the original design depending on the type of the organisation. The perspective of customer may be referred as stakeholder. Learning and growth may be referred as organizational capacity.

Step 3: Strategic Objectives

In this step, the building blocks of strategy are developed. Strategic Objectives are the cornerstones of a successful strategic planning and management system and are the key to implementing strategy.

Step 4: Strategy Mapping

In this step, a cause-and-effect linkage is developed between each strategic objective. This creates a "value chain" of how customers and stakeholders are satisfied by the organization's products and services. Organizational strategy maps - graphic representation of cause-and-effect relationships of objectives across the four perspectives - are developed.

Step 5: Performance Measures

In this step, performance measures also known as key performance indicators (KPIs) which are critical to tracking progress of an organization's strategy are developed. Operational measures focus on the use of resources, processes and production (output). These measures "drive" the outcomes a business desires, with some outcomes being more intermediate than other, more final, outcomes.

Step 6: Strategic Initiatives

In this step, the projects that are critical to success of the strategy, are developed, prioritized, and implemented. Initiatives help close performance gaps in performance to hit targets. It is important to focus the organization on the execution of the most prioritized strategic projects versus creating a long list of potential actions and projects. Without this disciplined focus, organizations struggle to execute their strategy.

Scorecard Rollout: Integrating Steps 1 through 6

Once Step 6 is complete, the organization-level scorecard system is ready to be rolled out to employees. The goal is to create more internal enthusiasts and build a coalition of employees to start thinking more strategically and using the system to improve the decision making process.

Step 7: Performance Analysis

In this step, data is transformed into evidence-based knowledge and understanding. Effective analysis helps people make better decisions that will drive improved strategic outcomes. This step focuses on measuring and evaluating performance to identify what works well and what doesn't, taking corrective action and becoming a high-performance organization.

Step 8: Alignment

In this step, strategy is transformed from something only executives worry about to something everyone supports by cascading high-level enterprise strategy to business support units and employees. The alignment step produces scorecards for business and support units, and individual scorecards for each employee or team.

Step 9: Evaluation

Evaluation is an opportunity to review and refresh. During this step, leaders and managers evaluate how well the organization has accomplished desired results and how well the strategic management system improves communications, alignment and performance. It ensures that the strategic planning and management system is dynamic and incorporates continuous improvement into day-to-day operations and management.

Multiple Choice Questions – 2.1

1. According to Kaplan and Norton, what should be the main perspective of the balanced scorecard?

(a) Financial (b) Customer (c) Internal business process (d) Learning and growth

Answer: (a) Financial

2. According to Norton and Kaplan, the balanced scorecard should be used as:

(a) a control system (b) a performance measurement system (c) a financial system (d) an operational system

Answer: (b) a performance measurement system

3. The various stakeholders include vendors, employees, distributors, customers, stockholders and society. According to Norton and Kaplan, which of these should be represented on the balanced scorecard?

(a) all stakeholders are important and should be included (b) all except society which is too general to be included (c) only employees, customers and stockholders (d) only those that are vital for achieving the company's strategy

Answer: (d) only those that are vital for achieving the company's strategy

4. In the Balanced Scorecard, four perspectives that need to be balanced for companies to become and remain competitive. Which perspective places more emphasis on investing in employees?

(a) Financial (b) Customer (c) Internal business processes (d) Learning & growth

Answer: (d) Learning & growth

5. Which of the balanced scorecard perspectives serves as the focus of the other perspectives?

(a) Financial (b) Customer (c) Internal business processes (d) Learning & growth

Answer: (a) Financial

6. Which of the following is not one of the main parts of the balanced scorecard concept? Balancing:

(a) financial and non financial measurements (b) cash flows and non cash flows (c) short term and long term measurements (d) leading and lagging indicators

Answer: (b) cash flows and non cash flows

7. Arrange the five measurements below in the order of cause and effect.

A. Improve customer loyalty. B. Improve return on capital employed. C. Improve repeat and expanded sales. D. Improve cycle time. E. Improve on time delivery to customer. F. Improve employee skills.

(a) B→C→A→E→D→F (b) F→E→D→C→A→B (c) F→D→E→A→C→B (d) A→D→F→E→B→C

Answer: (c) F→D→E→A→C→B

8. Which of the following statement is correct with regard to the balanced scorecard?

(a) It is an approach to the provision of information to management to assist strategic policy formulation and achievement. (b) It emphasizes the need to provide the user with a set of information which addresses all relevant issues of performance in an objective and unbiased fashion. (c) The information provided may include both financial and non-financial elements and cover areas such as profitability, customer satisfaction, internal efficiency and innovation. (d) All of the above

Answer: (d) All of the above

9. The scorecard can be used both by profit and not-for-profit organisations because it acknowledges the fact that both financial and non-financial performance indicators are important in achieving strategic objectives.

(a) The above statement is true (b) The above statement is false

Answer: (a) The above statement is true

10. How many different perspectives are there with a balanced scorecard?

(a) 3 (b) 2 (c) 6 (d) 4

Answer: (d) 4

11. Balanced Scorecard measures with benchmark for performance in:

(a) Financial areas (b) Nonfinancial areas (c) Development areas (d) Structural areas

Answer: (b) Nonfinancial areas

12. Balanced scorecard can act as a powerful:

(a) Development framework (b) Operations framework (c) Service framework (d) Organizing framework

Answer: (a) Development framework

13. Consensus gaining while strategy management in balanced scorecard is made at the stage of:

(a) Feedback and learning (b) Translating the vision (c) Business planning (d) Learning

Answer: (b) Translating the vision

14. Important dimensions of communicating and learning includes communicating and educating, setting goals and:

(a) Gaining consensus (b) Link stakeholders (c) Link reward to performance (d) Strategic feedback

Answer: (c) Link reward to performance

15. What is the purpose of a balanced scorecard?

(a) To measure contribution of people to business growth (b) To combine a range of qualitative and quantitative indicators of performance (c) To relate business performance to customer satisfaction (d) To relate business performance to financial measures

Answer: (b) To combine a range of qualitative and quantitative indicators of performance

2.2 Du-Pont Analysis and RONA Model

2.2.1 Introduction

Profitability analysis is one of the most important measures in performance management. This is a traditional measure and evaluates the financial performance of the entity. Though several developments emerged in the arena of profitability analysis like analysis of social profitability and the triple bottom line approach, the basic premise of profitability analysis remain the same. Profitability of an entity is measured:

- (a) in relation to sales (expression of various measurements of profit per rupee of sales)
- (b) in relation to a firm's investment obligatory to generate the return (expressing the different profit measures in proportion to investment value).
- (c) in relation to valuation of the firm.

All aspects of profitability discussed in (a), (b) and (c) are covered in analysis of financial ratios. The DuPont analysis is an extension of the analysis of profitability discussed in point (b) above.

The most popular ratio under category (b) above is the return on investment (ROI), which is a mixed ratio as it relates profit, which is an item of the income statement, to investment, which is an item of the balance sheet. There are two specific variations of the ROI, which are as follows:

- (1) Return on Assets (ROA)
- (2) Return on Equity (ROE) or Return on Net Worth (RONW)

2.2.2 Return On Assets (ROA) and Return on Equity (ROE)

Return on assets is a profitability ratio that provides how much profit a company is able to generate from its assets. In other words, return on assets (ROA) measures how efficient a company's management is in generating earnings from the economic resources or assets on their balance sheet.

ROA is shown as a percentage, and the higher the number, the more efficient a company's management is at managing its balance sheet to generate profits.

$$\textbf{Return on Assets} = \textbf{Net Profit / Average Total Assets}$$

where, average total assets = (opening Assets + closing balance of assets) / 2

Since total assets represent the total pool of funds circulating in the business in the form of equity, debt capital and current obligations, it will be unsound to use net income or PAT, which denotes return to stockholders alone, in the numerator for calculating ROA. Thus, to make a proper match of the numerator with the denominator in calculating ROA, EBIT adjusted for taxes [EBIT (1-t)] is used in the numerator.

As such, EBIT (numerator) is a flow variable, while asset (denominator) is a stock concept, average of assets is taken in the denominator for better matching. ROA acts as an indicator of the management's ability and efficiency in using the firm's assets to generate profits vis-a-vis the industry.

2.2.3 DuPont Analysis

A finance executive at E.I. du Pont de Nemours and Co., of Wilmington, Delaware, created the DuPont system, also known as the DuPont model, of financial analysis in 1919. The name comes from the DuPont corporation that started using this formula in the 1920's. The Du Pont corporation pioneered this system of financial analysis which decomposes Return On Assets (ROA) into several component ratios with a view to understanding the overall earning power of the firm. The DuPont model is an extended analysis of the profitability of the organisation. The model comprises levels of:

- Three component analysis and
- Five component analysis

As such, at the introductory level, return on asset (ROA) is a multiplicative factor of two ratios namely the net profit margin (given as profit as a percentage of sales) and the asset turnover ratio (how effectively the company is utilises the assets to generate sales).

$$\text{ROA} = \text{Return} / \text{Total Asset}$$
$$\Rightarrow \text{ROA} = (\text{Return} / \text{Sales}) \times (\text{Sales} / \text{Total Asset})$$

$$\Rightarrow \text{ROA} = \text{Margin on Sales} \times \text{Total Asset Turnover}$$

Thus, ROA measure is a synthesis of two ratios - a profitability ratio (i.e., margin on sales) and an activity ratio (i.e, total asset turnover). This implies that profitability, measured in terms of the ROA can be improved by enhancing either of the two ratios. A low ROA can result from low asset turnover indicating poor asset management or low profit margins or a combination of both the factors or when lower turnover more than offsets the increase in profitability or vice-versa. This provides an explanation why a grocery store having a low margin on sales but a high asset turnover can have the same ROA as that of a jewellery shop having a high margin but a low asset turnover. This explanation is the basis of the DuPont analysis and is referred by some authors as the two-component DuPont analysis.

The two-tier approach is a primary approach to analysis of the contributory factors to profit. This shows that improvements on the financial performance of an enterprise can be accomplished either through more effective use of available resources i.e. capital, measured by asset turnover sequence or by a better relationship between sales and expenses, measured by profit margin sequence. Before delving into 3/5 component DuPont analysis it is important to note that both the measures of profitability; the return on asset (ROA) and the return on equity (ROE) are variations of the ratio return on investment (ROI) and are interconnected through the equity multiplier, better known as the financial leverage.

$$\text{ROE} = \text{ROA} \times \text{Equity multiplier}$$
$$\text{ROE} = \text{ROA} \times (\text{Total Asset} / \text{Equity Share Capital})$$

Thus, in case of an all equity firm (equity multiplier = 1) ROA = ROE

2.2.4 Three Component DuPont Analysis

The Return On Equity (ROE) is often considered as the most significant measure of profitability, as the ratio considers the return generated for the shareholders who are the most important stakeholder of a business and the stockholder theory is pivoted on them. Since the ROE is the most important measure, the factors which contribute to it is of crucial importance. The DuPont framework is a method of analyzing the ROE into its component parts. The DuPont framework breaks ROE algebraically into three ingredients: profitability, productivity, and leverage.

$$\text{Return on Equity (ROE)} = \text{Profitability} \times \text{Productivity} \times \text{Equity multiplier}$$

$$\Rightarrow \text{ROE} = \text{Profit Margin} \times \text{Asset Turnover} \times \text{Equity multiplier}$$

$$\Rightarrow \text{ROE} = (\text{Net Profit} / \text{Sales}) \times (\text{Sales} / \text{Total Asset}) \times (\text{Total Asset} / \text{Shareholders' Equity})$$

Three Components Explained

- **Profitability** – The net profit margin is the notion which reflects the return of every rupee of sales effected by the company. This is the first and foremost contributing factor.
- **Productivity** – That a company is generating handsome profit margin is not sufficient to comprehend the overall profitability as ROE may reinforced or otherwise by the company's productivity. The asset turnover is a measure of productivity which measures how efficiently a company uses its assets to generate sales.
- **Equity multiplier** – Equity multiplier (an approximation of financial leverage) can augment return, given that the total income of the firm (EBIT) remain same. In simple terms, by increasing the debt proportion (and corresponding decrease of shareholders equity in percentage terms) the ROE may be increased.

Thus, DuPont framework analyses of the components of ROE. This enables analysts to determine the contribution of each factor to a change in ROE. The ROE can therefore be improved by improving:

- margin on sales ratio either by increasing selling prices or by reducing and controlling costs; or
- asset turnover ratio either by increasing sales volume or by raising the productivity of capital invested in assets through their optimum utilization; or
- equity multiplier or financial leverage ratio by enhancing the extent of internal (i.e. equity) financing of assets; or
- a combination of the above.

The DuPont analysis brings forth two imperfections of the ROE as a measure of profitability:

- (a) From the above discussion it is noted that the way a company is financed measured in terms of the financial leverage is one component of the ROE. Thus as such, a highly geared firm would show higher profitability than a lowly geared firm. This problem makes analysts to prefer the return on capital (EBIT in terms of firm's capitalisation [debt plus equity]).

- (b) The second problem which is omnipresence in the concept of profit, is that the ROE fails to correspond to the cash-generating capability of a business.

Solved Case 1 (ICMAI Study Material): Retailer A vs Retailer B

Mrs. EuCheu is an investor who has decided to invest her money in the business of either Retailer A and Retailer B. She researches their financial numbers and finds that the ROE for the both the Retailers are same at 45%. Thus she decides to look further and finds the following data:

- Retailer A's profit margin is 30%, asset turnover is 0.50, and equity multiplier is 3.
- Retailer B's Profit Margin of 15%; Asset Turnover is 3; and Equity Multiplier is 1.

Solution (ICMAI Standard):

Mr Dune uses the DuPont Framework which states that:

DuPont ROE = Margin on Sales × Asset Turnover × Equity Multiplier

⇒ DuPont ROE = (Net Profit / Sales) × (Sales / Total Asset) × (Total Asset / Shareholders' Equity)

In case of Retailer A:

DuPont Return on Equity (ROE) [45%] = Margin on Sales (30%) × Asset Turnover (0.50) × Equity Multiplier (3)

Check: 0.30 × 0.50 × 3 = 0.45 = 45%

In case of Retailer B:

DuPont Return on Equity (ROE) [45%] = Margin on Sales (15%) × Asset Turnover (3) × Equity Multiplier (1)

Check: 0.15 × 3 × 1 = 0.45 = 45%

Observations:

- (a) Retailer A's business is more profitable in terms of rupee return generated against sales.
- (b) Regarding utilisation of assets at disposal, retailer B is better as its asset turnover is three against 0.50 of retailer A.
- (c) The equity multiplier of retailer B is one (shareholders' equity equals total assets) implying that it is an all equity firm. Thus it may be inferred that the financial risk perception is nil. Whereas, the equity multiplier of retailer A is three, implying that the total assets (debt + shareholders' equity) is three times the shareholders equity. And a portion of financing total asset is debt financing implying some amount of financial risk.

Solved Case 2 (ICMAI Study Material): Lotus Inc. and ASA Inc.

An investor has been watching two similar companies, Lotus Inc., and ASA Inc. that have recently been improving their return on equity compared to the rest of companies in the industry.

Table 2.2: DuPont Analysis of Lotus Inc. and ASA Inc.

Particulars (figures in '000)	Lotus Yr 1	Lotus Yr 2	ASA Yr 1	ASA Yr 2
a. Net Income	1,000	1,200	2,100	2,100
b. Revenue from operation	10,000	10,000	17,500	17,500
c. Profit Margin (a÷b)	0.10	0.12	0.12	0.12
d. Revenue from operation	10,000	10,000	17,500	17,500
e. Average Assets	5,000	4,800	8,750	8,750
f. Asset Turnover (d÷e)	2	2.08	2	2
g. Average Assets	5,000	4,800	8,750	8,750
h. Average Equity	2,000	2,000	5,000	3,500
i. Equity Multiplier (g÷h)	2.5	2.4	1.75	2.5
j. ROE (c×f×i)	**50%**	**60%**	**42%**	**60%**

Analysis (ICMAI Standard):

It is obvious from the above table that, Lotus Inc. improved its profit margins by increasing net income and reducing its total assets. Shareholders' equity has remained stable at 2000. The equity multiplier has marginally fallen as the average assets is reduced. Simply, Lotus Inc. improved its profit margin and asset turnover while equity remained constant. It can be also inferred that there is partial reduction of debt since average total asset has declined while equity has remained constant.

While the situation at ASA Inc. is very dissimilar. It may be observed that the profit margin and the asset turnover both has remained the same over the years. ROE has significantly risen from 42% to 60% over the two-year period. The entire change in ROE is due to an increase in equity multiplier which increased from 1.75 to 2.5. This is also projected in the fact that though the average asset remained same at 8750, equity decreased from 5000 to 3500 implying that there is debt instrument in the capital structure.

The investor is concerned because the additional borrowings has increased the ROE but actually it didn't change the profitability of the firm.

Summary:

- The DuPont analysis is a model created by the DuPont Corporation and is used to analyse a company's fundamental financial performance - profitability.
- The three variables of the framework are: Net Profit Margin, Asset Turnover, and Equity Multiplier.
- The results of this are usually expressed as a percentage.
- The DuPont analysis dissects the various factors that determines Return on Equity (ROE).
- One of the major advantages of the DuPont framework is that it encompasses the equity multiplier, a measure of the financial leverage, in the measure of the profitability which is an operational ratio.

2.2.5 Five Component DuPont Analysis

The 5-component DuPont analysis is an extension of the original model. In this case, the ROE is segregated into five components which provide information on five aspects of profitability.

ROE = Operational Efficiency × Interest Burden on Earnings × Tax burden on earnings × Asset Utilization × Equity multiplier (Financial leverage)

$$\Rightarrow \textbf{ROE} = (\text{EBIT/Sales}) \times (\text{EBT/EBIT}) \times (\text{EAT/EBT}) \times (\text{Sales/Total Assets}) \times (\text{Total Assets/Equity})$$

Five Components Explained

- **(EBIT ÷ Sales)** – This is approximation of the net margin. Here earnings before interest and taxed (EBIT) is used as an approximation of the net profit, used in the previous 3-component framework. EBIT is calculated by adjusting net profit. This shows the operational efficiency of the firm.
- **(EBT ÷ EBIT)** – This component is an addition in the 5-component framework. Earnings before taxes (EBT) is mapped against the EBIT. This component shows the impact of interest burden on the earnings of the firm. If this ratio is one, it implies zero interest burden which further implies that there is no debt in the capital structure (all equity firm).
- **(EAT ÷ EBT)** – This is the third component in the 5-component framework. Earnings after taxes (EAT) is mapped against EBT. This component shows the impact of tax burden on the earnings of the firm.
- **(Sales ÷ Total Assets)** – This shows the return generated in terms of the asset base of the firm. The issue of asset utilization is addressed in this ratio.
- **(Total Assets ÷ Equity)** – This ratio is referred as the equity multiplier and is an approximation of the financial leverage. If the ratio is one, it implies that all of the assets is sourced from equity and there is no debt component.

Solved Case 3 (ICMAI Study Material): Sulekha Ltd – Krishna LLP

Sulekha Ltd is planning to take over the business of Krishna LLP. For the purpose they appoint Mr Dune, a professional accountant to analyse the profitability of Krishna LLP for the period ended 31st March 2024.

Balance Sheet Extract

Particulars	Amount (₹)
Sales	7,100
Depreciation	200
Interest Expenses	20
Tax Expenses	900
Net Income	1,650
Current Assets	4,600
Fixed Assets, net	2,650
Total Assets	7,250
Current Liabilities	3,000
Long term debt	150
Shareholders' Equity	4,100
Total Liabilities and Shareholder's equity	7,250

Solution (ICMAI Standard):

Traditional ROE = (Net Return / Equity) × 100 = (1650 / 4100) × 100 = **40.24%**

DuPont 5-Component Analysis:

Dupont ROE = (EBIT/Sales) × (EBT/EBIT) × (EAT/EBT) × (Sales/Total Assets) × (Total Assets/Equity)

Component	Computation	Value
EBIT ÷ Sales	2570 / 7100	0.3619718314
EBT ÷ EBIT	2550 / 2570	0.992217899
EAT ÷ EBT	1650 / 2550	0.647058824
Sales ÷ Total Assets	7100 / 7250	0.979310345
Total Assets ÷ Equity	7250 / 4100	1.768292683

[where, net income (1650) + interest (20) + tax (900) = EBIT (2570)]
[EBT (2550) = EBIT(2570) - Interest(20)]
[EAT (1650) = EBT(2550) - tax(900)]

Thus, DuPont ROE = 0.361971831 × 0.992217899 × 0.647058824 × 0.979310345 × 1.768292683
= **0.402439024 = 40.24%**

Inferences drawn by Mr Dune:

- (a) EBIT/Sales, which measures the operational efficiency is satisfactory at 36.20% approximately
- (b) The EBT and the EBIT are almost same (as the ratio, EBT/EBIT is 0.99 implying that the interest burden is minimal. This is also reflected in the information given which shows that long term debt in the capital structure is very low, only 150 while the equity is 4100.
- (c) Tax burden is significant as the ratio EAT/EBT indicates. The ratio stands at 64.71% (approximately) implying that a significant portion of the income (35.29%) is the tax burden.
- (d) Assets are managed efficiently as the Sales/Total Assets indicates.
- (e) Equity multiplier of 1.77 (approximately) indicates that the firm depends primarily of equity for its financing. This is also represented in the low long term loan (150) in the capital structure of Krishna LLP.

2.2.6 RONA (Return on Net Assets)

Return on net assets (RONA) is measure of profitability which calculates net profit as a proportion of the sum of fixed assets and net working capital. Thus RONA is yet another variation of the return on investment which considers the investment in the working capital, as well. The net profit, considered, is after interest and taxes.

$$\textbf{RONA = Net Profit / (Fixed Assets + NWC)}$$

where: NWC = Current Assets - Current Liabilities

The RONA ratio shows how well a company and its management are deploying assets in economically valuable ways; a high ratio result indicates that management is squeezing more earnings out of each dollar invested in assets. RONA is also used to assess how well a company is performing compared to others in its industry.

Three Important Key Aspects of RONA

1. (a) Return on net assets (RONA) compares a firm's net profits to its net assets to show how well it utilizes those assets to generate earnings.
2. (b) A high RONA ratio indicates that management is maximizing the use of the company's assets.
3. (c) Net income and fixed assets can be adjusted for unusual or non-recurring items to gain a normalized ratio result.

Implications of RONA

RONA provides a comparison between a firm's net income and its assets (fixed asset and excess of current asset over current liabilities). This provides assistances to financial analysts to define how well the company is generating profit from its assets. The higher a firm's earnings relative to its assets, the more effectively the company is deploying those assets. RONA is an

especially important metric for capital intensive companies, which have fixed assets as their major asset component. In the capital-intensive manufacturing sector, RONA can also be calculated as:

> **RONA = (Plant Revenue - Costs) / Net Assets**

RONA is just another ratio used to evaluate a company's financial health of the enterprise.

Multiple Choice Questions – 2.2

1. The following is NOT part of the DuPont analysis formula:

(a) Profit Margin (b) Total Asset Turnover (c) Cash Balance (d) Financial Leverage

Answer: (c) Cash Balance

2. DuPont Analysis is an expression which breaks _____ into three parts.

(a) Gross Profit (b) Return on Equity (ROE) (c) Net Profit (d) Current Asset

Answer: (b) Return on Equity (ROE)

3. DU PONT Analysis deals with:

(a) Analysis of Current Assets (b) Analysis of Profit (c) Capital Budgeting (d) Analysis of Fixed Assets

Answer: (b) Analysis of Profit

4. What is DuPont Analysis used for?

(a) Calculating profit margins (b) Analyzing financial performance (c) Analyzing current assets (d) None of the above

Answer: (b) Analyzing financial performance

5. Which financial ratios are considered in DuPont Analysis?

(a) Current ratio and quick ratio (b) Debt-to-equity ratio and interest coverage ratio (c) Return on assets and return on equity (d) Gross profit margin and net profit margin

Answer: (c) Return on assets and return on equity

6. What does the asset turnover ratio measure in DuPont Analysis?

(a) Profitability of assets (b) Efficiency in using assets to generate sales (c) Debt management (d) Employee productivity

Answer: (b) Efficiency in using assets to generate sales

7. What is the formula for the DuPont Identity?

(a) ROE = Net Income / Average Shareholder's Equity (b) ROE = Profit Margin × Asset Turnover × Financial Leverage (c) ROE = Earnings per Share / Price per Share (d) ROE = Gross Profit Margin - Operating Expenses

Answer: (b) ROE = Profit Margin × Asset Turnover × Financial Leverage

8. Why is the DuPont Analysis considered a comprehensive financial tool?

(a) It focuses only on profitability (b) It includes multiple financial ratios (c) It analyzes social responsibility (d) It measures employee satisfaction

Answer: (b) It includes multiple financial ratios

9. How does DuPont Analysis help investors?

(a) Predicting weather trends (b) Assessing financial risk (c) Analyzing political landscapes (d) Monitoring global population growth

Answer: (b) Assessing financial risk

10. What does the DuPont Analysis reveal about a company with a high asset turnover ratio?

(a) Inefficient use of assets (b) Low sales efficiency (c) High operational efficiency (d) Excessive reliance on debt

Answer: (c) High operational efficiency

11. How does DuPont Analysis contribute to strategic decision-making for a company?

(a) By predicting stock market trends (b) By assessing operational efficiency and risk (c) By evaluating customer satisfaction (d) By analyzing competitor social responsibility

Answer: (b) By assessing operational efficiency and risk

12. What does the debt-to-equity ratio represent in DuPont Analysis?

(a) Operational efficiency (b) Financial risk (c) Profitability (d) Asset liquidity

Answer: (b) Financial risk

13. How does DuPont Analysis assist in identifying areas for improvement in a company's financial performance?

(a) By analyzing social media trends (b) By evaluating employee satisfaction (c) By pinpointing specific components impacting return on equity (d) By predicting economic recessions

Answer: (c) By pinpointing specific components impacting return on equity

14. How does DuPont Analysis address the relationship between profitability and financial structure?

(a) By ignoring financial structure (b) By combining profitability and financial structure into a single ratio (c) By analyzing profitability and financial structure separately (d) By measuring employee turnover

Answer: (b) By combining profitability and financial structure into a single ratio

15. Given the following information for a business: Asset turnover = 3.50, Equity multiplier = 1.00, Return on equity = 30%. Using the DuPont analysis what is the net profit margin?

(a) 8.57% (b) 7.65% (c) 8.01 (d) 7.95

Answer: (a) 8.57%

2.3 Benchmarking & Bench Trending

2.3.1 Introduction

The main goal of a business is not only to be profitable, but also to sustain in the competitive business environment for an indefinitely long period. For the purpose the company is always in the look out to create more efficient processes in order to sell more of their products and services. So profit and profit are the two main goals of an organisation. But unless the company's performance is compared with industry standard or another competitor it is not possible to gauge the success of the company.

For example, Mr Dune (a financial expert) observes that a company, say Sulekha Inc. has generated ROE of 25%. It is also known that Sulekha Inc. is in the business of manufacturing and selling of stationary products. Now the moot question is how does Mr Dune infer that the ROE (25%) is good enough. An investor would also query whether ROI of 25% is a good investment opportunity in this line of business. The answer to the queries is plausible only through comparison with a standard, may be that of a close competitor or the industry at large. This is the crux of Benchmarking. Benchmarking, as such, is a much process than just comparison. It is used to measure the quality and performance of your company's products, services, and processes. Through the benchmarking process, any business can compare itself against a standard and develop a consistent way of measuring performance.

2.3.2 Definition of Benchmarking

Doug Blanchard's Definition: Benchmarking as the continuous process of comparing one's business processes and performance metrics to industry bests and/or best practices from other industries. For the purpose the dimensions typically measured are quality, time, and cost and the improvements are in terms of doing things in a 'better, cheaper and faster' way. Benchmarking is far more than copying. It requires deep self-assessment and the ability to translate practices that work in another context into a process appropriate to the organisation.

Kempner (1993) Definition: Benchmarking as an ongoing, systematic process for measuring and comparing the work processes of one organization to those of another, by bringing an external focus to internal activities, functions, or operations.

From the above definitions it is clear that the goal of benchmarking is to provide key personnel, in charge of processes, with an external standard for measuring the quality and cost of internal activities, and to help identify where opportunities for improvement may reside.

2.3.3 Types of Benchmarking

Literature on the issue of benchmarking is diverse despite the fact that it is as such a straight forward concept. Numerous categories of benchmarking which appear in the literature. One such categorization based around the nature of business it serves, results in the identification of four types of benchmarking:

Type 1: Internal Benchmarking

In which comparisons are made between various departments within the same organisation. For example, in an undergraduate college, the number of classes taken in a particular department, say English department may be compared with the Benchmark, say the Philosophy department, which is considered so as it is the best department in the college in terms of final result.

Type 2: Competitive Benchmarking

In which comparisons are made with direct competitors. For example, in XYZ college, the number of classes taken in a particular department, say English department may be compared with the number of classes taken in the English department of MNK college both of which caters to same area and thus compete with each other regarding the number of students' admittance.

Type 3: Industry Benchmarking

In which the benchmarking partner is not a direct competitor, but does share the same industry as one's organisation. In the example cited in (2) above, if the colleges do not compete with each other regarding students' admittance, then the same is an example of industry benchmarking.

Type 4: Generic Benchmarking

Generic benchmarking broadly conceptualizes unrelated business processes or functions that can be practiced in the same or similar ways regardless of the industry.

Second Method of Categorisation (Based on Practices or Processes)

(a) Product Benchmarking

This is an age old practice of product oriented reverse engineering. Every organization buys its rival's products and tears down to find out how the features and performances etc., compare with its products. This could be the starting point for improvement.

(b) Process Benchmarking

Process benchmarking is a crucial first step. It constitutes comparing and analyzing the business processes of an organisation with those processes that are considered the best practices in the industry.

(c) Performance Benchmarking

Performance benchmarking involves gathering and comparing quantitative data (i.e., measures or key performance indicators). It compares performances.

(d) Strategic Benchmarking

Strategic benchmarking is comparing improvements in strategic performance of an organisation to that of performance leaders in similar field of activity, in addition to comparing them to the past performance of the organisation itself.

2.3.4 The Process of Benchmarking

Though there are various understandings of the process of benchmarking as suggested by existing literature, one particular study is noted to have gained relevance. Stapenhurst (2015) points that the basic aspect of the model is that an individual within an organization has identified a need for benchmarking. Thus the model is not applicable where an organisation is already using some benchmarking techniques.

The first phase of the project is **internal preparation** which includes a proposal for the study. This is an important arena as it is based on the importance that the management has identified with the benchmarking process. The proposal is likely to include the purpose and objectives of the study, performance indicators (PIs), timescales, potential participants and contacts.

The second phase is **data comparison** which comprises of two parts. The first is to recruit and work with participants in order to finalize the details of the benchmarking study. While reviewing, refining and harmonizing what was developed in phase one is taken up in the first part of this phase, the second part of this phase consists of data collection, validation and report writing.

The final phase is **improvement of the organisation**. The information contained in the report are used by the participants use to improve their own organization.

Fig 2.3: Phases of the Benchmarking Process

Table 2.3: The Specifics of the Model

Phase	Objective	Particulars
Phase 1	To develop a project proposal	Begins with identifying the need to benchmark and ends with an approved detailed proposal, including a plan. The organization is now ready to approach other groups to invite them to benchmark.
Phase 2	To recruit participants into the study and work with them to finalize details of the study	Begins by contacting potential participants inviting them to join the study. Includes agreeing the details of the study with the participants and data collection, analysis and reporting. Ends with an issued report and/or other deliverables.
Phase 3	To improve the organization	Begins by using the information in the report/deliverables to identify specific improvement areas and tasks. Completes the improvement activity by any appropriate method.

2.3.5 Bench Trending

There are numerous developments, occurring regularly, in the political, economic, social and technological arena. Organisation needs to continuously monitor these developments in order to identify future gaps that may be created by significant market changes, customer preferences, innovation threats and other environmental variables which are critical to the long term success of the firm. Such trend studies are known as bench trending. Bench trending is the latest approach to benchmarking. It involves continuous monitoring of specific process performance with a selected sample.

Table 2.4: Benchmarking Vs Bench Trending

Benchmarking	Bench Trending
Benchmarking is the process of evaluating the business performance with the standard business metrics of the industry.	Bench trending is used for monitoring the performance and operations for bringing improvements and setting a direction.
These business process that are measured for their performance include productivity, cycle time, cost and quality.	These are methods which are used for bridging the gaps and improving performance levels through various new technological methods.

Multiple Choice Questions – 2.3

1. In which form of benchmarking is comparison of a business process done with a similar process within the organization?

(a) Internal benchmarking (b) Competitive benchmarking (c) Functional benchmarking (d) Generic benchmarking

Answer: (a) Internal benchmarking

2. In which form of benchmarking is direct comparison with competitor done of a product, service, process or method?

(a) Internal benchmarking (b) Competitive benchmarking (c) Functional benchmarking (d) Generic benchmarking

Answer: (b) Competitive benchmarking

3. In which form of benchmarking is comparison of similar or identical practices within same or immediate industry is done?

(a) Internal benchmarking (b) Competitive benchmarking (c) Functional benchmarking (d) Generic benchmarking

Answer: (c) Functional benchmarking

4. Which of the following is not a challenge to functional benchmarking?

(a) Variation in corporate culture (b) Takes more time than internal benchmarking (c) Common functions are difficult to find (d) Takes less time compared to internal benchmarking

Answer: (d) Takes less time compared to internal benchmarking

5. In which form of benchmarking unrelated business processes or functions that can be utilized are studied?

(a) Internal benchmarking (b) Competitive benchmarking (c) Functional benchmarking (d) Generic benchmarking

Answer: (d) Generic benchmarking

6. _____ is an essential step for benchmarking process.

(a) planning (b) self-assessment (c) gathering data (d) all of the above

Answer: (d) all of the above

7. Benchmarking is a/an _____ tool.

(a) improvement (b) cutting (c) quality (d) production

Answer: (a) improvement

8. Benchmarking can also be used by an organization to determine:

(a) whether an organization is able to comply with standards (b) whether an organization is able to meet customer expectations (c) areas for future improvement to remain competitive in the market (d) all of the above

Answer: (d) all of the above

9. Which of the following is not a type of benchmarking?

(a) internal benchmarking (b) external benchmarking (c) national benchmarking (d) international benchmarking

Answer: (c) national benchmarking

10. Strategic benchmarking deals with:

(a) management (b) managers (c) workers (d) all of the above

Answer: (a) management

11. Benchmarking is most used to measure:

(a) capacity (b) performance (c) length (d) height

Answer: (b) performance

12. The first organization which initiated benchmarking concept:

(a) Motorola (b) Xerox (c) Suzuki (d) Daimler Benz

Answer: (b) Xerox

13. The term benchmarking was first used by:

(a) Carpenters (b) Goldsmiths (c) Blacksmiths (d) Cobblers

Answer: (d) Cobblers

14. Benchmarking involves _____ between the performance level of the organization with its benchmark.

(a) Increasing the gap (b) Reducing the gap (c) Opening the gap (d) Broadening the gap

Answer: (b) Reducing the gap

15. Benchmarking is used extensively in:

(a) Manufacturing organizations only (b) Service organizations only (c) Manufacturing and service organizations (d) Government institutions only

Answer: (c) Manufacturing and service organizations

2.4 Six Sigma and Lean Management

2.4.1 Six Sigma

Introduction

Quality is a two edged sword. Improvement of quality is surely the road to success for a company, but the same increases cost which acts as a deterrent for the company in the market. In order to manage quality, improvement of performance, in terms of the internal processes seems to be the solution. In the book Good to Great, Jim Collins posits that in order to achieve sustainable growth in the competitive environment, companies need to dramatically break away from the past and tread a radical path in improving their performance, as reflected in market value appreciation. The author through empirical research shows that greatness of the company is not a function of what leaders did, but actually depended on what the companies did to improve their performance. Improvement of performance is through achievement of processes. Six Sigma or 6σ is a statistical concept which is used as a methodology for process improvement. σ (sigma) is used to indicate the standard deviation of a data set. It estimates the variation in the data set. A stated sigma level, such as Six Sigma, is used to describe how well the process variation meets the customer's requirements. Six Sigma ensures superior quality of products by removing the defects in the processes and systems.

Product defects leads to poor customer satisfaction. Six Sigma is a statistical concept, which when suitably deployed, reduces variation in process and lessens the probability of error which lead to lesser product defects. Six sigma is a process which helps in improving the overall processes and systems by identifying and eventually removing the hurdles which might stop the organization to reach the levels of perfection.

In deploying Six Sigma, organisation has to depend on goal oriented teams lead by project managers who seek to implement strategies based on measurement and metrics. Thus, Six Sigma is data driven and is a suitable augmentation for intuition/experience based decision making of business leaders.

Why Six Sigma (6σ)?

In order to manage the problem of higher number of defects in the production process, the concept of Six Sigma (σ) uses the normal curve. For the purpose, variation in the data set is assumed to follow the normal distribution. The standard deviation (σ), which is a measure of the variation of the data set, is multiplied with the numbers 1, 2, 3 etc, to come up with a range.

For example, if it is assumed that the average of the data set is 12, and the σ is 1.5, then in case of 1σ, 68.26% of the data will lie between 12 +/- (plus/minus) 1σ i.e., 10.5 (12 - 1×1.5) and 13.5 (12 + 1×1.5). Similarly, in case of 3σ, 99.73% of the data lies between 12 +/- (plus/minus) 3σ. Thus 99.73% of the data will lie between [12 +/- (plus/minus) 3×1.5], i.e., 7.5 and 16.5.

Fig 2.4: The Normal Curve

Range	% of Data
Mean ± 1σ	68.26%
Mean ± 2σ	95.44%
Mean ± 3σ	99.73%

-3σ to +3σ covers 99.73% of data; only 0.27% lies outside → 3.4 defects per million opportunities at 6σ.

From the above definition it is clear that as the sigma level (standard deviation) is increased, more and more of the data set falls within the perimeter of the curve. This concept may be applied to the manufacturing or service industry for lesser defects and greater customer satisfaction. For example, in case of a bank, if the mean wait time of the customer at the teller is 7.5 minutes and the standard deviation (σ) is 1 minute, then at 3σ level, then in 99.73% of cases the wait time of the customer at the teller would be within 4.5 minutes [7.5 - 3×1] and 11.5 [7.5 + 3×1]. Thus at 3σ level, management of the Bank would have to ensure that the wait time of the customer at the teller is within 4.5 minutes and 11.5 minutes. This would make 99.73% of the customers satisfied.

If the sigma level is increased, may be, to six then more number of the customers would be satisfied. The implication is that at six sigma level of performance customer wait time will only exceed the customer requirement a very small percent of time.

Table 2.5: DPMO and Sigma Level - Inverse Relationship

Sigma Level	Defects per million of opportunities	Percentage defects
1	691462	69%
2	308538	31%
3	66807	6.7%
4	6210	0.62%
5	233	0.023%
6	3.4	0.00034%
7	0.019	0.000019%

History of Six Sigma

During early 80s, threatened by competition from Japanese companies, Motorola alike many American companies, was desperately looking for measures to improve of performance so that they could make up the losses in terms of profitability and market share. For this reason, the management summoned the top engineers at Motorola and told them to combine all the best quality management practices known till that time and make an aggregated methodology which would be the base of Motorola's competitive quality improvement program. Thus developed the first Six Sigma program. Within four years, the Six Sigma programs saved the company $2.2 billion. Motorola was awarded the coveted Malcolm Baldrige National Quality Award 1988.

Six Sigma Deployment

Jack Welch commented, "Six Sigma is a quality program that, when all is said and done, improves your customer's experience, lowers your costs, and builds better leaders." It is also referred by its generic or customized name "Operational Excellence," "Zero Defects," or "Customer Perfection". For elimination of defects in any process, this data driven approach is used.

There are two methodologies for deployment of Six Sigma:

- **DMAIC** (Define, Measure, Analyze, Improve, and Control)
- **DMADV** (Define, Measure, Analyze, Design, and Verify)

The DMAIC process is used when an existing process fails to meet the specification and the firm is looking for improvement to uplift the system. Whereas the DMADV process is an improvement system used to develop new processes or products at Six Sigma quality levels. Both the Six Sigma processes (DMAIC and DMADV) are executed by professionals who are categorized as Six Sigma Green Belts and Six Sigma Black Belts, and are overseen by Six Sigma Master Black Belts.

DMAIC – Five Steps:

1. (a) **Define** the process improvement goals that are consistent with customer demands and enterprise strategy.
2. (b) **Measure** the current process and collect relevant data for future comparison.
3. (c) **Analyze** to verify relationship and causality of factors. Determine what the relationship is, and attempt to ensure that all factors have been considered.
4. (d) **Improve** or optimize the process based upon the analysis using techniques like Design of Experiments.
5. (e) **Control** to ensure that any variances are corrected before they result in defects. Set up pilot runs to establish process capability, transition to production and thereafter continuously measure the process and institute control mechanisms.

DMADV – Five Steps:

1. (a) **Define** the goals of the design activity that are consistent with customer demands and enterprise strategy.
2. (b) **Measure** and identify CTQs (critical to qualities), product capabilities, production process capability, and risk assessments.
3. (c) **Analyze** to develop and design alternatives, create high-level design and evaluate design capability to select the best design.
4. (d) **Design** details, optimize the design, and plan for design verification. This phase may require simulations.
5. (e) **Verify** the design, set up pilot runs, implement production process and handover to process owners.

7 Key Roles for Successful Deployment of Six Sigma

Role	Description
a) Executives	In the Six Sigma hierarchy, executives are at the top level. They provide strategic leadership for implementation of Six Sigma program in accordance with an organization's specific culture and goals.
b) Champion	The champions, second in the hierarchy, are the middle level executives. It is their duty to understand the details and peculiarities of a company - such as its vision, mission, and metrics - and use this information to tailor the Six Sigma plan to fit the corporation's goals. It is a part of their duty to bypass barriers in the implementation process like resistance from employees to changes.
c) Master Black Belt	The Master, third in hierarchy, are experts in the methodology, resources, and practices of Six Sigma. The main objective of a Master Black Belt is to coach and train Black Belts. They work alongside the Six Sigma leaders (Executives and Champions) as possess specific skills in project implementation. Master Black Belts also have the ability to train and certify others in the methods of Six Sigma.
d) Black Belt	Certified Black Belts are full-time professionals whose acts as a team leader for Six Sigma projects. The Six Sigma Academy states that Black Belts have the ability to save businesses an estimated $230,000 for each project they lead and they can complete four to six projects a year. While Executives, Champions, and Master Black Belts focus on finding the best-fitting Six Sigma projects, Black Belts fill in to deploy Six Sigma in all practically. The black belts undergo training in the core Six Sigma principles and project implementation models; DMAIC and DMAIV.
e) Green Belt	Green Belts are part-time professionals with a variety of duties, which include assisting on Black Belt projects and leading smaller projects. They are trained in problem-solving techniques and the tenets of the DMAIC project model. When working in projects with Black Belts, their duties mainly focus on accumulating data, executing experiments, and analyzing information. Their work on smaller, focused Six Sigma projects allows them to devote less time than the Black Belt's full-time commitment.
f) Yellow Belt	Yellow Belt certification signifies an understanding of the basic metrics and improvement methods of Six Sigma, plus the ability to integrate these tactics into an organization's production systems. Their role in the Six Sigma process is that of a core team member. Often, their focus on an area of knowledge can lead Yellow Belts to be subject matter experts, with the responsibility of running smaller improvement projects. Yellow Belts are responsible for identifying certain processes that need improvement.
g) White Belt	At the novice level of Six Sigma, the White Belt provides the most basic introduction to the principles and methodologies of the program. They can work locally to solve problems and support projects, though individuals who have White Belt certification sometimes are not members of the Six Sigma team. The White Belt level provides a foundation for those who are deciding whether they plan to continue within the Six Sigma process.

Six Sigma and Total Quality Management (TQM)

TQM, Six-Sigma, and Toyota production system (or lean production), are three main quality improvement programs initiated by various companies in order to better their production processes to meet ever-growing challenges of the new competitive business environment. Both Six Sigma and TQM are quality management tools which have been put to effective use by companies. Although the methodologies and procedures used in the two appear quite similar, there are certain differences between the two which are enumerated below:

Basis	Six Sigma	TQM
Origin	Newer concept; incepted in 1981 in Motorola	Evolved through contributions of quality gurus post 1950; Feigenbaum introduced TQC in 1951
Focus	Improving quality by minimizing and eventually eliminating defects from the system	Preserve existing quality standards
Implementation	Much complicated; dependent on certified professionals (Master Black Belts). Employees certified as "Green Belts" or "Black Belts"	A philosophy which can be referred to a part time activity which does not require any special training
Results	Delivers better and effective results; customer feedbacks makes Six Sigma more accurate and result oriented	Growing consensus that six sigma will outperform TQM in future

2.4.2 Lean

Introduction

Lean manufacturing, also known as lean production, refers to systemized reduction of time within the production cycle including response times of suppliers and customers. Lean, similar to just-in-time (JIT), emphasizes reduction of inventory cost and wastage and increases productivity. The word, lean refers to a thin production system, which is almost devoid of wastes. It eliminates all such activities that do not add value to the finished product. The system is considered as lean because more and more can be achieved with less and less.

The term 'lean' was coined by John Krafick in 1988 in his famous book The Machine that Changed the World. Further detailing was made by the author in the book Lean Thinking published in 1996. In his first book the author notes that Eiji Toyoda, benefited from his discourse with Henry Ford in 1950, created an alternative philosophy to mass production, called the Toyota Production System (TPS). For the purpose Taiichi Ohno made enormous contribution and is considered as the father of the TPS. The TPS is the forbeaker of lean production.

Lean Manufacturing – An Overview

Systematic elimination of waste is at the heart of lean manufacturing. It aims cutting "fat" from the production activities. It focuses on 3M's:

- **Muda** (meaning waste in Japanese)
- **Mura** (meaning inconsistency in Japanese)
- **Muri** (meaning unreasonableness in Japanese)

Of the three, muda is a tangible issue and the most important. Waste is broadly defined as anything that adds cost to the product without adding value.

Seven Perspectives of Waste (7 Wastes)

1. **Transportation** – Unnecessary movements of vehicles, parts, or the plant of machinery.
2. **Inventory** – Storing too much inventory or components.
3. **Motion** – Movement of people that adds nothing to the production process.
4. **Waiting** – Inactivity of people or machinery waiting for inputs.
5. **Overproduction** – Producing more goods than required.
6. **Over-processing** – Having additional unnecessary steps in the production process.
7. **Defects** – Faults or errors that need re-work or scrapping.

These were first defined by Taiichi Ohno, the father of Lean in manufacturing operations though the waste wheel configuration. Muda, Japanese term for waste, is defined as anything that uses resources, but does not add real value to transforming the product or service.

Five Principles of Lean Manufacturing

1. **Value** – Value is determined by what the customer considers to be important within a product or service, rather than what the individuals developing or delivering the product or service consider important.
2. **Value Stream** – The set of business activities and steps involved in creating and delivering products and services to the customer; it is the connection of the steps together rather than considering each step in isolation.

3. **Flow** – The degree to which there is smooth uninterrupted flow of activities that add value to the customer, rather than waste and inefficiency that impedes the flow through the value stream.
4. **Pull** – The degree to which the value stream is only processing products and services for which there is a customer demand, rather than creating something and hoping someone wants it.
5. **Perfection** – The continuous assessment of value stream performance to identify and improve the value created and delivered to the customer, rather than resisting changes that improve the process of creating and delivering customer value.

The 5 S's of Lean

Much of Lean manufacturing is applying "common sense" to manufacturing environments. In implementing Lean, the 5S quality tool, derived from five Japanese terms beginning with the letter "S", are used to create a workplace suited for visual control and lean production. 5 S's are frequently used to assist in the organization of manufacturing. The 5 S's are from Japanese and are:

1. **Seiri:** To separate needed tools, parts, and instructions from unneeded materials and to remove the unneeded ones.
2. **Seiton:** To neatly arrange and identify parts and tools for ease of use.
3. **Seiso:** To conduct a clean-up campaign.
4. **Seiketsu:** To conduct seiri, seiton, and seiso daily to maintain a workplace in perfect condition.
5. **Shitsuke:** To form the habit of always following the first four S's.

Benefits of Lean

- Improved safety
- Higher equipment availability
- Lower defect rates
- Reduced costs
- Increased production agility and flexibility
- Improved employee morale
- Better asset utilization
- Enhanced enterprise image to customers, suppliers, employees, and management

It is clear from the above discussion that the basic aspect of lean manufacturing is to create efficient production processes. As such the proposition that Lean is all about waste management is a myth. Eliminating waste, minimizing inconsistencies and taking a reasonable are the three areas of lean manufacturing.

2.4.3 Lean Six Sigma (LSS)

A late entrant in the arena is the Lean Six Sigma (LSS). LSS is a vital part of today's business environment. In LSS, a company uses both Lean and Six Sigma simultaneously. Dramatic improvements have been noted for the companies which have implemented a combination of the two strategies. It is noted that while the issue of statistical control is imprecise in the concept of lean manufacturing, improvement in process speed and identification and elimination of waste is not covered in Six Sigma. Thus a fusion of Lean and Six Sigma is the order of the day. LSS is a methodology that maximizes shareholder value by achieving the fastest rate of improvement in customer satisfaction, cost, quality, process speed and invested capital. Many Companies, worldwide are adopting LSS and it is now an accepted fact that it delivers result. Even the US army has adopted LSS huge financial benefits. Since the start of the Army's LSS deployment in 2006, a cumulative of $19.1 billion dollars has been saved through a number of Army process improvements including improved materiel flow in Iraq and Afghanistan. During the fiscal years 2011 and 2012 process improvement projects are underway representing $3.6 billion in potential financial savings.

Multiple Choice Questions – 2.4

1. Who is considered to be the father of Six Sigma?

(a) Bill Smith (b) Deming (c) Crosby (d) Taguchi

Answer: (a) Bill Smith

2. Which of the following is not an advantage of using Six Sigma?

(a) Process improvement (b) Product improvement (c) Defect reduction (d) A decrease in customer satisfaction

Answer: (d) A decrease in customer satisfaction

3. The combination of Six Sigma and lean manufacturing is known as:

(a) Lean Sigma (b) Lean Two Sigma (c) Lean Six Sigma (d) Lean Three Sigma

Answer: (c) Lean Six Sigma

4. What is the percentage accuracy in the six sigma process?

(a) 99.8% (b) 99.1% (c) 99.05% (d) 99.99966%

Answer: (d) 99.99966%

5. In which among the following is the Six Sigma process not applicable?

(a) Healthcare (b) Business administration (c) Selecting the best employee of the year (d) Supply Chain

Answer: (c) Selecting the best employee of the year

6. Which of the following is not a six sigma belt level ranking?

(a) Yellow Belt (b) Pink Belt (c) Green Belt (d) Black Belt

Answer: (b) Pink Belt

7. The concept of Six Sigma was developed by the following company:

(a) General Electric (b) Motorola (c) Honeywell (d) DuPont

Answer: (b) Motorola

8. Six Sigma strategies seek to improve the quality of the output of a process by:

(a) identifying the causes of defects (b) removing the causes of defects (c) minimizing variability in manufacturing (d) all of the above

Answer: (d) all of the above

9. Six Sigma project follows the following project methodology(ies):

(a) DMAIC (b) DMADV (c) Both (A) and (B) (d) None of the above

Answer: (c) Both (A) and (B)

10. In "DMAIC", M stands for:

(a) Method (b) Measure (c) Machine (d) Manpower

Answer: (b) Measure

11. Six Sigma is applicable to:

(a) Finance (b) Supply chain (c) Healthcare (d) All of the above

Answer: (d) All of the above

12. Which of the following is not a phase of the Six Sigma DMAIC process?

(a) Define (b) Measure (c) Analyze (d) Implement

Answer: (d) Implement

13. What is the primary goal of the Six Sigma methodology?

(a) To reduce costs (b) To improve customer satisfaction (c) To increase efficiency (d) To reduce defects

Answer: (d) To reduce defects

14. Which of the following is an example of a Six Sigma tool used in the Analyze phase?

(a) Ishikawa diagram (b) Pareto chart (c) Control chart (d) Process map

Answer: (a) Ishikawa diagram

15. Which of the following is an example of a lean tool used in process improvement?

(a) Control chart (b) Pareto chart (c) Kaizen event (d) Process map

Answer: (c) Kaizen event

2.5 Statistical Quality Control (SQC)

2.5.1 Introduction

In 1985, Michael E. Porter wrote a book, which brought about a paradigm shift in the business landscape and emphasized the necessity of creating sustainable competitive advantage. For this, the author argued that the entity needs to develop strategies in line with the mission and vision of the organisation. Porter, in his book wrote about three strategies for developing sustainable competitive advantage; cost leadership, differentiation, and focus. Differentiation strategy, one of the most important strategy, is based on providing a unique or high-quality product that reaches the customer faster.

Thus quality is the buzzword that contributes handsomely in creating sustainable competitive advantage which results in superior performance.

The term quality is included to mean the features and characteristics of a product or a service made or performed according to specifications to satisfy customers at the time of purchase and during use.

The benefits of focusing on the quality of a product or service generally:

- (a) builds expertise in producing it,
- (b) lowers the costs of providing it,
- (c) creates higher satisfaction for customers using it, and
- (d) generates higher future revenues for the company selling it.

2.5.2 Eight Basic Elements of Quality (Dimensions of Quality)

This was propagated by David A. Garvin in 1987:

1. **Performance** – These refers the primary operating characteristics of a product.
2. **Features** – The additional characteristics available of the product along with the primary operating characteristics are categorised in the second dimension, features'.
3. **Reliability** – The probability of a product's failure in relation to a time frame is categorised as the dimension of reliability.
4. **Conformance** – Customers obviously want that the product to meet the specifications. Conformance refers to this criterion of a product to meet the specifications.
5. **Durability** – Durability refers to the operational life of the product, i.e., how long the product can be used without replacement.
6. **Serviceability** – This is the sixth dimension of the quality. Consumers are concerned not only about a product break-down, but also about the time taken before the product is serviced and restored.
7. **Aesthetics** – Aesthetics of the product means how a product looks, sounds, feels, etc. This is purely subjective.
8. **Reputation** – Reputation is related to the past performance of the company. In many cases, customers also check out the quality of products made by the company in the past.

Quality control is an assurance process in which actual performance is compared with the standard, which is set before the process starts. In case deviations (difference between actual and the standard performance) occur which is beyond tolerance level, necessary action is taken.

2.5.3 SQC – An Overview

Statistical quality control (SQC) refers to the whole gamut of statistical techniques which are applied in the arena of quality control. The first mention of the use of statistics in quality control may be traced to 1907, when AT&T began systematic inspection and testing of products and materials. W. S. Gosset, W.S. (1908) introduced the t-distribution which was the results from his work on quality control at Guinness Brewery. In 1924, W. A. Shewhart, considered as the father of SQC, introduced concept of control chart in a Bell Laboratories technical memorandum. This is considered as the watershed moment in the development of SQC. In 1931, Shewhart published Economic Control of Quality of Manufactured Product in which he conscripted statistical methods for use in production and control chart methods.

Definition: SQC is defined as the technique of applying statistical methods (theory of probability and sampling) to establish quality standard and to sustain a minimum the qualitative process at least cost.

2.5.4 The Elements of SQC

1. (a) **Sample Inspection** – Full inspection or 100% inspection is, as such, the best measure of quality control. But it involves huge expenditure in terms of money and time. Further, the nature of the product may be such that it perishes with

inspection, then 100% inspection is not a feasible option. In such cases SQC is the option in which inspection is carried on randomly selected samples.

2. (b) **Statistical techniques** – SQC, as the name suggest, is application of various statistical tools and techniques in the arena of quality control.
3. (c) **The fundamental objective** – SQC assists the management to identify whether the process and the products are within control or out of control i.e., whether they are in accordance to the specifications.
4. (d) **Decision making** – The management, with the help of SQC, takes appropriate decisions regarding the out of control process or product subject to the tolerance limit.

2.5.5 The Benefits of SQC

Implementation of SQC benefits the organisation in various ways. Some of which are listed below:

1. (a) Reducing product defects lead to less variable cost associated with labor and material.
2. (b) Reduction in wastage, scrap and pollution.
3. (c) Ability to produce quality products over longer period of time.
4. (d) With quality maintenance needs for inspection reduces leading to decrease in maintenance cost.
5. (e) Large pool of satisfied customers.
6. (f) Increase in employee motivation and awareness of quality.
7. (g) Increase in productivity and overall efficiency.

2.5.6 Techniques of SQC

The techniques of SQC can broadly be classified into two categories:

1. (a) Statistical process control (control charts) related to confirming whether the process is within pre-determined parameters and
2. (b) Acceptance sampling related to products.

Fig 2.7: Classification of SQC Techniques

2.5.7 Process Control

A process is a sequence of operations that transforms inputs to outputs, in the form of products or services. Often a stable process is said to be distressed if and when the output is not in conformity with the specifications. In simple terms there is a deviation between the actual specification and the standard specification. A stable process is one in which only common causes of variation affect the output quality. Such a process can also be described as being in a state of statistical control. An unstable process is one in which both assignable causes and common causes affect the output quality. Such a process can also be described as being out of control. Statistical process control (SPC) embrace all such statistical techniques through which a process is kept under control.

Major Tools of SPC

1. (a) Histogram
2. (b) Check sheet
3. (c) Pareto chart
4. (d) Cause and effect diagram
5. (e) Process flow diagram
6. (f) Scatter diagram
7. (g) Control chart

Control charts (point 7) is one of the most important tool of SPC used in the industry. W.A. Shewhart introduced the concept of graphical representation of quality characteristics through control chart in 1924.

Control charts are used for the industrial processes and distinguishes acceptable (chance) variation from the assignable variation.

A control chart, based on theory of sampling and probability, is a two-dimensional graphical display of the quality characteristic of a process. The quality characteristics are measured in terms of mean and standard deviation of the sample which is randomly selected from processes. The sample number is taken in the X-axis and the quality characteristic is taken in the Y-axis.

2.5.8 Control Chart

The basic construct of the control chart is the Centre Line (CL), Upper Control Line (UCL) and Lower Control Line (LCL).

- The CL is the reference line. It is average value of the quality characteristic.
- UCL represents the upper value of the variation in the quality characteristic.
- LCL is the lower value of the variation in the quality characteristic.

For the purpose of preparation of control charts, the quality characteristic is assumed to be normal distributed. For normal distribution;

$$P[\mu - 3\sigma \leq X \leq \mu + 3\sigma] = 0.9973$$

This means that the probability that a random variable (X) lies between $\mu - 3\sigma$ and $\mu + 3\sigma$ is 0.9973. Consequentially, the chance that the random variable will lie beyond $\mu - 3\sigma$ and $\mu + 3\sigma$ is significantly small (0.27). This indicates for 100 samples, only 0.27 lies beyond control at 3σ level. Thus the UCL and LCL of a control chart are called 3σ limits of the chart.

For example, if n is a test statistic that measure a quality characteristic and μ_n is the mean and σ_n is the standard error of the test statistic n, then the CL, UCL and LCL are calculated as follows:

$$CL = \mu_n$$
$$UCL = \mu_n + 3\sigma_n$$
$$LCL = \mu_n - 3\sigma_n$$

If a particular data points is between the UCL and the LCL, the process is in control. But, if the data point is beneath the LCL or beyond the UCL then an out of control situation is indicated.

Control Charts for Variables

Control charts are prepared either for variables or attributes:

a) Variables – X-Bar Chart (Mean Chart)

In this case characteristics of the process are measured on a continuous scale. X bar and R charts are used to enquire whether the average and the range of the sample persist within the limits. An X-bar chart also referred as mean control chart is used to monitor changes in the mean of a process.

In this case the parameters with 3-sigma control limits are:

$$UCL = \bar{X} + A_2\bar{R}$$
$$CL = \bar{X}$$
$$LCL = \bar{X} - A_2\bar{R}$$

(the values of A_2 are calculated for the sample size given in Table 2.6, n refers to the sample size)

Range (R) Charts

R charts monitor the dispersion or variability of the process. This chart is prepared as a control mechanism of the process variability since the sample range is related to the process standard deviation. The centre line of the R chart is the average range. The parameters of the R chart with the customary 3-sigma control limits are:

$$UCL = \bar{R}\ D_4$$
$$CL = \bar{R}$$
$$LCL = \bar{R}\ D_3$$

(the values of D_3 and D_4 are calculated for the sample size given in Table 2.6, n refers to the sample size)

Table 2.6: Factors for Calculating Limits for A_2 and R Charts

n	A_2	D_3	D_4
2	1.880	0	3.267
3	1.023	0	2.575
4	0.729	0	2.282
5	0.577	0	2.115
6	0.483	0	2.004
7	0.419	0.076	1.924
8	0.373	0.136	1.864
9	0.337	0.184	1.816
10	0.308	0.223	1.777

For both, the CL, UCL and the LCL are created and then the observed data point is measured in terms of the UCL and the LCL to calculate whether it is in control or out of control.

b) Attributes (p chart and c chart)

In this case characteristics of the process are measured and are either "acceptable" or "not acceptable". Thus this assumes that the attribute is discrete, binary, and assume integer values. This may be progressed through P Charts (measures proportion defective) and C Charts (measures the number of defects/unit).

p chart – Fraction Nonconforming

This chart shows the fraction of nonconforming or defective product produced by a manufacturing process. It is also called the control chart for fraction nonconforming. A quality characteristic follows a binomial distribution if:

- All trials are independent.
- Each outcome is either a "success" or "failure".
- The probability of success on any trial is given as p.
- The probability of a failure is 1− p.
- The probability of a success is constant.

The mean and variance of the binomial distribution are given as:

$$\mu = np$$
$$\sigma^2 = np(1 - p)$$

When a standard value of p is given, then the control limits for the fraction nonconforming are:

$$UCL = p + 3\sqrt{[p(1-p)/n]}$$
$$CL = p$$
$$LCL = p - 3\sqrt{[p(1-p)/n]}$$

If no standard value of p is given, then the control limits for the fraction nonconforming are:

$$UCL = \bar{p} + 3\sqrt{[\bar{p}(1-\bar{p})/n]}$$
$$CL = \bar{p}$$
$$LCL = \bar{p} - 3\sqrt{[\bar{p}(1-\bar{p})/n]}$$

Illustration 1 (ICMAI Study Material): p chart

A process that produces bearing housings is investigated. Ten samples of size 100 are selected.

Sample size	1	2	3	4	5	6	7	8	9	10
Number of Nonconf.	5	2	3	8	4	1	2	6	3	4

Is this process operating in statistical control?

Solution (ICMAI Standard):

Given: n (population) = 100; m (sample size) = 10

Sample	Number Nonconf.	Fraction Nonconf.
1	5	0.05
2	2	0.02
3	3	0.03
4	8	0.08
5	4	0.04
6	1	0.01
7	2	0.02
8	6	0.06
9	3	0.03
10	4	0.04

$\bar{p}$ = (0.05 + 0.02 + 0.03 + 0.08 + 0.04 + 0.01 + 0.02 + 0.03 + 0.04) / 10 = 0.038 (approximately, from dataset)

Using ICMAI standard: $\bar{p} = \Sigma p / 10 = 0.038$

Thus the Control Limits are:

UCL = $\bar{p} + 3\sqrt{[\bar{p}(1-\bar{p})/n]} = 0.038 + 3\sqrt{[0.038(1-0.038)/100]} = 0.038 + 0.057 =$ **0.095**

CL = $\bar{p}$ = **0.038**

LCL = $\bar{p} - 3\sqrt{[\bar{p}(1-\bar{p})/n]} = 0.038 - 0.057 = -0.02 \approx$ **0**

Since the fraction nonconforming (0.05, 0.02, 0.03, 0.08, 0.04, 0.01, 0.02, 0.06, 0.03, 0.04) all lie between UCL = 0.095 and LCL = 0, the process is in statistical control.

c chart – Number of Defects per Unit

The C chart is a statistical control chart that plots movement in the number of defects per unit. Here the number of nonconformities in a given area is modelled by the Poisson distribution. Let c be the parameter for a Poisson distribution, then the mean and variance of the Poisson distribution are equal to the value c (as per definition). The probability of obtaining x nonconformities on a single inspection unit, when the average number of nonconformities is some constant, c, is found using:

$$p(x) = (e^{-c}\, c^{x}) / x!$$

The control charts are (standards are given):

$$UCL = c + 3\sqrt{c}$$
$$CL = c$$
$$LCL = c - 3\sqrt{c}$$

And the control charts are (when standards are not given):

$$UCL = \bar{c} + 3\sqrt{\bar{c}}$$
$$CL = \bar{c}$$
$$LCL = \bar{c} - 3\sqrt{\bar{c}}$$

Illustration 2 (ICMAI Study Material): c chart

The number of weekly customer complaints are monitored in a large hotel using a c-chart. Develop three sigma control limits using the data table below.

Week	1	2	3	4	5	6	7	8	9	10
Table No. of Complaints	3	2	3	1	3	3	2	1	3	1

Solution (ICMAI Standard):

$\bar{c}$ = Number of Complaints / Number of Samples = 22 / 10 = 2.2

The control limits are:

UCL = $\bar{c} + 3\sqrt{\bar{c}} = 2.2 + 3\sqrt{2.2} = 2.2 + 4.45 =$ **6.65**

CL = $\bar{c} =$ **2.2**

LCL = $\bar{c} - 3\sqrt{\bar{c}} = 2.2 - 4.45 = -2.25 \approx$ **0**

All the data points (3, 2, 3, 1, 3, 3, 2, 1, 3, 1) lie between UCL = 6.65 and LCL = 0, hence the process is in control.

2.5.9 Acceptance Sampling

As stated earlier in this section, SQC applied to products, is known as acceptance sampling. It was popularized by Dodge and Romig who made a study in US on the testing of bullets during World War II. There famous observation was that if every bullet was tested in advance, no bullets would be left to ship. On the other hand, if none were tested, malfunctions might occur in the field of battle. Thus 100% inspection or no inspection would both lead to disastrous results. They reasoned that a sample should be picked at random from the lot, and on the basis of information yielded by the sample, a decision should be made regarding the disposition of the lot. This process is called Lot Acceptance Sampling or just Acceptance Sampling (AS).

Thus AS is a trade-off between no inspection and 100% inspection. There are two types, AS for attributes and AS for variables.

The most important point in AS is that it assists in deciding whether or not the lot is likely to be acceptable. AS does not help in assessing the quality of the product.

AS, as such, is applicable in the following cases:

- (i) Testing is destructive
- (ii) The cost of 100% inspection is very high and
- (iii) 100% inspection takes too long.

Multiple Choice Questions – 2.5

1. Which among the following is a type of control chart for variables?

(a) C chart (b) P chart (c) X chart (d) U chart

Answer: (c) X chart

2. The distribution of measured data can be studied by using:

(a) X chart (b) R chart (c) both X and R chart (d) None of the above

Answer: (c) both X and R chart

3. Match the following group 1 (charts) with group 2 (use) and select the correct option.

1. R chart A. study the number of defects per unit
2. C chart B. size of variable is studied
3. P chart C. dispersion of measured data
4. X chart D. defective units produced per subgroup

(a) 1-A, 2-B, 3-D, 4-C (b) 1-C, 2-D, 3-B, 4-A (c) 1-A, 2-D, 3-B, 4-C (d) 1-C, 2-A, 3-D, 4-B

Answer: (d) 1-C, 2-A, 3-D, 4-B

4. Defectives word has almost same meaning as:

(a) Conforming (b) Nonconforming (c) Non-defective (d) Un-conforming

Answer: (b) Nonconforming

5. Quality characteristics which are related to only conforming or non conforming products, are called:

(a) Attributes (b) Continuous characteristics (c) Discrete characteristics (d) Variables

Answer: (a) Attributes

6. The control chart which relates to the fraction of defective product produced by a manufacturing process, is called:

(a) The control chart for nonconformities (b) Control charts for fraction nonconforming (c) Control charts for conformities per unit (d) Control chart for process mean

Answer: (b) Control charts for fraction nonconforming

7. The control chart designed to deal with the defects or nonconformities of a product, is called:

(a) p chart (b) c chart (c) R chart (d) s chart

Answer: (b) c chart

8. The control chart for fraction nonconforming is also called:

(a) u chart (b) c chart (c) p chart (d) R chart

Answer: (c) p chart

9. The method of average sample size is used when there is:

(a) Variable sample size (b) Constant sample size (c) Sample size = 1 (d) Sample Size = 10

Answer: (a) Variable sample size

10. When the process is a complex assembly operation, and the product quality can only be judged in terms of occurrence of nonconformities, the _____ are more helpful.

(a) Only x Charts (b) R-charts (c) s-charts (d) p-charts

Answer: (d) p-charts

11. When there are very tight specifications, overlapping assembly tolerances problems, which of the control charts are used?

(a) Attributes control charts (b) Variables control charts (c) Both, attributes control charts and the variables control charts can be used (d) Neither

Answer: (b) Variables control charts

12. When destructive testing is required, which type of control should be used?

(a) p-chart (b) c-chart (c) x Bar and R charts (d) u-charts

Answer: (a) p-chart

13. When attributes charts are used when:

(a) Destructive testing is required (b) Process must be continuously stabilized and monitored for its capability (c) Historical summary of process performance is needed (d) Existing process but in chronic trouble

Answer: (c) Historical summary of process performance is needed

14. Which of these does not require SPC implementation?

(a) When Specifications change without notice (b) When customer demands both control and capability (c) When process is stable (d) When the process is estimated to reduce its capability in near future

Answer: (c) When process is stable

15. Which of these should be carried out if the process is in-control and capable?

(a) SPC only (b) Experimental design (c) Change process (d) Investigate specifications

Answer: (a) SPC only

2.6 Plan-Do-Check-Action (PDCA)

2.6.1 Shewhart Cycle

In 1939, Dr Shewhart propagated the 'Shewhart Cycle' in his book, which was edited by W. Edwards Deming who subsequently modified the 'Shewhart Cycle' and conceived the 'Deming Wheel' in 1950. Dr Shewhart opined that the mass production cycle constitutes three steps; specification (making a hypothesis), production (carrying out an experiment) and inspection (testing the hypothesis).

Fig 2.11: The Shewhart Cycle

2.6.2 Deming Wheel

In 1950, Deming modified the Shewhart cycle at a seminar on statistical quality control for managers and engineers. In the seminar he presented his thesis on production cycle (a modification of the Shewhart Cycle) in four steps; Design, Produce, Sell, and Redesign through marketing research. This was renamed by the Japanese as the 'Deming Wheel' in 1951.

Fig 2.12: The Deming Wheel

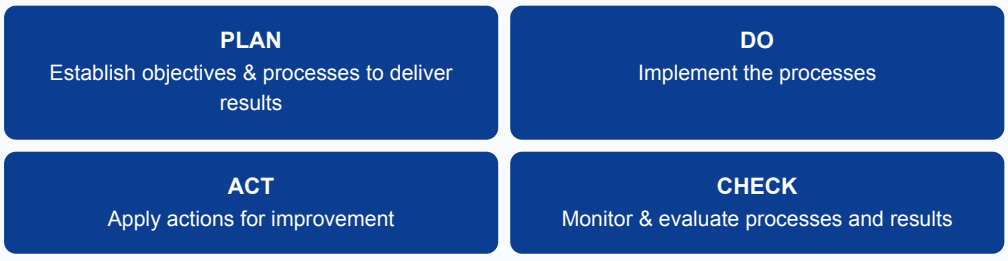
2.6.3 PDCA Cycle

In literature the 'Deming Wheel' is referred as the PDCA cycle. But Imai conjectured that for practical purpose the Deming wheel was re-casted into the Plan-Do-Check-Act (PDCA) cycle. Thus the PDCA cycle is application oriented model of the Deming Wheel.

Table 2.7: The Deming Wheel and the PDCA Cycle

Deming Wheel	PDCA Cycle
Design	Plan – Product design resembles the planning phase.
Production	Do – Production resembles to 'doing' as per the product design.
Sales	Check – Sales figures is similar to checking on customer satisfaction.
Research	Action – In case of a complaint being filed, it has to be incorporated into the planning phase, and action taken for the next round of effort.

Fig 2.13: The PDCA Cycle



Four Phases Explained

- **PLAN:** Establish the objectives and processes necessary to deliver results in accordance, with the specifications.

- **DO:** Implement the processes.
- **CHECK:** Monitor and evaluate the processes and results against objectives and specifications and report the outcome.
- **ACT:** Apply actions to the outcome for necessary improvement. That means reviewing all steps (Plan, Do, Check, Act) and modifying the process to improve it before its next implementation.

2.6.4 PDSA Cycle

Discourse on the PDCA cycle remain incomplete if a few lines is not written about the PDSA cycle; its immediate successor. Deming adapted a new version of the cycle in 1986 and called it the Shewhart cycle for learning and improvement - the PDSA cycle. S stands for Study representing a study about the results and the dissection of the learning process.

Multiple Choice Questions – 2.6

1. PDCA cycle is used for:

(a) Continuous improvement (b) Intermittent improvement (c) Both (d) None

Answer: (a) Continuous improvement

2. Which of the following is not a use of the PDCA cycle?

(a) Starting a new project aimed at improvement (b) For continuous improvement (c) As a project planning tool (d) For intermittent improvement

Answer: (d) For intermittent improvement

3. To define the problem' is a part of which phase of PDCA cycle?

(a) Plan (b) Do (c) Check (d) Act

Answer: (a) Plan

4. To train all employees in quality improvement methods and techniques' is a part of which phase of PDCA cycle?

(a) Plan (b) Do (c) Check (d) Act

Answer: (b) Do

5. To evaluate the trial project with the already decided performance indicators' is a part of which phase of PDCA cycle?

(a) Plan (b) Do (c) Check (d) Act

Answer: (c) Check

6. Which of the following decision is not part of the 'Action' phase?

(a) Introducing the 'Plan' (b) Adjusting the 'Plan' (c) Rejecting the 'Plan' (d) Defining the problem

Answer: (d) Defining the problem

7. To document the standard procedures regarding improvement' is a part of which phase of the PDCA cycle?

(a) Plan (b) Do (c) Check (d) Act

Answer: (d) Act

8. PDCA cycle is the contribution of:

(a) Walter Shewhart (b) Philip Crosby (c) Genichi Taguchi (d) W. Edward Deming

Answer: (d) W. Edward Deming

9. PDCA cycle is also known as the Deming Cycle (Plan, Do, Study, Act).

(a) True (b) False

Answer: (a) True

10. PDCA cycle stands for:

(a) plan do check act (b) plan did check act (c) process do check act (d) process did check acknowledge

Answer: (a) plan do check act

2.7 Management Information System in a Digital Environment

2.7.1 Introduction

Human race has traversed on three waves; the first wave of agriculture and handwork, the second wave of industrial revolution and the third wave of information flow. The whole gamut of collecting, distributing and transforming data into meaningful information is referred as the information system. Information system facilitates problem solving. Unless information is used to create knowledge, the objective of an information system is unfulfilled. There are several different information systems that organizations can use. Some of the important ones are:

- Transaction processing system (TPS)
- Management information system (MIS)
- Office automation system
- Decision support system (DSS)
- Business intelligence system
- Electronic commerce system
- Accounting information system

Thus, MIS is a hierarchical subset of information systems.

2.7.2 Management Information System (MIS) – An Overview

MIS is a systematized process of providing relevant information at the right time, in the right design to the right person within the organisation which enables effective decision making. It is defined as a system of collecting, processing, and transmitting of data to meet the information requirement of the managers at different levels of an organization. It comprises of three elements:

- **Management** – covers various management functions and their information needs
- **Information** – refers to collecting data regarding the management functions and converting them into information which facilitates managerial decision making
- **System** – implies doing things in a systematic way, i.e., integrating the managerial function with their respective information needs for achievement of organisational goals.

Types of Information Based on Management Level

1. **Operational information:** Operational information relates to the day-to-day operations of the organisation and thus, is useful in exercising control over the operations that are repetitive in nature. Since such activities are controlled at lower levels of management, operational information is needed by the lower management.
2. **Tactical information:** Tactical information helps middle level managers allocating resources. For example, information regarding the alternative sources of funds and opportunities for deployment of funds in short-term securities, etc. may be required at the middle levels of management. These are tactical information.
3. **Strategic information:** Strategic information is used by managers to define goals and priorities, initiate new programme and develop policies for acquisition and use of corporate resources. Strategic information helps in identifying and evaluating options that makes the organisation different from its competitors. This is a pre-requisite of the higher level managers.

However, this categorization is not stringent and there are spill overs i.e., often high level managers are in need of tactical information and middle level managers are need of tactical or strategic information.

Fig 2.14 & 2.15: Levels of Management and Information Systems

Level of Managers	Information System
Top Level Managers	EIS (Executive Information Systems) and DSS (Decision Support System)
Middle Level Managers	MIS (Management Information System)
Lower Level Managers	TPS (Transaction Process System)

2.7.3 Strategic Objectives of MIS

In the digital environment, MIS has become vital element for the survival of the firm. In the United States, more than 23 million managers and 113 million workers in the labour force rely on information systems to conduct business. Information systems are essential for conducting day-to-day business as well as achieving strategic business objectives. An effective MIS has the following Objectives:

- To provide the managers at all levels with timely and accurate information for control of business activities
- To highlight the critical factors in the operation of the business for appropriate decision making
- To develop a systematic and regular process of communication within the organization on performance in different functional areas
- To use the tools and techniques available under the system for programmed decision making
- To provide best services to customers
- To gain competitive advantage
- To provide information support for business planning for future

2.7.4 MIS Reports

The main purpose of MIS is to provide managers with the information which facilitate the decision making process, the crux of management. MIS, for the purpose generate structured reports containing necessary information to enable structured decisions making. Management by exception (MBE) is of vital importance as specific reports may be prepared only when an exception occurs in the business process. Exceptions may also be grouped together and the reports are prepared accordingly.

Types of MIS Reports

Report Type	Description
a) The Summary Reports	Summary reports are a particular type of MIS report used to visualize aggregate data and provide a summary. For example, sales summary report which summarizes the sales revenue, the geographical distribution of sales, and details of products sold.
b) The Trend Reports	Trend Reports are types of MIS reports that allow your company to see the trends and patterns among different categories.
c) Predictive Reports	These reports are prepared by analyzing past data and observing trends and patterns. This reports in an MIS system attempts to predict the circumstances for the company in the near future.
d) The Exception Reports	An exception report is a type of MIS report that aggregates all reports of exceptions, which occur only under unusual circumstances within the company. For example, an understocked inventory may arise due to a faulty purchase process or abnormal lead time. But it needs to be reported.
e) On-Demand Reports	This type of MIS reports is produced on specific demands of the management. For example, a sales manager may want to know the peak sales season for a particular product in a particular location. This will help the manager to decide whether similar products may succeed in the same market.
f) Financial Reports	This is the most common type of MIS report. These reports are used to determine the financial performance and position of an organization. A financial report often includes a company's balance sheets, income, and expense details, and cash flow statements.
g) Inventory Reports	Inventory reports are a type of MIS report that is used to manage and keep a track of all the products in your inventory.
h) Sales Reports	The sales report is an integral part of MIS reporting system. It includes a visualization of products that have been sold during the last quarter/month in your organization. This may also be geographic location wise which facilitates the marketing department.
i) Budget Reports	Budgeting is an important operational process and is also has strategic importance. Budget reports include cash budgets, income and expenditure budgets, marketing budget, HR budget, production budget, etc. An MIS budget report is used to maintain the company's financial health as well as drives growth.
j) Production Reports	Production report is a MIS report that contains information about production activities of the company. The manufacturing division prepares this report. This report details products manufactured and may be compared against the forecast production level. Production bottlenecks are highlighted in the report.
k) Cash Flow Reports	This is an important type MIS report that underlines the amount of cash inflow versus the cash outflow in your organization.
l) Cost Reports	Various departments prepare cost reports relevant to their operations. These reports assist the management to aggregate costs across departments which are reflected in other financial reports.

2.7.5 MIS in Digital Environment

It is evident from the above discussion that the main component of data driven MIS, is digitization of the business environment. In a digitized business environment analog information are converted to digital form with the aid of electronic devices which makes storing, processing and transformation of information smoother and faster. Thus, digitization is the core issue in MIS. Digital technologies involve rampant use of computers and other digital devices. Digital technologies have advanced more rapidly than any innovation in our history - reaching around 50 per cent of the developing world's population in only two decades and transforming organizations.

Three Key Terms

Term	Definition
Digitization	Is the process of converting information from a physical format to digital one. It means converting analogous data into a digital representation. For this computer systems are used extensively.
Digitalization	Is the process of leveraging the digitization process mentioned above. This term refers to the use of digital technologies and data to create revenue, improve business, and create a digital culture where digital information is at the core. It converts processes to be more efficient, productive, and profitable. An effective MIS is a direct fallout of digitalization which also creates the digital environment.
Digital transformation	Is comparatively a newer word which is used to mean the transformation of business activities, processes, products, and models to fully leverage the opportunities of digital technologies. The main goal is to improve efficiency and manage. Digital transformation is doing things in a new (digital) way.

ICT Technologies for Digital Environment

- **Bar Coding & Decoding** (used in inventory management)
- **Programmable Logic Controller or PLC** (used for monitoring work-flow and machine conditions)
- **General Pocket Radio system or GPRS** (used in LAN for controlling fleet of mobile equipments. Sometimes vehicles are provided with sensors for recording work load, fuel stock, etc.)
- **Face Recognition System or FRS** (used for recording attendance of employees by recognizing faces photographed in the system)
- **Computer Aided Designing or CAD and Digital Surveying**
- **Computer Aided Manufacturing or CAM**
- **e-Commerce** (used in online bidding, ordering, invoicing, banking, etc.)
- **Enterprise Resource Planning (ERP):** This is, may be, the most important and comprehensive digitalisation and includes financial systems, stock management, order management, human resources management system. It creates real time data which is available to any node (computer) connected to the system. Availability of information is the main advantage of the ERP.

Examples of Integration

- (i) Online invoicing and inventory records are facilitated by e-Commerce and Bar Coding & Decoding.
- (ii) Order fulfilment in both Purchasing and Selling can be monitored on integration of purchase orders and sales orders with goods receipts and issues in inventory records for stores and finished goods.
- (iii) Face Recognition System is used to migrate attendance data into Pay Roll system for calculation of employee-wise wages & salary including overtime and for updating leave records.
- (iv) Plenty of data downloaded from PLC and GPR systems can be built-up in integrated information (e.g. work completed, work-in-progress, equipment running hours, power or fuel & lubricant consumptions, vehicle trips, breakdowns, machine conditions in terms of temperature, stress, vibrations, noise level, etc.)

New Digital Transformation Technologies

1. **Modern ERP and database technologies** – ERP is transformed into cloud based ERP which make is much more user friendly and adaptable. This is basically the "brains" of the digital business transformation process. Modern ERP may also be powered with artificial intelligence technologies which supports management and analysis of big data.
2. **Advanced analytics** – Advanced analytics provides insights and reports that are deep, accurate, and actionable and thus revolutionize the MIS. It uses artificial intelligence and machine learning technologies.
3. **Cloud connectivity** – Successful digital transformation depends on cloud-based infrastructure. It uses much of the internet of things (IoT) technologies.
4. **Artificial intelligence (AI) Machine Learning solution** – Big data is a collection of data which is huge in magnitude which is ever increasing. Conventional data management tools are inapt to process big data because of its complexity. The combination of big data, AI, and machine learning is the fundamental aspect of digital transformation.

Though there are also the concepts of internet of things (IOT) and robotic process automation (RPA) which are arenas of digital transformation, but the radicalization of the MIS is based on the four mentioned digital transformation tools.

Multiple Choice Questions – 2.7

1. The information of MIS comes from the _____ source.

(a) Internal (b) External (c) Superficial (d) Internal and external

Answer: (d) Internal and external

2. MIS is normally found in _____ sector.

(a) Service (b) Education (c) Manufacturing (d) Marketing

Answer: (d) Marketing

3. Management information system usually NOT serves managers interested in _____ results.

(a) weekly (b) monthly (c) yearly (d) day-to-day

Answer: (d) day-to-day

4. _____ is an important factor of a management information system.

(a) Information (b) System (c) Planning (d) Personnel

Answer: (a) Information

5. Management information system is _____ human-machine based system.

(a) an interpreted (b) an interstellar (c) an integrated (d) an interdependent

Answer: (c) an integrated

6. Business Intelligence (BI) can be used by _____ management.

(a) frontline (b) middle (c) top (d) all of the above

Answer: (d) all of the above

7. A key role of Management Information Systems is:

(a) To develop and share documents that support day-to-day organizational activities. (b) To process business information (c) Both (d) None

Answer: (b) To process business information

8. Which one of the following is not a prerequisite for a good MIS?

(a) Database (b) Support from Staff (c) Control and maintenance of MIS (d) MIS executives

Answer: (d) MIS executives

9. What amongst the followings are the primary characteristics which must be processed by information?

(a) Availability (b) Timeliness (c) Accuracy (d) All of these

Answer: (d) All of these

10. Which of the following is not an objective of MIS?

(a) Supports in decision-making (b) Provides insightful information (c) Assist management people (d) Recruit people for system

Answer: (d) Recruit people for system

11. Which one is the organization's Back Bone?

(a) Capital (b) Employee (c) Management (d) Information

Answer: (d) Information

12. Which one is an internal source of information for MIS?

(a) Customers care department (b) HR department (c) Marketing department (d) All of these

Answer: (d) All of these

13. An _____ is a collection of procedures for converting data into knowledge and facts.

(a) Information system (b) Data system (c) Storage system (d) None of these

Answer: (a) Information system

14. Which of the following steps is/are the implementation plans involved in MIS?

(a) Preparing organizational plans (b) Planning of work flow (c) Training of personnel (d) All of the above

Answer: (d) All of the above

15. Strategic information and decision-making are important to _____ decision-makers.

(a) Executive managers (b) Supervisors (c) Supporting staff (d) None of these

Answer: (a) Executive managers

2.8 Total Productive Maintenance (TPM)

2.8.1 TPM – An Overview

TPM is neither a maintenance function nor is it a maintenance department initiative. On the contrary, it is relative to manufacturing which considers operation and maintenance as equals under the umbrella of business process and endeavours to build a close relationship between productivity and maintenance. The traditional concept of manufacturing department adding value and maintenance department acting as a support mechanism which cost money is considered both inefficient and in effective. TPM, on the other, is based on the philosophy that maintenance is an equally important aspect of the business process. Often TPM is also considered as total productive manufacturing.

For the purpose of TPM, maintenance implies maintaining and improving the integrity of our production and quality systems through the machines, processes, equipment and people who add value to our products and services, that is, the operators and maintainers of our equipment. In order to better manufacturing process and to create a world class manufacturing the organisation must create and maintain an effective and efficient maintenance system. One approach to improve the performance of maintenance activities is to implement a Total Productive Maintenance (TPM) system. TPM is an extension of the concepts laid in Total Quality Management (TQM) program. The tools and techniques of TQM like employee empowerment, benchmarking, documentation, etc. are also used to implement and optimize TPM.

TPM establishes some kind of closeness between machine and its operator. TPM creates an environment where the operator ensures availability, efficiency and reliability of the machine he is working on. Thus the TPM approach reduces wastes of different forms like idleness due to breakdown, stock-out of some of regular spares, additional manpower otherwise required for storing some of the regular spares and for regular machine inspection & general maintenance. Thus, TPM is also in line with 'lean' manufacturing.

2.8.2 Five Key Elements or Pillars of TPM

1. (a) Improving equipment effectiveness by targeting the major losses.
2. (b) Involving operators in the daily, routine maintenance of the equipment.
3. (c) Improving maintenance efficiency and effectiveness.
4. (d) Training for everyone involved.
5. (e) Life-cycle equipment management and maintenance prevention design.

2.8.3 Six Major Losses

Faulty equipment or operation causes six major losses, the elimination of which is the main focus of TPM.

Table 2.8: Six Major Losses

Sl. No.	Loss Category	Costs to Organization
1	Unexpected breakdown losses	Results in equipment downtime for repairs. Costs can include downtime (and lost production opportunity or yields), labour, and spare parts.
2	Set-up and adjustment losses	Results in lost production opportunity (yields) that occurs during product changeovers, shift change or other changes in operating conditions.
3	Idling and Stoppage losses	Results in frequent production downtime and that difficult to record manually. As a result, these losses are usually hidden from efficiency reports and are built into machine capabilities but can cause substantial equipment downtime and lost production opportunity.
4	Speed losses	Results in productivity losses when equipment must be slowed down to prevent quality defects or minor stoppages. In most cases, this loss is not recorded because the equipment continues to operate.
5	Quality defect & Rework losses	Results in low standard production and defects due to equipment malfunction or poor performance, leading to output which must be reworked or scrapped as waste.
6	Equipment and capital investment losses	Results in wear and tear on equipment that reduces its durability and productive life span, leading to more frequent capital investment in replacement equipment.

2.8.4 Overall Equipment Effectiveness (OEE)

TPM targets elimination of the above mentioned six major losses which brings in dramatic improvement in the Overall Equipment Effectiveness (OEE). OEE is considered as the definitive standard for measuring manufacturing productivity. An OEE score of 100% implies perfect score on three aspects; cent percent quality (good parts), cent percent performance (quickest time) and cent percent availability (no interruption of production schedule). OEE is the best metric for categorizing losses, benchmarking progress, and improving the productivity of manufacturing equipment by eliminating waste.

OEE is the multiplicative of three issues of:

- **Availability of the machine (A)** – a measure of the proportion of time machine is actually available against the actual time it should be available.
- **Performance Rate (PR)** – Rate efficiency (RE) × Speed Rate (SR)
  - RE = Actual average cycle time is slower than design cycle time because of jams, etc. Output is reduced because of jams
  - SR = Actual cycle time is slower than design cycle time machine output is reduced because it is running at reduced speed.
- **Quality Rate (Q)** – percentage of good parts out of total produced.

$$\mathbf{OEE = A \times PR \times Q}$$

Higher OEE is interpreted as higher equipment efficiency. The benchmark is 85%.

Solved Case 4 (ICMAI Study Material): Krishna Inks – OEE Calculation

Dr Sreekumar, the owner of Krishna Inks, calculates the OEE for his manufacturing process of fountain pen inks. For the purpose he uses the usual parameters and uses the formula; OEE = A × PR × Q [where, A, PR and Q have their usual meaning]

The following is the OEE data for two sequential weeks:

OEE FACTOR	WEEK 1	WEEK 2
OEE (overall)	85.1%	85.7%
Availability	90.0%	95.0%
Performance	95.0%	95.0%
Quality	99.5%	95.0%

Analysis (ICMAI Standard):

From the above data it is noted that despite the fact that there is a fractional improvement of OEE from 85.1% to 85.7% which is mainly because of increase in availability (notion of availability of machine) from 90% to 95%. But the quality (percentage of good units produced) has actually declined by 4.5% which is certainly not a good option for Dr Sreekumar.

2.8.5 Benefits of TPM

The main benefits of TPM are as follows:

- Increased productivity and OEE (Overall Equipment Effectiveness).
- Rectify customer complaints.
- Reduce the manufacturing cost by up to a great extent.
- Satisfy the customer's needs by almost 100% (Delivering the right quantity at the right time, in the required quality).
- Reduce accidents.
- Follow pollution control measures.
- Higher confidence level among the employees.
- Keep the work place clean, neat and attractive.
- Favorable change in the attitude of the operators.
- Achieve goals by working as team.

- Horizontal deployment of a new concept in all areas of the organization.
- Share knowledge and experience.
- The workers get a feeling of owning the machine.

2.8.6 Steps for Implementing TPM

TPM implementation pivots around proper organization structure. The organisation structure would have a plant manager being appointed as a TPM coordinator. TPM requires effective leadership from the top. Implementation of TPM is a 12 step process:

1. Step 1: Announcement of top management decision
2. Step 2: TPM education Program and collection of information
3. Step 3: Establish an organizational structure
4. Step 4: Formulate basic TPM policies and goals
5. Step 5: Master plan for TPM deployment and its presentation
6. Step 6: Feasibility study & its presentation
7. Step 7: Pilot installation
8. Step 8: Plant-wide installation
9. Step 9: Introduction audit
10. Step 10: Progress audit
11. Step 11: Certification
12. Step 12: TPM Award

📝 Multiple Choice Questions – 2.8

1. MP in Total Productive Maintenance refers to:

(a) Main program (b) Main part (c) Maintenance prevention (d) Major part

Answer: (c) Maintenance prevention

2. Which of the following is not a loss that TPM focuses on reducing?

(a) Equipment breakdown (b) Defects and rework (c) Idling and minor stoppages (d) Optimized equipment cycle time

Answer: (d) Optimized equipment cycle time

3. Which of the following is not a goal shared by TPM?

(a) Zero defects (b) Maximum productivity (c) Minimum productivity (d) Zero breakdowns

Answer: (c) Minimum productivity

4. Which pillar of TPM focuses on routine maintenance?

(a) Training and Education (b) Just-in-time (c) 5S (d) Autonomous maintenance

Answer: (d) Autonomous maintenance

5. Improved safety is one of the benefits of implementing TPM.

(a) True (b) False

Answer: (a) True

6. Which of the following is not an advantage of implementing TPM?

(a) Improved equipment reliability (b) Reduced equipment downtime (c) Increased equipment downtime (d) Lower maintenance and production costs

Answer: (c) Increased equipment downtime

7. Which of the following is not a tool used to implement and optimize TPM?

(a) Employee empowerment (b) Benchmarking (c) Census (d) Documentation

Answer: (c) Census

8. TQM focuses on _____ and TPM focuses on _____

(a) Equipment, Quality (b) Statistics, Equipment (c) Equipment, Statistics (d) Quality, Equipment

Answer: (d) Quality, Equipment

9. In which of the following type of maintenance techniques, the repair is made after machine or equipment failure?

(a) Breakdown maintenance (b) Routine maintenance (c) Benchmarking (d) Poka Yoke

Answer: (a) Breakdown maintenance

10. Which of the following is a stitch-in-time technique aiming at avoiding breakdowns?

(a) Forecasting (b) Routine maintenance (c) Poka Yoke (d) Benchmarking

Answer: (b) Routine maintenance

11. Total Productive maintenance (TPM) approach has the potential of providing almost a seamless integration between:

(a) Production and Quality (b) Quality and Maintenance (c) Production and Maintenance (d) All of the above

Answer: (c) Production and Maintenance

12. A systematic approach for maintenance is:

(a) Problem-Cause-Diagnosis-Rectification (b) Problem-Diagnosis-Cause-Rectification (c) Problem-Measure-Diagnosis-Rectification (d) Problem-Diagnosis-Measure-Rectification

Answer: (b) Problem-Diagnosis-Cause-Rectification

13. With the increase in preventive maintenance cost, breakdown maintenance cost:

(a) Increases (b) Decreases (c) Remain same (d) Any of the above

Answer: (b) Decreases

14. Which of the following is not an interpretation of the term 'perfect production'?

(a) Production without any breakdown (b) Production without any defects (c) Production without any accidents (d) Production with 100% errors

Answer: (d) Production with 100% errors

15. Which of the pillar of TPM schedules maintenance based on predicted and/or measured failure rates?

(a) Autonomous maintenance (b) Planned maintenance (c) Focused improvement (d) Benchmarking

Answer: (b) Planned maintenance

2.9 Total Quality Management (TQM)

2.9.1 Introduction

In an earlier section of this study note, the importance of quality as a competitive tool is discoursed upon. Quality is noted as a perception, the definition of which depends on the perception of the people defining it. Thus it has no single universal definition. As such Quality refers to the following five perspectives:

1. (a) **Conformance to specifications:** How well the product or service meets the targets and tolerances determined by its designers. For example, the dimensions of a machine part may be specified by its design engineers as 3 ± .05 inches. This would mean that the target dimension is 3 inches but the dimensions can vary between 2.95 and 3.05 inches.
2. (b) **Fitness for use:** A definition of quality that evaluates how well the product performs for its intended use. [user based definition].
3. (c) **Value for price paid:** Quality defined in terms of usefulness of product or service for the price paid. [it assumes that the definition of quality is price sensitive].
4. (d) **Support services:** Quality defined in terms of the support provided after the product or service is purchased. [Quality does not apply only to the product or service itself; it also applies to the people, processes, and organizational environment associated with it].
5. (e) **Psychological criteria:** Is a subjective definition that focuses on the judgmental evaluation of what constitutes product or service quality. [ambiance, prestige, friendly staff].

2.9.2 Quality Costs

An organisation has to deliver superior performance which aids organisation to create sustainable competitive advantage. Superior performance is measured in terms of profit, profit growth and market share. Quality has direct connotation to superior performance. Quality has costs which negatively impacts the financial and operational performance of the organisation. Quality costs categorized either quality control costs or quality failure costs.

Quality Control Costs

- **Prevention costs** are all costs incurred in the process of preventing poor quality from occurring. They include quality planning costs, such as the costs of developing and implementing a quality plan.
- **Appraisal costs** are incurred in the process of uncovering defects. They include the cost of quality inspections, product testing, and performing audits to make sure that quality standards are being met.

Quality Failure Costs

- **Internal failure costs** are associated with discovering poor product quality before the product reaches the customer site.
- **External failure costs** are associated with quality problems that occur at the customer site. These costs can be particularly damaging because customer faith and loyalty can be difficult to regain.

2.9.3 Major Quality Gurus and Their Contribution

During the early years of the 20th century a significant change in the perception of the organisations as regards to quality is noticed. Processes (set of activities that convert inputs into outputs by adding value) were included in quality practices. Inspection of products and processes was the first quality management practice in organisation. Walter A. Shewhart introduced the concept of control charts in 1924 which was instrumental in making quality relevant not only for the finished product but also for the processes that shaped it. Research by various quality gurus led to an extensive repertoire of literature on quality and quality management practices.

Table 2.9: Major Quality Gurus and Their Contribution

Name of the Quality Guru	Major research and contribution
Dr. Walter A. Shewhart (1891–1967)	• Contributed to understanding of process variability • Developed concept of statistical control charts • Pointed to eliminating variability improves quality • His finding lead to Statistical Process Control (SPC)
Dr. W. Edwards Deming (1900–1993)	• The Japanese established in 1951 the Deming Prize (for his contribution) • Pointed management's responsibility for quality • Developed "14 points" to guide companies in quality improvement
Dr. Joseph M. Juran (1904–2008)	• Stressed that conformance to specifications is necessary but not sufficient requirement of a product • Defined quality as "fitness for use" • Developed the idea of quality trilogy: Quality Planning, Quality Improvement and Quality Control
Dr. Armand V. Feigenbaum (1922–2014)	• Developed the concept of cost of quality • Introduced concept of total quality control (TQC), later developed as Total Quality Management (TQM)
Philip B. Crosby (1926–2001)	• Initiated the Zero Defects program at the Martin Company Orlando, Florida, plant • Coined phrase "quality is free" (in his famous book) • Crosby's response to the quality crisis was the principle of "doing it right the first time" (DIRFT)
Dr. Kaoru Ishikawa (1915–1989)	• Developed cause-and-effect diagrams (also known as Ishikawa or "Fish Bone" diagrams) • Simplified statistical techniques for QC • "Quality does not only mean the quality of product, but also of after sales service, quality of management, the company itself and the human life." – the famous quote. • Identified concept of internal customer
Dr. Genichi Taguchi (1924–2012)	• Focused on product design quality • Developed loss function to measure financial loss to society resulting from poor quality • A quality product is a product that causes a minimal loss (expressed in money) to society during the life of the product.

Dr. Feigenbaum conceived the concept of Total Quality Control (TQC) in 1961 which he emphasized in his book, Total Quality Control. Later Kaoru Ishikawa's wrote the book What Is Total Quality Control? The Japanese Way in 1985. These two books laid the foundation of Total Quality Management (TQM).

TQC was a 'hit' in Japan, where the first quality circles were set up in 1962, and which later developed into what the Japanese themselves call Company-Wide Quality Control (CWQC). This is identical with TQM.

Specifically, the term TQM was coined in 1984, when an arm of the United States Navy asked some of its civilian researchers to assess statistical process control and the work of several prominent quality consultants and to make recommendations as to how to apply their approaches to improve the Navy's operational effectiveness. The recommendation was to adopt the teachings of W. Edwards Deming. The Navy initiated the project in 1985 and named it 'Total Quality Management (TQM)'. As such, TQM is the West's answer to Japan's companywide quality control (CWQC).

2.9.4 TQM – An Overview

The new business environment is marked by free flow of information and products; organizations retain their competitive advantage by reducing prices; improves existing products and brings in innovation.

TQM is a business strategy that allows organization to achieve all this and is based on the premise that improvement of quality leads to decreased costs, better productivity. Thus TQM posits that quality is the most important and critical component for creation of strategic business advantage. Three key issues will help the reader to comprehend the notion of TQM:

- (a) TQM is an integrated organizational effort designed to improve quality at every level.
- (b) TQM is a vision which the firm achieves through: (i) long-term planning, (ii) drawing up and implementing annual quality plans

- (c) TQM is a corporate culture characterized by increased customer satisfaction through continuous improvements, in which all employees in the firm actively participate.

A snapshot of the components of TQM is presented in Figure 2.16. It may be noted that:

- (a) There are three aspects of TQM; total, quality and management.
- (b) The term 'total' is included to mean all pervasiveness in all processes and products.
- (c) In TQM, the term 'quality' is viewed from the perspective of the customer.
- (d) Continuous improvement of products and process and effective utilisation of resources are the two major aspect of management emphasized in TQM.

Fig 2.16: Snapshot of the Three Terms of TQM

Total	Quality	Management
• Cover all functional area • Cover all employees at all level • Cover all internal	• Full Fill customer needs & expectations • Fitness for use • Achieve customer satisfactions	• Effective utilization of all resources • Continuous development & improvement

2.9.5 TQM – Some Definitions

Literature suggest several meaningful definitions of TQM. In the following lines, three important definitions are mentioned for understanding of the reader.

Feigenbaum (1960): Defined TQM as an "effective system for integrating the quality development, quality maintenance, and quality improvement efforts of the various groups in an organization to achieve full customer satisfaction."

ISO 8402:1994: Defines TQM as "A management approach of an organization, centred on quality, based on the participation of all its members and aiming at long term success through customer satisfaction and benefits to all members of the organization and society."

Management Study Guide: Total Quality management is defined as a continuous effort by the management as well as employees of a particular organization to ensure long term customer loyalty and customer satisfaction.

2.9.6 The Essentials of TQM

The main approach of TQM is to have an impact on the society though continuous satisfaction of the customer. The simple issue is always accurately do the correct works at the beginning so that time and money is not wasted on the rectification and overhauling process. The key issues of TQM are as follows:

a) Customer Focus

The first, and overriding, feature of TQM is the company's focus on its customers. Quality is defined as meeting or exceeding customer expectations.

b) Continuous Improvement

Another concept of the TQM philosophy is the focus on continuous improvement. Traditional systems operated on the assumption that once a company achieved a certain level of quality, it was successful and needed no further improvements. Continuous improvement, called kaizen by the Japanese, requires that the company continually strive to be better through learning and problem solving. A philosophy of never-ending improvement. Two approaches that can help companies with continuous improvement are:

- The plan-do-study-act (PDSA) cycle – The circular nature of the cycle shows that continuous improvement is a never-ending process.
- Benchmarking: Companies implement continuous improvements by studying and effecting business practices of companies considered "best in class." This is called benchmarking.

c) Employee Empowerment

TQM philosophy is to empower all employees to seek out quality problems and correct them. With the old concept of quality, employees were afraid to identify problems for fear that they would be reprimanded. Often poor quality was passed on to someone else, in order to make it someone else's problem. The other, the new concept of quality, TQM, provides incentives for employees to identify quality problems. Employees are rewarded for uncovering quality problems, not punished.

d) Use of Quality Tools

TQM places a great deal of responsibility on all workers. If employees are to identify and correct quality problems, they need proper training. They need to understand how to assess quality by using a variety of quality control tools, how to interpret findings, and how to correct problems.

e) Product Design

A critical aspect of building quality into a product is to ensure that the product design meets customer expectations. This typically is not as easy as it seems. Customers often speak in everyday language. A useful tool for translating the voice of the customer into specific technical requirements is quality function deployment (QFD). QFD is also useful in enhancing communication between different functions, such as marketing, operations, and engineering.

f) Process Management

According to TQM a quality product comes from a quality process. This means that quality should be built into the process. Quality at the source is the belief that it is far better to uncover the source of quality problems and correct it than to discard defective items after production.

g) Managing Supplier Quality

TQM extends the concept of quality to a company's suppliers. Traditionally, companies tend to have numerous suppliers that engaged in competitive price bidding. When materials arrived, an inspection was performed to check their quality.

2.9.7 Three Core Concepts of TQM

- **Quality Control (QC):** It is concerned with the past and deals with data obtained from previous production, which allow action to be taken to stop the production of defective units.
- **Quality Assurance (QA):** It deals with the present and focuses to create and operate appropriate systems to prevent defects from occurring.
- **Quality Management (QM):** It concerned with the future and manages people in a process of continuous improvement to the products and services offered by the firm.

2.9.8 Steps for Implementation

Stage 1: Identification of customers / customer groups: Through a team approach (a technique called Multi-Voting), the firm should identify major customer groups. This helps in generating priorities in the identification of customers and critical issues in the provision of decision-support information.

Stage 2: Identifying customer expectations: Once the major customer groups are identified, their expectations are listed. The question to be answered is - What does the customer expect from the Firm?

Stage 3: Identifying customer decision-making requirements and product utilities: By identifying the need to stay close to the customers and follow their suggestions, a decision-support system can be developed, incorporating both financial and non-financial information, which seeks to satisfy used requirements. Hence, the Firm finds out the answer to - What are the customer's decision-making requirements and product utilities? The answer is sought by listing out managerial perceptions and not by actual interaction with the customers.

Stage 4: Identifying perceived problems in decision-making process and product utilities: Using participative processes such as brainstorming and multi-voting, the firm seeks to list out its perception of problem areas and shortcomings in meeting customer requirements. This will list out areas of weakness where the greatest impact could be achieved through the implementation of improvements. The firm identifies the answer to the question - What problem areas do we perceive in the decision-making process?

Stage 5: Comparison with other Firms and benchmarking: Detailed and systematic internal deliberations allow the Firm to develop a clear idea of their own strengths and weaknesses and of the areas of most significant deficiency. Benchmarking exercise allows the Firm to see how other Companies are coping with similar problems and opportunities.

Stage 6: Customer Feedback: Stages 1 to 5 provide a information base developed without reference to the customer. This is rectified at Stage 6 with a survey of representative customers, which embraces their views on perceived problem areas. Interaction with the customers and obtaining their views helps the Firm in correcting its own perceptions and refining its process.

Stage 7 & 8: Identification of improvement opportunities and implementation of Quality Improvement Process: The outcomes of the customer survey, benchmarking and internal analysis, provides the inputs for stages 7 and 8. i.e., the identification of improvement opportunities and the implementation of a formal improvement process.

Multiple Choice Questions – 2.9

1. Who is known as the father of TQM (Total Quality Management)?

(a) Edward Deming (b) Joseph Juran (c) Philip Crosby (d) Kaoru Ishikawa

Answer: (a) Edward Deming

2. Which of the following is a principle of TQM?

(a) Decisions made by top executives only (b) Intermittent improvement (c) Customer-focus (d) Product-centered system

Answer: (c) Customer-focus

3. Which 'pillar of TQM' recognizes that product quality is a result of process quality?

(a) Customer Focus (b) Process Management (c) Employee Empowerment (d) Continuous Improvement

Answer: (b) Process Management

4. What is the kind of focus put in a company's processes in TQM?

(a) Steady improvement (b) Continual improvement (c) Passive improvement (d) Unsteady improvement

Answer: (b) Continual improvement

5. How does the product quality change after implementing the TQM philosophy?

(a) We cannot comment on product quality (b) Decreases (c) Increases (d) Remains the same

Answer: (c) Increases

6. Which of the following is a tangible benefit of following TQM?

(a) We can't comment on employee grievances (b) No change in employee grievances (c) Increase in employee grievances (d) Reduction in employee grievances

Answer: (d) Reduction in employee grievances

7. A company is known to have a reward policy for its employees. The manager gives its employees a chance to improve if a mistake is conducted by them. What can you infer about the management culture?

(a) Sales Management (b) Traditional Management (c) Total Quality Management (d) Supply Chain Management

Answer: (c) Total Quality Management

8. Which of the false regarding quality leaders reviewing organizational performance?

(a) They review organizational performance and also their own performance (b) They don't review organizational performance as they hate it (c) They don't review organizational performance as they don't have time for it (d) They review organizational performance but not their own performance

Answer: (b) They don't review organizational performance as they hate it

9. Which of the following is not a principle of JIT manufacturing?

(a) Supplier Management (b) MRP (c) Production Management (d) Total Quality Management

Answer: (b) MRP

10. Which of the following is a dimension of 'product quality'?

(a) Probability (b) Machinability (c) Durability (d) Customer Satisfaction

Answer: (c) Durability

11. The manager of a company is known to threaten his employees for the presence of a defect. What can you infer about the management culture?

(a) Total Quality Management (b) Traditional Management (c) Sales Management (d) Supply Chain Management

Answer: (b) Traditional Management

12. Company M has short-term goals like achieving the predicted quarterly profit. Company N has long-term goals like achieving sustained customer satisfaction. What can you infer about the management culture?

(a) Company M and Company N follows TQM (b) Company M and Company N follows traditional management (c) Company N follows traditional management, Company M follows TQM (d) Company M follows traditional management; Company N follows TQM

Answer: (d) Company M follows traditional management; Company N follows TQM

13. Which of the following is mandatory in TQM to attain customer satisfaction?

(a) Founder involvement (b) Co-founder involvement (c) Total employee involvement (d) Manager involvement

Answer: (c) Total employee involvement

14. Which team provides the overall direction for achieving a total quality culture?

(a) Quality Commissioner (b) Quality Chancellor (c) Quality Management (d) Quality Council

Answer: (d) Quality Council

15. Which of the following is associated with defining of product or service features and specifications?

(a) Quality Improvement (b) Quality Assurance (c) Quality Planning (d) Quality Control

Answer: (c) Quality Planning

2.10 Data Envelopment Analysis (DEA)

2.10.1 Introduction

Data Envelopment Analysis (DEA), originally developed as a performance measurement technique, is a data oriented decision making tool based on the principle of mathematical programming to compare the relative operational efficiency of a set of comparable decision making units (DMUs) which functions even with multiple inputs and outputs. It is used to assess the relative performance of a set of DMUs that use multiple inputs to produce multiple outputs.

DMUs are units in an organisation which are responsible for taking decisions. These units are under evaluation in DEA. DMUs can include manufacturing units, departments of big organizations such as universities, schools, bank branches, hospitals, power plants, police stations, tax offices, prisons, defence bases, a set of firms or even practising individuals. The performance of DMUs is assessed in DEA using the concept of relative efficiencies that is, efficiencies of a DMU relative to the best performing DMU (or DMUs if there is more than one best-performing DMUs). The best-performing DMU is assigned an efficiency score of unity or 100 per cent, and the performance of other DMUs vary, between 0 and 100 per cent relative to this best performance.

Charnes, Cooper, and Rhodes initiated the DEA model in 1978. This is heavily inspired on the earlier work of Farrell (1957). The work of Debreu's, who introduced in the early fifties the coefficient of resource utilisation is also influential in the development of the DEA model propagated by Charnes, Cooper, and Rhodes. The first application of DEA (though the name was not coined then) was in the agriculture field. In 1950, Farrell applied it to 48 states in the United States of America, considering four inputs and two outputs. At that time, the DEA term was not yet created, so in fact the first time the term DEA and that technique was applied was in the area of education, specifically in the analysis of Program Follow Through, conducted in the USA, in the late seventies (Rhodes 1978).

It is important to note that in DEA, the efficiency or performance of DMU's were measured in two ways:

- **Input-oriented model:** It tries to see if the DMU can reduce its current input and still producing the same amount of outputs.
- **Output-oriented model:** It tries to see if the DMU can increase its current output using current input level.

2.10.2 Fundamental Issues in Efficiency Measurement

It would be reiteration to state that efficiency is the ratio of the input to output in a work process or a labour process. In the manufacturing process it is crucial to identify all inefficient processes as that would aid minimisation of wastage and maximisation of efforts, energy and time in producing the desired result. Efficiency is denoted by η and is given as follows:

$$\text{Efficiency } (\eta) = (\text{Output} / \text{Input}) \times 100$$

It is important to note that the output and the input are of the same units of measurement. This simple measurement of efficiency quantifies the η only in case of single output corresponding to single output.

For example, if a cyclist puts 600 J of work on his bicycle and the bicycle gives out 140 J of useful work. The efficiency of the cyclist can be calculated as follows:

Efficiency (η) = (140 / 600) × 100 = **23.33%**

This measure of efficiency is applicable for business process and other business perspectives. For example, in business processes the η is measured in terms of input (material, labour, energy resources) and the output (the value of outputs). For the purpose both the inputs and the outputs are to be represented in terms of Rupee value. If the cost of the inputs, in a particular business process is ₹3 and the value of the output is ₹4 then the η is calculated as:

Efficiency (η) = (4 / 3) × 100 = **133.33%**

2.10.3 Advantages and Disadvantages of DEA Model

Advantages of DEA Approach

- No need to explicitly specify a mathematical form for the production function
- Capable of handling multiple inputs and outputs
- Capable of being used with any input-output measurement, although ordinal variables remain tricky
- The sources of inefficiency can be analysed and quantified for every evaluated unit using the dual of the optimization problem
- Identifies which DMUs is evaluating itself against which other DMUs

Disadvantages of DEA

- Results are sensitive to the selection of inputs and outputs
- High efficiency values can be obtained by being truly efficient or having a niche combination of inputs/outputs
- The number of efficient firms on the frontier increases with the number of inputs and output variables
- A DMU's efficiency scores may be obtained by using non-unique combinations of weights on the input and/or output factors

2.10.4 Efficiency Measurement in DEA – Case of Single Input and Single Output

The simple measure of Efficiency (η) as discussed in the previous section is applicable without much modification to a situation where there is one input and there is one output. In such case it is easy to identify the efficient DMU from an inefficient one.

Solved Case 5 (ICMAI Study Material): Stores A to H – Single Input / Single Output

There are eight stores (A to H) across a city in which certain number of employees (given in the table below) effects Sales in a particular month.

Stores (DMUs)	A	B	C	D	E	F	G	H
Employee (No.)	20,400	32,000	34,200	44,000	54,000	54,000	62,000	80,000
Sales (₹)	16,000	27,500	25,400	44,000	46,000	43,200	56,000	58,000

Solution (ICMAI Standard):

Efficiency in terms of sales per employee for each store is given as (SALES / EMPLOYEE) of that store signifying the sales affected by one employee:

Store	Sales / Employee	Relative Efficiency
A	16000 / 20400 = 0.784	0.78
B	27500 / 32000 = 0.859	0.86
C	25400 / 34200 = 0.743	0.74
D	**44000 / 44000 = 1.000**	**1.00 (Efficient)**
E	46000 / 54000 = 0.852	0.85
F	43200 / 54000 = 0.800	0.80
G	56000 / 62000 = 0.903	0.90
H	58000 / 80000 = 0.725	0.73

It is evident from the above that store D has an efficiency score of 1.00 which is the highest. If the efficiency scores are plotted with number of employees on the horizontal axis and sale on the vertical axis, the slope of the line connecting each point to the origin corresponds to the sales per employee and the highest slope is attained by the line from the origin through D.

This line is called the **efficient frontier**. It is important to note that the efficient frontier touches at least one point (D, in this case) and all other points are below this line. The name Data Envelopment Analysis is derived from this particular property as in mathematical parlance, such a frontier is said to envelop all the remaining points including the points on the frontier.

While regression shows the central tendency of the data set, DEA deals with best performance and evaluates all performances by deviations from the frontier line. This leads to contrasting approaches to improvement. DEA identifies a point like store D which acts like a benchmark for other stores in seeking improvements. While in regression all the stores are considered in calculating the line of best fit and the stores A, B, D, E and G are to be considered as efficient choices and only store C, F and H are considered as inferior.

Solved Case 6 (ICMAI Study Material): Four Firms A, B, C and D – Value Added per Capital Employed

There are four firms (A, B, C and D) which operates under similar conditions and are comparable. Miss Izumi, the cost accountant of Firm B has been authorized by the top management to look into the matter and report back. She is of the opinion that the value added is the comparable output and the capital employed is the comparable input.

Table 2.10: Comparison of performance of the firms

Firm	Capital Employed (₹ in Million)	Value added (₹ in Million)	Value added per Capital Employed
A	8.6	1.800	0.209
B	2.2	0.200	0.091
C	15.6	2.800	0.179
D	31.6	4.100	0.130

Solution (ICMAI Standard):

From Table 2.10, it is easy to note that Firm A has the highest efficiency, measured in terms of the Value added per unit of capital employed which is 0.209 and Firm B has the lowest (0.091).

Table 2.11: Relative Efficiencies of the Firms

Firm	Value added per Capital Employed	Relative efficiency (%)
A	0.209	100.00
B	0.091	43.40
C	0.179	85.88
D	0.130	62.08

Thus as Y(B)/X(B) < Y(A)/X(A), Firm B is said to be relatively inefficient. Similarly Firm C and Firm D are said to be relatively inefficient.

The DEA model specifies that for inefficient Firms, Performance Targets may be set which will enable to achieve cent percent efficiency alike Firm A which is a benchmark for the inefficient Firms.

Input Target = Actual Input × Relative Efficiency (in fraction term)

Input Target (B) = 2.2 × 0.434 = 0.955

This implies that if Firm B uses ₹0.955 million as input, and produces ₹0.2 million as value added output, then it will be considered as efficient as Firm A.

For inefficient firms, Input Target < Actual Input.

Input Slack = Actual input – Input Target = 2.2 – 0.955 = 1.245

Input Slack Percentage = (Input Slack / Actual Input) × 100 = (1.245 / 2.2) × 100 = 56.6%

Miss Izumi reports that in order to be as efficient as Firm A, Firm B should be able to produce the same output of ₹0.20 million Value Added using 56.6% less capital employed (input).

Output target = Actual output / Relative efficiency in fraction

Output Target (B) = 0.2 / 0.434 = ₹0.46 million

Output Slack = Output Target − Actual Output = ₹0.46 million − 0.2 million = ₹0.26 million

Output Slack Percentage = (Output Slack / Actual Output) × 100 = (0.26 / 0.2) × 100 = 130%

From the perspective of output, if Firm B is to achieve the same efficiency as Firm A, it should increase its output by ₹0.26 million or by 130 per cent for the same level of input (capital employed).

2.10.5 Efficiency Measurement in DEA – Case of Two Inputs and One Output

Real life situations are not as simple as categorized in the first case where there is one input and one output. Differing situations arise where there are multiple inputs and multiple outputs.

Solved Case 7 (ICMAI Study Material): Two Inputs – One Output

Sl no.	DMUs	A	B	C	D	E	F
1	Number of Customers (Output) (in '0000)	1	1	1	1	1	1
2	Number of Employees (Input 1)	8	12	14	8	4	10
3	Floor Space (Input 2) (in square meter)	6	6	2	4	8	4
4	Employee/Customer	8	12	14	8	4	10
5	Floor Space/Customer	6	6	2	4	8	4

Solution (ICMAI Standard):

In this case it is important to note that the inverted efficiency ratio is taken against serial number 4 and 5 (Employee/Customer and Floor Space/Customer). This implies that the lower the ratio the better is the efficiency. In case of DMU A, eight employees serve 10000 customers implying that each employee serves 1250 customers. While in case of DMU E, only four employees serve 10000 customers implying that each employee serves 2500 customers. Thus **DMU E is the most efficient** in terms of Employee/Customer.

Efficiency of DMU E is highest amongst all the DMUs.

In terms of Floor space/Customer, **DMU C is the most efficient** as they are serving 10000 customers in 2 square meter of space which is the minimum.

The analysis of which DMU is more efficient than the other is done through charting the production possibility sets and the efficient frontier. All the given sets (A through F) are production possibility sets. It is also noted that lower the value of Employee/Customer and Floor space/Customer the more efficient is the DMU. Accordingly, DMU E is the most efficient in terms of Employee/Customer and DMU C is most efficient in terms of Floor space/Customer.

The efficiency frontier shows that DMUs C, D and E are efficient as they lie in their efficiency frontier. While DMUs A, B and F are enveloped within the frontier are inefficient. The important point is that a Virtual DMU can be surrogated as A which lies on the intersection of the efficiency frontier line and the straight line joining the origin and the production possibility DMU A.

2.10.6 Efficiency Measurement in DEA – Case of Single Input and Two Outputs

Solved Case 8 (ICMAI Study Material): Single Input – Two Outputs (Bank Branches)

In a bank two issues are considered as output; number of personal transaction (PT) completed and number of business transactions (BT) completed. The following figures are given for four branches of the ABC bank. And the measure of input is the number of staff.

Table 2.12: Relative efficiencies (output-input ratios)

Code	Branch	PT (Y1) (figures in '000)	BT (Y2) (figures in '000)	Staff (X1)	PT/Staff (Y1/X1)	BT/Staff (Y2/X1)
A	Esplanade	130	55	20	6.50	2.75
B	Harish Avenue	50	25	17	2.94	1.47
C	Gariahat	85	60	18	4.72	3.33
D	Sudder Street	25	15	11	2.27	1.36

Solution (ICMAI Standard):

The output-oriented technical efficiency of each branch in producing two outputs can be found by dividing each of their outputs by their input. It is observed from the above table that Esplanade Branch (A) has the highest ratio of personal transactions per staff member, whereas Gariahat Branch (C) has the highest ratio of business transactions per staff member. Harish Avenue Branch (B) and Sudder Street Branch (D) do not compare so well with Esplanade Branch (A) and Gariahat Branch (C), so are relatively less efficient at using their given input resource (number of staff) to produce outputs.

The DEA analysis (graphical representation): The figure shows personal transactions per staff member (Y1/X1) in the X-axis and business transactions per staff member (Y2/X1) in the Y-axis. The observed level of two outputs of a bank branch is represented by its branch code. The frontier technology is formed by connecting the observations A and C and further extending the line horizontally from point A to the Y-axis and extending the line perpendicularly from point C to the X-axis.

Any branches on the frontier are technically efficient ($TE_0 = 1$). Thus the **Esplanade Branch (A)** and the **Gariahat Branch (C)** are efficient. It is evident from the graph that the other two branches (**Harish Avenue [B] and Sudder Street [D]**) are technically inefficient ($TE_0 < 1$).

If the branch, Sudder Street Branch (D), is placed under evaluation, the ratio personal transactions/business transactions = (25 / 15) = 1.67, that is, there are 1.67 personal transactions for every business transaction. Mathematically, the value 1.67 is also the ratio of personal transactions per staff member / business transactions per staff member, that is, 2.27 / 1.36 = 1.67.

Numerically, the measure of the (relative) efficiency of Sudder Street Branch (D) is calculated by the following ratio:

= Length of line from origin to Sudder Street Branch (OD) / Length of line from origin through Sudder Street Branch to efficient frontier (OR)

= 2.646 / 6.126 = **0.432**

2.10.7 Mathematical Programming in DEA

It is evident that efficiency measurement and performance evaluation for the case of two inputs and one output and two output and one input is more complicated than the single input single output scenario. Despite the problem graphical analysis is used for analysing these cases. But with greater number of inputs and outputs graphical analysis cannot be used. Mathematical formulation is needed for calculating the efficient frontier and the relative efficiencies of the underachieving DMUs. Farell (1957) in his seminal work provided frontier analysis for performance evaluation. The mathematical framework to handle frontier analysis could be established only after 20 years, when Charnes et al. (1978) in their seminal paper provided the fundamentals of the mathematical aspects of frontier analysis. The authors also coined the term Data Envelopment Analysis (DEA).

In DEA, the efficiency or performance of DMU's were measured in two ways:

- **Input-oriented model:** It tries to see if the DMU can reduce its current input and still producing the same amount of outputs.
- **Output-oriented model:** It tries to see if the DMU can increase its current output using current input level.

Return to scale (RTS) is often used to characterise the different DEA models. The different types of DEA frontiers are as follows:

- **Constant RTS: CRS**
- **Variable RTS: VRS** (Constant, Increasing and Decreasing RTS)
- **Non-increasing RTS: NIRS**
- **Non-decreasing RTS: NDRS**

2.10.8 Steps in DEA Analysis

1. (a) Collect the pooled data on 'Output' and 'Input' quantities and their respective values for different DMU's
2. (b) Download the open source DEAP software from the Centre for Efficiency and Productivity Analysis (CEPA) portal (http://www.uq.edu.au/economics/cepa/deap.htm)
3. (c) Install the DEAP
4. (d) Arrange the dataset as per the requirement of DEAP (output first followed by inputs) in *.txt file
5. (e) Modify the inbuilt instruction file and compute the Technical, Allocative and Economic efficiency

The website https://onlineoutput.com/dea-software/ provides a free software which returns the results of Data Envelopment Analysis of the data entered into by the user. There are numerous packages in R such as lpSolve, Benchmarking, FEAR to do DEA Analysis.

2.10.9 Final Note

DEA is a very powerful technique for performance measurement and widely used across the industry. This technique may be used to find out efficiencies of any units that raises interest. One can even find out performance analysis of IPL teams in a particular season and recommend for improvement for next season.

Multiple Choice Questions – 2.10

1. Efficiency is a measure of:

(a) How hard an employee works (b) How effectively a manager supervises his subordinates (c) How profitable a business is (d) How productively resources are used to achieve a goal

Answer: (d) How productively resources are used to achieve a goal

2. The resources utilized for production are:

(a) Materials, Machines, Manpower (b) Materials, Methods, Machines (c) Machines, Manpower, Methods (d) Methods, Machine, Manpower

Answer: (a) Materials, Machines, Manpower

3. What does the DEA stand for?

(a) Data Equipment Analysis (b) Data Environmental Analysis (c) Data Envelopment Analysis (d) Data Effective Analysis

Answer: (c) Data Envelopment Analysis

4. What is the main purpose of DEA?

(a) DEA measures firms' effectiveness (b) DEA measures firms' efficiency (c) DEA measures firms' profit (d) DEA measures firms' productivity

Answer: (b) DEA measures firms' efficiency

5. Data Envelopment Analysis (DEA) is a method for:

(a) Measuring a firm's quality performance by comparing it with other companies that are recognized as "best in class." (b) Determining the feasibility of technological innovations in service operations. (c) Analyzing the gap between the service customer's expectations and perceptions. (d) Comparing the efficiency of multiple service units that provide similar services.

Answer: (d) Comparing the efficiency of multiple service units that provide similar services.

6. How many ways are the efficiency or performance of DMUs measured?

(a) 3 (b) 4 (c) 2 (d) 5

Answer: (c) 2

7. A dataset includes information about input quantity, input cost and output quantity. Which type of efficiency cannot be measured?

(a) Technical efficiency (b) Cost efficiency (c) Revenue efficiency (d) Scale efficiency

Answer: (c) Revenue efficiency

8. 'Pure' technical efficiency reflects:

(a) A global measure of firm performance (b) The efficiency of a firm operating at an incorrect scale (c) A measure of profit efficiency (d) The efficiency of a poorly managed firm

Answer: (a) A global measure of firm performance

9. Firm A is inefficient. Who is its peer(s)?

(a) One or several firms whose efficiency scores are worse than firm A's efficiency (b) One or several firms whose efficiency scores are better than firm A's efficiency, but which are not located on the efficiency frontier (c) One or several efficient firms located on the efficiency frontier (d) None of the above

Answer: (c) One or several efficient firms located on the efficiency frontier

10. A firm has diseconomies of scale. How can the management team improve its efficiency?

(a) By merging with another firm (b) By producing more output (c) By producing less output (d) By producing the same amount of output

Answer: (c) By producing less output

📌 Key Takeaways – Module 2

Section	Key Takeaway
2.1	BSC = 4 Perspectives (Financial, Customer, Internal, Learning & Growth) + 9 Steps to Success; Kaplon-Norton doctrine
2.2	DuPont 3-Component: ROE = Profit Margin × Asset Turnover × Equity Multiplier; DuPont 5-Component adds Interest & Tax burden; RONA = Net Profit / (FA + NWC)
2.3	Benchmarking = 4 types (Internal, Competitive, Industry, Generic); 3 Phases; Bench Trending = continuous monitoring
2.4	Six Sigma: 6σ = 3.4 DPMO; DMAIC & DMADV; 7 Belts; Lean: 7 Wastes, 5 Principles, 5S; LSS = Lean + Six Sigma
2.5	SQC: Control Charts (X-Bar, R, p, c); Acceptance Sampling; 8 Dimensions of Quality (Garvin)
2.6	PDCA: Plan-Do-Check-Act; Evolution: Shewhart → Deming → PDCA → PDSA
2.7	MIS: TPS (lower), MIS (middle), EIS/DSS (top); 12 MIS Report types; Digitization vs Digitalization vs Digital Transformation
2.8	TPM: 5 Pillars, 6 Major Losses, OEE = A × PR × Q (benchmark 85%), 12-Step Implementation
2.9	TQM: 8 Dimensions of Quality, 7 Essentials, 7 Quality Gurus, 3 Core Concepts (QC, QA, QM)
2.10	DEA: Efficiency = Output/Input; DMUs; Efficient Frontier; Input & Output Oriented Models

📐 Important Formulas – Module 2

Formula	Description
ROA = Net Profit / Average Total Assets	Return on Assets
ROE = Margin × Turnover × Equity Multiplier	DuPont 3-Component
ROE = (EBIT/Sales) × (EBT/EBIT) × (EAT/EBT) × (Sales/TA) × (TA/Equity)	DuPont 5-Component
RONA = Net Profit / (Fixed Assets + NWC)	Return on Net Assets
OEE = A × PR × Q	Overall Equipment Effectiveness
Efficiency (η) = (Output/Input) × 100	Basic efficiency measure
UCL = $\bar{\bar{X}} + A_2\bar{R}$; LCL = $\bar{\bar{X}} - A_2\bar{R}$	X-Bar Chart
UCL = $\bar{R}D_4$; LCL = $\bar{R}D_3$	R Chart
UCL = $\bar{p} + 3\sqrt{[\bar{p}(1-\bar{p})/n]}$; LCL = $\bar{p} - 3\sqrt{[\bar{p}(1-\bar{p})/n]}$	p Chart
UCL = $\bar{c} + 3\sqrt{\bar{c}}$; LCL = $\bar{c} - 3\sqrt{\bar{c}}$	c Chart
Relative Efficiency = (Best Actual / Actual) × 100	DEA Relative Efficiency
Input Target = Actual Input × Relative Efficiency	DEA Input Target
Output Target = Actual Output / Relative Efficiency	DEA Output Target

✅ Revision Checklist – Module 2

- □ Explain BSC 4 perspectives and 9-step implementation
- □ Solve DuPont 3-component and 5-component analyses
- □ Explain RONA and its implications
- □ Describe 4 types of benchmarking and 3 phases
- □ Differentiate Benchmarking and Bench Trending
- □ Explain Six Sigma DMAIC and DMADV methodologies
- □ List 7 Six Sigma Belts

- □ Explain Lean 7 wastes, 5 principles, 5S
- □ Describe 8 dimensions of quality (Garvin)
- □ Solve p chart and c chart illustrations
- □ Explain PDCA cycle and its evolution
- □ Describe 12 types of MIS reports
- □ Explain TPM 5 pillars, 6 losses, OEE formula
- □ Explain TQM essentials, 7 quality gurus
- □ Solve DEA single input/output and multi-input/output cases
- □ Differentiate Input-oriented and Output-oriented DEA models

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Disclaimer: These revision notes are for educational purposes only. Students are advised to refer to the official ICMAI study material and latest amendments for comprehensive preparation.

Next Module: Module 3 – Economic Efficiency of the Firm - Performance Analysis

CMA FINAL PAPER 20A

Strategic Performance Management & Business Valuation

MODULE 3 – Economic Efficiency of the Firm: Performance Analysis

Complete Coverage as per ICMAI Study Material (Syllabus 2022)

For December 2026 Examination | CMA Knowledge Series – cmaknowledge.in

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2. Profit Optimization under Different Market Structures
3. Market Factors Affecting Pricing Decisions
4. Key Takeaways & Revision Checklist

Module Learning Objectives

- Summarize the various market forms and their respective profit maximisation techniques.
- Recapitulate the theories of the firm and appreciate the various pricing mechanisms suitable in the respective market forms.
- Gather fundamental knowledge about the key performance indicators (KPI) and their linkages with performance measures.

Introduction to Economic Efficiency

A brief note on economic efficiency is presented in the following lines before moving on to the context of the study note. This will pave way for easier comprehension of the subject matter of this study note. Efficiency is predominantly an economic term. In economics, it is discussed upon from two perspectives:

1. (a) efficiency in the production of goods and services
2. (b) efficiency in the distribution of services from producers to end users

In a study of the economic efficiency of the firm the first of the two aspects is more or less the subject matter of the study as efficiency in distribution is beyond the firm and is rather a subject matter of the society and/or the state.

There are, as such, four perspectives of Efficiency in production:

1. (a) available resources are fully used.
2. (b) resources (inputs) are optimally used so as to maximize the total social value of the output. This also implies that the firm would have to minimize the opportunity costs of those resources.
3. (c) producers collectively produce the right quantity and combination of outputs.
4. (d) that goods and services are carried from their producers to end users through cost-minimizing distribution channels.

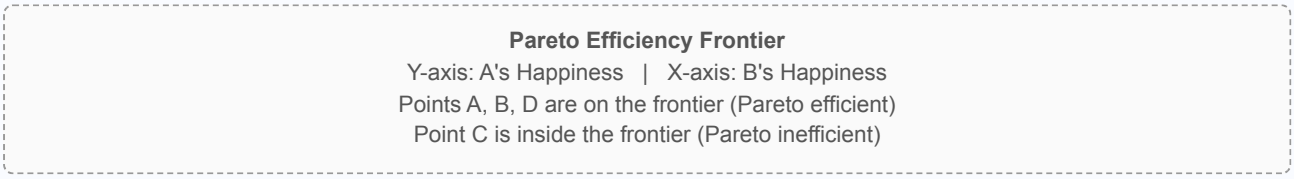
3.1 Economic Performance Indicator

3.1.1 Pareto Efficiency / Pareto Optimality

As regards to economic efficiency of the firm, the works of Vilfredo Pareto is considered to be one of the most significant and ground breaking. Thus, the construe of the term, Pareto efficiency or Pareto optimality. The concept is best understood if discoursed from the point of view of a two-person economy where a fixed set of resources (inputs) is allocated to the production of commodities, each of which could then be distributed to the two persons in a particular way.

There may be various allocation of resources which after converted into outputs are distributed to the two persons. The consumptions of outputs make the two person (A and B) happier. There must be a set of allocation of resources, the produce from which makes A and B happy. But all such allocations of resources, the produce from which makes one person happier in exchange of lesser happiness of the other person is said to be inefficient.

Fig 3.1: Pareto Optimality



In Figure 3.1, point C refers to an inefficient set of allocation of resources as a rearrangement can be made and such a rearrangement would produce higher happiness for A, while B's happiness remains the same. The points A, B and D represent Pareto efficiency and the line is the Pareto efficiency frontier.

Definition: An allocation of resources in the economy is economically efficient (now called Pareto efficient) if it is impossible to reallocate the resources so as to make at least one person feel better off without making someone else feel worse off.

The above analysis of efficiency is in respect of distribution of output amongst two individuals, on the consideration that the output has been efficiently produced. However, the concept of Pareto efficiency can easily be adapted from the context of happiness to the production of goods and services. In this case the volumes of output per period of two distinct commodities are measured in X axis and Y axis. The resultant is the production possibility frontier (PPF).

3.1.2 Pareto Improvement

From the above, the issue of Pareto improvement is easy to comprehend. As such Pareto improvement is an action that makes at least one person better off without making anyone worse off. If the reallocation of resources brings about a betterment of output of commodity M, without compromising the output of the other commodity N, then Pareto improvement is made. These improvement cease once Pareto optimality is reached. In figure 3.1 (for production of goods and services), if reallocation of resources is made to move from point C to point D, it is Pareto improvement.

In the business world, for example, Pareto improvement trials are initiated by floor shop managers in which they reallocate input resources in order to increase the productivity of assembly line workers without decreasing the productivity of the packing and shipping workers.

Pareto improvements also work for consumers who can reconsider the combination of goods for their consumption. If a change in the consumption pattern allows them more happiness, then they should reallocate the basket of consumer goods and in doing so the consumer literally gets something for nothing by making a Pareto improvement.

3.1.3 Economic Performance Indicator (EPI)

For an economy at large, a statistic that reads into economic data and comes up with numbers that allow analysis of economic performance and predictions of future performance of an economy is referred to as an economic performance indicator (EPI). Amongst the various uses of an economic indicator, decision making of the investor is the most important. An investment strategy is built on the projections made by economic indicator which has three major attributes:

(a) Relation to Business Cycle/Economy

- **Procyclic** economic indicator is one that moves in the same direction as the economy.

- **Countercyclic** economic indicator is one that moves in the opposite direction as the economy.
- **Acyclic** economic indicator is one that has no relation to the health of the economy and is generally of little use.

(b) Frequency of the Data

On the basis of availability of the data economic indicators differ. For example, in most countries, gross domestic product (GDP) figures are released quarterly (every three months) while the unemployment rate is released monthly.

(c) Timing

On the basis of timing, an economic indicator is either leading, lagging, or coincident (on the basis of their changes relative to the changes in the economy).

- **Leading economic indicators** are indicators that change before the economy changes. For example, an upward/downward movement of the stock market index forecasts the movement of the economy at large.
- **Lagged economic indicators** are indicators that does not change direction until a few months after the economy does. For example, the unemployment rate is a lagged economic indicator.
- **Coincident economic indicator** is one that changes in tandem with the economy. For example, the GDP.

Categories of Economic Performance Indicators (US example)

For an economy, there may be different categories of economic (performance) indicators. For example, in US, seven types of indicators are published monthly by the government:

1. Total Output, Income, and Spending
2. Employment, Unemployment, and Wages
3. Production and Business Activity
4. Prices
5. Money, Credit, and Security Markets
6. Federal Finance
7. International Statistics

3.1.4 Firm Performance – Santos & Brito Model

Though financial performance of a firm is often used interchangeably with its economic performance, in a broader sense of the term, economic performance refers to the accomplishment of the financial as well as operational objectives of the firm. Certain non-financial parameters, along with the financial parameters, are essential as they are linked to the overall mission and vision of the firm.

Santos & Brito, (2012) presented a comprehensive subjective model for measuring firm performance. The model presented in the study is based on the stakeholder theory proposed by Freeman (1984). Thus the approach moves away from the traditional approach of gauging a firm through profit and profit growth which are the basis of superior performance. Freeman (1984) propagated that there are various stakeholders of the firm viz., shareholders, suppliers, employees, customers, government and competitors. Thus organizational effectiveness cannot be constricted to profitability which is the prime focus of the shareholder theory. Organizational effectiveness, which is sole issue of sustainability of the business, depends not only on financial performance but also on operational performance.

Overall firm performance, synonymous with organizational effectiveness, is categorized either as financial performance or strategic performance.

Seven Measures of Overall Firm Performance

In the following lines, seven measures of overall firm performance are presented which is categorized into two groups as mentioned above.

(a) Financial performance

- (i) Profitability performance
- (ii) Market value performance
- (iii) Growth performance

(b) Strategic performance

- (i) Employee satisfaction
- (ii) Customer satisfaction

- (iii) Social performance
- (iv) Environmental performance

3.1.5 List of Economic Performance Indicators of the Firm

In Table 3.1, a list of Economic Performance Indicator, which are categorized either as financial performance indicator or strategic performance indicator of the firm, is listed. As the table posits, there are in all thirty-nine (39) parameters. Though literature on finance is yet to zero down on the exact number of parameters but the below mentioned set of parameters provides a comprehensive list.

Table 3.1: List of Economic Performance Indicators of the Firm

Type of Indicator	Parameter	Performance Indicator	Number
Financial Performance Indicator	Profitability Performance	Return on Asset (ROA), EBITDA margin, Return on investment, Net income ÷ Revenues, Return on equity	6
	Market Value Performance	Economic value added, Earnings Per Share, Changes in Stock Price, Dividend Yield, Stock Price Volatility, Market Value added, Tobin's Q	7
	Growth Performance	Market-share growth, Asset growth, Net revenue growth, Net income growth, Number of employees growth, Labour Turnover, Investments in Employees Development and Training	6
Strategic Performance Indicator	Employee Satisfaction	Wages and Rewards Policies, Career Plans, Organizational Climate, General Employees' Satisfaction, Mix of products and services, Number of complaints, Repurchase rate, New customer retention	6
	Customer satisfaction	General customers' satisfaction, Number of new products/services launched	6
	Environmental performance	Number of projects to improve/recover the environment, Level of pollutants emission, Use of recyclable materials, Recycling level and reuse of residuals	6
	Social performance	Number of environmental lawsuits, Environmental audit performance, Employment of minorities, Number of social and cultural projects, Number of lawsuits filed by employees, Customers and regulatory agencies	4

3.1.6 Key Performance Indicator (KPI)

In the previous section a comprehensive list of economic performance indicators is conceptualized on the basis of available literature. But in the functional domain, the concept of Key Performance Indicator (KPI) is acknowledged because of the identification of the critical factor. KPIs are performance indicators that are critical to the success of the business. Thus it is a subset of performance indicators which are most critical to the business. The KPIs are metrics that help measure the progress of the organisation towards the strategic goals. The KPIs are chosen in respect to four organizational perspectives; financial, customer, process and people. There cannot be a standard set of KPIs as organizations vary as regards to the above mentioned four perspectives. Selection of KPI is, as such, one of the most important aspect for the success of the business.

For example, in restaurant business if the management chooses serving of smaller portions of food as a KPI then it the restaurant may have attained its goal of minimum bottom line, but it will be counterproductive as there would be unsatisfied customers which will make the restaurant loose customers. Rather cleanliness and fresh food processing will surely be better KPIs.

3.1.7 KPIs and Critical Success Factors (CSF)

KPIs, as such, are different from critical success factors (CSF). In order to identify the CSFs, the management often neglects the KPIs. Though both are of crucial importance and are complementary to each other there is difference between the two concepts. As such KPIs are parameters that measure whether the CSFs are working. The performance indicators reflect the level of success, while CSFs point out the cause of success.

Table 3.2: Difference between CSFs and KPIs

Points of Difference	CSFs	KPIs
The parameter	Identification of issues which lead to success	The metrics of success
The main role	Specify requirement for the success	Indicate what we are doing
Dependency	Standalone	Depend on benchmarks
Type of measurement	Qualitative	Quantities
Business insights	Use insights	Generate insights

For example, if the strategic goal of a restaurant business in the forthcoming year is identified as increasing profit by 5%, with a corresponding increase in throughput by 10% in lunch and dinner without reducing the gross margin then the CSFs and the KPIs may be identified as:

CSF	KPI	Target
Market Share	Percentage of business within specific range	Threshold limit of 10%
Customer Satisfaction	Percentage of satisfied customers	Threshold limit of 96%
Meal Quality	Percentage of meals returned due to poor quality	Threshold limit of 1.8%

3.1.8 Principles for Implementing KPIs

Parmeter (2015) in his famous book posits seven crucial principles for implementing KPIs which are given in the following lines:

1. (a) **Partnership with the staff, unions, and third parties** – a congenial and cooperative attitude amongst employees, representatives of unions, and other stakeholders is the first foundation stone for successful implementation of KPIs.
2. (b) **Transfer of power to the front line** – employees are not mere servants of the company. They are of crucial importance in attainment of strategic goals. This primarily requires empowerment especially for the workers who are the interface with process and products.
3. (c) **Measure and report only what matters** – it is prime importance that top management develops an integrated reporting framework which should be covering the CSFs.
4. (d) **Source KPIs from the critical success factors** – there shall have to be a critical linkage between the CSFs and the KPIs as they represent a cause and effect relationship.
5. (e) **Abandon processes that do not deliver** – Peter Drucker recognized abandonment as the crucial to performance management. All initiatives of the management are not fruitful. Early identification of such ineffective initiatives is essential for zeroing down on effective KPIs.
6. (f) **Appointment of a home-grown chief measurement officer** – in house (appointed from internal management) measurement officer who has full responsibility of implementation of KPI is another principal aspect of the implementation process.
7. (g) **Organization-wide understanding of the winning KPIs definition** – It is of crucial importance that the senior management team, led by the CEO, communicate the nuances of a KPI and that is accepted unanimously by the employees and other staff members.

3.1.9 Factors in Setting Effective Performance Measures

A performance measure becomes effective and consequentially a KPI when the characteristics of "SMART" goals are effected. The acronym represents the following:

- **Specific** – clarity and specificity of the measures as regards to the objective.
- **Measurable** – it is essential to create a indicator that is easily measurable.
- **Attainable** – if a measure is impossible to attain, employees will be unmotivated and will not attempt to achieve the objective the measure is designed to address.
- **Realistic** – the goal must be realistic with respect to the resources available, knowledge and time.
- **Tangible** – for measures to be motivating for employees, they must ultimately be a tangible measure.

3.1.10 18 Key Performance Indicators

Though financial literature is yet to zero down on the specificity of KPIs, it is very specific about the fact that KPIs shall vary from business to business as the perspectives change. In an earlier section an attempt to identify KPIs is presented and as such 39 performance indicators are concluded upon by the researchers. But how many of them are key to realization of business strategies are not delved upon. But it is clear that a good KPI should act as a compass that shows whether the business is progressing toward its strategic goals or deviating from its path. As such a linkage exists between the KPI and the Balanced Score Card.

Thus KPIs may also be categorized into four perspectives; Financial, Customer, Process and People. 18 KPIs are presented in the following lines on the basis of four mentioned perspectives.

Financial Metrics

1. **Profit:** this is one of the most important performance indicators inspite of the numerous shortcomings.
2. **Cost:** cost reduction and cost control are two important measures of cost effectiveness is second most important aspect.
3. **Revenue Vs. Target:** analysis of actual revenue against target revenue is an important parameter which is succeeded by analysis of the discrepancies between the two numbers.
4. **Expenses Vs. Budget:** similar to point number three actual expenses need to analysed against planned expenses and also the chargeability of the expense need to be identified and measured.
5. **Cost of Goods Sold (COGS):** correctly measuring the COGS is the most important determinant of the cost structure of the organisation.
6. **Day Sales Outstanding (DSO):** this is the indicator of accounts receivable management. Any changes in this indicates various issues and thus it needs to monitored frequently.
7. **Sales by Region:** sales data analysis by region is crucial for making strategic decisions.

Customer Metrics

8. **Customer Lifetime Value (CLV):** CLV is a part of the value chain analysis and aids the organisation in creating a long-term customer relationship that assists customer relationship management.
9. **Customer Acquisition Cost (CAC):** CAC is calculated by dividing the total acquisition costs by the number of new customers within a time frame. This is considered one of the most important metrics in e-commerce as it helps evaluation the cost effectiveness of any marketing campaign.
10. **Customer Satisfaction & Retention:** though this looks simple, this is one of the most difficult to measure metrics. Multiple performance indicators are used to measure CSR initiatives which includes customer satisfaction scores and percentage of customers repeating a purchase.
11. **Net Promoter Score (NPS):** finding out the company's NPS is one of the best ways to indicate long-term company growth. To determine your NPS score, quarterly surveys are put to customers in order to ascertain the likelihood of customer's recommending the organization to someone who is yet to become a stakeholder.
12. **Number of Customers:** this is a simple measure of market share and also includes repeating customers. Though simple, this is the most important measure of whether the company is keeping into the track of achieving its strategic goal.
13. **Customer Support Tickets:** Analysis of the number of new tickets, the number of resolved tickets, and resolution time aids in creation of best customer service department in the industry.
14. **Percentage of Product Defects:** this is measured as the number of defective units divided by the total production (in percentage terms). Simply the lower the percentage defective the better the effectiveness as regards to process metrics.
15. **Organisation's overall Efficiency Measure:** efficiency measure will differ from organisation to organisation. For example, in manufacturing units' efficiency will be measured through analysis of how many units you are produced every hour, and what percentage of time the plant was put to use.

People Metrics

16. **Employee Turnover Rate (ETR):** this is same as the labour turnover rate. The ETR is a percentage of the number of employees who have left the organisation to the average number of employees of the organisation during a particular time frame. A high ETR, signifies unsatisfied workforce. And in such case an examination of the workplace culture, employment packages, and work environment is required to be undertaken.
17. **Percentage of response to Open positions:** this metric informs the management as to value of the firm to the job seekers.
18. **Employee Satisfaction:** Measuring employee satisfaction through surveys and other metrics is vital to the organisation health as the employees are resources who activate other resources for meeting the strategic goal.

Multiple Choice Questions – 3.1

1. The relationship between the economy and an economic indicator can be:

(a) Procyclic (b) Countercyclic (c) Acyclic (d) All of the above

Answer: (d) All of the above

2. Key Performance Indicator (KPI) is defined as:

(a) A vision statement that outlines a company's successful strategy (b) An executive officer's ability to lead his division (c) A performance measurement tool to gauge how a company is doing (d) A growth strategy that takes competition into account

Answer: (c) A performance measurement tool to gauge how a company is doing

3. Pareto improvement is an action that makes:

(a) Both the person better off (b) At least one person worse off (c) At least one person worse off without making anyone better off (d) At least one person better off without making anyone worse off.

Answer: (d) At least one person better off without making anyone worse off.

4. On the basis of timing an economic indicator is:

(a) Leading (b) Lagged (c) Coincident (d) All of the above

Answer: (d) All of the above

5. Which is not a perspective of efficiency of production?

(a) Available resources fully used (b) Efficiency in estimation of demand. (c) Right quantity and combination of inputs (d) Minimize the opportunity cost.

Answer: (b) Efficiency in estimation of demand.

6. What are parameters of financial performance indicators?

(a) Profitability performance (b) Market value performance (c) Growth performance (d) All the above.

Answer: (d) All the above.

7. Who presented comprehensive subjective model for measuring firm performance?

(a) Freeman (b) Pareto (c) Santos & Brito (d) None.

Answer: (c) Santos & Brito

8. Which is the key performance indicator (KPI) in financial metrics?

(a) Cost of goods sold (COGS) (b) Sales by region (c) Day sales outstanding (d) All the above.

Answer: (d) All the above.

9. According to 'Parmenter' which is not the crucial principle for implementing KPI?

(a) Transfer of power to the front line. (b) Measure and report only what matters. (c) Percentage of response to open positions. (d) Partnership with staff, unions and third parties.

Answer: (c) Percentage of response to open positions.

10. Organisation effectiveness depends on:

(a) Financial performance (b) Strategic performance (c) Both A & B (d) None

Answer: (c) Both A & B

3.2 Profit Optimization under Different Market Structures

3.2.1 Introduction to Market and Profit

In order to pursue the strategic goal of an organisation, top level managers rely on SWOT (strength, weakness, opportunity and threat) analysis. While analysis of strength and weakness is relatable to the analysis of the internal environment of the organisation, a scrutiny of opportunity and threat refers to the analysis of the external environment of the organisation. Thus it is evident that the performance of an organisation depends not only on its internal well-being but also on some external factors which needs to be assessed by the management.

All the performance measures discussed in the previous section posits that superior performance of the firm is the key to long term success of the firm. Superior performance is measured in terms of profit and profit growth which are indicated in the market share of the organisation.

Thus, understanding of market and profit have specific linkages to the realization of strategic goals.

3.2.2 Concept of Profit

Profit is the life blood of the business. It is measured either as excess of revenue over expenses during a particular period (often referred as a financial year) or as the excess of closing net asset over opening net assets where net asset is defined as excess of total tangible asset over total liabilities. The first of the above concept is related to the matching principle while the second concept is that of capital maintenance which is more inclined to the economic definition of profit.

It is important to note that the economic concept of profit is also addressed in the Conceptual Framework for Financial Reporting under Indian Accounting Standard (Ind AS). Thus it is reasonable to say that even in accounting parlance the concept of capital maintenance is being adopted as the standard procedure for measurement of profit. Profit, as such, is the excess of revenue over cost.

$$\pi = \text{Revenue} - \text{Cost}$$
$$\Rightarrow \pi = (Q \times P) - (TVC + TFC)$$
$$\Rightarrow \pi = (Q \times P) - [(Q \times VC) - TFC]$$

Where π = Profit; Q = Quantity sold; P = Sale Price; TVC = Total variable cost; VC = variable cost per unit; TFC = Total fixed cost

In financial accounting literature, fixed cost is relatable to a particular period and is referred as non-operating expense. Its magnitude depends much on the scale of operation. The equation mentioned above is on the basic assumption that there is a single product. It may be noted that though the variable cost (VC) and the total fixed cost (TFC) are internal management issues, quantity sold is contingent upon a number of factors of which the nature of the market is the most important. Even the sale price (P) is a factor of the nature of market because competitive forces do not allow a firm to determine the sale price purely on the basis of cost structure. As such the sale price is often market determined.

3.2.3 Definition and Elements of Market

A place where buyer and seller meet to transact goods and services (sale and transfer of ownership occurs) is referred as a Market. Economists describe a market as an assemble of buyers and sellers who transact over a particular product or product class (the housing market, the clothing market, the grain market etc.).

Definitions of Market

Though there are numerous definition of market the following three definitions are considered for the purpose of the study note.

Philip Kotler: "Market is a societal process by which individuals and groups obtain what they need and want through creating, offering and freely exchanging products and services of value with others."

Cournot: "Economists understand by the term Market not any particular market place in which things are bought and sold but the whole of any region in which buyers and sellers are in such free intercourse with one another that the prices of the same goods tend to equality, easily and quickly."

Jevons: "The word market has been generalized so as to mean anybody of persons who are in intimate business relations and carry on extensive transactions in any commodity."

Elements of Market

- Sellers and buyer agree to transact at a particular price of a product.
- Nature of the commodity is known to both parties
- Price of the product is determined under conditions of the market
- Competition depends on the increase in the buyers and seller
- If there is increase in number buyers, price will increase and it is treated as Seller's market
- If there is increase in number sellers, price will decrease, it is treated as buyer's market
- Free communication between the buyers and sellers.
- Size of the market is not restricted; it may certain city, a region a country or even the entire world.
- Product is homogenous in case of perfect competition, and the product may be differentiated in case of other markets

3.2.4 Market Structure

Market structure, in economics, refers to how different industries are classified and differentiated based on their degree and nature of competition for goods and services. It is based on the characteristics that influence the behavior and outcomes of companies working in a specific market.

Fig 3.3: Market Structure

3.2.5 Perfectly Competitive Market

In economic literature this is referred simply as perfect competition. In the next few lines two major definitions of the perfect market are taken up for discussion.

Lift Witch: "Perfect competition is a market in which there are many firms selling identical products with no firm large enough relative to the entire market to be able to influence market price."

Mrs. Joan Robinson: "It prevails when the demand for the output of each product is perfectly elastic."

Features of Perfectly Competitive Market

1. There must be large number of Buyers and sellers.
2. In perfect competition, the goods produced by different firms are homogeneous or identical.
3. In perfect competition there is free entry and exit of the firms into the industry.
4. The buyers and the sellers must have the knowledge with regard to the prices of various commodities at different supply and demand forces.
5. The smooth functioning of perfect competition necessitates perfect mobility of factors of production. The factors of production should be free to move into any industry which they consider profitable for themselves.
6. Nonexistence of any artificial restrictions on the demand, supply, prices of commodities and factors of production in the market.
7. There must be no governmental fixation of the prices of goods and factors of production. It is assumed that price is determined by interaction of market demand and supply forces. This equilibrium price is accepted by a large number of sellers and buyers.
8. As a large number of sellers sell homogeneous products at a given price, it rules out the possibility of advertisement and other sales promotion expenses.

3.2.6 Price Determination under Perfect Competition

A market is said to be perfect when there is a large number of buyers and sellers of the product in the market. The products are homogeneous in nature. It implies that the products of the various firms are perfect substitutes. The buyers and the sellers have

full knowledge of the market conditions. Price tends to be uniform all over the market. Under such conditions firms may get abnormal profits and suffer loss in the short-run. However, in the long-run, only normal profit exists. Thus only the efficient firms are able to exist in a perfect market in the long run. Under perfect competition the price is determined at that point where the demand and supply of the commodity are equal.

Table 3.3: Demand, Supply and Equilibrium Price

Price	Demand	Supply	Price Movement
5.00	200	600	downward
4.00	300	500	downward
3.00	**400**	**400**	**No change (Equilibrium)**
2.00	500	300	upward
1.00	600	200	upward

In Table 3.3 above it is noted that if the price of the commodity is Rs. 5 then there is a demand for 200 units of the commodity and the supply is 600 units of the commodity. Excess supply would create pressure on the price which would move downwards. On the other, if the price is 1 rupee then there is a demand for 600 units and supply is reduced to 200 units. In this situation there is excess demand which pressurizes the price to move upwards.

When the price is Rs 3, there is a demand for 400 units and the supply is also 400 units. This is state of equilibrium and the price set is the equilibrium price (Rs 3).

Fig 3.4: Demand, Supply and Equilibrium Price

Y-axis: Price | **X-axis:** Output
DD' = Demand Curve (downward sloping, inverse to price)
SS' = Supply Curve (upward sloping, direct to price)
E = Equilibrium Point (Intersection of DD' and SS')

In a perfectly competitive market structure the units of commodity supplied (supply curve) is directly proportional to price and the units of quantity demanded (demand curve) is inversely proportional to price. In figure 3.4, DD' is the demand curve (inversely proportional to price) and SS' is the supply curve (directly proportional to price).

3.2.7 Imperfectly Competitive Market

An imperfectly competitive market (imperfect competition) refers to a market that does not meet the rigorous principles of the hypothetical perfectly competitive market. It has been discussed previously that the perfect form of competition is a hypothetical concept as in all practicality the conditions for such a market to exist is impossible to replicate in the practical scenario. As all real markets can be classified outside the spectrum of the perfectly competitive market model all real markets can be classified as imperfect markets. As is observed in the real world, individual buyers and sellers influence prices and production, there is no full disclosure of information about products and prices, and there are high barriers to entry or exit in the market. These are all perspectives of the imperfect market condition. Even if one condition of the perfect market is not met it translates into an imperfect market.

Various Types of Imperfect Competition

Monopoly

The main feature of this market structure is one seller who dominates the market as he is the sole supplier of a product/service which has no clear substitute. These markets have high barriers to entry and a single seller sets the prices of the particular product or service. Consequentially the setting of price is determined not by interaction of the demand and supply but by the seller himself.

In an article, Almeida (2021) provides a list of top ten Indian monopoly companies. The following is a list of five most important monopoly companies in India:

1. (i) **IRCTC** is a state-owned entity in railways sector (passenger and freighter) which enjoys cent percent monopolistic power in the Industry. Rail networks are generally considered as Natural Monopolies.

2. (ii) The **Hindustan Aeronautics India Limited (HAL)** represents the Indian aviation industry and plays a very important role in the Indian defence sector.
3. (iii) **Cerelac** is the brand of instant cereal made by Nestle for infants and is a supplement for breast milk. It has a market share of 96.5% despite functioning in an open to all industry. Thus it has become an undisputed market leader in baby food segment.
4. (iv) **Coal India Limited** works as a coal mining and refining company and is owned by the Union government of India and managed by the Ministry of Coal. The company contributes up to 82% of the total coal production in India.
5. (v) **ITC** holds 77% a strong position in the Indian cigarette business markets.

Monopolistic Competition

In monopolistic competition, there are many sellers who offer similar products that can't be substituted. Product differentiation is the key aspect of this type of market share. Businesses compete with one another and are price makers, but their individual decisions do not affect the other. For example, in the food sector, Pizza Hut, Dominos and Oven Story in Monopolistic competition with each other. Though they operate in the same industry product differentiation make them unique in their own menu set and helps them set their prices.

Oligopoly

Oligopoly is a market structure in which there are only a few sellers. As such oligopoly lies in between monopolistic competition and monopoly. In an oligopoly, no single firm enjoys an absolute market power to raise its prices above the price that would exist under a perfect competition scenario. In an oligopoly, all firms would need to collude in order to raise prices and realize a higher economic profit. Most oligopolies exist in industries where goods are relatively undifferentiated and broadly provide the same benefit to consumers. In India, markets for automobiles, cement, steel, aluminium are the examples of oligopolistic market. In all these markets, there are few sellers but huge number of buyers for each particular product.

Duopoly

Duopoly is a special case of oligopoly, in which there are exactly two sellers. In this particular case it is assumed that the product sold by the two sellers are homogeneous and there is no substitute for each of them. The following are the examples of duopoly:

- Pepsi and Coca-Cola in the soft drink market;
- Amazon and Flipkart in e-commerce;
- Intel and AMD in the consumer desktop computer microprocessor market.

Monopsony

This is a particular market in which there is only one buyer. This buyer is the one who regulates prices and imposes the demands and needs regarding the good or service offered.

Oligopsony

This is a type of market in which there are very few buyers of a certain good or service. Buyers have some power to regulate the price and characteristics of the product.

For example: In the production of cereals there are many producers, but few firms that buy the product.

3.2.8 Price Discrimination

Price discrimination is specifically relatable only to the monopoly. It means the practice of selling the same commodities at different prices to different buyers. Economists define price discrimination as, "the act of selling the same article produced under single control at different prices to different buyers". There are two specific conditions which are necessary for price discrimination to be effected, which are:

- The monopolist must be able to divide the market into sub-parts according to the price elasticities for each specific part.
- There must be effective separation of the sub-markets, so that the buyer is not able to resell and transact between the low-price market and the high-price market. This condition shows why price discrimination is easier to apply with commodities like electricity or gas, and services (like services of a doctor, transport, a show), which are consumed by the buyer and cannot be resold.

Kinds of Price Discrimination

1. (a) **Personal discrimination:** In this case the Monopolist will charge different prices from different customers on the basis of the ability to pay. For example, a doctor may charge more fee from a rich patient and less fee from a poor patient for the same services rendered.
2. (b) **Place (or) Local Discrimination:** In this discrimination different prices are charged from different places. The monopolist charges lower price at one place and higher price at another place. Dumping is the best example for local

discrimination. In this case the monopolist sells his output with lower price in the foreign market and with higher price in the domestic market.

3. (c) **Trade (or) Use discrimination:** In this the monopolist will charge different prices for different types of uses of the same commodity. For example, electricity will be sold at cheaper rate for agricultural purpose and higher price for industrial purpose.

Degrees of Price Discrimination

Economists considers three degrees of price discrimination:

- **First degree:** Under the first type of price discrimination the monopolist will not allow any consumer surplus to the consumers. This type of price discrimination is called perfect price discrimination.
- **Second degree:** Second degree of price discrimination occurs where the monopolist is able to get a part of consumer surplus but not entire consumer surplus.
- **Third degree:** In this third degree of price discrimination the monopolist divides the customer into two or more classes or groups or market and are divided on the basis of elasticity of demand. This type of discrimination is the most common one.

Importance of Price Discrimination

- There are certain services such as Railways etc., which cannot be provided profitably unless the price discrimination is allowed to take place: uniform price for such services will lead to low incomes or losses to the entrepreneur.
- If the welfare of the country is required in certain cases the price discrimination is desirable. For example, if the doctor charges more fee from rich and less fee from poor, then the public welfare will be increased.

3.2.9 Profit Optimization

The term 'optimisation' is used to mean either maximisation or minimisation. In general terms, the goal of a firm includes maximisation of profit and/or minimisation of cost. In simple cases, mathematical technique of maxima and minima is applied to the profit function (for profit maximisation) and for cost minimisation the same technique is applied to the cost function. For all practical purposes, optimization problem operates under conditions of constraints. For constrained optimization, modification is made to the technique of maxima and minima. In general, mathematical technique of linear programming is used in the case of constrained optimization. Advanced mathematical techniques like goal programming and integer programming are also used for solving critical aspects of the optimization problem.

Optimization of Functions

Optimization is the technique of discovering the critical point where a function is at its relative maximum or minimum. For the purpose, the following two steps are followed:

1. (a) The first order condition is to set the first order derivative of the function to zero. The equation is solved for the critical point(s). At all such point(s) the function is either at its maximum or at its minimum. Conceptually the first order derivative shows the slope of the function. At the maximum/minimum point the function is neither increasing nor decreasing implying that the slope is zero.
2. (b) The second order condition, also referred as the test of concavity, evaluates the critical point(s) found out in step one. For the purpose of finding whether the function is at its maximum or at its minimum, the second order derivative is calculated. If at the critical point the second order derivative is greater than zero, then the function is at its relative minimum and if at the critical point the second order derivative is less than zero, then the function is at its relative maximum.

a) First order condition ⇒ set $dy/dx = 0$, and calculate the value of x which are the critical point(s)

b) Second order condition ⇒ find d^2y/dx^2

▲ If $d^2y/dx^2 < 0$, the critical point calculated above is the maxima.

▲ If $d^2y/dx^2 > 0$, the critical point calculated above is the minima.

Illustration 1 (ICMAI Study Material): Optimize $y = 2x^3 - 30x^2 + 126x + 59$

Solution (ICMAI Standard):

Step one: The critical points are calculated by taking the first order derivative of the equation and setting the same equal to zero, and solving for x.

$dy/dx = d(2x^3 - 30x^2 + 126x + 59)/dx = 6x^2 - 60x + 126 = 0$

x = 3 and x = 7 (these are the critical points)

This implies that at x = 3 and x = 7 the function is either at its maximum or at its minimum. (the function is neither increasing or decreasing).

Step two: Test for concavity by taking the second derivative, evaluating it at the critical points, and checking the signs to distinguish between a relative maximum and minimum.

$d^2y/dx^2 = d^2(2x^3 - 30x^2 + 126x + 59)/dx^2 = d(6x^2 - 60x + 126)/dx = 12x - 60$

At x = 3 (critical point 1), $d^2y/dx^2 = 12 \times 3 - 60 = -24 < 0$

Thus at x = 3 the function is at its maximum. Or x = 3 is the relative maxima.

At x = 7 (critical point 2), $d^2y/dx^2 = 12 \times 7 - 60 = +24 > 0$

Thus at x = 7 the function is at its minimum. Or x = 7 is the relative minima.

The function is maximized at x = 3 and minimized at x = 7.

Optimization Technique in Economics

Before proceeding with the discussion it is worthwhile to revisit some of the economic concepts that is required for the purpose.

- **Total cost (TC)** is given as sum of total variable cost (TVC), which is number of units sold (Q) multiplied by variable cost per unit (VC) and total fixed cost.

$$TC = (VC \times Q) + TFC$$

- **Average total cost (AC)** is total cost (TC) divided by quantity sold (Q)

$$AC = [(VC \times Q) + TFC] / Q$$

- **Marginal cost (MC)** is defined as the change in total cost incurred from the production of an additional unit. This is the slope of the TC function. Thus the first order derivative (with respect to Q) of the total cost function gives the marginal cost.

$$MC = dy/dx = d(TC)/dQ$$

For example, if the cost function is given as, $TC = Q^2 + 80Q + 105$ then $MC = 2Q + 8$ (as given in study material)

- **Total Revenue (TR)** is the sale price (P) multiplied by the quantity sold (Q)

$$TR = P \times Q$$

- **Marginal Revenue (MR)** defined as the change in total revenue brought about by the sale of an extra good. Thus the first order derivative (with respect to Q) of the total revenue function gives the marginal revenue.

$$MR = d(TR)/dQ$$

For example, if the total revenue function is given as $TR = 15Q + 4Q^3$ then $MR = 15 + 12Q^2$

- **Total profit (π)** is arrived at deducting total cost (TC) from total revenue (TR) which is sale price per unit (P) multiplied by number of units sold (Q).

$$\pi = \text{Total revenue} - \text{Total cost}$$
$$\pi = (P \times Q) - [(VC \times Q) + TFC]$$
$$\pi = Q(P - VC) - TFC$$

Illustration 2 (ICMAI Study Material): Maximize profits for the firm

Given: Total revenue (TR) = $4000Q - 33Q^2$ and Total cost (TC) = $2Q^3 - 3Q^2 + 400Q + 5000$ assuming $Q > 0$

Solution (ICMAI Standard):

$\pi = TR - TC$

$\pi = 4000Q - 33Q^2 - (2Q^3 - 3Q^2 + 400Q + 5000)$

$\pi = 4000Q - 33Q^2 - 2Q^3 + 3Q^2 - 400Q - 5000$

$\pi = -30Q^2 - 2Q^3 + 3600Q - 5000$

Step One: calculate the first order derivative of the profit (π) function and set it equal to zero.

$d(\pi)/dQ = -60Q - 6Q^2 + 3600 = 0$ (setting the first order derivative equal to zero)

$= -6(Q^2 + 10Q - 600) = 0$

$= -6(Q + 30)(Q - 20) = 0$

Thus, $Q = -30$, $Q = 20$ are the critical points. (Q cannot be negative, thus critical point is $Q = 20$)

Step two: calculate the second order derivative ($d^2\pi/dQ^2$) and check whether $d^2\pi/dQ^2$ is greater than or less than zero.

$d^2\pi/dQ^2 = d(-60Q - 6Q^2 + 3600)/dQ = -12Q - 60$

At $Q = 20$, $= -12(20) - 60 < 0$

This implies that Profit (π) is at its relative maximum at critical point $Q = 20$

Maximum profit at $Q = 20$ is given as:

$\pi = -30Q^2 - 2Q^3 + 3600Q - 5000$

At $Q = 20$, $\pi = -30(20)^2 - 2(20)^3 + 3600(20) - 5000 =$ **₹39,000**

Illustration 3 (ICMAI Study Material): Maximum profit for a manufacturer

A manufacturer can sell 'Q' items ($Q > 0$) at a price of $(330 - Q)$ each; the cost of producing Q items is $TC(Q) = Q^2 + 10Q + 12$. How many items should he sell to make the maximum profit? Also determine the maximum profit.

Solution (ICMAI Standard):

Given, Price (P) = $330 - Q$ and Cost (c) = $Q^2 + 10Q + 12$ and $Q \geq 0$

Revenue (R) = $P \times Q = 330Q - Q^2$

Profit (π) = $R - C = 330Q - Q^2 - (Q^2 + 10Q + 12)$

$\pi = 330Q - Q^2 - Q^2 - 10Q - 12$

$\pi = 320Q - 2Q^2 - 12$

In order to maximize the profit, the two steps are followed:

$d\pi/dQ = 320 - 4Q = 0$ (setting the first order derivative equal to zero)

Thus, at $Q = 320/4 = 80$, which is the critical point of the profit function.

Thus the second order condition is taken up. $d^2\pi/dQ^2 = -4$ which is negative.

Therefore, the profit is maximum at $Q = 80$ and the maximum profit is calculated as:

$\pi = 320Q - 2Q^2 - 12$

$\pi = 320(80) - 2(80)^2 - 12$

$\pi =$ **₹12,788**

3.2.10 Profit Maximisation in Perfect Competition

From discussion in an earlier section it is clear that the perfectly competitive firm is a price taker and can sell any amount of the commodity at the prevailing market price. Though perfect competition is rarely seen in the real world, it is a used as a benchmark for all types of businesses. The profit maximisation is overviewed from the short run perspective and long term perspective.

The perfectly competitive firm in short run, maximizes its profit using the marginal-revenue-marginal-cost approach. The perfectly competitive firm is a price taker and can sell any quantity of the commodity at the equilibrium price and the demand curve is horizontal to the x-axis, is also equal to price (P). Thus MR = AR = P. This is also the demand curve.

Short-run Profit Maximisation

The profit-maximizing level of output of the firm can also be viewed in Figure 3.5. The demand curve facing the firm is horizontal at P = MR. As long as MR exceeds MC, it pays for the firm to expand output. Thus, the firm maximizes its total profits at the output level of Q1 (given by point E where MR = MC). The profit per unit at this level of output is AE and total profit is given by the area of rectangle AECB.

From the above discussion the two general conditions for short term profit maximisation may be summarized as follows:

- MR = MC and
- Slope of MR > Slope of MC

Under conditions mentioned above, the firm maximizes its total profits where P = MR = MC. If at this point P exceeds AC, there arises super normal profit which would be wiped out in the long run. The firm breaks even if P = AC and if P is larger than average variable cost (AVC) but smaller than AC, the firm is incurring loss. If P is smaller than AVC, the firm minimizes total losses by shutting down. Thus, P = AVC is the shutdown point for the firm. The firm's short-run supply curve is given by the rising portion of its MC curve over and above its AVC, or shutdown point.

Long-run Profit Maximisation

In the long-run firms will enter the perfectly competitive industry if there is profits in the short run. Thus market prices would decline as supply of the commodity increases. This would wipe out short term super normal profit and all firms will break even. On the contrary, in cases of short-run losses, supply would reduce and losses would wipe out. As a result, all firms in a perfectly competitive industry with long-run equilibrium produce where P = lowest average cost and resources are utilized in the most efficient way. Figure 3.5 shows the long run output determination which maximizes profit.

3.2.11 Profit Maximisation in Monopoly

The two general conditions (MR = MC and MR > MC) as mentioned earlier applies to the monopoly as well. The profit-maximizing output for this monopolist is represented in Figure 3.6. In this figure, the best level of output is at the point where MR = MC. At this level, P is the price determined as depicted by E in the AR curve. Point A in the figure represents the average total cost. Thus the profit per unit is AE (=BP). Thus the total profit is the area AEPB. Note that since Price > MR where MR = MC, the rising portion of the MC curve above the AVC does not represent the monopolist supply curve. In the long run, the monopolist can adjust the scale of plant, and profits may persist because of blocked or restricted entry.

A monopolist can increase TR and profits at a given level of output and TC by practicing price discrimination. This involves charging different prices for the commodity for different quantities purchased, to different classes of consumers, or in different markets. For example, a telephone company may charge individuals 15 cents for each of the first 50 telephone calls made during each month, 10 cents for each of the next 100 calls, and so on.

It is important to note that a monopoly produces output where MR = MC and Price > MR, the monopolist produces less and charges a higher price than a perfect competitor with the same cost curves.

Illustration 4 (ICMAI Study Material): Profit Maximisation with Price Discrimination

A producer has the possibility of discriminating between two markets; market A and market B for a product where the demands, respectively, are:

$Q_1 = 21 - 0.1P_1$ ... (D)

$Q_2 = 50 - 0.4P_2$ ... (E)

Total cost = 2000 + 10Q where $Q = Q_1 + Q_2$

What price will the producer charge in order to maximize profits (a) with discrimination between markets and (b) without discrimination? (c) Compare the profit differential between discrimination and nondiscrimination.

Solution (ICMAI Standard):

Price and output determination with discrimination:

To maximize profits under price discrimination, the producer will set prices so that MC = MR in each market. Thus, MC = MR1 = MR2

Given TC = 2000 + 10Q, MC = d(2000 + 10Q)/dQ = 10 (this is same for both the markets) ... (1)

In Market A, $Q_1 = 21 - 0.1P_1$

$P_1 = 210 - 10Q_1$

$TR_1 = P_1 \times Q_1 = (210 - 10Q_1) \times Q_1 = 210Q_1 - 10Q_1^2$

$MR1 = d(210Q_1 - 10Q_1^2)/dQ_1 = 210 - 20Q_1$ ... (2)

In Market B,

$Q_2 = 50 - 0.4P_2$

$P_2 = 125 - 2.5Q_2$

$TR_2 = P_2 \times Q_2 = (125 - 2.5Q_2) \times Q_2 = 125Q_2 - 2.5Q_2^2$

$MR2 = d(125Q_2 - 2.5Q_2^2)/dQ_2 = 125 - 5Q_2$ ... (3)

Thus, MR1 = MR2 = MC

$\Rightarrow 210 - 20Q_1 = 125 - 5Q_2 = 10$ ... (4)

Therefore, in Market A:

$210 - 20Q_1 = 10$ {from equation 4}

$Q_1 = 10$ (from equation 5) [$Q_1 = 200/20 = 10$]

and $P_1 = 210 - 10Q_1 = 210 - 10 \times 10 = 110$

$TR_1 = P_1 \times Q_1 = 10 \times 110 =$ **1100**

Therefore, in Market B:

$125 - 5Q_2 = 10$ {from equation 5}

$Q_2 = 23$ [$Q_2 = 115/5 = 23$]

and $P_2 = (125 - 2.5Q_2) = 125 - 2.5 \times 23 = 67.5$

$TR_2 = P_2 \times Q_2 = 67.5 \times 23 =$ **1552.5**

The discriminating producer charges a lower price ($P_2 = 67.5$) in the market B where the demand is relatively more elastic and a higher price ($P_1 = 110$) in the market A where the demand is relatively less elastic. And his total profit is calculated below which is also the maximum under given condition.

$\pi = (TR1 + TR2) - TC$

TR1 and TR2 is calculated as 1100 and 1552.5 respectively. And calculation of total cost is given as:

Given, $TC = 2000 + 10Q$ where $Q = Q_1 + Q_2$

$TC = 2000 + 10 \times 33$, [$Q = 10 + 23 = 33$]

$TC = 2330$

Therefore, profit (π) is given as:

$\pi = (1100 + 1552.5) - 2330 =$ **₹322.5** ... (7)

Price and output determination without discrimination:

If the producer does not discriminate, P1 = P2 and the two demand functions (D) and (E) may simply be aggregated. Thus,

$Q = Q_1 + Q_2$

$\Rightarrow Q = Q_1 + Q_2 = (21 - 0.1P) + (50 - 0.4P)$ [P = P1 = P2] (same price for both the markets).

$\Rightarrow Q = 71 - .5P$

$\Rightarrow P = 142 - 2Q$

$TR = P \times Q = (142 - 2Q) \times Q = 142Q - 2Q^2$

$MR = d(142Q - 2Q^2)/dQ = 142 - 4Q$

Setting MR = MC:

$142 - 4Q = 10$ {MC = 10 refer to equation (1) above}

Therefore, Q = 33 and P = 142 − 2Q = 142 − 2×33 = 76

Thus when the monopolist does not discriminate then the equilibrium is set at Q = 33 and P = 76 (for both the markets A and B). In that case,

TR = P × Q = 33 × 76 = 2508

And TC = 2000 + 10Q = 2000 + (10 × 33) = 2330. Therefore,

π = TR − TC = 2508 − 2330 = **₹178** ... (8)

From the above discussion it is clear that when no discrimination takes place, the price P = 76 is between the relatively high price of the market A (P_1 = 110) and the relatively low price of the market B (P_2 = 67.5). Notice, however, that the quantity sold remains the same: at P = 76, Q1 = 13.4, Q2 = 19.6, and Q = 33.

Comparison of the profit differential:

- Profit when the monopolist follows price discrimination between the two markets: **π = ₹322.5** (from equation 7)
- Profit when the monopolist does not follow discrimination between the two markets: **π = ₹178** (from equation 8)
- Thus, profit of the monopolist is **higher when he follows price discrimination**.

Multiple Choice Questions – 3.2

1. A firm's marginal revenue is defined as:

(a) The ratio of total revenue to total quantity produced (b) The additional output produced by lowering price (c) The additional revenue received due to technical innovation (d) The additional revenue received when selling one more unit of output.

Answer: (d) The additional revenue received when selling one more unit of output.

2. Which of the following is a characteristic of a perfectly competitive market?

(a) Firms are price setters (b) There are few sellers in the market (c) Firms can exit and enter the market freely (d) All of these.

Answer: (c) Firms can exit and enter the market freely

3. In order to maximize profits, a firm should produce at the output level for which:

(a) Average cost is minimized (b) Marginal revenue equals marginal cost (c) Marginal cost is minimized (d) Price minus average cost is as large as possible.

Answer: (b) Marginal revenue equals marginal cost

4. Which is not element of the market?

(a) Sellers and Buyers (b) Nature of commodity (c) Government intervention (d) Free communication

Answer: (c) Government intervention

5. Who determine the price of the good in perfect market?

(a) Buyers (b) Sellers (c) Both A & B (d) Only firm.

Answer: (c) Both A & B

6. Under perfect market the firm earn _____ profits in long period.

(a) Abnormal profits (b) Normal profits (c) Maximum profits (d) Maximum loser.

Answer: (b) Normal profits

7. Which is the example for duopoly market?

(a) Pepsi and Coca-cola (b) Amazon and Flip cart (c) Intel and AMD (d) All the above.

Answer: (d) All the above.

8. Which type of price discrimination is most common one?

(a) Price discrimination of First Degree (b) Price discrimination of Second Degree (c) Price discrimination of Third Degree (d) None.

Answer: (c) Price discrimination of Third Degree

9. Which is the perfect opposite for perfect market?

(a) Monopoly (b) Duopoly (c) Oligopoly (d) Monopolistic competition.

Answer: (a) Monopoly

10. Automobiles are the best example for _____ market.

(a) Monopoly (b) Duopoly (c) Oligopoly (d) Perfect market.

Answer: (c) Oligopoly

3.3 Market Factors Affecting Pricing Decisions

3.3.1 Traditional versus Modern Theories of the Firm

Pricing decision of the firm depends on the primary goal of the firm. Traditional economic theory of the firm refers profit maximisation as the primary goal of the firm. In the later years, several other theories have been posited which contradicts the traditional theory. In 1939 the first major challenge was poised when Hall and Hitch published their research paper on the decision process of businessmen in relation to government measures. The most astounding results of the studies as reported by Hall and Hitch were that firms did not attempt to maximize their profits, that they did not use the marginalist rule, MC = MR, and that oligopoly was the main market structure of the business world. They posited that firms aim at long-run profit maximisation and for the purpose set their price on the average-cost principle. Thus firms do not set their price and output, as propagated by the traditional economic theory, at the levels determined by the intersection of the MC and MR curves. Rather they set a price to cover the average variable cost, the average fixed cost and a normal profit margin.

$$P = AVC + AFC + \text{profit margin}$$

Subsequently the traditional theory of the firm was critically challenged. The primary aspect is that the traditional theory does not distinguish between owners and managers' interests. As a consequence, the managerial and behavioral theories of firm were developed by researchers on the premise that owners and managers are separate entities in the corporate form of the business and they have different goals and motivation. Pricing decision of the firm is dependent based on the economic goal of the firm. Traditional economic theory suggests profit maximisation as the sole objective of the firm but researchers have posited various other alternative goals of the firm which are considered as the critique of the profit maximisation model which targets the goal of the owner-shareholder only. But the firm is actually being run by managers whose motivation differs from that of the owner-shareholder. The firm is also being run for various stakeholders, shareholders being only of such. In the next few lines some of the important alternative objectives of the firm are discussed.

a) Baumol's Theory of Sales Revenue Maximisation

W. J. Baumol suggested sales revenue maximisation as an alternative goal to profit maximisation. Corporations are run by managers who are separate from the owners. Thus profit maximisation, which is the goal of the owner, is not what motivates the managers. According to Baumol, the most reasonable factor in managers' utility functions is maximization of the sales revenue. Two basic models are propagated by Baumol; the static single-period model and the multi-period dynamic model of growth of sales revenue maximisation.

b) Marris's Model of Maximization of Firm's Growth Rate

The goal of the firm in Marris's model is the maximisation of the balanced rate of growth of the firm, that is, the maximisation of the rate of growth of demand for the products of the firm, and of the growth of its capital supply. In simple words, a firm's growth rate is considered to be balanced when demand for its product and supply of capital to the firm increase at the same rate. The two growth rates according to Marris, are translated into two utility functions such as:

- **Manager's utility function** is given as: U_m = f (salary, power, job security, prestige, status)
- **Owner's utility function** is given as: U_o = f (output, capital, market-share, profit, public esteem).

Owner's utility function U_o implies growth of demand for firms' products and supply of capital. Therefore, maximization of U_o means maximization of demand for a firm's products or growth of supply of capital.

c) Williamson's Model of Managerial Discretion

The model is based on the simple argument that managers would rather maximize their own utility than attempting to maximize profits which is basically maximization of the utility of owner-shareholders. And as such, profit acts as a constraint to their managerial behaviour of utility maximisation. Managers' utility function (U) is expressed below:

$$U = f(S, M, ID)$$

where, S = additional expenditure on staff; M = Managerial emoluments; ID = Discretionary investments

A minimum profit is necessary to satisfy the shareholders and also to secure the job of managers. This acts as a constraint to managerial utility maximisation.

d) The Behavioural Model of Cyert and March

The seminal article, 'A Behavioural Model of Rational Choice' was published in the Quarterly Journal of Economics in 1955. This initiated the behavioural theories of the firm. This was subsequently elaborated by Cyert and March with whose name the model is referred as. Simon had argued that the real business world is full of uncertainties. Accurate and adequate data are not readily available. If data are available, managers have little time and ability to process them. Managers also work under a number of constraints. Under such conditions it is not possible for the firms to act in terms of consistency assumed under profit maximization is. Nor do the firms seek to maximize sales and growth. Instead they seek to achieve a satisfactory profit or a satisfactory growth and so on. This behavior of business firms is termed as satisfaction behavior. According to the Cyert-March, "firm's behavior is satisfying behaviour which implies satisfying various interest groups by sacrificing firm's interest or objectives."

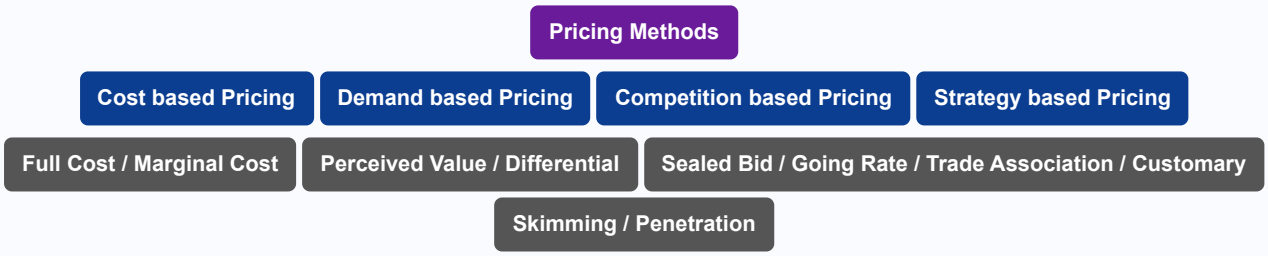
3.3.2 Pricing Methods

Pricing of goods and services is the most important decisions of the firm. While under-pricing results is losses as revenue is insufficient to cover cost of production, over-pricing results in loss of market share. Thus fixation of right price is crucial for long term sustenance of the firm. Previously it is stated that $\pi = (P \times Q) - (TFC + TVC)$. In this simple profit calculation, total variable cost (TVC) and total fixed cost (TFC) adds up to cost of the product and is dependent on many internal and external factors. Q represent the quantity sold which also depends on the nature of market discussed in the previous sections. Thus fixation of the P which represent pricing is a major decision that directly impacts the profitability of the firm.

As such there are four bases to pricing:

1. Cost based pricing
2. Demand based pricing
3. Competition based pricing
4. Strategy based pricing

Fig 3.7: Pricing Methods



1. Cost Based Pricing

This is the simplest form of pricing where a markup is added to cost (either full cost or variable). Thus either percentage markup is added to total cost (variable plus fixed cost) or variable cost of production. This simple form suffers serious limitation as the market demand is not taken into consideration in the pricing decision and there is no way of determining if potential customers will purchase the product at the calculated price. Thus cost based pricing is either:

- (a) **Full cost pricing** – Markup added to total cost (variable + fixed)
- (b) **Variable cost pricing / Marginal cost pricing** – Selling price is fixed in such a way that it covers fully the variable or marginal cost and contributes towards recovery of fixed costs fully or partly, depending upon the market situations. This is also called break-even pricing or target profit pricing.

2. Demand Based Pricing

Pricing is set on the basis of consumer preference and the consumer perception. Thus if seller wishes to sell more he must reduce the price of his product, and if he wants a good price for his product, he could sell only a limited quantity of his good. There are two types of demand based pricing namely:

- (a) **Perceived value pricing:** Perceived value pricing considers the buyer's perception of the value of the product as the basis of pricing. Here the pricing rule is that the firm must develop procedures for measuring the relative value of the product as perceived by consumers.
- (b) **Differential pricing:** Differential pricing is nothing but price discrimination. It involves selling a product or service for different prices in different market segments. Price differentiation depends on geographical location of the consumers, type of consumer, purchasing quantity, season, time of the service etc.

3. Competition Based Pricing

(a) Going Rate Pricing

Another method of pricing adopted by small firms – which are price followers – is known as going rate pricing. Under this system, a firm sets its price according to the general pricing structure in the industry or according to the price set by the price leader. In a sense, each firm has "monopoly" power over its produce and it can, if it chooses, fix a monopoly price and face all the consequences of monopoly. In practice, however, it prefers the easier and more practical method of choosing price going in the market. It will change its price only when other firms do the same. Such a price policy is useful and safe to a firm under certain circumstances. For instance, the firm may not have an accurate idea of its costs or it may like to play safe and not provoke the larger firm to go for cut-throat competition. Besides, it is difficult for each firm to calculate the full implication of change in costs and prices and it is much better to follow the same pattern of pricing adopted by others. Even a large firm may be satisfied with going rate pricing lest a change in price by it unnecessarily disturbs the whole market. No firm would like to "spoil" the common market by reducing the price.

(b) Sealed–Bid Pricing

This method is more popular in tenders and contracts. Each contracting firm quotes its price in a sealed cover called 'tender'. All the tenders are opened on a scheduled date and the person, who quotes the lowest price, other things remaining the same, is awarded the contract.

(c) Trade Association Pricing

To avoid uncertainties of pricing decision and the downward pressure on prices which competition exerts, firms frequently come to the express or implied agreements to maintain prices at a similar level. Though express (or, overt) agreements are generally declared as illegal, the firms can easily and safely enter into an implied (or, tacit) collusion. Individual firms, however, may frequently find it worthwhile to break out of any such agreements, but this leads to the following possible alternatives:

- (i) The price-cut may spark off a price war between the firms which will go on until one or all firms give up the struggle; or
- (ii) If the firm breaking out of the collusion is able to keep its rivals in the dark about the price-cut, it can gain out of the price-cut only when either the original customers of this firm are unaware or are in some way loyal to this firm. But such situations are generally rare.

(d) Customary Pricing

There are certain goods whose prices tend to be fixed more or less in the minds of consumers-these are known as the "Charm" prices. Change in costs of production – if the change is moderate – will not affect the price, as the firms will not and cannot change the price. Accordingly, a rise in cost of production may probably lead to reduction in quality of the product but not to a rise in price. Likewise, a fall in cost of production may not be accompanied by a decline in price. Pricing in this case may be known as customary pricing.

4. Strategy Based Pricing

(a) Penetration Pricing

This is a pricing technique in which new product is offered at low price, by adding a nominal mark up to its cost of production, to penetrate the market as early as possible. It aims at maximizing the market share of the product, and once it is achieved, i.e. when the demand picks up, the firm can increase the price of the product. The pricing strategy of Reliance Jio is a typical example. Reliance Jio started operations in the year 2016 in the telecommunication sector, it gained more than 50 million subscribers in exactly 83 days of launch. This the company accomplished as it offered free services to the subscribers for the initial period.

Penetration pricing results in lower profits in the short run, however, in the long run, it results in higher profits because it increases the market share. The reasons behind adopting penetration pricing are as under:

- New product offered by the firm is already provided by other well-established brands. The low price will lure customers to switch to the new product, who are already familiar with other brands.
- It can help in increasing sales of the product in short period.
- It restricts new entrants from entering the market.

(b) Skimming Pricing

The pricing strategy in which high mark-up is charged for the new product, leading to the high price, so as to skim the cream from the market, is known as Skimming Pricing. It entails fixing a high price for the new product before other competitors step into the market.

This technique is used in case of new product, which faces no to little competition in the market, and have a great extent of consumer acceptability. Market skimming pricing is adopted by the company, due to the following reasons:

- In the early stages, the demand for the product is inelastic, till the product occupies a good position in the market.
- In the initial phase, the demand for the product is not known, and high price helps in covering the cost of production.
- In the beginning, there is a huge requirement of capital for producing the product, resulting in high production cost. Further, a huge amount is invested in the promotional activities, that also adds to its cost. When the product is charged high, it will cover the cost of production and promotion expenses easily.

3.3.3 Factors Affecting Pricing Decision of the Firm

Some of the costs incurred by the firm are fixed upto certain capacity level while some costs are variable in nature and is proportional to the number of units manufactured. It is certain that price of the product must be fixed at that level which enables the firm to cover up both the costs. But often prices fixed by competitors acts as the yardstick for the firm's pricing decision. A firm, thus, always endeavours a unique marketing strategy so that it can price its products uniquely. However, there are some internal and external factors affect the pricing strategy of the company which are omnipresent.

Internal Factors

Some of the factors affecting the pricing decision are internal to the organisation. Some of which are discussed below:

• The Strategic Goal of the Company

The strategic goal of the organisation is the primary determinant of the pricing decision. Superior performance which depends on profit and profit growth is reflected in market share. This aids organisations to accomplish its strategic goal of long term sustainability. Pricing decision is of crucial importance and is relatable to the strategic goal of the company.

• Costs

The cost of the product is the most important internal factor as it is the base on which the price is set. Cost, as such, is a double edged sword. A reduction of cost results in much desired increase in profit but on the other it may be at the expense of degradation of quality of the product which negatively impacts the market share and in the ultimate results in loss of business. Thus a company has to trade-off between cost and quality. In this regard the management has to consider the product's demand and the prices of the competitors as well. Finally, the management also considers the customers' ability to pay the price, because it would be useless to avoid customers in the price decision.

• Organisational Considerations

There is often conflict of interest within an organisation as various departments often develop as profit centres. While profit maximisation is the main consideration for finance managers; sales managers prefer sales maximisation. Pricing decision is one major decision which unifies the considerations of departmental managers. Thus, this decision should be taken by the top level after elaborate considerations to the inputs of various middle level managers.

• Marketing Mix Strategy

In marketing the concept of 4P is of crucial importance. Price, product, promotion, and place are referred as the 4Ps of marketing. It is often considered that out of the 4Ps, price is the most important factor as it is the linking pin between the other Ps. In spite of the Product being of right quality a slight change in price can affect the Promotion and dissemination of the product at different Places.

External Factors

Some of the external factors that affect the pricing decision are as follows:

• Demand in the Market

Amongst the various external factors, demand of product is the most crucial. It, down the line, depends on the competitors, size of the market, and customers' preferences and their ability to pay the price. If the demand is high due to certain reason in comparison to the supply, then the price may be set at higher than what is suggested in cost based pricing. This is the most prevalent pricing in the local bazar. In winter prices of some vegetables (for example, Capsicum) reduces while in summer, prices of other vegetables (for example, Pointed-gourd alias Parwal) reduces. This is mainly due to the increase in demand in comparison supply. The case of increase in supply, demand remaining constant may also be considered in this category.

• Competitors

The product and pricing offered by the competitors is also a determinant of the pricing decision of the firm. The nature and stiffness of competition depends on the nature of the market. In case of perfect competition, theoretically, competition is most stiff while in monopoly, there is no competition. Various forms of markets exist between these extreme form. In monopolistic competition products are offered over a range of prices as sellers differentiate the products and the buyers. This is also

applicable for oligopoly. In monopoly price can be set too low to enable everyone to buy it or price can be set too high to reduce competition. Similar situation exists for duopoly.

• ***Government Policies***

Tax sops, exemptions, subsidies, special schemes in terms of special economic zones, priority sectors etc. have tangible financial benefits which leads to reduction in cost. Government may also be a part of pricing decision makers by licensing or deciding quotas.

• ***The Economy***

If the economy of the country is prosperous where people are employed and earning considerable earnings, then raising prices wouldn't be a problem. In such an environment, customers are willing to pay more. However, when the economy of a country is in a recession, where people have limited sources of income. Businesses and companies have to set low prices to meet the customers' ability to pay.

Multiple Choice Questions – 3.3

1. The price of the good should cover:

(a) Average variable costs (b) Average fixed costs (c) Profit margin (d) All the above.

Answer: (d) All the above.

2. According to Baumol's theory which is alternative goal to profit maximization:

(a) Minimization of sales revenue (b) Maximization of sales revenue. (c) Both A & B (d) None.

Answer: (b) Maximization of sales revenue.

3. According to Williamson's model, manager's utility depends upon:

(a) Additional Expenditure on staff (b) Managerial emoluments. (c) Discretionary investments (d) All the above

Answer: (d) All the above

4. Customer pricing also called:

(a) Going rate price (b) Trade association price (c) Charm price (d) None

Answer: (c) Charm price

5. The pricing strategy of Reliance Jio in _____ pricing:

(a) Penetration pricing (b) Charan pricing (c) Skimming pricing (d) Sealed bid pricing.

Answer: (a) Penetration pricing

6. Skimming is:

(a) High price (b) Low price (c) Moderate price (d) Least price.

Answer: (a) High price

7. Which is not an external factor that effect the pricing decision:

(a) Competitors (b) The Economy (c) Demand in the market (d) Marketing mix starting

Answer: (d) Marketing mix starting

8. One of the following is not a Competition based pricing method.

(a) Going rate pricing (b) Sealed bid pricing (c) Marginal cost pricing (d) Trade association based pricing

Answer: (c) Marginal cost pricing

9. The pricing of niche products is appropriate to:

(a) Perceived value pricing (b) Penetration pricing (c) Differential pricing (d) Full cost pricing

Answer: (a) Perceived value pricing

10. One of the below mentioned in not a modern theory of the firm:

(a) Baumol's sales maximisation (b) Shareholder's wealth maximisation (c) Marri's model of maximisation of Firm's Growth rate (d) Williamson's model of managerial discretion

Answer: (b) Shareholder's wealth maximisation

📌 Key Takeaways – Module 3

Section	Key Takeaway
3.1	Pareto efficiency & Pareto improvement; EPI classification (Procyclic/Countercyclic/Acyclic; Leading/Lagging/Coincident); Santos & Brito model; 39 Economic Performance Indicators; KPI vs CSF; SMART principles; 18 KPIs
3.2	Profit = Revenue − Cost; Market structure classification (Perfect/Imperfect); Perfect competition (features, equilibrium); Monopoly (5 Indian examples); Monopolistic Competition; Oligopoly; Duopoly; Monopsony; Oligopsony; Price Discrimination (3 kinds, 3 degrees); Profit optimization (maxima/minima); Profit maximisation in Perfect Competition & Monopoly
3.3	Traditional (Ends-Ways-Means) vs Modern theories: Baumol (Sales Revenue Max), Marris (Growth Rate Max), Williamson (Managerial Discretion), Cyert & March (Behavioral); 4 Pricing Methods (Cost, Demand, Competition, Strategy based); 8 Internal & External Factors

📐 Important Formulas – Module 3

Formula	Description
$\pi = (Q \times P) - (TVC + TFC)$	Profit equation
$\pi = Q(P - VC) - TFC$	Simplified profit
$TC = (VC \times Q) + TFC$	Total Cost
$AC = [(VC \times Q) + TFC] / Q$	Average Total Cost
$MC = d(TC)/dQ$	Marginal Cost
$TR = P \times Q$	Total Revenue
$MR = d(TR)/dQ$	Marginal Revenue
First order condition: $dy/dx = 0$	Critical points
If $d^2y/dx^2 < 0 \rightarrow$ Maxima	Second order condition
If $d^2y/dx^2 > 0 \rightarrow$ Minima	Second order condition
P = AVC + AFC + Profit Margin	Average cost pricing
U_m = f(salary, power, job security, prestige, status)	Marris Manager's utility
U_o = f(output, capital, market-share, profit, public esteem)	Marris Owner's utility
U = f(S, M, ID)	Williamson's utility function

✅ Revision Checklist – Module 3

- □ Explain Pareto efficiency and Pareto improvement
- □ Classify economic indicators (Procyclic/Countercyclic/Acyclic; Leading/Lagging/Coincident)
- □ Describe Santos & Brito model of firm performance
- □ List 39 Economic Performance Indicators
- □ Differentiate CSFs and KPIs
- □ Explain SMART principles for setting effective performance measures
- □ List 18 KPIs under 4 perspectives
- □ Explain profit equation and its components
- □ Describe Market definitions (Kotler, Cournot, Jevons)
- □ Explain 4 types of imperfect competition
- □ List features of perfect competition
- □ Solve price determination (Demand-Supply equilibrium)

- □ Explain Price Discrimination (kinds and degrees)
- □ Solve optimization illustrations (maxima/minima)
- □ Solve profit maximisation in Perfect Competition and Monopoly
- □ Solve price discrimination illustration (Two markets A & B)
- □ Explain 4 modern theories of firm (Baumol, Marris, Williamson, Cyert & March)
- □ Describe 4 pricing methods with subtypes
- □ Explain 8 Internal and External factors affecting pricing

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Disclaimer: These revision notes are for educational purposes only. Students are advised to refer to the official ICMAI study material and latest amendments for comprehensive preparation.

Next Module: Module 4 – Enterprise Risk Management

CMA FINAL PAPER 20A

Strategic Performance Management & Business Valuation

MODULE 4 – Enterprise Risk Management

Complete Coverage as per ICMAI Study Material (Syllabus 2022)

For December 2026 Examination | CMA Knowledge Series – cmaknowledge.in

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1. Risk Management
2. Corporate Risk Management
3. Corporate Failure
4. Key Takeaways & Revision Checklist

Module Learning Objectives

- Gather fundamental knowledge about 'risk' and the various risk management techniques.
- Appreciate the internationally applicable frameworks of corporate risk management.
- Conceptualize the basic risk management techniques applicable in the Insurance sector.
- Comprehend the process of corporate risk management in practice.
- Recapitulate the capital adequacy norms in banking industry.
- Intellectualize the models of corporate distress prediction models and their analysis.

Introduction to Risk

'Risk' has significant insinuations in the world of finance. Conceptualizing of the term is the first and foremost task for every business manager before any attempt is made to measure and manage it. This module ensues with an introduction to the connotation of risk and subsequently presents a discourse on the recent developments in the arena of risk management. Though the term risk in finance parlance has various connotation the following two definitions are important comprehensions.

CIMA Official Terminology, 2005: 'Risk is a condition in which there exists a quantifiable dispersion in the possible outcomes from any activity. It can be classified in a number of ways.'

International Federation of Accountants, 1999: 'Uncertain future events which could influence the achievement of the organization's strategic, operational and financial objectives.'

4.1 Risk Management

4.1.1 Introduction and Objectives – Financial Risk

It is a well know perspective that 'what cannot be measured, cannot be managed'. Thus it is modest to state that risk is to be measured before it is managed. But before issues of risk management is discoursed, conceptualization of risk along with the important connotations needs to be discussed.

The most famous definition of 'risk' is found in the works of Frank Knight (1921). Connotation of risk and uncertainty is theorized in his famous book, Risk, Uncertainty and Profit. The author posits that while risk entails a situation in which the probability distribution of the outcome is known (either priori or through statistical inferences), in uncertainty the probability of occurrence is not known.

Solved Case 1 (ICMAI Study Material): Tinkuji's Decision – Expected Value Calculation

Tinkuji is a small vendor who is undecided on what to sell in the fairground as a fair is to be organized in ten days. He has the option of selling tea or ice creams on day one (1st of June, 2023) of the fair. He has made a projection that selling tea would fetch him a profit of ₹300 if it rains on 1st June 2023, but if it is sunny and humid on the day, he would not have much customers and then he would make a profit of ₹30. If he sells ice cream his profit is much higher (₹150) if 1st June 2023 is hot and humid. But if he decides to sell ice cream and it rains on that day then his profit would be ₹10. How would make the decision of what to sell, tea or ice cream on 1st June 2023.

Background: Tinkuji has to decide on selling tea or ice-cream on 1st June 2023. These are termed as acts. On 1st June 2023 when these acts are to take place it can either be sunny and humid or rainy. These are called states of nature. Tinkuji's decision (to sell tea or ice-cream) is reliant on the information he can garner on the states of nature. The information on chance of the day being 'sunny and humid' or being 'rainy' can be got from data of the last years. Tinkuji can visit the met office and check the data of the last 200 years. This would mean 200 data points about whether the 1st June 2023 would be 'sunny and humid' or 'rainy'. After collection of the data, Tinkuji finds that out of 200 days (past data) it rained for 30 days. From this he can infer that the probability of rain on 1st June 2023 as 0.15 (30/200) and the probability of the day being 'sunny and humid' is 0.85 (1 – 0.15).

Solution (ICMAI Standard):

The 2×2 Matrix (for expected value calculation):

States of Nature	Hot and Humid	Rainy
Probability of Occurrence	0.85	0.15
Acts: Sell Tea	30	300
Acts: Sell Ice-Cream	150	10

The expected value (on the basis of which the decision is to be taken) is given as:

$EV = \Sigma P(X_i) \times (X_i)$

Where $P(X_i)$ = Probability of occurrence of event i and X_i is the payoff related to the event i.

In the given case, the EV (tea) = 30 × 0.85 + 300 × 0.15 = **70.5**

EV (ice-cream) = 150 × 0.85 + 10 × 0.15 = **129**

Since this is pay off, Tinkuji would choose that act which gives the highest pay off. Thus the decision takes his decision about which act to consider based on the highest expected value in case of pay off. **Thus Tinkuji should sell ice-cream.**

This is only possible if the decision maker has access to information about the probability of occurrence of the various states of nature. Such a situation is referred as a **risky situation**.

In all practicality, business situations are not this simple and decision maker do not have access to probability distribution regarding various acts or decision points. This is referred as **decision making under uncertainty**.

In decision making under uncertainty, the probability distribution associated with the various states of nature is either unknown or cannot be determined. This lack of information has led to the development of special decision criteria:

- (a) Laplace
- (b) Minimax
- (c) Savage
- (d) Hurwicz

The above mentioned categorization of risk and uncertainty is often not considered in the business world. In the world of finance, risk is simply referred as the probability that the company's net cash flows fall short of the future financial obligations of the entity. This is more in tandem with the connotation of risk forwarded by Markowitz in 1952. In this famous research paper on portfolio selection the author posits a maxim for investment behaviour which he refers as expected returns – variance of returns. The hypothesis is that the investor considers expected return as a desirable thing and variance of return as an undesirable thing. Subsequently the author represents the variance of return as the standard deviation of return (σ) from a security and is referred as risk.

4.1.2 Classification of Financial Risk

In the business world, risk connotes the extent to which any selected action or inaction leads to some undesirable outcome. In finance parlance risk is categorized from various perspectives. From a broader perspective financial risk is classified as:

- **Systematic risk**
- **Unsystematic risk**

Systematic Risk

Systematic risk occurs due to macroeconomic factors. It is also called market risk or non-diversifiable or volatility risk as it is beyond the control of a specific company or individual, and hence, can't be diversified. All investments and securities suffer from such type of risk. One can't eliminate such a risk by holding more number of securities. It is categorized as:

- **Interest rate risk** – The market interest rate varies and can negatively impact the entity. Entities hold financial assets in the nature of fixed interest bearing securities. This mainly impacts the fixed income securities as bond prices are inversely related to the interest rate.
- **Market risk** – Variations in price sparked off due to real social, political and economic events are referred to as market risk. It is basically the tendency of security prices to move collectively. For instance, in the falling market, the stock price of even the best performing company's drop. Conventionally, market risk accounts for about two-thirds of total systematic risk.
- **Purchasing power risk** – Uncertainties of purchasing power is referred to as risk due to inflation. If investment is considered as consumption sacrificed, then a person, purchasing securities, foregoes the opportunity to buy some goods or services for so long as he continues to hold the securities. In case, the prices of goods and services, increases during this period, the investor actually loses purchasing power. The investors expected return will change due to change in real value of returns.
- **Foreign exchange risk** – This risk stems from the uncertainty in the changes in the value of the currencies. So, it affects only the companies doing foreign exchange transactions, like export and import companies.
- **Political risk** – Such type of risk occurs primarily due to political instability in a country or a region. For instance, if a country is at war, then the companies operating there would be considered risky.

Unsystematic Risk

Unsystematic risk, on the other, is that portion of total risk which results from known and controllable factors. It refers to that portion of the financial risk of an entity which is caused due to factors unique or related to an entity or the industry. It is categorized as:

- **Liquidity risk** – It is that portion of an asset's total variability of return which results from price discounts given or sales commissions paid in order to sell the asset without delay. It is a situation wherein it may not be possible to sell the asset. Assets are disposed of at great inconvenience and cost in terms of money and time. Any asset that can be bought or sold quickly is said to be liquid. Failure to realize with minimum discount to its value of an asset is called liquidity risk.
- **Credit risk** – This is also known as default risk. This arises due to the default in meeting the financial obligations as and when due for payment. The non-payment of interest and principal amounts in time will increase the risk of insolvency and bankruptcy costs.
- **Operational risk** – Operational risk arises primarily due to deviation from planned normal functioning of system, procedures, technology, human failure, omission or commission of errors. It also arises due to inherent fault in the systems, procedures and technologies that affect the revenue of the organization adversely. As the activities of the organization change due to globalization and integration, new factors are continuously influencing and increasing the operational risk.

Fig 4.2: Various Types of Risk

Systematic Risk	Unsystematic Risk
• Market Risk • Interest Rate Risk • Foreign Exchange Risk • Purchasing Power Risk • Political Risk	• Liquidity Risk • Operational Risk • Credit Risk

4.1.3 The Risk Management Process

From above discussion it is clear that whatever be the connotation of risk, it needs to be identified and managed as its presence makes the decision making process indeterminate. Future is uncertain. This influences the outcome of the decision making process and often dampens the strategic goal of the organisation. Today, the business landscape has radically changed and managers work in VUCA environment. The framework and process of risk management must be continuously strengthened to be fit for purpose in the constantly-changing face of VUCA. Risk management which is an integral part of the overall management of the organisation has gained considerable importance in the new business environment.

Key Terms in Risk Management

- **Likelihood:** Is the possibility that an event may occur. Likelihood can be described using qualitative terms such as high, medium, and low. Alternately, likelihood can be described using quantitative measures such as a percentage and frequency.
- **Impact:** Represents the effect that a given event will have on an entity. Impact can be described both qualitatively and quantitatively. Entities often describe events based on severity, consequences, or dollar amounts.
- **Risk exposure:** In any business or an investment is the measurement of potential future loss due to a specific event or business activity and is calculated as the probability of the even multiplied by the expected loss due to the risk impact.

Risk Management (CIMA Official Terminology, 2005): 'A process of understanding and managing the risks that the entity is inevitably subject to in attempting to achieve its corporate objectives. For management purposes, risks are usually divided into categories such as operational, financial, legal compliance, information and personnel. One example of an integrated solution to risk management is enterprise risk management.'

Five Steps of Risk Management Process

1. **(a) Identification of Risk** – Risk should be identified before it is managed. For the purpose, the risk of the enterprise needs to be categorised in silos as discussed in the previous section.
2. **(b) Analyse the Risk** – After identification of the risk the task of the risk manager is to look into the nature, magnitude and consequence of the risk. During this step, the risk management team will examine the probability of occurrence and consequence of each risk in order to identify the focus area. Factors such as possible financial loss, time lost, and severity of impact play a part in precisely analyzing each risk. By placing each risk under the microscope, the risk manager exposes any common issues across a project and further improve the risk management process for future projects
3. **(c) Prioritize the risk** – An organisation is exposed to various forms of risk. On the basis of the analysis undertaken in step 2 the risk manager has to prioritize which risk to focus when. This step gives the risk manager a comprehensive view of the task at hand and pinpoints where the team's focus should lie. This helps identification of useful solutions for each risk.
4. **(d) Mitigate the risk** – After prioritisation of the risk, which assist risk manager to focus which risk to target upon, he attempts mitigating the particular risk. Starting with the highest priority risk first, the risk management team under the guidance of the risk manager delves in eliminating the risk or at least reducing the risk so that the negative impact is minimised and the strategic goal can be accomplished.
5. **(e) Monitor the risk** – Risk management is a continuous process and it is very important that risk along with the measures adopted in step four is monitored. For this transparent communication among the risk manager and the stakeholders is crucial.

CIMA Generic Framework for Risk Management

Chartered Institute of Management Accountants (CIMA) theorized a generic framework for risk management. According to the framework, the managing risk is a process which comprise of five distinct aspects:

(a) Risk assessment

This is the initial step which analyses and evaluates the risk. This step comprises of three aspects:

- (i) Identification and categorization of the risk
- (ii) Description of the risk identified in the earlier stage. Risk identified need to be displayed in a structured format.
- (iii) Risk estimation is the important third step which defines the qualitative and the quantitative aspects. The magnitude of the risk and the likelihood of occurrence are classified for impact assessment. For the purpose various tools related to decision making are employed. Scenario planning; simulations, including Monte Carlo spreadsheet simulation; decision trees; real option modelling; sensitivity analysis; risk mapping; statistical inference; SWOT or PEST analysis; root cause analysis; cost benefit/risk benefit analysis; and human reliability analysis are some of the tools employed for the purpose.

- (iv) After risk assessment organisation needs to maintain a risk register in which a comprehensive serial wise record is maintained regarding each risk that the organisation is exposed along with the likelihood of occurrence and magnitude of effect.

(b) Risk management policy

The organisation has to clearly define its risk appetite which is the organizations' attitude towards risk. This is briefed in the organizations' risk management policy.

(c) Risk response

This is the most important stage in which organizations' deal with the prioritized risk. This is the process of selecting and implementing measures to manage the risk. Risk managers has to design the treatment of risk with specific reference to the risk appetite of the organisation. This will create a portfolio of appropriate responses. Mitigating risks is referred as responses to risk which are categorized as:

- (i) **Risk avoidance:** This is similar to risk avoidance and in this case action is taken to cease the activities due to which risk arises.
- (ii) **Risk reduction:** Action is taken to mitigate the risk of likelihood of occurrence or impact of the risk, generally by implementing internal control mechanism.
- (iii) **Risk sharing or transfer:** In this case the risk manager adheres to risk transfer mechanisms like insurance, outsourcing or hedging where a portion of the risk is shared with third parties.
- (iv) **Risk acceptance:** In this case the risk manager takes no action as the likelihood of occurrence or impact of the risk is within the risk tolerance limit of the organisation.

(d) Risk Reporting

Reporting of risk is a part of the framework. This has to be undertaken by the risk manager on two levels:

- (i) **Reporting to external authorities** – Companies often publish a risk report along with the annual reports. Though it is not yet mandatory to report risk framework along with approaches in risk management in annual reports it is often included as a best practice. In the Indian scenario, section 134(3) (n) of the Companies Act, 2013 requires the board of directors of a company to furnish a statement indicating the development and implementation of a risk management policy for the Company. This is required to be furnished as a part of the Board of director's report.
- (ii) **Reporting to internal stakeholders** – The reporting of risks and risk management information is essential for internal decision makers which ultimately ensures accomplishment of strategic goal. In the Indian scenario, for adhering to the provisions of Section 177(4)(vii) of the Companies Act, 2013 the companies are needed to frame and adopt a "Risk Management Policy".

(e) Residual risk reporting

This involves comparing gross risk (before risk responses are made operative) and net risk (after risk responses are made operative). This enables the risk manager assess the effectivity of the risk response adopted. If there is insufficiency in the risk response adopted, the risk manager explores feasible alternative options.

Objectives of Risk Management

- To prepare the firm for potential losses in the most economical way.
- To reduce of anxiety and fear of unadjusted exposures.
- To meet any legal obligation.
- To ensure that after a loss occur, the firm can resume at least partial operations within some reasonable time period. The ability to operate after a loss is extremely important. A public utility firm must continue to provide service.
- To ensure that EPS can be maintained if the firm continues to operate. However, a firm may incur substantial additional expenses to achieve this goal.

4.1.4 Traditional Risk Management and ERM

Traditionally, risk management is an integral part of the management process adopted by successful business leaders. The traditional approach to risk management is often referred to as silo or stove-pipe risk management whereby each silo leader is responsible for managing risks within his domain. Each of the functional leaders has the responsibility of managing risk in their particular domain. For example, marketing manager is responsible for sales and customer relationships and manages risk related to that domain. Finance manager is responsible for finance functions and manages risk related to finance domain. This may overlap with the treasurer's responsibility for managing risks related to financing and cash flow. Chief Operating Officer is responsible for managing production and distribution.

Limitations of Traditional Risk Management

There are several limitations of the traditional approach to risk management. Some of the limitations are listed below:

1. (a) Risks cannot be mapped exclusively to the organisational chart. Thus there may be risks that lies 'between the silos', that the functional leaders are unable to identify. Such risks are unattended by any of the functional (silo) leaders causing that risk to go unnoticed until it triggers a catastrophic risk event.
2. (b) There are some risk events that affect multiple silos. Thus even though the functional (silo) leader identifies the risk, he is unable to comprehend the significance or the magnitude of the risk. A risk that seems relatively innocuous for one business unit, might actually have a significant cumulative effect on the organization if it were to occur and impact several business functions simultaneously.
3. (c) An individual functional (silo) leader may not understand how an individual response to a particular risk might impact other aspects of a business. A risk response by silo leader might trigger another risk event which affects the domain of another silo leader.
4. (d) Often individual silo leaders view risk management from internal perspective with minimal focus on risks that might emerge externally from outside the business. For example, an entity may not be observing a competitor's move that potentially disrupts how products are used by end users.
5. (e) Business leaders sometimes struggle to connect their efforts in risk management to strategic planning.

Lately these shortcomings have been recognized and companies have begun to embrace the concept of enterprise risk management (ERM) as a way to strengthen their organization's risk oversight. With the advent of time ERM has evolved as a strategic tool which holistically and proactively manages risk.

ERM is based in a holistic view of the most significant risks of the organisation at large. It is a strategic tool which enables organisations to achieve its strategic goal. An effective ERM process should be an important strategic tool for leaders of the business. Insights about risks emerging from the ERM process should be an important input to the organization's strategic plan.

Elements of ERM

To be effective, ERM has to be an ongoing process as risks are constantly emerging. The ERM process includes five specific elements:

1. **Strategy/objective setting** – Comprehending the strategies and associated risks of the business.
2. **Risk identification** – Create a profile of major risks that can negatively impact the company's overall financials.
3. **Risk assessment** – Identified risks are analyzed on the basis of their likelihood of occurrence and magnitude of impact.
4. **Risk response** – The various risk response strategies are considered and the appropriate actionable response which aligns identified risks with management's risk tolerances are selected.
5. **Communication and monitoring** – Relevant information and data need to be constantly monitored and communicated across all departmental levels.

Once management ensues with ERM, they are on a constant journey to regularly identify, assess, respond to, and monitor risks related to the organization's core business model. Value creation is an integral aspect of ERM. An effective starting point of an ERM process begins with gaining an understanding of what currently drives value for the business and what's in the strategic plan that represents new value drivers for the business.

4.1.5 COSO Framework

The Committee of Sponsoring Organisation's (COSO) ERM – Integrated Framework is one of the most important approaches to managing risk which is also advocated by CIMA. The COSO ERM – Integrated Framework along with the other propagated ERM frameworks describes an approach for identifying, analyzing, responding to, and monitoring risks and opportunities, within the internal and external environment which the entity faces. Management selects a risk response strategy for specific risks identified and analyzed, which includes:

- **Avoidance of risk:** Evading activities which are risky
- **Reduction:** Taking action to reduce the likelihood of occurrence or magnitude of impact
- **Transfer:** Transferring or sharing a portion of the risk
- **Accept:** No action is taken as the risk manager notes that the cost of managing risk is greater than the benefit derived from the risk management decision.

Monitoring is typically performed by management as part of its internal control activities, such as review of analytical reports or management committee meetings with relevant experts, to understand how the risk response strategy is working and whether the objectives are being achieved.

COSO published the ERM - Integrated Framework in 2004. This is the most widely used ERM framework which is used by companies worldwide. The framework is centred around value creation. The underlying philosophy is that value is maximised when the strategies are set such that there is an optimal balance between return goals and related risks. For this purpose, resources and capabilities at the disposal of the organisation are to be efficiently and effectively deployed. This ensures accomplishment of strategic goal of the organisation. In 2017, COSO published ERM - Integrating with Strategy and Performance.

Misconceptions about ERM (as clarified in 2017 document)

1. (a) Enterprise risk management is not a function or department. It is the culture, capabilities, and practices that organizations integrate with strategy-setting and apply when they carry out that strategy, with a purpose of managing risk in creating, preserving, and realizing value.
2. (b) Enterprise risk management is more than a risk listing. It requires more than taking an inventory of all the risks within the organization. It is broader and includes practices that management puts in place to actively manage risk.
3. (c) Enterprise risk management addresses more than internal control. It also addresses other topics such as strategy-setting, governance, communicating with stakeholders, and measuring performance.
4. (d) Enterprise risk management is not a checklist. It is a set of principles on which processes can be built or integrated for a particular organization.
5. (e) Enterprise risk management can be used by organizations of any size. If an organization has a mission, a strategy, and objectives—and the need to make decisions that fully consider risk—then enterprise risk management can be applied.

The goal of the ERM framework is to provide companies with:

- key principles and concepts,
- common language, and
- clear direction and guidance regarding the management enterprise risks.

Definition of ERM

ERM Framework Definition: 'Enterprise risk management is a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives.'

Fundamental Aspects of ERM Definition

1. (a) ERM is an ongoing process which is applicable to all aspects of the organisation.
2. (b) The risk management process must be managed by people who are close enough to that risk situation to understand the various factors surrounding that risk including its implications.
3. (c) ERM is an aspect of strategy setting.
4. (d) ERM is applied across the enterprise and adopts an entity level portfolio view of risk.
5. (e) ERM is designed to proactively identify potential risk events and map them with the risk tolerance profile of the organisation.
6. (f) ERM is the alternative to the traditional silo or stove-pipe risk management and specifically addresses the between the silo risk events since it is developed at the strategic level.

Eight Interrelated Components of ERM (COSO Framework)

The components of ERM does not occur serially where one component affects only the next. Rather it is a multidirectional, iterative process in which component effects and influences other. The COSO Framework advocates eight interrelated components of an ERM which are:

1. **(a) Internal Environment** – This is the basis around which risk is viewed and addressed by an entity. The risk management philosophy which is based on the risk appetite, integrity and ethical values of the entity, and the environment in which they operate are aspects which design the internal environment.
2. **(b) Objective Setting** – Objectives must be set before management can identify potential events affecting their achievement. Effectively implemented ERM ensures that management has in place a process to set objectives and that the chosen objectives support and align with the entity's mission and are consistent with its risk appetite.
3. **(c) Event Identification** – Events that affect accomplishment of an entity's objectives is identified either as risks and opportunities. Opportunities, referred as upside aspect of risk, are to be adjusted against the management's strategy or

objective-setting processes.

4. **(d) Risk Assessment** – Risks are analyzed, considering likelihood of occurrence and magnitude of impact. This is the basis which is the determining factor of risk management.
5. **(e) Risk Response** – Management has to select risk responses which are either avoiding, accepting, reducing, or sharing risk. For the purpose the organisation has to develop set of actions to align risks with the entity's risk tolerances.
6. **(f) Control Activities** – Policies and procedures are established and implemented to help ensure the risk responses are effectively carried out.
7. **(g) Information and Communication** – Relevant information is identified, captured, and communicated in a structured form and within timeframe that enable people to carry out their responsibilities.
8. **(h) Monitoring** – The entirety of ERM is monitored and modifications made as necessary. Monitoring is accomplished through ongoing management activities.

Four Categories of Entity Objectives (COSO Framework)

The COSO framework advocates four categories of entity's objectives which an effective ERM targets:

- **(a) Strategic** – These objectives are high level and are aligned with an entity's mission.
- **(b) Operations** – These objectives refer to the effective and efficient use of resources.
- **(c) Reporting** – These objectives surround an entity's need for reliable reporting.
- **(d) Compliance** – These objectives refer to an entity's need to comply with applicable laws and regulations.

Managing risks in these four categories within an entity's risk appetite will aid in the creation of stakeholder value.

4.1.6 Risk Pooling

Pooling of Risk in Insurance

Risk pooling is a risk management strategy which is effectively used by Insurance companies to group large numbers of people together to minimize the cost impact of the highest-risk individuals. Health, car, home and life insurance all practice risk pooling by insuring people who are unlikely to need insurance to cover the costs of people who are more likely to need insurance. Thus the concept of pooling of risk is similar to cross subsidization of interest rates where a group of people enjoys higher interest rate from bank for their deposits which is subsidized by other group of people enjoying lower interest rate.

Insurance risk pools are a risk management mechanism by which insurance companies can offer insurance products to more high-risk individuals and businesses for certain catastrophic losses by sharing costs and potential exposure more evenly across the board.

The pooling of risk is fundamental to the concept of insurance. A health insurance risk pool is a group of individuals whose medical costs are combined to calculate premiums. Pooling risks together allows the higher costs of the less healthy to be offset by the relatively lower costs of the healthy, either in a plan overall or within a premium rating category. In general, the larger the risk pool, the more predictable and stable the premiums can be.

Benefits of Larger Insurance Pools

There are two specific benefits of larger insurance pools which are interlinked.

1. (a) Pooling of risk helps Insurance companies mitigate the problem of premium spiraling. Adverse selection is an inherent problem in insurance. This describes a situation in which an insurer (or the insurance market as a whole) attracts a disproportionate share of unhealthy individuals. It occurs because individuals with greater health care needs are more likely to purchase health insurance than individuals with fewer health care needs. This increases premiums for everyone in a health insurance plan or market because it results in a pool of enrollees with higher-than-average health care costs. This results in higher premiums which may lead to healthier individuals opting out of coverage, which would result in even higher premiums. This process is referred to as a premium spiral. Pooling of risk enables the insurer to avoid this particular problem.
2. (b) Risk pooling assists the insurer as well the insured by keeping the premium stable and within specific limit. It is important to note that the largest component of health insurance premiums is the medical spending paid on behalf of insured. As a result, health insurance premiums reflect the expected health care costs of the risk pool. Thus an efficiently selected risk pool in health care insurance balances between share of unhealthy individuals insured and healthy individuals insured and this keeps the premiums within control.

Pooling of Risk in Supply Chain Management

Pooling of risk, as a risk management strategy, is also used in inventory and supply chain management. Inventory risk pooling is the concept that the variability in demand for raw materials is reduced by aggregating demand across multiple products. When properly employed, a business can use risk pooling to maintain lower inventory levels while still avoiding stock out conditions.

> **Simchi-Levi (2009) posits:** Risk Pooling suggests that demand variability is reduced if one aggregates demand across locations. …. It becomes more likely that high demand from one customer will be offset by low demand from another … allowing a decrease in safety stock and therefore reduced average inventory.

In a business, investment gets tied in inventory of raw material, work in process, and finished goods. The capital trapped in inventory can lead to shortage of capital, opportunity cost, higher cost of product due to holding cost. Thus any change in market conditions or demand might result in those inventories losing their values completely or partially. Thus companies are always in the lookout for reduction of idle inventories. For the purpose Just in Time (JIT) has been developed which keeps inventories low. But the major criticism is that it is susceptible to demand and supply shocks. Also as there is no inventory buffer, business can suffer greatly if any one element of production is delayed. Another way of avoiding idle inventory is demand forecasting. But demand forecasting for individual market or the product at large is always questioned for accuracy.

For the purpose of avoiding idle inventories and thus increasing the efficiency of the production process risk pooling may be used.

Risk pooling, for the purpose of supply chain management, is defined as a statistical concept that suggests that demand variability is reduced if one can aggregate demand, for example, across locations, across products or even across time. Risk pooling as a statistical concept that suggests that aggregation reduces variability and uncertainty. For example, if demand is aggregated across different locations, it becomes more likely that high demand from one customer will be offset by low demand from another. This reduction in variability allows a decrease in safety stock and therefore reduces average inventory.

Applications of Risk Pooling in Supply Chain Decision Making

1. (a) **Inventory Management** – It is obvious that lesser the variability in demand, lesser is the safety stock required to buffer against fluctuations. Thus the more consolidated the inventory, the easier it is to manage overall and the less risk of obsolescence.
2. (b) **Warehouse location and product flow** – Risk pooling suggests warehouses to be strategically closer to the customers. By centralizing a product in one location, businesses can take advantage of the aggregated demand. On the other businesses need to consider proximity to customers and other factors that may push towards maintaining more warehouses.
3. (c) **Transportation** – Transportation costs are cheaper with more consolidation of the products and the warehouses as shipments can be sent in larger batches. Therefore, risk pooling has positive impact on transportation costs.
4. (d) **Product design** – Decisions on the number of choices and complexity in products can benefit from risk pooling considerations – the lesser the choices or other options the simpler the demand forecast and many other aspects of the supply chain since the aggregated demand is easier to determine.

Positive and Negative Impact of Risk Pooling

It is noted in finance literature that aggregating demand of different markets/stores, and products can result in less safety stock, reduced overhead cost, lower transportation and handling cost while processing time or quality of product or service remain same or is bettered.

Positive impacts:

- Increased Service Level
- Decreased overhaul cost
- Decreased Safety Stock

Likely negative impacts:

- The likely possibility of increased cost due to increased distance between different markets would result in higher transportation cost.
- The increased distance may/can also cause longer lead time.
- Any force majeure can lead to shortage of alternative options.

4.1.7 Diversification

Introduction

Diversification is a risk management strategy used by investors to manage risks. It involves spreading the investment across several assets classes and/or across different industries. This is done on the basic premise of not placing all eggs in one basket. For example, if investor Mr A has investible fund of Rupees one lakh. If Mr A decides to put all the fund in a particular asset class (say equity share) or decides to invest in equity shares of a particular industry (say banking sector) then he is not abiding by the fundamental aspect of investing; diversification strategy. If he abides by the basic principle of investing, then he would have to create a well-diversified portfolio of investment or buy into such number of equity share (or any other asset class) which is also across various industries.

Unsystematic Risk

Unsystematic risk is a firm-specific risk. For example, if the credit evaluation of model applied by a particular housing finance company may be faulty. This would imply that mortgage loans are disbursed without proper credit evaluation of the potential borrower which would make the portfolio of mortgage loans of the particular housing finance company default risk prone. This is unsystematic risk as this is particular to this housing finance company. If Mr A (refer to previous example) is aware of such faulty credit evaluation mechanism of the company, he may prefer and diversify his funds away from this particular company and thus this type of risk is referred as diversifiable risk. This is that part of the portfolio risk which is put away with if the investor avoids investing in the security of the particular firm. This is also referred as unique risk which arises because many of the perils that surround an individual company are peculiar to that company and perhaps its direct competitors.

When a portfolio is well-diversified, the positive performance of some securities compensates the negative performance of others. This holds true only if the securities in the portfolio are not perfectly correlated – that is, they respond in a different way, often inversely, to market influences.

Based on studies and mathematical models, maintaining a well-diversified portfolio of 25 to 30 securities yields the most cost-effective level of risk reduction. Investing in more securities generates further diversification benefits, although at a significantly smaller rate.

Systematic Risk

Systematic risk is not specific to a particular security. This type of risk is not specific to a particular company or industry. It affects the market in its entirety. Diversification does not usually affect the inherent, or systematic, risk that applies to the financial markets as a whole. This is also referred as market risk. These risks stem from economy wide perils that threaten all businesses. Market risk explains why stocks have a tendency to move together, so that even well-diversified portfolios are exposed to market movements.

The Mathematics of Portfolio Diversification

Harry Markowitz presented his seminal paper Portfolio Selection in 1952. His key contribution was quantifying the impact that correlations between pairs of investments had on reducing a portfolio's overall risk. The idea was that the contribution to overall portfolio risk that a single investment brought to a portfolio was not just its weight in the portfolio, but how it interacted with the other constituents of the portfolio. This interaction is measured by correlation. Technically speaking, correlation is a scaled version of covariance. Covariance measures how two variables change in relationship to one another. Correlation normalizes covariance to a scale ranging from -1.0 to +1.0.

Solved Case 2 (ICMAI Study Material): Mr Sandeep Awasthi's Portfolio

Mr Sandeep Awasthi created a portfolio consisting of two asset classes:

- equity shares of HDFC (referred as security A for the purpose of this illustration) and
- regular income bonds of ICICI bank (referred as security B for the purpose of this illustration).

Mr Awasthi decided to put 1/3 of his investible fund in security A which has an expected return of 18 percent and 2/3 of his investible fund in security B which has an expected of earn 9 percent. Thus if Mr Awasthi decides to invest Rupees ninety thousand (₹90000) then his portfolio would be as presented below:

Financial Assets/Securities	Total Fund ₹90000 shared as	Return
Equity Share of HDFC (Security A)	₹30000 (1/3 of Investible fund)	18%
Regular income bonds of ICICI (Security B)	₹60000 (2/3 of Investible fund)	9%

Solution (ICMAI Standard):

The return from the portfolio (r_p) is given as:

$r_p = w_1r_1 + w_2r_2 + ...+ w_nr_n = \Sigma w_jr_j$

r_j = expected return on each individual asset; w_j = fraction for each respective asset investment; n = number of assets in the portfolio and $\Sigma w_jr_j = 1$

In such a case of two assets comprising a portfolio, the portfolio return is calculated below:

Portfolio return (two security case): $r_p = w_Ar_A + w_Br_B$

For Mr Awasthi, r_p = (1/3) × 18% + (2/3) × 9% = **12%**

Table 4.1: Calculation of Portfolio return of Mr Awasthi

Security	Fraction (w_i)	Return (r_i)	w_ir_i
Security A	1/3	18%	1/3 × 18% = 6%
Security B	2/3	9%	2/3 × 9% = 6%
Portfolio return (r_p) = Σw_ir_i			**12%**

Portfolio Risk

Unlike returns, the risk of a portfolio (σ_p) is not simply the weighted average of the standard deviations of the individual assets in the contribution, for a portfolio's risk is also dependent on the correlation coefficients of its assets. The correlation coefficient (ρ) is a measure of the degree to which two variables move together. It has a numerical value that ranges from -1.0 to +1.0.

In a two-asset (A and B) portfolio, the portfolio risk is defined as:

$$\sigma_p = \sqrt{[w_A^2\sigma_A^2 + w_B^2\sigma_B^2 + 2w_Aw_B\rho_{AB}\sigma_A\sigma_B]}$$

where σ_A and σ_B = standard deviations of assets A and B, respectively; w_A and w_B = weights, or fractions, of total funds invested in assets A and B; ρ_{AB} = the correlation coefficient between assets A and B.

It is important to note that $\rho_{AB} = Cov(A,B) / (\sigma_A\sigma_B)$

Portfolio risk, σ_p, is sum total of Unsystematic risk (unique risk of the respective security) and systematic risk (market risk which affects all securities of the market). The unsystematic risk can be diversified by combining assets in an appropriate manner.

In the given case if Mr Awasthi is able to assimilate information about the standard deviation (measure of total risk of the security) of a security A and security B, then he can use the above formula to calculate the portfolio risk.

If σ_A = 20% and σ_B = 10% then:

$\sigma_p = \sqrt{[(1/3)^2 \times (0.2)^2 + (2/3)^2 \times (0.1)^2 + 2 \times (1/3) \times (2/3) \times \rho_{AB} \times (0.20) \times (0.10)]}$

$\sigma_p = \sqrt{[0.0089 + 0.0089\rho_{AB}]}$

Thus it may be noted that the correlation coefficient between the two securities significantly defines the portfolio risk.

Three Cases:

Case 1: ρ_{AB} = +1 (Perfectly Positive Correlation):

$\sigma_p = \sqrt{[0.0089 + 0.0089 \times 1]} = \sqrt{0.0178} = 0.1334$ = **13.34%**

If ρ = +1, then as the value of asset A increases in response to market conditions, so does the value of asset B, and it does so at exactly the same rate as A.

Case 2: ρ_{AB} = 0 (No Correlation):

$\sigma_p = \sqrt{[0.0089 + 0.0089 \times 0]} = \sqrt{0.0089} = 0.0943$ = **9.43%**

The portfolio risk is simply the risk of the expected returns on the assets.

Case 3: ρ_{AB} = -1 (Perfectly Negative Correlation):

$\sigma_p = \sqrt{[0.0089 + 0.0089 \times (-1)]} = \sqrt{0}$ = **0**

If ρ_{AB} = -1, then as the price of A rises, the price of B declines at the very same rate. In such a case, risk would be completely eliminated.

From the above three perspectives it may be noted that a positive correlation between assets increases a portfolio's risk above the level found at zero correlation, while a perfectly negative correlation eliminates that risk.

It is important to note that since perfectly negative correlation is a theoretical concept which is not possible, portfolio managers should choose securities which have as minimum as possible correlation coefficient which would minimize portfolio risk.

The Essence of Diversification

It is obvious from the above discussion that portfolio managers would always pick securities in the portfolio such that they are negatively correlated with each other. This would minimize the portfolio risk. Thus additional securities in the portfolio will have the effect of reducing the portfolio risk which is the target of the portfolio manager.

The total risk of the portfolio (σ_p) comprises of systematic risk (also referred as market risk or non-diversifiable risk) and unsystematic risk (also referred as unique risk, idiosyncratic risk or diversifiable risk). Addition of a second security reduces standard deviation, or risk, as does the addition of a third security, and so on. The total risk of the portfolio steadily falls with diversification. It is important to note that diversification does not allow total risk to go to zero. This is simply because the systematic risk is ignored in the Solved Case, which is also evident as a perfect negative correlation (ρ_{AB} = -1) is considered which is a hypothetical situation.

There is a limit to the benefit of diversification, because only unsystematic risk is getting diversified away. Systematic risk is left untouched. Thus, while diversification is good as it reduces the portfolio risk, it is evident that systematic risk just doesn't decrease through diversification.

It is implicitly assumed that all securities have the same level of systematic risk. Because of this assumption the portfolio risk became zero when a hypothetical portfolio is created comprising of securities which are perfectly negatively correlated (ρ_{AB} = -1). Essentially all securities have some systematic risk. Rather certain securities have more of this systematic (market) risk than others. The amount of systematic risk is measured by beta (β).

4.1.8 Risk Analysis

After identifying and classifying the risks, it is important to analyse the level of risk which refers to the examination of the possibility and the consequences of each risk factor. This is the next phase in the risk management process. This is specifically done for projects. It is done to determine which risk factors potentially have a greater impact on the project and, therefore, must be managed by the entrepreneur with particular care and on a priority basis. It is also referred as the process that figures out how likely risk will arise in a project. It studies the uncertainty of potential risks and how they would impact the project in terms of schedule, quality and costs if in fact, they were to show up.

Benefits of Risk Analysis

The benefits of risk analysis in risk management are as follows:

- Avoid potential litigation
- Address regulatory issues
- Comply with new legislation
- Reduce exposure
- Minimize impact
- Risk analysis is an important input for decision making during all the stages of the project management cycle

Methods of Risk Analysis

There are three kinds of methods used for determining the level of risk of a business. The methods can be:

- Qualitative Methods
- Quantitative Methods
- Semi-quantitative Methods.

(a) Qualitative Methods

This method of risk analysis is most often used for decision making in business projects; entrepreneurs base themselves on their judgment, experience and intuition for decision making. These methods can be used when the level of risk is low and does

not warrant the time and resources necessary for making a full analysis. These methods are used when the numerical data available are not adequate for quantitative analysis that would serve as the basis for a subsequent and more detailed analysis of the entrepreneur's global risk. Qualitative risk analysis is referred as the base for quantitative risk analysis, and it's beneficial because not only the uncertainty in the project gets reduced, but you also focusses on the high-impact risks. Thus it helps the prioritization of risk.

The qualitative methods include:

- Brainstorming
- Questionnaire and structured interviews
- Evaluation for multidisciplinary groups
- Judgment of specialists and experts (Delphi Technique)

(b) Semi-Quantitative Methods

Risks are classified as high, medium or low, with a detailed descriptions of likelihood and consequences. These classifications are shown in relation to an appropriate scale for calculating the level of risk. It is important to give careful attention to the scale used in order to avoid misunderstandings or misinterpretations of the results of the calculation.

(c) Quantitative Methods

Quantitative risk analysis tallies the possible outcomes for the project and figures out the probability of accomplishing project objectives. This assists decision-making, especially when there is uncertainty in the planning phase. It helps project managers create realistic cost, schedule and targets. These are considered to be those that enable us to assign values of occurrence to the various risks identified, that is, to calculate the level of risk of the project. Quantitative methods encompasses:

- Analysis of likelihood.
- Analysis of consequences and
- Computer simulation.

The development of these measurements can be effected by means of different mechanisms, among which we note particularly the Monte Carlo Method, which is characterized by:

- A broad vision in order to show a range of possible scenarios.
- Simplicity in putting it into practice.
- Suitable for performing computer simulations.

Risk Analysis Methods

There are several risk analysis methods that assist risk managers in their decision-making process. Some of these involve the use of risk analysis tools such as charts and documents.

Bow Tie Analysis

This qualitative risk analysis method is used to identify causes and consequences for all potential project risks. The project management team must first identify risks that might affect the project and then think about causes, consequences and more importantly, a risk mitigation strategy for them. It's a very versatile method that can be used in any industry.

Risk Analysis Matrix

The risk analysis matrix assesses the likelihood and the severity of risks, classifying them by order of importance. It's main purpose is to help managers prioritize risks and create a risk management plan that has the right resources and strategies to properly mitigate risks. Risk likelihood is measured on a relative scale, not a statistical one, which makes it a qualitative risk analysis tool.

Risk Register

A risk register is a crucial project management tool to document project risks. It's a document that lists all the potential risks that could occur during the project execution phase, as well as critical information about them. It is used as an input for the risk management plan, which describes who's responsible for those risks, the risk mitigation strategies and the resources needed. Creating a risk register usually involves several, reliable information sources such as the project team, subject matter experts and historical data.

SWIFT Analysis

Structured What If Technique (SWIFT) is a risk analysis method that focuses on identifying potential risks associated with changes made to a project plan. Risk manager is responsible and is required to come up with any what if questions they can to find out all the potential risks that could arise. SWIFT Analysis is a structured brainstorming method of determining what things can go wrong and judging the likelihood and consequences of those situations occurring. The answers to these questions form

the basis for making judgments regarding the acceptability of those risks and determining a recommended course of action for those risks judged to be unacceptable. An experienced review team can effectively and productively discern major issues concerning a process or system. Lead by an energetic and focused facilitator, each member of the review team participates in assessing what can go wrong based on their past experiences and knowledge of similar situations.

Table 4.2: What If Analysis

What If?	Answer	Likelihood	Severity	Recommendations
What could go wrong?	What would happen if it did?	How likely?	Consequences	What will we do about them Again – prevent and monitor

Monte Carlo Method

It is discussed in the previous section that Monte Carlo Method is the most important quantitative method of risk analysis. The method was given this name in reference to the Principality of Monaco, which is famous as "the capital of games of chance". Regarding this the following issues are important and should be noted:

- Monte Carlo simulation, or probability simulation, is a technique used to understand the impact of risk and uncertainty in financial, project management, cost, and other forecasting models.
- This method seeks to represent reality through a mathematical risk model, in such a way that by assigning values randomly to the variables of the model, different scenarios and results are obtained.
- The Monte Carlo Method is based on making a sufficiently high number of iterations (assignments of values in a random fashion), so that the sample of results obtained is sufficiently broad so as to be considered to be representative of a real situation. These iterations can be made by using a data processing engine.
- With the results obtained from the various iterations made, a statistical study is performed, from which relevant conclusions are extracted with respect to the risk of the project, such as mean, maximum and minimum values, standard deviations, variances and likelihood of occurrence of the different variables determined on which to measure the risk.

Monte Carlo simulation, in simple words, is a risk analysis technique that builds models of potentials results of portfolio returns. It is extensively used by portfolio managers to gauge their portfolio on a risk-return basis. The result of this model would be an array of possible outcome values, which could be very difficult to assess and interpret. This model is combined with a simulation which is a virtual representation of the problem and the solution for easy interpretation.

Monte Carlo simulation considers various inputs and various consequences of those inputs and tries to eliminate uncertainties. It facilitates analysts in decision-making. It tries to rule out various uncertainties, as it is a very flexible model. We can change the inputs according to the situation, and it automatically models a range of possible outcomes. This approach is a computer-based method that uses statistical sampling to build a model of a possible range of results (a probability distribution) for those factors that have an element of uncertainty.

4.1.9 Risk Mapping

It is discussed in a previous section that CIMA theorized a generic framework for risk management of which risk assessment is a significant component. Risk mapping is an integrated part of risk assessment procedure. Risk mapping is the most frequent used tool of risk assessment. It is a listing of all the relevant risks that might affect the company, where each single risk is placed in a two-dimensional space: impact and probability of occurrence. It involves a matrix of likelihood/probability and impact/consequences.

The location of the risks in this space allows top management to reach a decision regarding which risks should be assumed and which risks should be hedged. It is the process of identifying, quantifying and prioritizing the risks that may interfere with the achievement of your organizational objectives.

A risk map is built by plotting the frequency, defined as how likely the risk is or how often risk will occur, on Y-axis and the severity, referred as how much of an impact it would have if it did occur, on the X-axis.

Fig 4.7: A Basic Risk Map

Risk Map Matrix

	Low Severity	High Severity
High Frequency	Medium Risk (Share & Transfer)	High Risk (Mitigate & Control)
Low Frequency	Low Risk (Accept)	Medium Risk (Control)

Indications of Risk Map

Risk Level	Risk Response
Low Risk (low impact – low likelihood of occurrence)	Accept the risk
High Risk (high impact – high likelihood of occurrence)	Mitigate and control the risk
Medium Risk (high impact – low likelihood of occurrence)	Control the risk
Medium Risk (low impact – high likelihood of occurrence)	Share and transfer the risk

Importance of Risk Mapping

- **Understand the Risk Environment** – The process of risk management entails creating a bucket list of risk, referred as risk register, which the organisation faces. Depending on the scale and nature of operation, this list do become quite a handful. Risk mapping is beneficial because it categorises all the risk that the organisation is exposed to. The risks are categorised on the basis of its causes and the consequences of each risk. Thus it allows the organisation to look at the risk environment as a whole and comprehend the frequencies and severities with which the risks occur. Since a risk map is a simple visual tool it aids anyone in the organization with a helicopter view of the overall risk environment.
- **Prioritize mitigation strategies** – Since for an organisations resources are always limited it is important to be strategic about mitigating risks which negatively impacts the resources. Risk mapping facilitates the process of risk mitigation. This prioritization method facilitates the risk manager to address the risks that have the most potential to cause harm to the organization.
- **Reduce insurance costs** – Developing risk maps can help organizations demonstrate a comprehensive, well-aligned risk management strategy to insurance companies and thus aids in creating favourable insurance premium structure;
- **Other aspects** – Support collaboration between the organization's risk function and other functional departments, which have greater visibility; encourage shared strategic decision-making on the basis of risk issues; effectively focus on improving risk management and risk governance; sharpen the enterprise's definition of its risk appetite and risk tolerance; generate better integration of risk management activities across enterprise functions; and give teams throughout the enterprise a common language for discussing risk.

The Risk Mapping Process

The risk map is a visual tool, there is a particular process for creating a risk map, which is similarly followed in larger organisations. Generally the process of risk management ensues with a presentation by the risk manager of the 'Top 10 risks'. The senior executive team will be shown a list of these risks in tabular format which is referred as the risk register. The risk register will list each risk that made it into the top 10, starting with the biggest risk. Each risk will have a description and some assessment that says, for example, that the risk would have had a critical severity without any risk management strategy, but because one is in place the residual risk is now only medium. There will be a cell in the table describing the risk management strategy that has achieved this miracle. The table may even give a red, orange, green color-coding to emphasize the point.

The Top 10 risks is, then, plotted in a heat map which is simply the colour coded version of the risk map. Heat maps, like risk registers, are very popular tools in the risk management process.

The top management team will be satisfied with the risk events plotted below the yellow diagonal represented as green and turquoise blue since they represent low or moderate risk level in terms of likelihood of occurrence and impact or severity. The risk events plotted in the red zone are the most critical and requires the top management including the risk manager to focus their attention. The risk events falling in the orange zone are less critical but requires specific focus of the top management and the risk manager.

Disadvantages of Risk Mapping

Risk maps are crude tools and can often become misleading. The following are some of the disadvantages of the risk map.

- Qualitative scores for probability and impact are imprecise, inflexible and are relative. One person's 'low' is another person's 'quite low', etc. Unlikely risks with very large impacts will typically have probabilities like 1 in 100 or 1 in 1000 and these cannot be distinguished from 1 in 10 in the grids. Also this cannot represent a risk that is expected to occur say 5 times in the next year;
- Impacts can have multiple dimensions (financial loss, injuries, environmental damage, project delays, etc) and without a quantitative scale it is impossible to represent them in a consistent manner;
- A financial loss to a small business unit might be considered 'very high' to them but 'very low' to the owning corporate entity. A loss of life in a tiny project will need to have the same importance as a loss of life at head office. Rescaling rules can only work if one uses quantitative evaluations;
- Unless the risk manager have quantitative evaluations for likelihood and impact he can never evaluate whether risk management strategies are cost-effective and thus the business will inevitably lose competitive advantage in its risk management.

4.1.10 Risk Indicators

Risk indicators (RIs) are an important tool within the risk management framework. Since there are many RIs only the most important of them also known as Key Risk Indicators (KRIs) are applicable and are used to enhance the monitoring and mitigation of risks and facilitate risk reporting. A KRI can be thought of as a smoke alarm system in a housing apartment. As a smoke alarm detects smoke in the building and triggers alarm for the residents so that they can take proactive measure to mitigate the risk of fire so does a KRI. It indicates a risk event which might impact the organisation such that the risk manager can undertake some measure proactively rather and not wait for the negative outcomes to occur.

But it is important to note that the word key is pivotal. KRIs aren't about monitoring every single risk facing the business. Instead, they focus on the most critical indicators for managing the highest risks – and these will vary from business to business in tandem with the company's objectives and priorities. What constitutes a key risk for one business may not be important for another. Even the key risk shall differ between the years.

KRIs acting independently or in conjunction with other risk environment related data, such as, loss events, assessment outcomes, and issues offer considerable insights into the weaknesses within the risk and control environments. They act as metrics of changes in an organization's risk profile, but given the changing risk landscape, simply establishing them within the corporate protocol may not be enough. KRIs play an important role in risk management by predicting potential high risk areas and enabling timely action. Effective KRIs help to:

- Identify the biggest risks.
- Quantify those risks and their impact.
- Put risks into perspective by providing comparisons and benchmarks.
- Enable regular risk reporting and risk monitoring.
- Alert key people in advance of risks unfolding.
- Help people to manage and mitigate risks.

In Module 3 of this study note a discussion on the Key Performance Indicators (KPIs) is made which is revisited in this section as it is easier to comprehend the notion of KRIs if it is compared and contrasted with KPI. In simple terms, KPIs help to measure business performance while KRIs help to quantify risks. While KPIs help organisations to understand how well they are doing in relative to their strategic plans, KRIs help them understand the risks involved and the likelihood of not delivering good outcomes in the future. The interlinkage is easily comprehended through the following three examples.

- (a) A company establishes a KPI to measure information technology (IT) system performance and a complementary KRI to track the susceptibility to cyberattacks.
- (b) A company creates a KPI to monitor its market share growth because that's a key business objective. But a KRI linked to the same goal could monitor the risks of losing market share due to customer shifts or new competition.
- (c) A company measure of staff engagement or staff satisfaction is an important KPIs but monitoring the likelihood of losing key staff and the risks to their employer brand as KRIs.

Features of KRIs

The features of well designed KRIs are as follows:

- KRIs are typically measurable, i.e., they can be quantified in terms of percentages, numbers etc
- They are predictable and are often used as early warning signals, while also tracking trends over a period of time.

- Since they offer useful insights about potential risks that may impact organizational achievements and objectives, KRIs are informative and act as a catalyst for decision making.

Types of KRIs

KRIs can be broken down into three main categories, based on types of risk:

- **Financial:** These are metrics that help to quantify market risk, regulatory changes or competitive risk. Examples are economic downturn, regulatory changes.
- **People:** KRIs that measure employee satisfaction, customer churn, employee retention, etc. Examples are high staff turnover, low staff satisfaction
- **Operational:** Ways to take stock of risks that can stem from day-to-day like a technical malfunction or security breach. Examples are system failure, information technology security breach.

Effectivity of KRIs

Accomplishment of strategic goal is the primary target of any organisation. Effective KRIs are interlinked with this. At the initial stage businesses' key goals are identified. The next logical step is the design of KPIs that monitors performance and measures the alignment of business tactics with the strategic goals. Then the major risks related to each goals which might hinder strategic goal accomplishment process are identified which also requires the identification and design of the KRIs which track those risks and act as an early warning system, thereby flagging up when the business is at risk of not achieving its goals.

In this way, each KRI should ideally be linked to a KPI and, in turn, be linked to core strategic goal, priorities and initiatives. This helps to keep the focus on key risks and not every possible risk that the organisation might face.

KRIs should be specific, predictive and easy to quantify through hard numbers, percentages or ratios. In addition, for each KRI, the risk manager needs to identify the relevant thresholds and trigger points.

After identification and design of the KRIs and KPIs the risk manager need to monitor and track them regularly. Some indicators may need to be monitored in real time basis while others require only a quarterly check. KPIs and KRIs can also be reviewed regularly in terms of their relevancy to the business.

4.1.11 COBIT

Control Objectives for Information and Related Technology (COBIT) is the most popular control framework developed by Information Systems Audit and Control Association (ISACA) for the enterprise governance of information and technology (EGIT). COBIT has enormously helped enterprises optimize the value of their critical information assets. Over the years, ISACA has released a number of COBIT documents in which there has been a paradigm shift in focus of operations.

Table 4.3: COBIT – A Timeline

Year of Publication	Document	Focus
1996	COBIT (version 1.0)	Support (financial) audit professionals who were increasingly confronted with automated environments. Framework for executing IT audit assignments.
1998	COBIT (version 2.0)	Comprehensive set of control objectives for IT processes
2000	COBIT (version 3.0)	Incorporated management guidelines including metrics, critical success factors, and maturity models for IT processes.
2005	COBIT (version 4.0)	The purpose of this fourth edition was to further establish COBIT as a generally accepted framework for IT governance. The alignment of business and IT goals and their relationships with the supporting IT processes, roles and responsibilities in the context of the IT processes, and the interrelationships between IT processes
2006	Val IT (version 1)	IT-related business processes and responsibilities in value creation
2008	Val IT (version 2)	IT-related business processes and responsibilities in value creation (with certain amendments)
2009	Risk IT	IT-related business processes and responsibilities in risk management
2012	COBIT (version 5.0)	Integrated good-practices framework for IT governance and IT management. Merging of Val IT and Risk IT frameworks. Also had stronger ties with other established frameworks and standards.
2018	COBIT 2019	Aimed at facilitating a more flexible, tailored implementation of effective enterprise governance of information and technology (EGIT). Includes the modification of COBIT principles.

Risk Management and COBIT

IT risk is one of the risk that are not considered in details in the usual risk management framework though it is of prime importance, especially in today's business environment which sometimes referred as the ICE (information, communication and entertainment) age. Assessing and managing IT risk, which have specific linkages to the strategic goals, can help companies to operate more efficiently. This is the particular aspect where COBIT plays a crucial role. As part of creating a holistic approach to information governance, COBIT aims to help organisations' develop, organize, and implement strategies that align IT infrastructure with business goals. It offers models and metrics that measure how well IT is contributing to achieving the strategic objectives.

Initially, COBIT was created as a set of information technology control objectives to help financial firms with their IT auditing. However, over the years, its applications have expanded and it now covers information governance and IT management methods, including information to help with risk management.

COBIT 4.0 (2005) and COBIT 4.1 (2007) include details about information technology and communication technology governance.

Holistic cybersecurity program are enclosed in COBIT 5 (2012) which also provides an IT framework that incorporates ISACA's proprietary Val IT, Risk IT, and Information Technology Infrastructure Library (ITIL) which are in tandem with the relevant standards produced by the International Organization for Standardization.

In addition, COBIT 5.0 works with the Committee of Sponsoring Organizations of the Treadway Commission (COSO) to help create a controlled landscape and a risk and governance model to enable security to comply with regulatory requirements.

For example, if an organisation has to comply with the COSO Framework, it can use COBIT 5.0 as a way to define and measure the effectiveness of IT controls of the organisation. Uniting these components, COBIT 5.0 offers a holistic cybersecurity program for enterprise IT governance. In addition, COBIT 5 defines five maturity models for determination of status of regulatory compliance.

Using COBIT 5.0, an organization can improve its IT risk-related capabilities, awareness, communication, decision making, and outcomes by giving key stakeholders an accurate, consistent, and validated assessment of the current level of IT risk and its impact on the business.

COBIT 2019 enables organizations to develop, organize, and implement more collaborative and flexible governance strategies. It addresses new and evolving technologies, trends, and requirements for businesses. COBIT 2019 includes other frameworks, such as The Open Group Architecture Framework (TOGAF), Capability Maturity Model Integration (CMMI), and ITIL. It's especially helpful for companies that want to use it as an overall framework linking different processes running in their organizations while focusing on risk management, governance, and security.

The bottom Line is that the COBIT framework stresses regulatory compliance, allows companies to get more value from IT, and helps align IT with the goals of the business to enable organizations to manage risk more effectively.

Multiple Choice Questions – 4.1

1. Which of the following statements best describes risk?

(a) Uncertainty when looking to the future (b) Clarity in future decisions (c) Uncertainty when looking at the past (d) Certainly of not suffering harm or loss

Answer: (a) Uncertainty when looking to the future

2. What assess the risk and your plans for risk mitigation and revise these when you learn more about the risk?

(a) Risk monitoring (b) Risk planning (c) Risk analysis (d) Risk identification

Answer: (a) Risk monitoring

3. Elements of a risk management system are:

(a) There should be a culture of risk awareness within the company. (b) There should be a system and processes for identifying, assessing and measuring risks. (c) There should be an efficient system of communicating information about risk and risk management to managers and the board of directors. (d) All of the above

Answer: (d) All of the above

4. This type of risk can be avoided by diversifying properly.

(a) systematic risk (b) unsystematic risk (c) portfolio risk (d) total risk

Answer: (b) unsystematic risk

5. A portfolio having two risky securities can be turned risk less if:

(a) The securities are completely positively correlated (b) If the correlation ranges between zero and one (c) The securities are completely negatively correlated (d) None of the above

Answer: (c) The securities are completely negatively correlated

6. A portfolio comprises two securities and the expected return on them is 12% and 16% respectively. Determine return of portfolio if first security constitutes 40% of total portfolio.

(a) 12.4% (b) 13.4% (c) 14.4% (d) 15.4%

Answer: (c) 14.4%

7. The greater the beta, the security involved:

(a) Greater the unavoidable risk (b) Greater the avoidable risk (c) Less the unavoidable risk (d) Less the avoidable Risk

Answer: (a) Greater the unavoidable risk

8. Which of the following is not a common risk factor?

(a) Market Risk (b) Promotional Risk (c) Interest Rate Risk (d) Inflation Risk

Answer: (b) Promotional Risk

9. Unsystematic risk is_____.

(a) The risk associated with movements in security prices. (b) Reduced through diversification. (c) Higher when interest rates rise. (d) The risk of loss of purchasing power.

Answer: (b) Reduced through diversification.

10. Diversification reduces:

(a) Interest rate risk (b) Market risk (c) Unique risk (d) Inflation risk

Answer: (c) Unique risk

11. Which of the following is not related to overall market variability?

(a) Financial risk (b) Interest rate risk (c) Purchasing power risk (d) Market risk

Answer: (a) Financial risk

12. The____ is an effort to achieve a balance between the desire for the lowest possible risk and the highest possible return.

(a) group (b) investment (c) risk return trade off (d) securities

Answer: (c) risk return trade off

13. Higher risk is associated with greater probability of higher_____,

(a) goal (b) return (c) investment (d) standard deviation

Answer: (b) return

14. Insurance is a risk management technique involving…

(a) Risk retention (b) Risk avoidance (c) Loss Control (d) Risk transfer

Answer: (d) Risk transfer

15. Willingness to retain whole or part of a given risk is called……..

(a) Risk retention (b) Risk carrying (c) Risk bearing (d) None of the above

Answer: (a) Risk retention

4.2 Corporate Risk Management

4.2.1 Transformation of Enterprise Risk Management to Risk-Enabled Performance Management

Traditionally performance management and risk management are considered as two distinctive issues. While performance management focusses on performance of an organization, a department, an employee, or the processes in place to manage particular tasks, risk management is considered as an isolated issue which adds-on to operations focusing primarily on compliance and control activities. A constricted approach to performance and risk management can pose challenges for an organization. It reduces the organizations ability to monitor and mitigate critical risks and it prevents key decision makers from leveraging risk information. It is perfectly possible for a company to be fully compliant, but suffer from clearly inadequate risk management resulting in unexpected events that prevent the company from reaching its strategic goal. This is a classic example of strategic mismanagement and ultimately destroys shareholder value.

Today's uncertain business environment requires organizations to start taking a broader view of enterprise risks, focus on those risks with the greatest impact and occurrence and leverage performance management tools to manage and mitigate them.

Factoring risk into the main areas of performance management positions the enterprise to better limit uncertainties and capitalize on upside opportunities. Traditionally, organizations focused more on financial risks. Today, the risk landscape has changed and continues to evolve. In order to effectively execute strategy and deliver performance in this ever changing risk landscape, organizations must go beyond the obvious financial risks, identify, assess, evaluate and manage the non-financial risks with the potential of impacting on the organization's value drivers. Furthermore, there is need to understand how each risk might interact with others and the resulting compounding effect. This helps management make decisions with little or minimal implications on the overall performance of the business.

In order to manage risks, organizations must leverage performance management tools. This means use of historical comparisons of KRIs & KPIs, evaluation tools that set and specify risk thresholds, predictive analytics for measuring and monitoring risks, risk-adjusted forecasts which consider risk assessment an important part of decision-making, and process controls that are fully embedded in risk systems.

Integrating risk with performance management is critical. By doing so, organizations are more likely to identify potential risks faster, respond to them quicker and prepare for them better.

To incorporate risk into performance management, organizations must:

- Prioritize risks based on greatest impact and likelihood of occurrence.
- Create a line of sight working backward from the identified risks and their root causes.
- Correlate risks within and across silos.
- Adjust for the compounding effects of seemingly independent risk events.
- Plan for different scenarios. By identifying different scenarios, the organization will be able to develop various risk response plans that are applicable to many possible events, not just the specific scenario developed.

Risk Enabled Performance Management (REPM)

For the purpose of handling uncertainties and opportunities at the same time, business leaders need to be incorporate risk exposure, what-if scenarios, uncertainty, best case/worst case forecast, earned value models, risk drivers and contingency plans etc in their business plans. They cannot afford the traditional set up where risk is something handled independently by risk managers once a quarter. They need access to the insights, tools and models on a continuous basis. Thus, there is a need for a more comprehensive Risk Enabled Performance Management (REPM) which grows out of the traditional ERM model.

For REPM to succeed there need to be a change in the role and objective of the risk function. Risk and Performance Management would have to be integrated at all levels, and the risk managers need to become business advisors for line managers. This often requires a change of management principals, mental models and governance set up. In addition, management processes at strategic, tactical and operational level need to get sufficient risk support in goal setting, planning, performing and evaluating efforts. New risk enabled management processes often results in changes to existing meeting structure and new requirements for management information related to progress and forecast on key value and risk drivers.

Thus REPM have evolved from the traditional ERM because of the challenges of the ever emerging VUCA environment. It encompasses the data analytics and every possible tools and techniques to broaden the traditional ERM. It is based on the basic issue that risk taking is fundamental to economic reward. The key to the future is linking risk and performance management. This linkage often takes the route of data analytics. In the VUCA world, data availability is infinite. These issues

makes effective risk management process imperative for the strategic and long-term success of an organization. To cope with the changing dynamics businesses need to shift from ERM to REPM.

In REPM, the initial issue is identifying the business drivers that are crucial and map them to the objectives which help stakeholders identify relevant emerging risk trends and metrices for its effective monitoring. The effectiveness of this approach lies in formulating business drivers into key strategies and tasks, without losing focus on the macro perspective. Incorporating data analytics in risk management is key to the REPM. The risk management approach must entrench technologies across the entire risk management process. Thus it is obvious that leveraging the power of analytics is crucial to REPM.

Focus Areas of Traditional/Foundational ERM

- (a) Independent enterprise risk identification and assessment process.
- (b) Risk reporting to the top management is one of the primary aspect of traditional ERM.
- (c) The risk management process is independent of operations and performance management.
- (d) Historical perspective design the evaluation of current exposure
- (e) The focus is on compliance

Leading Practices for Transformation to REPM

The transformation to REPM is based on some leading practices which are grouped into three aspects:

(a) REPM is used to measure and drive performance

- (i) Integrates risk and performance management.
- (ii) Creates linkages between KRIs and performance drivers.
- (iii) Uses data analytics for risk analysis

(b) REPM is forward looking

- (i) Defines future trends and undertakes predictive analysis
- (ii) Emerging risks are also considered
- (iii) Scenario analysis and stress testing are two important tools used

(c) Action and result orientation

- Risk and uncertainty are key elements in strategic and operational decision framework and management process.

4.2.2 Risk Retention or Reduction

Risk Retention

Risk retention, in dictionary terms, means the following: 'A method of self-insurance whereby the organization retains a reserve fund for the purpose of offsetting unexpected financial claims'. In risk management, risk retention is referred as the practice of setting up a self-insurance reserve fund to pay for losses as they occur, rather than shifting the risk to an insurer or using hedging instruments. In simple terms, risk retention is defined as the intentional or unintentional act of retaining the responsibility for loss or financial burden of loss within the organization. A large deductible on an insurance policy is also a form of risk retention.

It is noted earlier in this study note that in the world of risk management, there are four main strategies:

- Avoid it.
- Reduce it.
- Transfer it.
- Accept it.

The last of the strategies accept it is the other name of risk retention.

It is obvious that there is associated cost of risk management. Avoiding a risk means constricting the organisation's activities which entails loosing out opportunities that reap benefits. Reducing a risk involves installation of costly new systems or processes and controls which the organisations are not comfortable with. Transfer of a risk also has a cost, for example an insurance premium. Thus in the case of minor risks (which score lower in terms of the frequency and severity), it may be best simply to accept or retain them. There's no sense investing in a whole new suite of expensive software just to mitigate a risk that wouldn't have had a very big impact. For the risks that scores low in the impact and likelihood matrix, the risk manager should look for a simple, low-cost solution, and in absence of such a solution it is advisable that the risk manager simply accepts or retains the risk and continues with business as usual.

Risk retention is not really a mitigation strategy because retaining a risk does not reduce its effect. However, risk retention is a reasonable option in risk management. There are various reasons why companies may choose risk retention in certain situations. The most common reason is that the cost of other risk management options, such as avoidance or transfer, may outweigh the cost of the risk itself. There is no benefit in spending ₹100,000 to avoid a ₹10,000 risk. In cases where the cost outweighs the benefit, most organizations choose to accept a risk rather than spend time or money mitigating it.

Advantages of Accepting or Retaining a Risk

- There's no cost, and
- It frees up resources to focus on more serious risks.

The biggest disadvantage is that the risk manager has no risk control mechanism in place. If the impact and likelihood are minor, that may be fine. For the purpose the critical evaluation of risk map is of prime importance.

Thus it may be noted that sometimes risks cannot be avoided or transferred, as the costs of doing so is too high. In these circumstances, the organization retains the risks.

As most businesses in the private sector know, hedging or shedding all risks is rarely possible, and in any case it often costs so much that little or no profit can be made. In these circumstances, companies may become risk takers as an integral part of conducting their business, and reap the associated rewards. In some instances, organizations may wish to consciously retain significant risks, particularly where they have the appropriate expertise to manage them. Risk retention will become an important consideration for those government agencies with current plans or future aspirations to compete with the private sector, those that may be corporatized or privatized, or those that may be judged on commercial criteria, such as profit and return on assets. Some organizations have statutory obligations to retain and manage risk. They will usually take particular care to select and implement risk prevention, mitigation and control strategies to ensure the residual risk they must accept is minimized.

Risk Retention Criteria

The following are cases when risk retention as a risk management strategy is adopted:

- Low-likelihood/low-consequence risks are candidates for risk retention.
- High and extreme risks cannot be retained.
- There are cases, such as data protected by laws or regulations or risk to human life or safety, where retention of risk is not an option.

Rules Relating to Risk Retention Followed by Risk Managers

- Determine the risk retention level through proper estimation of risk using sales projections, cash flows, contracts, liquidated damages, and guarantees.
- Though there is no precise formula for estimation of risks to be retained, statistical averages of such losses over a period of time give an indication to estimate such losses. For instance, bad debts occurring over a period of time are taken into consideration as an estimate to create a reserve for doubtful debts.
- It is also necessary to ascertain the capacity for funding a loss arising out of retained risk that is the measure for transferring the risk beyond that level.

Risk Reduction

It is mentioned in the earlier section that there are broadly four risk management strategies; avoidance of risk, reduction of risk, transfer of risk and acceptance of risk. In figure 4.7 above it is explained how the strategies are linked to the risk management strategies also referred as risk responses. It is noted that when the likelihood of occurrence (frequency) and the impact (severity) are both high (denoted in the top right) then it is referred as 'high risk' and the risk response is mitigation and control. This is risk reduction. This is high priority for the risk manager and he must initiate risk reduction strategies to control the risk events. This situation surely entails practice of risk management strategies as unlike the risk retention situation discussed above, in this case the impact of the risk is higher that the cost of such measure. Risk reduction is also referred as risk mitigation.

COSO Framework (2004) defines Risk Reduction: Action taken to reduce risk likelihood or impact or both. This typically involves any of myriad everyday business decisions that reduces risk to an amount of severity aligned with the target residual risk profile and risk appetite.

More used definition: Decision or action taken to either reduce how bad the end result of a risk will be or the chances of it occurring in the first place.

An everyday example of risk reduction is wearing a seatbelt before driving the car. Putting a seatbelt on before driving doesn't reduce the chance of an accident occurring but surely reduces the severity (negative effects) of the accident if the accident do occur.

The proper response cannot be determined until the risk has been analyzed to see how it compares to the organization's risk tolerance as risk acceptance is a better risk response measure if the risk falls within acceptable tolerance levels. But if it doesn't fall within acceptable tolerance levels, a decision will need to be made on how to proceed. Risk reduction or mitigation is one such choice that can be as complex as a process overhaul or cultural change or as simple as a decision to stop doing something.

Business Examples of Risk Reduction

- **Pulling out of a market** – Risk reduction may be an alternative for an organisation which is evaluating their option of entering the Asian market. The Asian market opens up all sorts of risks relating to culture and the stability of the workforce. In such a situation the organisation may strongly consider the option of pulling their operations out of Asia altogether.
- **Process change** – While this example may be interpreted as traditional risk management, it also blends with enterprise risks like reputation. Any business with delivery or service vehicles has huge risks around their drivers they must address. To prevent drivers from speeding, the business may opt to put a governor, or a speed-limiting device, on all of its vehicles. This not only reduces the risk of speeding fines and accidents, it also reduces any reputation risks borne out of careless driving on the part of employees.
- **Culture change** – If the organization is experiencing a higher than normal rate of talent loss, there may be a cultural issue at play that's prompting people to leave and seek opportunities elsewhere. In this case, exit interviews can be examined to see what this trigger may be. One reason may be people are leaving because they don't get fulfillment out of their jobs. A change in culture could reduce talent loss. It should be noted that risk reduction activities regarding culture can't be done in the short-term.
- **Discontinuing a product** – While risks remain for products that were already sold, discontinuing the product definitely reduces the potential impact in a variety of areas. For example, due to reports of adverse side effects and orders by the Food and Drug Administration (FDA) to add warnings on product packaging, Bayer announced in mid-2018 that it will no longer be offering its Essure permanent birth control device in the U.S. Besides the health risks to women, continuing to offer the product could have led to a host of legal and reputational risks to the pharmaceutical giant.

Although it is very helpful to see examples, exactly how the risk manager goes about reducing a risk depends on many factors like impact, likelihood, velocity, culture, and others specific to the organization. Availability of resources is another important aspect which the risk manager must consider before considering risk reduction as a risk response.

4.2.3 Value at Risk (VaR)

The most commonly used measure of market risk is value-at-risk (VaR). Value-at-risk is a systematic methodology to quantify potential financial loss based on statistical estimates of probability. It is an estimate of the probability of a loss being greater than (or less than) a particular Rupee amount as a result of market fluctuations. VaR attempts to answer the question, 'How much money might be lost?' based on probabilities and within parameters set by the risk manager. VaR is commonly used to measure market risk in a portfolio of assets or exposures. It provides an estimate of the riskiness of a portfolio.

VaR – A Conceptual Discussion

VaR is defined as the worst loss scenario arising out of unexpected fluctuations in the value of a portfolio over a given period of time which may be a single day or 10 days (used for the purpose of regulatory capital reporting) given a specified level of probability (referred as the confidence level).

For example, if a position has a daily VaR of ₹10 million at the 99 percent confidence level, it is meant that the realized daily losses from the position will on average be higher than ₹10 million on only one day in every 100 trading days. Thus VaR offers a probability statement about the potential change in the value of a portfolio resulting from a change in market factors over a specified period of time. It is important to note that the VaR measure does not state by how much actual losses are likely to exceed the VaR figure; it simply states how likely (or unlikely) it is that the VaR measure will be exceeded.

Suppose that investment managers of a big organisation has positions in foreign exchange, fixed income and equities. They need an assessment of what they can expect the worst case to be for the position overnight with a 95% degree of confidence. The VaR number gives this measurement. For example, if the portfolio manager have Rupees 100 million under management and an overnight-95% confidence interval VaR of Rupees four million. This means that 19 times out of 20 his biggest loss should be less than Rupees four million dollars. This measure of VaR can also be expressed as percentage of assets, in this case 4%.

Thus VaR provides a single number for summarizing the total risk of the portfolio.

Advantages of VaR

- (i) **Easy to understand:** VaR is a single number that approximates the amount of risk in a portfolio. VaR is presented either as a percentage of the value of a portfolio or simply in price units such as dollars. This makes it easy to understand and interpret.
- (ii) **Applicability:** VaR can be used to measure and make a comparison of risks across asset classes and portfolios. This equips the risk manager with relevant information on possible risks.
- (iii) **Acceptability:** The VaR figure is a widely accepted standard in the buying or selling of assets. Besides, it is acceptable to banking regulators. VaR has the same interpretation irrespective of the assets you are considering. Further, VaR is regularly seen in annual reports of financial companies.
- (iv) **Used for performance evaluation:** Instead of evaluating a firm's performance purely based on returns, a risk-adjusted return can be calculated by considering the level of risk taken. In this case, VaR can serve as an adjustment basis.
- (v) **Reliability:** VaR, as a measure of risk, can be verified by backtesting.

Limitations of VaR

- (i) **Depends on inputs and assumptions:** The parametric method, for instance, assumes that asset and portfolio returns follow a normal distribution. Consequently, one might end up using unrealistic return distributions as inputs. In turn, this will lead to underestimation of the real risk. Furthermore, the assumption by the historical simulation method that the past performance of a portfolio is a good indicator of its performance in the near future is unrealistic.
- (ii) **Inconsistent results:** Different approaches to calculating VaR use varying assumptions and, as a result, end up getting different values of VaR of the same portfolio.
- (iii) **Misleading and a false sense of security:** When VaR is calculated at a confidence interval of 99%, then its interpretation is that there is a 99% probability that one will lose no more than the VaR value obtained. This may give an investor a false sense of security.
- (iv) **Difficult to calculate given large portfolios:** Having many diverse assets complicates the calculation of VaR. This is mainly because to obtain VaR, the correlation between the assets, as well as the risk and return of all the assets, must be calculated.
- (v) **Subjectivity:** Calculating the VaR involves choosing parameter estimates, distribution assumptions, percentage of loss, as well as the lookback period. These choices can immensely affect the VaR.

Significance of VaR

The investment manager gives the following simple statement:

"with X % confidence it can be stated that a maximum of V loss can occur in the next N days"

In this case: V = Maximum loss = VaR; N = time horizon; X = Confidence limit.

If it is given that the daily VaR is ₹100000 at 95% confidence it means that there is only 5% chance that loss will be greater that ₹100000 for a particular day. Thus VaR gives the potential loss (along with the likelihood of happening of the risk) in the market value of the portfolio.

It is important to note that for calculating Banks capital requirement, regulators use X=99 and N=10 i.e., they use a 10 day VaR that is expected to exceed in only 1% case.

And Banks regulatory capital requirement ≥ 3 × 10 day VaR

The simple connotation of VaR is presented in figure 4.10:

NORMAL: $X \sim N(\mu, \sigma)$

N days = time horizon; X% = confidence interval

VaR = loss corresponding to the (100 –X) percentile point of the distribution of the change in the market value of the portfolio over N days

In the first instance N = 1. Thus it is simple to calculate the one day VaR and then calculate the N day VaR.

Given that N day VaR = One day VaR × $\sqrt{n}$

(this formula is true only when changes in the value of the portfolio on each successive days have identical normal distribution with mean = zero, in all other cases the formula is an approximation. But as such it is widely used)

Banks capital requirement = 3 times × 10 day VaR (99% confidence interval)

Thus capital level = $3\sqrt{n}$ × 1 day VaR (99%)

Calculation of VaR

The following procedure is followed to calculate the VaR of a position.

- Step one: a valuation of the current portfolio is made using current prices (on the assumption of the behaviour of the market factors).
- Step two: revaluation of the portfolio using a number of alternative prices based on changed market factors is to be made and the changed portfolio value is to be calculated.
- Step three: revaluing the portfolio gives a distribution of changes in value. Given this a portfolio VaR can be specified in terms of confidence levels.
- Step Four: the risk manager can calculate the maximum the firm can lose over a specified time horizon at a specified time horizon at a specified probability level.

There are several ways to calculate value-at-risk. In implementing VaR the main issue is obtaining a series of directional data regarding various market factors. Various methodologies are applied to resolve this issue for each of the three methods that can be used to calculate VaR. The methods vary in their need for market data, the computing power required, and the ability to model different types of instruments. Value-at-risk calculations are typically obtained using one of the following three methods:

- (a) **Historical method** – Values of the market factors for a particular historical period are collected and changes in these values over the time horizon are observed for use in the calculation.
- (b) **Simulation method** – The first step is to define the parameters of the distributions for the changes in market factors, including correlations among these factors. Normal and log-normal distributions are usually used to estimate changes in market factors, while historical data are most often used to define correlations among market factors. The distributions are then used in a Monte Carlo simulation to obtain simulated changes in the market factors over the time horizon to be used in the VaR calculation.
- (c) **Variance–covariance, analytic or parametric method** – This is similar to the historical method in that historical values of market factors are collected in a database. The next steps are then to:
  - (i) decompose the instruments in the portfolio into the cash equivalent positions in more basic instruments;
  - (ii) specify the exact distributions for the market factors (or 'returns'); and
  - (iii) calculate portfolio variance and VaR using standard statistical methods.

Of the above three, the variance –covariance approach also referred as the model building approach is the most popularly used and thus is taken up for discussion in the following lines.

The standard assumption is that there are 252 working days in a year for the securities market. Given the assumption:

The yearly volatility of the portfolio (measured in terms of the standard deviation) is to be converted to daily volatility of the portfolio.

$$\sigma_{year} = \sigma_{day} \sqrt{252}$$
$$\sigma_{day} = \sigma_{year} / \sqrt{252}$$

Therefore, daily volatility (measured in terms of standard deviation) = 6% of annual volatility

Solved Case 4 (ICMAI Study Material): Dr Sheldon's Satyam Shares VaR

Dr Sheldon has exposure to ₹10 million shares of Satyam. He is interested to know the maximum loss level over a 10 day period and he needs to be 99% confident about the estimation. It is also known that the yearly volatility = 32%.

His friend Dr Amy posits that the calculation of the VaR at N= 10 and X =99% would be exact purpose for Mr Sheldon. Dr Amy proceeds with the calculation by finding the daily volatility which is 6% of annual volatility.

Solution (ICMAI Standard):

Given, daily volatility = 6% of annual volatility = 6% of 32% = 1.92% ≈ **2%**

Since the exposure = ₹10 million

Standard Deviation (σ) of daily changes in value of position = exposure × σ_{day}

= ₹10 million × 2% = **₹2,00,000**

The standard assumption is that expected change in the market variable over time = 0.

A change in the value of the portfolio of Satyam shares over a one day period has a standard deviation of ₹2,00,000 and a mean of 0 (at least approximately). It is also assumed that the change is normally distributed.

Since Dr Sheldon wants to be 99% confident:

N(-2.33) = 0.01 [This means that there is a 1% probability that a normally distributed variable will decrease in value by more that 2.33 σ].

It means that there is 99% certainty that a normally distributed variable will not decrease by more than 2.33σ.

Thus,

One day 99% VaR for Dr Sheldon's portfolio consisting of single asset (₹10 million Satyam Shares)

= 2.33 × ₹2,00,000 = **₹4,66,000**

And 10 day VaR = 4,66,000 × √10 = **₹14,73,621**

Solved Case 4 (Continued) (ICMAI Study Material): Dr Sheldon's HDFC Shares VaR

In continuation of the above it is assumed that Dr Sheldon sold his position in Satyam shares and decided to buy ₹5 million shares in HDFC. The standard deviation (σ_{year}) is given as 16%.

Similar to the above Dr Amy, a friend of Dr Sheldon wishes to estimate the maximum loss level over a 10 day period and she needs to be 99% confident about her estimation.

Solution (ICMAI Standard):

Given σ_{year} = 16% (yearly volatility =16%)

Thus daily volatility is 1% (daily volatility = 6% of annual volatility = 6% of 16% = 0.96% ≈ **1%**)

Therefore standard deviation (daily) of the change in the value of the portfolio

= ₹50,00,000 × 1% = **₹50,000**

Assuming the change is normally distributed,

One day 99% VaR for Dr Sheldon's portfolio consisting of single asset (₹5 million HDFC Shares) =

= ₹50,000 × 2.33 = **₹1,16,500**

and 10 day 99% VaR = ₹1,16,500 × √10 = **₹3,68,405**

VaR and Diversification of Risk

Diversification of risk is considered in details in an earlier section of this study note. It is obvious from the discussion that the risk measured by standard deviation (σ) of a portfolio consisting of multiple securities is less than the sum total of the risk (σ) of the individual securities, given that the securities have zero correlation with each other or are negatively correlated which is a common phenomenon.

The portfolio risk (σ_p) of a two asset (asset A and asset B) case is given as:

$$\sigma_p = \sqrt{[w_A^2\sigma_A^2 + w_B^2\sigma_B^2 + 2w_A w_B \rho_{AB}\sigma_A\sigma_B]}$$

It is interesting to note that the results of diversification is verifiable with VaR as well. The following case deals with the effects of diversification on risk in terms of the VaR.

Solved Case 5 (ICMAI Study Material): Portfolio of Satyam + HDFC – VaR with Diversification

Dr Sheldon is assumed to possess the two assets (discussed in Caselet 4) at the same time. Thus his portfolio consists of ₹10 million in share of Satyam and ₹5 million in shares of HDFC.

Similar to the above Dr Amy, a friend of Dr Sheldon wishes to estimate the maximum loss level over a 10 day period and she needs to be 99% confident about her estimation.

In this situation Dr Amy assumes that the returns from two shares have a bivariate normal distribution with a correlation of 0.3.

Solution (ICMAI Standard):

She has already calculated the daily volatility of Satyam shares = 6% of annual volatility = 6% of 32% = 1.92% ≈ 2% and daily volatility of HDFC shares = 6% of annual volatility = 6% of 16% = 0.96% ≈ 1%.

She also calculates the X and Y where:

X = change in the value of the position in Satyam shares over a one day period

Y = change in the value of the position in HDFC shares over a one day period

(the standard assumption is that the changes in the value of the positions are normally distributed)

Therefore standard deviation (daily) of the change in the value of the Satyam

= exposure × σ_{day} = ₹10 million × 2% = **₹200000 (σ_x)**

Therefore standard deviation (daily) of the change in the value of the HDFC

= exposure × σ_{day} = ₹5 million × 1% = **₹50000 (σ_y)**

Thus the standard deviation of the change in the value of the portfolio consisting of both the stocks over a one day period is given as:

The standard deviation of portfolio (Satyam + HDFC)

$\sigma_p = \sqrt{[\sigma^2_{Satyam} + \sigma^2_{HDFC} + 2\,\rho_{Satyam,\,HDFC} \times \sigma_{Satyam} \times \sigma_{HDFC}]}$

$= \sqrt{[200000^2 + 50000^2 + 2 \times 0.03 \times 200000 \times 50000]}$

= **220227**

(the mean change is assumed to be zero)

One Day 99% VaR = 220227 × 2.33 = **₹5,13,129**

Therefore, = 10 days 99% VaR = 513129 × √10 = **₹16,22,657**

The benefit of diversification is evident if Solved Case 4 and Solved Case 5 are considered together. The results of the above two cases are summarized below:

1. 1. 10 day 99% VaR of the portfolio (only Satyam Shares) is ₹14,73,621
2. 2. 10 day 99% VaR of the portfolio (only HDFC Shares) is ₹3,68,405
3. 3. And 10 day 99% VaR of the portfolio (both Satyam shares and HDFC Shares in the weight of 2:1) is ₹16,22,657

Thus benefit of diversification = ₹16,22,657 – (₹14,73,621 + ₹3,68,405) = **₹2,19,369**

4.2.4 Introduction to Capital Adequacy Norms in Banking Industry

Banking Supervision

The Basel Committee on Banking Supervision (BCBS) was set up in 1974 by central bankers from G-10 countries. This endeavour was to re-build new international financial structures to replace the Bretton Woods system of the Internal Monetary Fund (IMF) which collapsed in 1971. The committee is headquartered in the offices of the Bank for International Settlements (BIS) in Basel, Switzerland. The primary global standard setter for the prudential regulation of banks and provides a forum for

regular cooperation on banking supervisory matters. As of 2018, the committee comprises of 45 members comprise central banks and bank supervisors from 28 jurisdictions.

Bank supervision, as described in the Basel Committee's core principles, is "to ensure that banks operate in a safe and sound manner and that they hold capital and reserves sufficient to support the risks that arise in their business". This is consistent with the view that the prudential regulation of banks helps to limit the costs associated with potential bank failures. Such costs involve losses to bank depositors, but also, to some extent, losses to taxpayers and other third parties. Although the traditional focus of banking supervision is on deposits and the protection of depositors, the broader impacts resulting from unsound operation may also be important. Accordingly, bank supervisors typically attempt to balance the desire to protect a subset of depositors through safety net arrangements (i.e., deposit insurance) with the need to mitigate moral hazard. In practice, this generally results in a supervisory program that strongly emphasizes the prevention of difficulties and promotes safe and sound practices.

Key Elements of the Bank Supervisory Program

The Key elements of the bank supervisory program to achieve these objectives typically include:

- (a) Efforts to ensure that bank policies and procedures conform with established sound practices,
- (b) Ongoing monitoring of bank financial condition including periodic reporting,
- (c) Capital regulation, and
- (d) Limitations on permitted activities.

The Basel accord - A set of agreements set by the Basel Committee on Bank Supervision (BCBS), which provides recommendations on banking regulations in regards to capital risk, market risk and operational risk. The purpose of the accords is to ensure that financial institutions have enough capital on account to meet obligations and absorb unexpected losses.

Holding capital is a substitute for transferring or hedging risks. Smaller banks tend to concentrate on ownership and owner-managers, suggesting that they prefer more risk management to less. Since they have only limited access to sophisticated risk management, they need to hold (relatively) more capital. There are certain other reasons for the relatively lower leverage of smaller banks. Therefore it is easy to infer that the capital structure choice in banks is closely related to the underlying risks held on the books of a bank. The role of equity capital in banks is that of a substitute for transferring risk and, hence, that of a buffer that protects the bank against costly unexpected shocks to its capital base. Equity capital, therefore, ensures a bank's safety. This is the fundamental principle of banking regulation as propagated in Basel regulations.

Basel I

Basel I, referred as the Basel Capital Accord, was documented in 1988. This was in response to the growing systemic risk in the financial market which was a natural consequence of the rapid internalisation of the banking system which significantly increased the integration and interdependence of financial markets. The Accord (along with the subsequent amendments) is now the basis for bank capital regulations in more than 100 countries.

The main issues of Basel I are given in the next few lines:

- (a) It is focused on credit risk as the predominant risk for banks. In April 1993 the Basel Committee released a package of proposed amendments to Basel I which proposed minimum capital requirements for banks' market risk. As per the amendments, the Banks would be required to identify a trading book and hold capital for trading book market risks and organization-wide foreign exchange exposures. Capital charges for the trading book would be based upon a crude value-at-risk (VaR) measure loosely consistent with a 10-day 95% VaR metric.
- (b) It is based on the calculation of a ratio of capital to risk weighted assets and sets a minimum for this ratio at 8%.
- (c) Capital under the Accord is divided into tier one capital (primarily equity and retained earnings) and tier two elements (e.g., general provisions and subordinated debt). This is a measure of the losses that a bank can absorb without a bank being required to cease trading. Banks need to maintain at least half of their capital in tier one elements. The other half of the capital is to be maintained in tier two capital which is absorbs losses in the event of a winding-up and so provides a lesser degree of protection to depositors. In practice, this means that two separate Basel capital ratios are to be reported.
- (d) There are four components of Tier II capital. These include:
    - (i) Revaluation reserves: These are reserves created by the revaluation of an asset. A typical revaluation reserve is a building owned by a bank.
    - (ii) Provisions: This category consists of losses that a bank may have of an as yet undetermined amount including from loans.
    - (iii) Hybrid capital instruments: This type of capital is a mixture of both debt and equity instruments. Preferred stock is an example of a hybrid instrument.
    - (iv) Subordinated debt: Debt is subordinated in regard to ordinary bank depositors and other loans and securities that constitute higher-ranking senior debt.

- (e) The first ratio of the ratios as mentioned in point 3 is known as the total risk-based ratio, consists of total capital as defined here (i.e., tier one plus tier two elements) divided by risk-weighted assets:

  > = (Tier I Capital + Tier II capital) / Risk weighted assets

  This is referred as capital charge which is also articulated as a capital adequacy ratio (CAR) of equity that must be held as a percentage of risk-weighted assets.
- (f) The second ratio, known as the tier one ratio, is calculated by dividing tier one capital elements by risk-weighted assets:

  > = Tier One Capital / Risk weighted Assets

- (g) Clearly, if the minimum total ratio is 8%, and tier one must make up at least half of total capital, the minimum tier one ratio is effectively 4%.
- (h) The banking regulator of a country tracks a bank's CAR to ensure that the bank can absorb a reasonable amount of loss and complies with statutory Capital requirements.
- (i) It defines risk weighted assets such that all
  - (i) Corporate and most retail loans receive a 100% risk weight, so that the effective capital charge on such assets is 8%.
  - (ii) Residential mortgage loans receive a 50% risk weight (4% capital charge).
  - (iii) Loans to OECD member sovereigns receive a 0% risk weight, so there is no capital charge on such assets.
  - (iv) Interbank loans to banks incorporated in OECD-member countries generally receive a 20% risk weight (1.6% capital charge), while those from other countries receive a 100% risk weight (8% capital charge).
- (j) Implication of the Capital Adequacy Ratio (CAR): This ratio is used to protect depositors and promote the stability and efficiency of financial systems around the world. Two types of capital are measured: tier one capital, which can absorb losses without a bank being required to cease trading, and tier two capital, which can absorb losses in the event of a winding-up and so provides a lesser degree of protection to depositors.

Illustration 2 (ICMAI Study Material): CAR Calculation – XYZ Bank

The following information is available from XYZ Bank as on 31/03/2024.

The capital structure of the Bank comprises of (₹ in Thousands): Tier One Capital = 3000, Tier Two Capital = 1000.

The assets along with risk weights as on the same date are given below:

Types of Assets	₹ in Thousand	Risk Weights
Debentures	9000	90%
Mortgage loan	45000	75%
Loan to Government	4000	0%

Solution (ICMAI Standard):

In the case mentioned above the risk weighted assets are:

Types of Assets	Risk Weighted Assets (₹ in Thousand)
Debentures	9000 × 90% = 8100
Mortgage loan	45000 × 75% = 33750
Loan to Government	4000 × 0% = 0
Total Risk Weighted Assets	**₹8100 + ₹33750 + ₹0 = ₹41850**

And the CAR = (Tier I Capital + Tier II capital) / Risk weighted assets

= (3000 + 1000) / 41850 = 0.0955 = **9.56%**

Since the CAR = 9.56% ≥ 8% it is inferred that the bank has maintained the regulatory capital and is said to have enough capital to cushion potential losses and protect depositors' money.

The CAR alias capital-to-risk weighted assets ratio helps determine whether or not a bank has enough capital to take on any losses before becoming insolvent and losing depositor funds. It is important for a bank to monitor this ratio and adhere to regulatory requirements to avoid going insolvent and to protect its clients and the larger economy as a whole.

Basel II

Risk is categorised as either credit risk, market risk or operational risk. Under Basel I, the calculation of CAR included cushioning of credit risk and market risk was being added later. Basel II, an extension of Basel I, was introduced in 2004. It provided specific regulations which made CAR consists of operational risk along with credit and market risks. The Basel Committee replaced the 1988 accord (amended in 1996 and adopted in 1998) in April 2006. This is referred as the Basel II. It includes more sophisticated treatment of credit risk. Basel II also addresses Operational risk among other things. It should be noted that RBI has suggested CAR of 9% while it is set at 8 percent internationally. The banks in India have kept a CAR in excess of 9% depending on the riskiness of assets in their portfolio.

Three Pillars of Basel II

Pillar 1: Minimum Capital Requirements

The first pillar, minimum capital requirements, develops and expands on the standardised 1988 rules. The risk–weighting system describes and replaces the earlier system by using external credit ratings. The basic aspect of maintaining a minimum CAR is maintained. In addition two approaches are included which includes:

- (a) **Standardized approach:** The standardized approach is suitable for banks with a smaller volume of operations and a simpler control structure. It involves the use of credit ratings from external credit assessment institutions for the evaluation of the creditworthiness of a bank's debtor.
- (b) **Internal ratings-based approach:** The internal ratings based (IRB) approach is suitable for banks engaged in more complex operations, with more developed risk management systems. There are two IRB approaches for calculating capital requirements for credit risk based on internal ratings:

    - **Foundation Internal Ratings based approach (FIRB):** In FIRB, banks use their own assessments of parameters such as the Probability of Default, while the assessment methods of other parameters, mainly risk components such as Loss Given Default and Exposure at Default, are determined by the supervisor.
    - **Advanced Internal Ratings-based approach (AIRB):** Under the AIRB approach, banks use their own assessments for all risk components and other parameters.

For operational risk capital estimation, there are three approaches:

- **Basic Indicator Approach (BIA):** Under BIA, the capital charge is derived as a fixed multiple (alpha=15%) of three years average gross income of Banks.
- **The Standardized Approach (TSA):** Under TSA, different business lines are assigned individual gross activity measures and the regulators determine the appropriate fixed multiple (beta) to calculate the regulatory capital requirement. The exposure indicator is gross income of various business lines of the Bank. The beta values range from 12% to 18%.
- **Advanced Measurement Approach (AMA):** Under the advanced measurement approach (AMA) banks have to use their internally defined risk parameters based on their historical internal loss data on Frauds, Business disruption & system failures, Execution, Delivery and Process, Transaction processing risk, Employment practices, Business Practices etc. Finally Banks can use Value at Risk (VaR) models to estimate figure for unexpected loss and operational risk capital subject to the regulatory review and approval.

Pillar 2: Supervisory Review of Capital Adequacy

The second pillar is the supervisory review of capital adequacy which seeks to ensure that a bank's position is consistent with its overall risk profile and strategy, and as such encourages early supervisory intervention. Supervisors want the ability to require banks which show a greater degree of risk to hold a minimum capital in excess of 8%. This is meant to identify the risk factors not captured in pillar one. For most lenders, the second pillar process results in a higher regulatory capital requirement. This requires banks to think about the whole spectrum of risks they might face including those not captured at all in pillar one such as interest rate risk. The supervisor is responsible for ascertaining whether the bank uses appropriate assessment approaches and covers all risks associated which includes the following:

- **Internal Capital Adequacy Assessment Process (ICAAP):** A bank must conduct periodic internal capital adequacy assessments in accordance with their risk profile and determine a strategy for maintaining the necessary capital level.
- **Supervisory Review and Evaluation Process (SREP):** Supervisors are obligated to review and evaluate the internal capital adequacy assessments and strategies of banks, as well as their ability to monitor their compliance with the regulatory capital ratios.
- **Capital above the minimum level:** One of the added features of the framework Basel II is the requirement of supervisors to ensure banks maintain their capital structure above the minimum level defined by Pillar 1.
- **Supervisor's interventions:** Supervisors must seek to intervene in the daily decision-making process in order to prevent capital from falling below the minimum level.

Pillar 3: Market Discipline

The third pillar, market discipline, encourages high disclosure standards and enhances the role of market participants in encouraging banks to hold adequate capital. This pillar aims to ensure market discipline by making it mandatory to disclose relevant market information. This is done to make sure that the users of financial information receive the relevant information to make informed trading decisions and ensure market discipline.

Comparison between Basel I and Basel II

Basis	Basel I (1988 with amendments 1996)	Basel II (to be in place by 2006 in G-10 countries and in India in 2008) – Based on 3 Pillars
Methodology	Capital adequacy based on Risk Weighted Assets	Capital adequacy based on Risk Weighted Assets
Risk Sensitivity	Not risk sensitive. Prescriptive.	Risk sensitive.
Risk Weighting	All credit exposures carried risk weight of 100%, except for some sovereign exposures and mortgages	Credit exposures carry risk weights based on credit qualities.
Risk Capital	Risk Capital = Credit exposure × Risk Weights × 8 per cent	Risk capital: Similar to Basel I. But efficient Banks can have lesser capital than others.
Implications	Every bank have to maintain same 8% CAR. Thus, there is no incentive on quality of assets. As a result credit quality is lowered to increase returns.	Banks with good quality assets have incentives because they can manage with lower capital.
Pricing	No provision for economic pricing by banks	Risk pricing can be done by banks based on credit risk perception.

Basel III

Basel III is an internationally agreed set of measures developed by the Basel Committee on Banking Supervision in response to the financial crisis of 2007-09. The measures aim to strengthen the regulation, supervision and risk management of banks. These set of new guidelines aims to improve the banking sectors' ability to absorb shocks from financial stress by:

- strengthening resilience against future shocks;
- supplementing the current recovery process and
- reducing the risk spillover to the real economy.

Basel III supplements new canons of market risk, credit risk and liquidity risk (this is particularly included in response to the global crisis). The guidelines pivots around the certain specific issues of Risk Management which are given in the next few lines:

- Enhanced quality and quantity of capital instruments
- Revision of credit risk weights (securitization and counterparty risk)
- Enhanced market risk capital charge
- Introduction of new global liquidity standards
- Sound compensation practices
- Leverage ratio

It identified the key reasons that caused the financial crisis as poor corporate governance, liquidity management, over-levered capital structures due to lack of regulatory restrictions, and misaligned incentives as specified in earlier documents. It proposed to strengthen the minimum capital requirements outlined in Basel I and II. In addition, it introduced various capital, leverage, and liquidity ratio requirements.

According to regulations in Basel III, banks were required to maintain the following financial ratios:

- (a) Capital Ratio = ≥ 4.5%
- (b) Leverage Ratio = ≥ 3.0%
- (c) Liquidity Coverage Ratio = ≥ 100%

** Assets are considered to be HQLA if they can be easily and immediately converted into cash at little or no loss of value. Thus HQLA is simply connoted as liquid assets.

A key element of new definition is the greater focus on "common equity" (paid up equity capital, reserves, retained earnings etc.). In addition to raising the quality of the capital base, banks need to ensure that all material risks are captured in the capital framework. What counts as core capital may impact the Indian banking sector's competitiveness significantly.

As per the RBI's new Basel III capital regulation, common equity (or core Tier I) should be at least 5.5% (1% higher than the original Basel III rule) & minimum Tier I capital should be at least 7% of total risk weighted assets. There should be predominance of common equity and Tier I regulatory capital. Common equity 78.57% of Tier I capital & total Tier I capital should be at least 77.58% of total minimum capital (as per RBI's Basel III circular).

Basel III regulation expects that Banks for its survival in future must understand the importance of people perception about a Bank's liquidity condition (short term as well as long term) besides internal management of liquidity. It emphasized that banks' liquid assets should be sufficient enough to cover net cash outflow.

Basel III urges banks to maintain high credit ratings to ensure greater solvency and to avoid costs of raising additional capital under unavoidable market conditions. It expects that bank should create buffer in good time so that it can be used in bad time. The regulator may take Credit to GDP ratio as a measure of balancing factor and calibrating measure.

Multiple Choice Questions – 4.2

1. Risk management can be defined as the art and science of _____ risk factors throughout the life cycle of a project.

(a) researching, reviewing, and acting on (b) identifying, analyzing, and responding to (c) reviewing, monitoring, and managing (d) identifying, reviewing, and avoiding

Answer: (b) identifying, analyzing, and responding to

2. Risk Management includes all of the following processes except:

(a) Risk Monitoring and Control (b) Risk Identification (c) Risk Avoidance (d) Risk Response Planning

Answer: (c) Risk Avoidance

3. Who is responsible for implementing ERM?

(a) The chief financial officer (b) The chief audit executive (c) The chief compliance officer (d) Management throughout the organization

Answer: (d) Management throughout the organization

4. When assessing the risk associated with an activity, an internal auditor should:

(a) Determine how the risk should best be managed. (b) Provide assurance on the management of the risk. (c) Update the risk management process based on risk exposure. (d) Design controls to mitigate the identified risk.

Answer: (b) Provide assurance on the management of the risk.

5. Operational risk is the risk of loss arising from various types of:

(a) Human error (b) System failed in the bank (c) Breakdown in internal control (d) All of the above

Answer: (d) All of the above

6. We can learn more about the true risk distribution of the portfolio by looking at Historical VaR and the VaR trend line over time.

(a) True (b) False

Answer: (a) True

7. What kind of market data can be analyzed with VaR tools?

(a) Daily returns (b) Monthly returns (c) Yearly returns (d) All of these can be analyzed

Answer: (d) All of these can be analyzed

8. Which one of the following is not an element of the formal definition for VaR?

(a) Worst Case Loss (b) Tolerance Level (c) Normality of returns (d) Liquidation period

Answer: (c) Normality of returns

9. Which of the following is known as the third pillar of Basel-II accord?

(a) Minimum capital requirement (b) Supervisory review process (c) Standard approach (d) Market discipline

Answer: (d) Market discipline

10. Which one is not under the three pillars of BASEL III norms in banking industry?

(a) Market Discipline (b) Minimum Capital Requirement (c) Risk oriented Supervision (d) Supervisory Review Process

Answer: (c) Risk oriented Supervision

11. What are the elements of Tier-I capital, including additional Tier-I capital as per BASEL-III?

(a) Paid up equity capital, statutory & disclosed reserves (b) Capital reserves representing surplus arising out of sale proceeds of assets (c) Perpetual non-cumulative preference shares and debt capital instruments eligible for inclusion under additional tier-I (d) All of the above

Answer: (d) All of the above

12. To calculate capital adequacy ratio, the banks are required to take into account which of the following risks?

(a) Credit risk and operational risk (b) Credit risk and market risk (c) Market risk and operational risk (d) Credit risk, market risk, operational risk

Answer: (d) Credit risk, market risk, operational risk

13. Basel Committee on Banking Supervision is a committee of banking super authorities that was established by:

(a) RBI (b) Central Bank governors of the group of 10 countries (c) United States of America (d) European countries

Answer: (b) Central Bank governors of the group of 10 countries

14. As per the Basel III implementation in India, minimum Tier1 capital must be _____ % of risk weighted assets on-going basis.

(a) 5.5% (b) 7% (c) 9% (d) 11%

Answer: (b) 7%

15. Which of the following statement is not correct regarding Basel III implementation in India?

(a) Minimum tier 1 capital ratio should be 8% (b) Maximum tier 2 capital should be 2% (c) Minimum total capital ratio should be 9% (d) Minimum total capital plus capital conservation buffer should be 11.5%

Answer: (a) Minimum tier 1 capital ratio should be 8%

4.3 Corporate Failure

4.3.1 Introduction to Corporate Failure

A corporation is defined as a legal entity that is distinct and separate from its owners. Consequentially, a sole-trader is, as such, not considered as a corporation. Furthermore, corporations enjoy similar rights & responsibilities that individuals possess, for example; rights to enter into contracts, obtain finance, enter litigation, appoint employees, acquire assets and pay taxes. Limited Liability is most significant aspect of a corporation, meaning that the owners/shareholders cannot be held individually liable for the firm's debts. Thus the issue of failure or success of a corporation is an important aspect as there are various stakeholders who are associated with the corporation and there is ripple effect which affects even the economy at large, when a corporation fails.

A corporation is said to be in distress when it performs poorly for certain number of years and there is no chance of revival. With this is associated the aspect of loss of market share. Corporate failure is the ultimate form of financial distress. Corporate failure (CF) is said to occur when a company can ceases to exist either through a liquidation or by receivership and as such CF may be textualized simply as a company going out of business. CF entails discontinuation of company's operations leading to inability to reap sufficient profit or revenue to pay the business expenses. It happens due to poor management, incompetence, and bad marketing strategies.

Thus consistent insufficiency in profit along with declining revenue which is brought about by declining market share are the main aspects of CF. As such the term failure has multiple meanings; hence, financial literature is yet to zero down on one particular definition of the what is meant by the term corporate failure means. The meaning differs from country to country as per the law of the land. In India, the Insolvency and Bankruptcy Code, 2016 (IBC) is the bankruptcy law which consolidates the framework by creating a single law for insolvency and bankruptcy. The focus of the legislation is on default payments by corporate debtors. The Code provides for voluntary liquidation proceedings by corporate person who intends to liquidate itself and has not committed any default and can pay off its debts fully from proceeds of liquidation of its assets. In US, CF is defined as a court filing by a company under Chapter 7 or 11 of the U.S Bankruptcy Code or other national codes.

Three Indicators of Corporate Failure

1. (a) Low profitability
2. (b) High gearing
3. (c) Low liquidity

Each of these three symptoms may be indicated by trends in the company's accounts. The symptoms are interrelated. The classic path to corporate failure starts with the company experiencing low profitability.

Corporate failure occurs when a company cannot achieve a satisfactory return on capital over the longer term. If unchecked, the situation is likely to lead to an inability of the company to pay its obligations as they become due. If a company is in financial distress, corporate failure will follow unless the company's problems can be identified and corrected.

Five Important Causes of Financial Distress in a Business

1. **Revenue failure**, caused by either internal or external factors. Revenue failure may be through a loss of orders (market failure) or through the acceptance of business which does not contribute to the growth of shareholder value.
2. **Cost failure**, caused by weak cost control, changes in technology, inappropriate accounting policies, inadvertent or exceptional cost burdens, poor financial management or failure of effective governance.
3. **Failure in asset management**, through failure to invest in appropriate technology, poor working capital management, inappropriate write off and reinvestment or poor organisation of the available assets.
4. **Failure in liability management**, through failure to manage the company relationship with the money markets, weak control of interest rate risk and currency risk or unsustainable credit policies.
5. **Failure of capital management**, through either over or under-capitalisation or poor management of the company relationship with the capital markets and in particular the company debt portfolio and the optimisation of its cost of capital.

Grinyer, Mayes et al. (1988) Study

A major study (Grinyer, Mayes et al., 1988) examined reasons of firms' performance decline. In the study, the main reasons have been categorised as:

1. (a) adverse changes in total market demand
2. (b) intensification of competition

3. (c) high cost structure
4. (d) poor financial controls
5. (e) weak management
6. (f) failure of a large project
7. (g) poor marketing effort
8. (h) poor acquisitions
9. (i) poor quality.

Some of the issues mentioned above are not strategic issues and thus much can be done, by strong management accounting, to reduce costs, improve financial information and controls, improve project management and quality control systems, without changing strategy. It is important to note that strategic management always builds on good operations management. No strategy can compensate for operational inefficiency in the long run.

However, many of the items included above involve changes in the marketplace, and the way that competition is carried out which are strategic issues. The main aspect of strategy is about adapting the firm to such changes thus the above mentioned issues are strategic failure which occur when the organisation does not change as quickly as the market.

Thus there are two aspects of CF; strategic failure and operational failure which impacts the performance of the company.

4.3.2 Corporate Distress Analysis

Financial distress is an indicator that the CF is imminent. It leads to bankruptcy of firm which features systemic impact on both macro and micro economy of the country unless a turnaround strategies are successfully implemented. Industry characteristics too play an important role in endurance of firm and successively with its financial strategies. Compulsion to evaluate the financial strength of firm is a significant aspect for both internal and external stakeholders, especially creditors who are greatly impacted if the company defaults on payments. Information that firm is approaching distress can set out managerial actions to anticipate problems before they occur.

Financial distress, relatable to a company, is termed as corporate distress. This is negatively connoted to mean the deteriorating financial health of a company. The company is confronted with a temporary liquidity shortage and with difficulties resulting in a failure to meet financial obligations. Companies defaulting on payment are downgraded by credit rating agencies and this has serious market implications. Thus it is a primary issue to differentiate between a financially sound company and a financially distressed company. In order to be able to answer this question with justification, it is imperative to identify the causes of the failure. As per existing financial literature a standard set of causes is yet to be formulated. For that matter there cannot be a standard set of causes since the perspectives varies significantly across countries. However researchers have theorized various causes of CF some of which are given in the following lines.

Mitroff (2001) – Seven Basic Causes of Financial Health Deterioration

Mitroff (2001) posits seven basic causes of financial health deterioration:

1. (a) **Economic causes** – strikes, labor riots, market failure, a decline in core earnings and sharp changes in market prices.
2. (b) **Information causes** – incorrect information, loss of protected and confidential information, machinations with computer data processing, loss of sensitive data related to customers, suppliers and other stakeholders.
3. (c) **Physical causes** – loss, destruction or damage to important assets - raw materials, machinery and equipment, means of transport.
4. (d) **Human resources** – departure, loss of key experts or managers, lack of skilled workforce in the labor market.
5. (e) **Reputation** – defamation, spreading false or alarming news about the company, damaging the good name of the business, theft of intellectual property, imitation of business logo.
6. (f) **Causes of criminal nature** – hostile takeover, terrorism, violence at the workplace.
7. (g) **Natural disasters** – earthquakes, fires, floods, hurricanes, whirlwinds, volcano eruptions, etc.

Endogenous and Exogenous Causes (Slatter and Lovett, 1999)

In another study the causes of business financial health deterioration are identified as endogenous and exogenous causes. The study theorize exogenous factors as those that can only affect companies in a minimal way but the company cannot be separated from the current dynamically evolving environment. The major causes as given in the study are listed below:

(a) Endogenous causes

- weak management and its mistakes,
- insufficient financial control,
- poor management of working capital

- high expenses,
- insufficient marketing,
- undertaking projects which are too large for the company,
- excessive production volume compared to the structure of financing,
- negative impacts of mergers and acquisitions,
- inappropriate financial policy of the company,
- incorrect and ambiguous in-house policies that lead to the lack of commitment and confusion between employees during their fulfillment.

(b) Exogenous causes

- negative changes in market demand for the company's products,
- competition,
- change in input commodity prices in an unfavorable direction.

4.3.3 Corporate Distress Prediction Models – Introduction

A study of financial literature suggests that specifically four generic terms namely failure, insolvency, default, and bankruptcy are used interchangeably to indicate that a company is in financial distress. In the following lines a broad introspection of the four terms are presented.

- **Failure**, by economic criteria, means that the realized rate of return on invested capital, with allowances for risk consideration, is significantly and continually lower than prevailing rates on similar investments. The term business failure was later adopted by Dun & Bradstreet (D&B) and includes to mean "businesses that cease operation following assignment or bankruptcy; those that cease with loss to creditors after such actions or execution, foreclosure, or attachment; those that voluntarily withdraw, leaving unpaid obligations, or those that have been involved in court actions such as receivership, bankruptcy reorganization, or arrangement; and those that voluntarily compromise with creditors".
- **Insolvency** is a term which depicts negative firm performance and is generally used to mean technical insolvency exists when a firm cannot meet its current obligations, signifying a lack of liquidity. Insolvency in a bankruptcy sense is more critical and usually indicates a chronic rather than temporary condition. A firm finds itself in this situation when its total liabilities exceed a fair valuation of its total assets. The real net worth of the firm is, therefore, negative.
- **Defaults**, another term associated with financial distress, can be technical and/or legal and always involve the relationship between the debtor firm and a creditor class. Technical default takes place when the debtor violates a condition of an agreement with a creditor and can be the grounds for legal action. When a firm misses a scheduled loan or bond payment, usually the periodic interest obligation, a legal default is said to arise.
- **Bankruptcy** is the fourth definition of financial distress. Bankruptcy refers to the erosion of the net worth position of an enterprise (discussed earlier). A second, more observable type is a firm's formal declaration of bankruptcy in a judicial court, which is accompanied by a petition either to liquidate its assets or attempt a recovery program (also referred as turnaround programme). This procedure is legally referred to as a bankruptcy reorganization.

Whatever the generic name of the financial distress it may be simply referred as a situation when a firm is unable to generate revenue to meet its financial obligations. It defaults on its payments to creditors and other long term loans which ultimately leads to bankruptcy. Thus there is enormous cost associated with financial distress which may be segregated as direct costs and indirect costs. Direct costs include legal, administrative, and accounting costs while indirect costs include loss of sale, uncertainty in events of natural calamity, affected supplier, and employee nature with the company. Indirect cost is more associated with the incidence of possible bankruptcy. Costs of financial distress make it difficult for companies to further raise finance. These costs also lead to companies reducing the debt levels comparatively. Early prediction of financial distress helps companies to minimize the impact of failure and even assists firms to turnaround. Over the years various prediction models has been developed by researchers on the basis of specific assumptions.

Two Phases of Prediction Models

Most of the initial studies on corporate distress prediction are univariate (single factor analysis) depicted through single ratio analysis. The most widely recognized univariate study is that of Beaver [1966]. In 1968, Altman published the first multivariate study which is considered as one of the most important studies in the arena of bankruptcy prediction models. Two specific period can be traced; one prior to 1968 (Altman's model) and the other after publication of the Altman model. In the prior period, all the studies for bankruptcy prediction were univariate models based which focused on individual ratios and sometimes compared ratios of failed companies with those of successful firms.

Phase One – The Univariate Models

The most important study of the period is the one made by Beaver in 1966. He compared the mean values of 30 ratios of 79 failed and 79 non-failed firms in 38 industries. He tested the individual ratios' predictive abilities in classifying bankrupt and non-bankrupt firms. Beaver posited that Net Income to Total Debt is a ratio with highest predictive ability (92% accuracy one year prior to failure). The Net Income to Sales with a score of 91% is ranked second on the basis of predictive ability. The Net Income to Net Worth, Cash Flow to Total Debt, and Cash Flow to Total Assets are all ranked third with predictive ability score of 90%. The most important aspect of the study is that Beaver theorized that multiple ratios considered simultaneously may have higher predictive ability than single ratios. This radically changed the arena of research on bankruptcy prediction models as the era of multivariate studies ensued.

Phase Two – Multivariate Models

On the basis of Beaver's theorization about greater predictive ability of a combination of multiple ratios in bankruptcy prediction a number of studies developed which are also based on multivariate analysis. One of the most popular studies is the multivariate bankruptcy prediction model developed by E.I. Altman (1968) from New York University in the late 1960's which is also the first of its kind. After this pioneering work, the multivariate approach to failure prediction spread worldwide and more than 165 studies were made during this second phase.

4.3.4 Altman Z Score Model

Edward Altman suggested a multiple discriminant analysis (MDA) as the appropriate statistical technique in his financial distress prediction model. MDA is a statistical technique used to classify an observation into one of several priori groupings dependent upon the individual characteristics of observations. For the adaptation of the MDA model, it is crucial how the sample of firms are categorised into two groups of interest, bankrupt and nonbankrupt, and the variables of the model are selected with specific reference to the two groups selected. Then statistical judgment rule of maximizing the between group variance relative to the within-group variance and is articulated as the ratio of the between group to the within-group variance. A linear combination of the variables utilized is formed into an equation:

$$Z = a + b_1X_1 + b_2X_2 + b_3X_3 + \ldots\ldots\ldots\ldots\ldots + b_nX_n$$

Where Z is the score, a is the constant, b is the discriminant coefficient (1 to n, for each independent variable), X are the independent variables.

Edward Altman used the MDA analysis in creating the Altman-Z score. In the study selected financial ratios were used for model building. This ratios were based on the balance sheet and income statement data. Altman compiled a list of 22 potentially important financial ratios for evaluation. He classified these variables into five standard ratios categories: liquidity, profitability, leverage, solvency, and activity ratios. From the original list of 22 financial ratios, Altman selected five ratios for the profile as doing the "best" overall job in the prediction of corporate bankruptcy.

Thus it is reasonable to state that the Altman Z-Score is an analytical representation created by Edward Altman in the 1960s which involves a combination of five distinctive financial ratios weighted by coefficients used for determining the odds of bankruptcy amongst companies. The coefficients were estimated by identifying a set of firms which had declared bankruptcy and then collecting a matched sample of firms which had survived, with matching by industry and approximate size (assets).

Final Discriminant Function (Altman 1968)

$$\mathbf{Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 0.999X_5}$$

where:

- X_1 = Working Capital / Total Assets
- X_2 = Retained earnings / Total Assets
- X_3 = Earnings before Interest and Taxes / Total Assets
- X_4 = Market Value of equity / Book Value of total liabilities
- X_5 = Sales / Total Assets
- Z = Overall Index

Table 4.4: Snapshot of Ratio and Coefficients in Altman's Z Score

Financial Ratios	Implications	Coefficients
X_1 = Net working capital to Total assets	The value of a company's working capital determines its short-term financial health. A positive working capital means that a company can meet its short-term financial obligations. In contrast, negative working capital means that a company will struggle to meet its short-term financial obligations because there are inadequate current assets.	1.2
X_2 = Retained Earnings to Total assets	If a company reports low retained earnings to total assets ratio, it means that the company is financing its expenditure using borrowed funds rather than funds from its retained earnings. It increases the probability of a company going bankrupt. On the other, a high retained earnings to total assets ratio shows that a company uses its retained earnings to fund capital expenditure. It shows that the company has been profitable over the years, and it does not need to rely on borrowings.	1.4
X_3 = EBIT to Total assets	It measures the productivity of assets employed in a firm. In fact the existence of a firm is based on the profitability. This ratio demonstrates a company's ability to generate enough revenues to stay profitable and fund ongoing operations and make debt payments.	3.3
X_4 = Market value of Equity to Total liabilities	The ratio shows the degree to which a company's market value would decline when it declares bankruptcy before the value of liabilities exceeds the value of assets in the balance sheet. A high market value of equity to total liabilities ratio can be interpreted to mean high investor confidence in the company's financial strength.	0.6
X_5 = Sales to Total Assets	It measures the sales generating ability of the firm's assets and management capacity in dealing with competitive conditions.	0.999

Implications of Z-Scores

The models is such developed that the lower the Z-score, the higher the odds that a company is heading for bankruptcy. A Z-score that is lower than 1.8 means that the company is in financial distress and with a high probability of going bankrupt. On the other hand, a score of 3 and above means that the company is in a safe zone and is unlikely to file for bankruptcy. A score of between 1.8 and 3 means that the company is in a grey area and with a moderate chance of filing for bankruptcy.

The model of Altman Z-Score has historically proven to be highly effective in determining the actual course of action for companies, primarily because of the reason that it gives a much-needed insight to the investors regarding their investment decisions in the company. Thus investors use Altman's Z-score to make a decision on whether to buy or sell a company's stock, depending on the assessed financial strength. If a company shows a Z-score closer to 3, investors may consider purchasing the company's stock since there is minimal risk of the business going bankrupt in the next two years. However, if a company shows a Z-score closer to 1.8, the investors may consider selling the company's stock to avoid losing their investments since the score implies a high probability of going bankrupt.

Suggested Rules for Interpretation

- (a) Z score above 2.99 – The firms are financially safe and healthy.
- (b) Z score between 1.81 and 2.99 – The Company is on alert and is said to be in the Gray zone.
- (c) Z score less than 1.81 – At this stage there is chance of the firm going into bankruptcy in the next two years. This is also referred as the Distress zone.

Solved Case 6 (ICMAI Study Material): Mr Hajime's Investment Decision – Lotus Inc and Woodex Inc

Mr Hajime is considering investing in bonds of two companies; Lotus Inc and Woodex Inc. He has recently received a sum of ₹35,50,000 from sale of a market related insurance product which he invested in 10 years back. He is nearing retirement age and desire to undertake minimal risk in his investment. He is also worried about the default risk associated with his investment and desire to assess the chance of the company (in which he invests) going bust. For the purpose of the financial assessment he recalls his childhood friend Simmamoto (he does not know whether she is married or not) who is currently into financial consultancy. He requests her to assess the bankruptcy risk associated with the two companies; Lotus Inc and Woodex Inc.

Relevant particulars from the annual reports of Lotus Inc

Particular	Amount
Working Capital	₹10,00,000
Retained Earnings	₹5,00,000
Earnings Before Interest and Taxes	₹7,50,000
Market Value of Equity	₹15,00,000
Sales	₹12,00,000
Total Assets	₹10,00,000
Total Liabilities	₹10,00,000

Solution (ICMAI Standard):

From the above particulars she calculates the Altman Z-Score for Lotus Inc as follows:

$Z = 1.2\ X_1 + 1.4\ X_2 + 3.3\ X_3 + 0.6\ X_4 + 0.999\ X_5$

where:

Ratio	Computation	Value
X_1 = Working Capital / Total Assets	10,00,000 / 10,00,000	1
X_2 = Retained earnings / Total Assets	5,00,000 / 10,00,000	0.5
X_3 = EBIT / Total Assets	7,50,000 / 10,00,000	0.75
X_4 = Market Value of equity / Book Value of total liabilities	15,00,000 / 10,00,000	1.5
X_5 = Sales / Total Assets	12,00,000 / 10,00,000	1.2

Therefore, Altman Z-Score (Z) is given as:

$Z = 1.2 \times 1 + 1.4 \times 0.5 + 3.3 \times 0.75 + 0.6 \times 1.5 + 0.999 \times 1.2$

$Z = 1.2 + 0.7 + 2.475 + 0.9 + 1.1988$

Z = 6.4738

Simmamoto refers to the inference of the model which states that Z score above three indicates that the company under consideration is financially healthy.

Relevant particulars from the annual reports of Woodex Inc

Particular	Amount
Working Capital	₹20,00,000
Retained Earnings	₹9,50,000
Earnings Before Interest and Taxes	₹7,50,000
Market Value of Equity	₹18,00,000
Sales	₹15,00,000
Total Assets	₹12,00,000
Total Liabilities	₹12,00,000

From the above particulars she calculates the Altman Z-Score for Woodex Inc as follows:

$Z = 1.2\ X_1 + 1.4\ X_2 + 3.3\ X_3 + 0.6\ X_4 + 0.999\ X_5$

Ratio	Computation	Value
X_1 = Working Capital / Total Assets	20,00,000 / 12,00,000	1.67
X_2 = Retained earnings / Total Assets	9,50,000 / 12,00,000	0.79
X_3 = EBIT / Total Assets	7,50,000 / 12,00,000	0.625
X_4 = Market Value of equity / Book Value of total liabilities	18,00,000 / 12,00,000	1.5
X_5 = Sales / Total Assets	15,00,000 / 12,00,000	1.25

$Z = 1.2 \times 1.67 + 1.4 \times 0.79 + 3.3 \times 0.625 + 0.6 \times 1.5 + 0.999 \times 1.25$

$Z = 2.004 + 1.106 + 2.0625 + 0.9 + 1.24875$

Z = 7.32125

Comparing the Z scores of the two companies Lotus Inc and Woodex Inc, Simmamoto advises Hajime that both the companies have pretty good scores and are considered to be financially healthy since the Z score of the companies under consideration is substantially higher than three.

- $Z_{\text{Lotus Inc}} = 6.4738$
- $Z_{\text{Woodex Inc}} = 7.32125$

> However there is slight difference in the scores and from the above it is clear that $Z_{\text{Woodex Inc}} > Z_{\text{Lotus Inc}}$. Thus Simmamoto advises Hajime that though both the companies are in safe as regards to bankruptcy risk it may be stated that Woodex Inc is a slightly safer company to invest than Lotus Inc as projected by the Altman Z score.

Other Models

There is wide array of literature on predictable ability of the models on corporate failure. A review of literature suggest that since 1968 the prime methods used for development of various models on corporate failure and its prediction are:

- multivariate discriminant analysis (MDA),
- logit analysis,
- probit analysis, and
- neural networks.

The early studies were dependant on MDA and with advent of time the other methods started were more and more used. It is important to note that the predictive ability of a model is dependant on the accuracy of the model which target at reducing the Type I and Type II errors.

When a bankrupt firm is classified as a non-bankrupt firm, Type I error is said to have occurred. Thus when a model predicts a to-be-bankrupt firm as a non bankrupt firm the predictive ability of the model is seriously questioned. On the other, Type II errors occur when non-bankrupt firms are misclassified as bankrupt firms. As such, Type I errors are more costly than Type II errors for several reasons including loss of business (audit clients), damage to a firm's reputation, and potential lawsuits/court costs.

It is important to note that on the basis of highest accuracy of all the models developed on the basis of MDA and also for models developed on neural network is 100%. Models developed on probit analysis is 98% (ranks second). And models developed logit analysis ranks third with 84% accuracy. Thus it may be noted that MDA and neural network models have provided the highest success rates amongst the numerous studies developed for predicting financial distress of companies.

4.3.5 Beneish M Model

One of the major causes of financial distress of companies and consequently its bankruptcy is corporate fraud. Altman's study along with all other corporate distress prediction models are developed on the basis of accounting numbers reported in financial statements of companies. Often financial statements are manipulated to hide the debt of the company to inflate profits such that the company's value is overstated.

Thus when the financial statements are themselves manipulated by the top management, the likelihood of Type I and Type II errors in the prediction models are magnified.

Corporate fraud and misconduct remain a constant threat to public trust and confidence in the capital markets. Fraud, as such, is an intentional act, committed to secure an unfair or unlawful gain or advantage by the perpetrator. It is any act designed to deceive others, often resulting in the victim suffering from loss of their investments. Financial literature suggests that bankruptcy and fraud are positively related to each other. Rather there is a cause and effect relationship between the two. Thus there is a high chance that a company at the verge of bankruptcy would engage in fraudulent activities or manipulate the financial statements. Bankruptcy is considered as a logical extension of the on-going misappropriation and mismanagement of a firm's funds. Recent empirical evidence collected by the Association of Certified Fraud Examiners [ACFE], (2008) revealed that there were about 1,843 global occupational fraud cases reported between January 8, 2008 and December 31, 2009 and that 25% of the fraud cases caused at least a loss of USD 1 million.

Thus in order to make an assessment of the financial distress and corporate bankruptcy a model which is able to identify the effect of fraud is of prime importance. Thus Beneish M score. This mathematical model was created by Professor Messod Beneish in 1999. It is used for the purpose of finding out that whether the company has done any sort of manipulation with its earning. Simply, Beneish M score is used to detect earnings manipulation in the financial statements reported by the company.

The Beneish M model is developed on eight financial ratios which considers eight different variables that are mentioned below.

The eight variables required for calculating the M-Score are calculated using the data from the income statement, balance sheet, and cash flows of the company, and then M-Score is calculated to know the degree of manipulation in earnings by the company. The degree of manipulation is represented through a score. The cut off score is -2.22. The following is the inference of the model.

- Beneish M-score < -2.22 ⇒ it suggests that the company is not a manipulating the earnings.
- Beneish M-score > -2.22 ⇒ it provides a signal that the company is (may be) manipulating its earnings.

$$\textbf{Beneish M-score} = -4.84 + 0.92 \times \text{DSRI} + 0.528 \times \text{GMI} + 0.404 \times \text{AQI} + 0.892 \times \text{SGI} + 0.115 \times \text{DEPI} - 0.172 \times \text{SGAI} - 0.327 \times \text{LVGI} + 4.679 \times \text{TATA}$$

Eight Variables Explained

1. DSRI (Days' Sales in Receivables Index)

This is the ratio of days sales in receivable in the first year in which earnings manipulation is uncovered (year t) to the corresponding measure in year t-1. This variable gauges whether receivables and revenues are in or out-of-balance in two consecutive years. The index is given as:

$$\text{DSRI} = [\text{Accounts Receivable}(t) / \text{Sales}(t)] / [\text{Accounts Receivable}(t-1) / \text{Sales}(t-1)]$$

DSRI score of 1.031 or below indicates that the financial statements in respect of the DSRI were not manipulated but a score of 1.465 and above indicates that the financial statements in respect of the DSRI have been manipulated.

2. GMI (Gross Margin Index)

This is used to measure the ratio of a prior year's GMI to that of the current year review. The GMI score of 1.041 or lower indicates that gross profit of the current period is not manipulated but a score of 1.193 indicates that gross profit of the company is manipulated. The index is given as:

$$\text{GMI} = [(\text{Sales}(t) - \text{Cost of Sales}(t)) / \text{Sales}(t)] / [(\text{Sales}(t-1) - \text{Cost of Sales}(t-1)) / \text{Sales}(t-1)]$$

3. AQI (Asset Quality Index)

AQI is used to measure the proportion of total assets of the current year to the previous year. When an AQI ratio greater than 1.056 is an indication that some expenses or intangible assets have been capitalized and others have been deferred for the future.

$$\text{AQI} = [1 - (\text{Current Asset}(t) + \text{PPE}(t)) / \text{Total Assets}(t)] / [1 - (\text{Current Asset}(t-1) + \text{PPE}(t-1)) / \text{Total Assets}(t-1)]$$

4. SGI (Sales Growth Index)

Measures sales in the current year over the sales of a previous year. A score of 1.134 or below is an indication of non-manipulation and a score above 1.607 indicates manipulation of the figures. Growth, as such, does not necessarily implies manipulation, but growth firms are more likely to commit fraud because their financial position and capital needs put pressure on managers to achieve earnings targets.

$$\text{SGI} = \text{Sales or Revenue}(t) / \text{Sales or Revenue}(t-1)$$

5. DEPI (Depreciation Index)

This is used to measure the ratio of the depreciation expense against the company's value of PPE in the current year against that of the previous year. A DEPI ratio of 1.001 or lower is an indication that DEPI has not been manipulated. According to Beneish (1999), a score above 1.077 is an indication that the assets value has been revalued or the useful life of the assets has been extended or adjusted upward.

$$\text{DEPI} = [\text{Depreciation}(t) / (\text{Depreciation}(t) + \text{PPE}(t))] / [\text{Depreciation}(t-1) / (\text{Depreciation}(t-1) + \text{PPE}(t-1))]$$

6. SGAI (Sales, General, and Administrative expenses Index)

This is used to measure the ratio of sales, general and administrative expenses for the current year over the previous year. A score of 1.001 or below is an indication that SGAI has not been manipulated. According to Beneish (1999) a disproportionate increase in sales indicates a negative signal about the company future prospects.

$$\text{SGAI} = [\text{Sales, distribution and administrative cost}(t) / \text{Sales}(t)] / [\text{Sales, distribution and administrative cost}(t-1) / \text{Sales}(t-1)]$$

7. LVGI (Leverage Index)

Is used to measure the company's ratio in terms of total debt to total assets for the current year divided over the previous year's ratio. A LVGI greater than 1 implies that there is an increase in leverage position in the company and that the company has

taken more debt to operate or to run the business for the period under review.

$$LVGI = [\text{Total Liabilities} / \text{Total Assets}]_t / [\text{Total Liabilities} / \text{Total Assets}]_{t-1}$$

8. TATA (Total Accruals to Total Assets)

Is used to measure the ratio of change in working capital (excluding cash) and less depreciation to the total assets. A mean score of 0.018 is an indication that there is non-financial manipulation while a mean score of 0.031 and above is an indication that the financial data have been tampered with.

$$TATA = (\text{Working Capital} - \text{Depreciation}) / \text{Total Assets}$$

Table 4.5: Scores of Individual Indices

Index	Non-Manipulator	Manipulator
DSRI	1.030	1.460
GMI	1.041	1.190
AQI	1.040	1.250
SGI	1.134	1.610
DEPI	1.001	1.077
SGAI	1.001	1.041
LVGI	1.037	1.111
TATA	0.018	0.031

Important Notes:

- M-Score has two versions, i.e., 8 variable models and 5 variable models. The most widely used out of two versions is 8 variable Beneish's models.
- Being the probabilistic model, the manipulation cannot be detected with 100% accuracies. As such the model identifies between 38% and 76% of the manipulated reporting companies correctly and misclassified between 3.5% and 17.5% of the manipulated companies as non-fraudulent companies (Beneish, 1999).
- The companies resort to various means of increasing their reported earnings like capitalization of the revenue natures expenses, prematured booking of the sales in accounts, etc. These are often considered as aspects of creative accounting. Although these are not illegal by the law the same signifies the unethical operations of the company and are often considered as manipulations of operations. Beneish M-Score is calculated to assess the degree of manipulation in earnings by the company. The Beneish M-Score model helps analysts in predicting these high profile failures.

Solved Case 7 (ICMAI Study Material): Pelikan Inc – Beneish M-Score

Mr Holdon is considering investing ₹15,00,000 in a Pelikan Inc as the company has decided to raise ₹100 million in corporate debt by private placement. Mr Holdon is apprehensive of manipulations in operations by top management of Pelikan Inc as he fears that earnings manipulation is the most distinctive aspect of financial distress. He approaches his friend Mari Asai, who is a financial consultant running her own consultancy firm, for his advice. Mari Asai desires to calculate the Beneish M score as this, according to her, is the best model to calculate the degree of earnings manipulation.

Mari Asai uses the above indexes and considering data from the financial statements furnishes the following:

Index	Score
1. DSRI	0.741
2. GMI	1.324
3. AQI	0.68
4. SGI	0.765
5. DEPI	0.798
6. SGAI	1.211
7. LVGI	0.945
8. TATA	0.044

Solution (ICMAI Standard):

From the above she calculates the Beneish M score as:

Beneish M-score = – 4.84 + 0.92 × DSRI + 0.528 × GMI + 0.404 × AQI + 0.892 × SGI + 0.115 × DEPI – 0.172 × SGAI – 0.327 × LVGI + 4.679 × TATA

Index	Coefficient	Individual Score	Composite Score
1. DSRI	0.920	0.741	0.68172
2. GMI	0.528	1.324	0.699072
3. AQI	0.404	0.68	0.27472
4. SGI	0.892	0.765	0.68238
5. DEPI	0.115	0.798	0.09177
6. SGAI	- 0.172	1.211	- 0.208292
7. LVGI	- 0.327	0.945	- 0.309015
8. TATA	4.679	0.044	0.205876
Total Composite Score			2.118231
Less: - 4.84			
Beneish M score			**-2.721769**

Thus, Mari Asai calculates the Beneish M score of Pelikan Inc. for a particular year as -2.721769. Now she refers the implication of the Beneish M model which states that cut off M score is -2.22. If the score is less than the cut off score then it suggest that the company is not manipulating the earnings and if the score is greater than the cut off score of -2.22 then it advocates that company is (may be) manipulating its earnings.

In the case of Pelikan Inc. the Beneish M score is calculated as -2.721769 which is less than the cut off M score of -2.22. This suggest that Pelikan Inc is not manipulating its earnings.

On the basis of the above calculations, Mari Asai suggests Mr Holdon to invest in the corporate debt of Pelikan Inc as the company is not manipulating its earnings according to the Beneish M model.

4.3.6 NCAER Model

The National Council of Applied Economic Research (NCAER) gave a very precise definition of industrial sickness while conducting a study for the Punjab National Bank in 1979. According to NCAER, an industrial undertaking may be financially viable, if its three elements are proved to be positive. The NCAER Study on Corporate Distress Prediction prescribed the following three elements/parameters for predicting the stages of corporate sickness:

These parameters are:

1. (i) A profitability measure reflected by Cash profit position = Net Profit ± Depreciation and other non-cash write off.
2. (ii) A liquidity measure by Net working capital position = Current Assets – Current Liabilities
3. (iii) A solvency measure i.e., Net worth position = Share Capital + Reserve and Surplus

If any of the above three parameters are found to be negative; it may be considered that the firm has a tendency of becoming sick. If any two of the above three parameters are found to be negative in a firm, it may be considered that the firm possesses incipient sickness. If all the above three elements are found to be negative in a firm, it may be considered that the firm is fully sick.

Summary of NCAER Model

Number of Negative Parameters	Classification
One negative	Tendency of becoming sick
Two negative	Incipient sickness
All three negative	Fully sick

Multiple Choice Questions – 4.3

1. Which of the following is a cause for corporate distress?

(a) Fraud by Management (b) Working Capital Problems (c) Mismanagement (d) All of the above

Answer: (d) All of the above

2. If a business is to operate in a society that is full of diverse and complicated problems, it may have _____.

(a) Little chance of success (b) Great chance of success (c) Little chance of failure (d) No relation with success or failure

Answer: (a) Little chance of success

3. Financial distress can be best described by which of the following situations in which the firm is forced to take corrective action.

(a) Cash payments are delayed to creditors. (b) The market value of the stock declines by 10%. (c) The firm's operating cash flow are insufficient to pay current obligations. (d) Cash distributions are eliminated because the board of directors considers the surplus account to be low.

Answer: (c) The firm's operating cash flow are insufficient to pay current obligations.

4. A firm that has a series of negative earnings, sales declines and workforce reductions is likely head to:

(a) a change in management. (b) a merger. (c) financial distress. (d) new financing.

Answer: (c) financial distress.

5. Which of the following is the reason for business failure?

(a) Lack of market research (b) Poor financial control (c) Poor management (d) All the above

Answer: (d) All the above

6. What is the absolute priority rule of the following claims once a corporation is determined to be bankrupt?

(a) administrative expenses, wages claims, government tax claims, debt holder and then equity holder claims (b) administrative expenses, wages claims, government tax claims, equity holder and then debt holder claims (c) wage claims, administrative expenses, debt holder claims, government tax claims and equity holder claims (d) wage claims, administrative expenses, debt holder claims, equity holder claims and government tax claims

Answer: (a) administrative expenses, wages claims, government tax claims, debt holder and then equity holder claims

7. Altman develop the Z-score model for publicly traded manufacturing firms. Using financial statement data and multiple discriminant analysis, he found that:

(a) in actual use, a Z-score greater than 2.99 meant bankruptcy within one year. (b) in actual use, a Z-score greater than 1.81 implied a 90% chance of bankruptcy within one year. (c) in actual use, a Z-score of less than 1.81 would predict bankruptcy within one year. (d) in actual use, a Z-score less than 2.99 meant non-bankruptcy within one year.

Answer: (c) in actual use, a Z-score of less than 1.81 would predict bankruptcy within one year.

8. The key intuition of a Z-score model like Altman's is that:

(a) only publicly traded firms can be evaluated. (b) one will be just as well off by guessing on default rates. (c) all corporations will default at least once. (d) financial profiles of bankrupt and non-bankrupt firms are very different one year before bankruptcy.

Answer: (d) financial profiles of bankrupt and non-bankrupt firms are very different one year before bankruptcy.

9. Altman's Z-score predicts the:

(a) percentage of payout to equity holders in liquidations. (b) percentage of payout to equity holders in reorganization. (c) likelihood of a private workout. (d) likelihood of bankruptcy of a firm within one year.

Answer: (d) likelihood of bankruptcy of a firm within one year.

10. Which of the following are not the element/parameter of NCAER model of corporate distress prediction?

(a) Net worth position (b) Outstanding liability position (c) Net working capital position (d) Cash profit position

Answer: (b) Outstanding liability position

📌 Key Takeaways – Module 4

Section	Key Takeaway
4.1	Risk vs Uncertainty; Systematic vs Unsystematic Risk; 5-Step Risk Management Process; CIMA Framework; Traditional vs ERM; COSO Framework (8 Components, 4 Objectives); Risk Pooling (Insurance & Supply Chain); Diversification (Markowitz); Risk Analysis (Qualitative, Quantitative, Semi-quantitative); Risk Mapping; KRIs vs KPIs; COBIT (1996-2019)
4.2	ERM to REPM transformation; Risk Retention vs Reduction; VaR (Single Asset & Portfolio); Basel I, II, III (Capital Adequacy Norms)
4.3	Corporate Failure indicators (Low profitability, High gearing, Low liquidity); 5 Causes of Financial Distress; Mitroff 7 causes; Endogenous & Exogenous; Altman Z-Score (3 zones); Beneish M-Score (8 variables); NCAER Model (3 parameters)

📐 Important Formulas – Module 4

Formula	Description
$EV = \Sigma P(X_i) \times (X_i)$	Expected Value
$\sigma_p = \sqrt{[w_A^2\sigma_A^2 + w_B^2\sigma_B^2 + 2w_Aw_B\rho_{AB}\sigma_A\sigma_B]}$	Portfolio Risk
$\sigma_{year} = \sigma_{day}\sqrt{252}$	Annual to Daily Volatility
N-day VaR = 1-day VaR × √n	VaR Scaling
Bank Capital ≥ 3 × 10-day VaR (99%)	Basel Capital Requirement
CAR = (Tier I + Tier II) / Risk Weighted Assets	Capital Adequacy Ratio
$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 0.999X_5$	Altman Z-Score
Beneish M = -4.84 + 0.92DSRI + 0.528GMI + 0.404AQI + 0.892SGI + 0.115DEPI - 0.172SGAI - 0.327LVGI + 4.679TATA	Beneish M-Score

✅ Revision Checklist – Module 4

- □ Explain Risk vs Uncertainty (Knight, 1921)
- □ Solve Tinkuji's Expected Value decision problem
- □ Classify Systematic vs Unsystematic Risk (with subtypes)
- □ Explain 5 Steps of Risk Management Process
- □ Describe CIMA's Generic Framework (5 aspects)
- □ Explain Traditional vs ERM (5 limitations, 5 elements)
- □ Describe COSO Framework (8 components, 4 objectives)
- □ Explain Risk Pooling (Insurance & Supply Chain)
- □ Solve Mr Awasthi Portfolio Diversification (3 cases: ρ = +1, 0, -1)
- □ Differentiate Qualitative, Quantitative, Semi-quantitative Risk Analysis
- □ Explain Risk Mapping (4 segments, 4 responses)
- □ Differentiate KRIs vs KPIs (3 examples, 3 types of KRIs)
- □ Explain COBIT Timeline (1996-2019)
- □ Explain ERM to REPM transformation
- □ Differentiate Risk Retention vs Risk Reduction
- □ Solve VaR (Satyam single asset, HDFC single asset, Portfolio combination)
- □ Explain Basel I, II, III (Pillars, ratios, capital requirements)
- □ Solve CAR Calculation (XYZ Bank)

- □ Explain Corporate Failure (3 indicators, 5 causes, Mitroff 7, Endogenous/Exogenous)
- □ Solve Altman Z-Score (Lotus Inc & Woodex Inc)
- □ Solve Beneish M-Score (Pelikan Inc)
- □ Explain NCAER Model (3 parameters, 3 classifications)

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Disclaimer: These revision notes are for educational purposes only. Students are advised to refer to the official ICMAI study material and latest amendments for comprehensive preparation.

Next Module: Section B – Module 5 – Fundamentals of Business Valuation

CMA FINAL PAPER 20A

Strategic Performance Management & Business Valuation

SECTION B – MODULE 5: Fundamentals of Business Valuation

Complete Coverage as per ICMAI Study Material (Syllabus 2022)

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7. Key Takeaways & Revision Checklist

Module Learning Objectives

- Explain the methods of valuation.
- Assess qualitative and quantitative factors affecting valuation, identifying which method to apply in respective circumstance.

Introduction to Business Valuation

Alfred Marshall: "Companies that grow and earn a return on capital that exceeds their cost of capital create value."

The ultimate purpose of any business is to create value for its owners (shareholders). Value creation is the key to well being of every organisation. Therefore, if firms are to achieve the goal of value maximisation, then understanding valuation is critical.

CFA Institute Definition: Valuation is the estimation of an asset's value based on variables perceived to be related to the future investment returns, on comparisons with similar assets, or, when relevant, on estimates of immediate liquidation proceeds.

Valuation requires both judgement and interpretation of data. Different parties can have different interpretations of the same data and thus have different valuations. Further, valuation requires arriving at reasonable analytical justification for a proposed transaction.

Business valuation is an activity conducted towards rendering an estimate or opinion as to the fair market value of a business interest at a given point of time.

A business valuation requires a detailed understanding of a variety of factors affecting value, professional judgement, and experience. The valuer should be able to assess the purpose of the valuation, identify the value drivers impacting the subject company, and an understanding of industry, competitive and economic factors. It also involves selection and application of the appropriate valuation approach and methods.

Companies create value for their shareholders by investing cash to generate more cash in the future. The amount of value they create is the difference between cash inflows and the cost of the investments made, adjusted for time value of money and the riskiness of future cash flows. This may be treated as an application of the concept of Net Present Value (NPV) under Capital Budgeting concepts.

Many professionals and executives believe that accounting profits have a direct impact on value and focus excessively on improving profits, sometimes by even manipulating it. However, while accounting profits and cash flow are often correlated, profits don't tell the whole story of value creation, and focusing too much on profits or profit growth often leads companies to deviating from a value-creating path. It should be remembered that Creating shareholder value is not the same as maximising short term profits. The evidence makes it clear that companies with a long strategic horizon create more value.

Points to Remember while doing Business Valuation

- Valuation is an estimation of a business' worth and thus it can be different for different valuers. There may not be a right or wrong value; neither can there be a precise valuation.
- Value is not the same as Price. Legendary investor Warren Buffet famously said "Price is what you pay, and value is what you get".
- Valuation is done at a point in time. As more information flows in, values may change over time.

Valuation Requires Good Understanding of:

- **Business and business environment:** Valuation is not a spreadsheet only exercise. Unless the valuer understands business and its environment, it is bound to be a futile exercise. Each business is unique and would have its own value-proposition.
- **Regulatory environment and Laws:** Most valuation exercise is done for a purpose and often the purpose is a regulatory compliance. Understanding of various laws (e.g. Companies Act, SEBI, FEMA, Income Tax etc.) are critical in doing the business valuation.
- **Accounting framework:** As accounting landscape changes with Ind AS, valuers need to be very strong in understanding the accounting framework, the key areas in accounting that has significant valuation impact.
- **Valuation methods and principles:** Various valuation concepts and principles are key to performing a valuation exercise.
- **Calculation or spreadsheet applications:** Finally, valuation is driven by numbers and valuers need to be strong at number crunching as well and may often require strong spreadsheet applications.

Key Principle: The value of any asset must equal the present value of its future cash flows, discounted at a rate that reflects its inherent risk. However, various methods can be applied to value any asset.

Key Terms around Valuation

Term	Definition
Market Value	The estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion.
Liquidation Value	The amount that would be realised when an asset or group of assets are sold on a piecemeal basis. Liquidation value should consider the costs of getting the assets into saleable condition as well as those of the disposal activity. Liquidation Value can be determined under two premises: (i) an orderly transaction with a typical marketing period; or (ii) a forced transaction with a shortened marketing period.
Investment Value	The value of an asset to the owner or a prospective owner given individual investment or operational objectives (may also be known as worth).
Fair Value	The price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.
Fair Market Value	The price a willing buyer would pay a willing seller in a transaction on the open market. Generally, neither the willing buyer nor the willing seller would be under any compulsion to buy or to sell and both having reasonable knowledge of relevant facts.
Equitable Value	This is the estimated price for the transfer of an asset or liability between identified knowledgeable and willing parties that reflects the respective interests of those parties.

5.1 Purpose of Business Valuation

Valuation is an essential prerequisite in choosing investments for a portfolio, in deciding on the appropriate price to pay or receive in a takeover, and in making investment, financing and dividend choices while running a business. Valuation is required throughout the life cycle of a company. From the time a company is incorporated and needs infusion of funds to liquidation of the company, valuation is a critical process at various stages of the company.

Common Purposes of Valuation

Examples of when a business valuation may be required include any or more of the following instances:

- Issue of shares or other securities by the company (e.g. private investors, employee stock options, rights issue, and sweat equity shares)
- Initial public offering and listing of equity shares in stock exchanges
- Mergers and acquisitions including Leveraged buyouts (LBO)
- Buyback of shares
- Business restructuring such as slump sale
- Shareholders' disputes settlement
- Purchase / sale of a business interest and step up acquisitions
- Non-arm's length transaction
- Disgruntled minority shareholders' actions
- Damage claims
- Estate planning
- Deemed disposition at death
- Insolvency proceedings and company liquidation
- Intangibles (Goodwill, brand)
- Financial Reporting

Regulations that Commonly Require Business Valuation

- The Companies Act, 2013 (including Insolvency and Bankruptcy Code, 2016)
- Securities and Exchange Board of India (SEBI) Regulations
- Foreign Exchange Management Act (FEMA)
- Income Tax Rules.

📝 Multiple Choice Questions – 5.1

1. Which of the following is false about business valuation?

A. Valuation is an estimation of a business's worth. B. Value is the not the same as price. C. Valuation doesn't change over time. D. Valuation requires understanding of business environment.

Answer: C. Valuation doesn't change over time.

2. What does Warren Buffet's phrase 'Price is what you pay and value is what you get' suggest?

A. Price and value are always the same. B. Price is more important than value. C. Price is less important than value. D. Price and value can be different.

Answer: D. Price and value can be different.

3. In which situation would a company likely have the need for business valuation?

A. When deciding the appropriate price to pay in a takeover. B. When buying stationery for office use. C. When hiring new staff member. D. When scheduling a board meeting.

Answer: A. When deciding the appropriate price to pay in a takeover.

4. Which of the following elements are not critical in doing the business valuation?

A. Understanding of various laws. B. Strong number crunching and spreadsheet abilities. C. Understanding of business environment. D. Knowing the company's stock price.

Answer: D. Knowing the company's stock price.

Short Answer – 5.1

1. Explain the importance of understanding business and its environment in business valuation.

Answer: Importance covers aspects like gaining a clear understanding of value-drivers impacting the company, industry competitive factors, and economic factors. Key elements include knowledge about the business environment, various laws like Companies Act, SEBI, FEMA, Income Tax, understanding of the accounting framework, understanding of various valuation concepts, principles, and calculation or spreadsheet applications.

2. Discuss some of the key elements a valuer should be knowledgeable about.

Answer: Application showcases the appropriate use of chosen valuation approach given a specific business scenario, its calculation, interpretation, and how it impacts the overall business valuation.

3. Define and differentiate between Market Value, Liquidation Value, Investment Value, and Fair Market Value.

Answer: Answer should include discussion on the critical role of laws and accounting framework in business valuation, highlighting aspects like regulatory compliance, financial reporting, understanding of business value and price, and impact on investment decisions.

4. Explain the statement 'Value is not the same as Price'. Discuss how this understanding is critical in the process of business valuation.

Answer: Explanation should reflect the essence of Warren Buffet's saying and discuss the importance of understanding the intrinsic, actual value of a business, separate from its market price, for successful business valuation.

5. If a company's growth rate is 20% and it has a return on capital that exceeds its cost of capital by 15%, calculate the value it creates for its shareholders.

Answer: Value is created when the return on capital exceeds the cost of capital. Given here, return on capital excesses cost of capital by 15%. Hence, if the company grows at 20%, it means each year, the company is effectively generating an additional return of 20%×15% = 3% of the firm's value, in excess to the cost of capital.

5.2 Valuation Premise

The valuation approach, inputs and assumptions applied are highly dependent on the selected premise of value. The premise of value is driven by the purpose of the valuation and basis of value used. A premise of value or assumed use describes the circumstances of how an asset or liability is used. Different bases of value may require a particular premise of value or allow the consideration of multiple premises of value.

Common Premises of Value

Premise	Description
a) Highest and best use (HABU)	Highest and best use is the use, that would produce the highest value for an asset. The highest and best use must be physically possible (where applicable), financially feasible, legally allowed and result in the highest value.
b) Current use/existing use	Current use/existing use, also known as "as-is-where-is" is the current way an asset, liability, or group of assets and/or liabilities is used. The current use may be, but is not necessarily, also the highest and best use.
c) Orderly liquidation	An orderly liquidation describes the value of a group of assets that could be realised in a liquidation sale, given a reasonable period of time to find a purchaser (or purchasers), with the seller being compelled to sell on an as-is, where-is basis. The reasonable period of time to find a purchaser (or purchasers) may vary by asset type and market conditions.
d) Forced sale	The term "forced sale" is often used in circumstances where a seller is under compulsion to sell and that, as a consequence, a proper marketing period is not possible and buyers may not be able to undertake adequate due diligence.
e) Going concern	Going concern value is the value of a business that is expected to continue to operate in the future. The intangible elements of Going Concern Value result from factors such as having a trained work force, an operational plant, the necessary licenses, marketing systems, and procedures in place etc.

Important Note: Usually, businesses are valued using Going Concern premise. In cases where businesses are under stress, they may be valued on Liquidation or Forced Sale premise. Tangible assets are usually valued using any of the premises except Going concern. Further, the bases and premises of value do not consider the transaction cost to either the buyer or the seller.

Multiple Choice Questions – 5.2

1. Which premise of value is often used in circumstances where a seller is under compulsion to sell and that as a consequence a proper marketing period is not possible?

A. Current use B. Orderly liquidation C. Forced sale D. Going concern

Answer: C. Forced sale

2. The _____ premise of valuation is use that would produce the highest value for an asset.

A. Going concern B. Forced sale C. Highest and best use D. Orderly liquidation

Answer: C. Highest and best use

3. Which premise of value considers the value of a business that is expected to continue to operate in the future?

A. Going concern B. Forced sale C. Highest and best use D. Orderly liquidation

Answer: A. Going concern

4. The value of a group of assets that could be realised in a liquidation sale given a reasonable period of time to find a purchaser deals with which premise of value?

A. Forced sale B. Going concern C. Current use D. Orderly liquidation

Answer: D. Orderly liquidation

5. An asset's premise of value is highly dependent on its selected _____.

A. Purpose B. Cash flow C. Risk factor D. Expected rate of return

Answer: A. Purpose

Short Answer – 5.2

1. Explain the premise of value 'Highest and Best use' and mention how it differs from 'Current use/existing use'.

Answer: Highest and Best Use is the use that would generate the maximum value for an asset. It must be viable, profitable, legal, and result in a higher value. Current Use/Existing Use refers to how an asset is utilized presently, which may not always yield the maximum possible value. The two differ in terms of value generation and usage optimization.

2. Give examples of scenarios where 'Orderly Liquidation' and 'Forced Sale' would be applied as a premise of value.

Answer: Orderly liquidation is applied when a business decides to discontinue its operations, allowing for a reasonable timescale to identify potential buyers. Forced Sale applies when the seller is under pressure to sell immediately without an adequate marketing period or due diligence by buyers, for example, in bankruptcy scenarios.

3. Discuss the concept of 'Going Concern' as a premise of value and how it relates to a business's future operation.

Answer: Going Concern value represents the business's value, assuming it will continue operations into the future. It considers factors like trained workforce, operational plants, marketing systems, etc., which contribute to its continuous operational ability.

4. Present a logical argument on why 'Going Concern' should not be used for valuing tangible assets.

Answer: Going Concern implies the expectation of continued operation, often assessed through intangible assets like licenses, workforce, etc. Hence, applying it to tangible assets, these intangible contributions and future expectations, are likely to distort the tangible assets' actual value.

5.3 Valuation Approaches

Valuers may apply one or more valuation approaches to valuation to arrive at the value in accordance with the basis of value. The principal valuation approaches are:

1. (a) Market Approach
2. (b) Income Approach
3. (c) Cost Approach

Each of these valuation approaches includes different methods of valuation. It should be remembered that ascertaining the appropriate value is the primary goal of the valuation exercise. A valuer should select the appropriate valuation approach or a set of approaches and methods as there may not be a single approach or method that is best suited for valuation in every situation.

Fig 5.1: Three Principal Valuation Approaches

5.3.1 Market Approach

The market approach provides an indication of value by comparing the asset with identical or comparable (that is similar) assets for which price information is available. This approach is also known as Relative Valuation approach.

When should Market approach be applied?

The market approach should be applied and afforded significant weight under the following circumstances:

1. (a) the subject asset has recently been sold in a transaction appropriate for consideration under the basis of value,
2. (b) the subject asset or substantially similar assets are actively publicly traded, and/or
3. (c) there are frequent and/or recent observable transactions in substantially similar assets.

In some instances, a valuer may consider using other valuation approaches instead of Market approach or in combination with Market approach, such as:

- (a) the business to be valued or its market comparables are not traded in the active market;
- (b) where the business has fewer identical or comparable assets (market comparable);
- (c) sufficient information on the comparable transaction is not available;
- (d) there is no recent transaction either in the business or in the market comparables; or
- (e) there are material differences between the business to be valued and the market comparables, which require significant adjustments.

Methods of Valuation under Market Approach

1. Market price method

Market is the best judge of value. For assets that are frequently traded in an active market, the market prices may be considered as representative of value.

2. Comparable Companies Multiple Method

Comparables Companies Multiple Method involves valuation of an asset based on valuation multiples of comparable assets that are traded in active market. The key steps involved in this process includes:

1. (a) Identify the market comparables;
2. (b) Select and calculate the market multiples of the identified market comparables based on appropriate value drivers. Examples of value multiples include Price/Earnings (P/E) Multiple; Price-Sales (P/S) Multiple; Enterprise value–EBITDA (EV/EBITDA) Multiple, Price-Book Value (P/BV) Multiple.
3. (c) Compare the asset to be valued with the market comparables to understand material differences; and make necessary adjustments to the market multiple to account for such differences, if any;

4. (d) Apply the adjusted market multiple to the relevant parameter of the asset to be valued to arrive at the value of such asset; and
5. (e) If value of the asset is derived by using market multiples based on different metrics/parameters, consider the reasonableness of the range of values.

Example: If a valuer has to value a privately held steel company that has market comparables such as Tata Steel Ltd, JSW Steel Ltd, Mukand Steel Ltd etc, the valuation multiples (e.g. Price to Book Value Multiple or Price to Sales Multiple) from these traded companies can be used to value the private company.

3. Comparable Transactions Method

Comparable Transactions Method, is also known as 'Guideline Transaction Method', involves valuing an asset based on transaction multiples derived from prices paid in transactions of asset to be valued / market comparables (comparable transactions). Usually, companies in specialised business where there may not be exchange-traded comparables, but comparable assets are having transactions in over-the-counter (private transactions), the valuation multiples may be taken from such transactions. It is important to consider recent and orderly transactions to avoid significant biases in valuation.

Steps:

1. (a) Identify comparable transaction appropriate to the asset to be valued;
2. (b) Select and calculate the transaction multiples from the identified comparable transaction;
3. (c) Compare the asset to be valued with the market comparables account where differences, if any existed;
4. (d) Apply the adjusted transaction multiple to the relevant parameter of the asset to be valued to arrive at the value of such asset; and
5. (e) If valuation of the asset is derived by using transaction multiples based on different metrics or parameters, the valuer shall consider the reasonableness of the range of values and exercise judgement in determining a final value.

Example: If a valuer is valuing an Ed Tech Company in India, where there is no listed company in Ed-Tech industry, value drivers from Private Equity transactions such as Think & Learn Pvt Ltd (Byju's), Vedantu etc. may be considered. If the subject company is at a very early stage, a size-discount may be applied to ensure that the valuation is not over-stated.

5.3.2 Income Approach

Income approach provides an indication of value by converting future cash flow to a single current value. Under this approach, the value of an asset is determined by reference to the value of income, cash flow or cost savings generated by the asset.

When to apply Income approach?

The market approach should be applied and afforded significant weight under the following circumstances:

1. (a) where the asset does not have any market comparable or comparable transaction;
2. (b) where the asset has fewer relevant market comparables; or
3. (c) where the asset is an income producing asset for which the future cash flows are available and can reasonably be projected.

Income approach should be used when the income producing ability of the asset is the critical element affecting value from participant perspective. Also consider Income approach along with other approaches, when:

- the timing and amount of future income is uncertain
- there is lack of access to information
- the asset has not yet begun generating income but is projected to do so

Methods of Valuation under Income Approach

1. Discounted Cash Flow Method (DCF)

The Discounted Cash Flow (DCF) Method is arguably the most preferred method of valuation among all stakeholders. Fundamentally, the DCF method attempts to prove that the value of an asset is the present value of its future cash flows. Accordingly, this method involves discounting of future cash flows expected to be generated by an asset over its life using an appropriate discount rate to arrive at the present value.

DCF method applies the concept of Net Present Value (NPV). It requires three key inputs viz., Cash Flows, Discount Rate and Terminal Value. However, each of these inputs are very critical in the valuation process.

Key steps in Discounted Cash Flow Method are as follows:

1. (a) Consider projections and determine future Cash flows
2. (b) Assess the reasonableness of the cash flows;

3. (c) Choose the most appropriate type of cash flows for the asset, viz., pre-tax or post-tax cash flows, free cash flows to equity (FCFE) or free cash flows to firm (FCFF);
4. (d) Determine the discount rate and growth rate beyond explicit forecast period; and
5. (e) Apply the discount rate to arrive at the present value of the explicit period cash flows and for arriving at the terminal value.

Cash Flows

Free cash flow is the actual cash that would be available to the company's investors after making all investments necessary to maintain the company as an ongoing enterprise. These are internally generated funds that can be distributed to the company's investors (e.g., shareholders and bondholders) without impairing the value of the company.

The cash flow can be:

- pre-tax or post-tax
- Nominal cash flows that include expectations regarding inflation
- In the same currency in which the forecast is prepared

> Accounting Profit
> Add: Non-Cash Expenses (e.g., Depreciation and Amortisation)
> Less: Outflow towards Capital Expenditure (Change in Gross Fixed Assets)
> Less: Outflow towards Working Capital (Change in Non-Cash Working Capital)
> **Equal: Free Cash Flows**

Free Cash Flows represent the after-tax cash generated by the business, available for all the investors (stockholders and banks), excluding any impact of the financial structure. In case of Discounted Cash Flow based valuation, we assess the Free Cash Flow for an explicit forecast period (usually 5 years and in some cases, up to 10 years).

Discount Rate (Cost of Capital)

The Free Cash flows should be discounted to its present value using a Discount Rate that is usually the Cost of Capital.

Cost of Capital (Kc) represents the cost of funds used for financing the business. It is the rate of return that the suppliers of capital—bondholders and owners—require as compensation for their contributions of capital.

- (i) If business is financed solely through Equity, Kc is the same as Cost of Equity (Ke)
- (ii) If business is financed solely through Debt, Kc is the same as Cost of Debt (Kd)

Usually, companies use a mix of Debt and Equity while financing their business, thus the overall cost of capital is derived from a weighted average of cost of all capital sources, known as the Weighted Average Cost of Capital (WACC). Cost of capital represents a minimum benchmark rate that a company must overcome before it can generate value for its financers.

Terminal Value

Terminal value is the value of an asset, business, or project beyond the explicit forecast period when future cash flows can be estimated. Terminal value may assume that a business will grow at a set growth rate forever after the forecast period. In case the business is expected to mature at the end of the explicit forecast period, the terminal value may assume that the Free Cash Flows will continue for an infinite period thereafter. Terminal value often comprises a large percentage of the total assessed value. Terminal Value calculation uses the concept of Perpetuity calculation (with, or without a constant growth rate).

2. Profit Earning Capitalised Value (PECV) or Capitalisation of Earnings Method

PECV or Capitalisation of Earnings Method is a simplified application of Income Approach. In case where the Free Cash Flows cannot be calculated, the valuer does not have access to future projections, PECV serves as a proxy for DCF method. However, this assumes that Profits are like Free Cash Flows and the company is in a stable stage. Valuers often use the past years' profits (adjusted for extraordinary or exceptional items) and assign them weights based on recency. This weighted profit is assumed to accrue over an infinite period and is then discounted using a Capitalisation Rate.

5.3.3 Cost Approach

Cost approach is a valuation approach that reflects the amount that would be required currently to replace the service capacity of an asset (often referred to as current replacement cost). This approach provides an indication of value using the economic principle that a buyer will pay no more for an asset than the cost to obtain an asset of equal utility.

When to apply Cost approach?

- (i) Where income or market approach cannot be used

- (ii) An asset can be quickly recreated with substantially the same utility as the asset to be valued;
- (iii) When liquidation value is to be determined

Also, Cost Approach can be used along with other approaches when:

- (i) The asset hasn't started generating income.
- (ii) An asset of substantially the same utility as the asset to be valued can be created but there are regulatory or legal hurdles.
- (iii) The asset was recently created.

Methods of Valuation under Cost Approach

1. Replacement Cost Method

Replacement cost is relevant to determining the price that a participant would pay as it is based on replicating the utility of the asset, not the exact physical properties of the asset. The key steps in the replacement cost method are:

1. (i) Calculating all of the costs that would be incurred by a typical participant seeking to create or obtain an asset providing equivalent utility,
2. (ii) Determining whether there is any deprecation related to physical, functional and external obsolescence associated with the subject asset, and
3. (iii) Deducting total deprecation from the total costs to arrive at a value for the subject asset.

2. Reproduction Cost Method

Reproduction cost indicates value by calculating the cost to recreating a replica of an asset.

Reproduction cost is appropriate in circumstances such as:

- (i) The cost of a modern equivalent asset is greater than the cost of recreating a replica of the subject asset, or
- (ii) The utility offered by the subject asset could only be provided by a replica rather than a modern equivalent.

3. Net Asset Value or Book Value Method

While not specifically mentioned in the Valuation Standards, Net Asset Value or the Book Value method serves as a common method of valuation of private companies where the detailed information is not available. This method relies on the financial statements (Balance Sheet) and assumes that the values reflected in the Balance Sheet are reflective of true and fair value of the business.

Where the financial statements are prepared using historical cost convention (e.g., Land, Building and investments are recorded at cost whereas their values may have increased over time), valuers may identify the fair values of these assets and adjust them to arrive at the Fair value of the assets and liabilities. Valuers must keep in mind that under Ind AS (applicable to all listed companies and some large privately held companies), various assets and liabilities may already be recorded at Fair Values.

Multiple Choice Questions – 5.3

1. Which of the following valuation methods involves the conversion of future cash flow to a single current value?

A. Market Approach B. Cost Approach C. Income Approach D. Comparable Transactions Method

Answer: C. Income Approach

2. Which valuation approach should be applied when the asset has not yet begun generating income but is projected to do so?

A. Market Approach B. Cost Approach C. Income Approach D. None of the Above

Answer: C. Income Approach

3. What is the Net Present Value (NPV) based on in the Discounted Cash Flow Method?

A. Future Cash Flows B. Past Cash Flows C. Current Market Value D. Return on Investment

Answer: A. Future Cash Flows

4. Which of the following valuation methods involves valuing an asset based on valuation multiples of comparable assets that are traded in active market?

A. Comparable Companies Multiple Method B. Discounted Cash Flow Method C. Net Asset Value or Book Value method D. Capitalisation of Earnings Method

Answer: A. Comparable Companies Multiple Method

5. Identify the incorrect statement in context of the valuation approaches:

A. The cost approach reflects the amount that would be required currently to replace the service capacity of an asset B. Income Approach should be applied when the asset has not started generating income yet and cannot reasonably be projected C. The market approach provides an indication of value by comparing the asset with identical or comparable assets D. Net Asset Value or the Book Value method serves as a method of valuation of private companies where detailed information is not available

Answer: B. Income Approach should be applied when the asset has not started generating income yet and cannot reasonably be projected

Short Answer – 5.3

1. What are the circumstances under which Market Approach should be applied for valuation and elaborate on the methods under this approach?

Answer: Market Approach should be applied when subject asset is recently sold or publicly traded, or there are frequent observable transactions in similar assets. The methods include Market Price method, Comparable Companies Multiple Method, and Comparable Transactions Method.

2. What is the Discounted Cash Flow method under Income Approach? Describe its key steps and components.

Answer: DCF is a method of valuation that involves discounting future cash flows using an appropriate discount rate. The key steps include projecting cash flows, assessing their reasonableness, choosing type of cash flows, determining discount rate and calculating the present value of cash flows.

3. Describe the Profit Earning Capitalised Value method as a part of Income Approach and elaborate on when it can be used.

Answer: PECV or Capitalisation of Earnings Method is a simplified application of Income Approach used when Free Cash Flows cannot be calculated or future projections are not accessible. It involves using past profits, adjusting for extraordinary items and assuming they accrue indefinitely, then discounting using a Capitalisation Rate.

4. Explain Cost Approach, its methods and the conditions under which it can be applied.

Answer: Cost Approach is applied when one of the other approaches can't be used, the asset can be quickly recreated, or when liquidation value needs to be determined. The methods include Replacement Cost Method and Reproduction Cost Method.

5. What is the concept behind Net Asset Value or Book Value method and when should it be used?

Answer: Net Asset Value or Book Value method of valuation relies on financial statements, assuming balance sheet values reflect true and fair value. It is used when detailed information is not available and is particularly common for private companies.

6. What is the theoretical principle behind the cost approach in asset valuation?

Answer: Cost Approach is based on the principle that a buyer will pay no more for an asset than the cost to obtain an asset of equal utility.

7. Discuss the concept of Terminal Value under the Discounted Cash Flow method and elaborate on how it is computed.

Answer: Terminal Value is the value of an asset beyond the forecast period when future cash flows can be estimated. It may assume infinite growth of the business or continue the Free Cash Flows for an infinite period. It uses the concept of Perpetuity calculation with or without a constant growth rate.

5.4 Fundamentals of Valuation – Risk & Return

Harry Markowitz, the father of modern finance was first to quantify risk and used the same in portfolio decision making. Based on risk-return criteria he suggested ways to identify optimal portfolio.

Markowitz's Two Important Assumptions

1. First, an investor is risk averse.
2. Second, an investor would prefer higher amount of wealth than the lower one. The reason is higher wealth leads to possibility of higher consumption.

Given two possible portfolios with similar risk profile, the one with higher expected return will be preferred. These two assumptions are most integral part of valuation exercise.

The Primary objective of any investor is to maximise return from the investments, subject to various constraints, primarily risk.

5.4.1 Return

Return may be realised or expected. The rate of return is total return the investor receives during the holding period stated as a percentage of the purchase price of the investment at the beginning of the holding period. The general equation for calculating the rate of return is as follows:

$$\mathbf{R = [D_t + (P_t - P_{(t-1)})] / P_{(t-1)}}$$

where:

- R = rate of return,
- P_t = Price of security during the holding period
- P_{t-1} = Price of security at the beginning of the holding period (purchase price)
- D_t = income or cash flows from the security during the holding period

Expected rate of return for any asset is the weighted average rate of return using the probability of each return as the weight.

5.4.2 Risk

Definition: Risk can be defined as the chance that the actual outcome from an investment will differ from the expected outcome. Risk and return go hand in hand considering investments and finance. Risk and return are directly related to each other. Higher the risk, higher is the expected return.

A commonly accepted measure of risk is volatility and is usually measured in terms of Standard Deviation (σ). An asset whose value fluctuates significantly or more frequently is said to have a higher risk.

The SD of the investment can be calculated as follows:

$$\mathrm{SD} = \sqrt{\text{variance}}$$

5.4.3 Diversification of Risk

One of the most frequent methods of reducing risk is by diversification i.e. investing in a group of securities rather than a specific stock. In an 'efficient market' a risk averse investor can achieve a more secured investment by investing in a combination of securities of different companies, preferably of different industries. However, the diversification benefit of reducing risk in such portfolios depends on the correlation (r) between the expected return among the individual investment. Hence, in order to reduce risk investors hold a diversified portfolio which might include equity, bonds, savings accounts, real estate, bullion and so on. i.e. an investor should not keep all eggs in one basket.

5.4.4 Types of Risk

Type of Risk	Description
Interest Rate Risk	Variability in security's return due to changes in the interest rates.
Market Risk	Variations in return due to fluctuations in the securities market.
Inflation Risk	Risk due to changes in prices of all commodities.
Business Risk	Risk associated with the different activities undertaken by the enterprise.
Financial Risk	Risk resulting from the existence of debt in the capital structure of the company.
Liquidity Risk	Risk associated with the secondary market in which the security is traded
Systematic Risk	Systematic risk is the risk that affects the entire market and hence, the firm too. It is also called non-diversifiable risk. It is measured as follows: $$\text{Systematic Risk} = \beta^2\sigma^2 = r_m^2\sigma_s^2 / \sigma_m^2$$
Unsystematic Risk	Unsystematic Risk is the variability in the security's return on account of the firm specific risk factors. It is also called diversifiable or avoidable risk. It is measured as follows: $$\text{Unsystematic Risk} = \text{Total Risk} - \text{Systematic Risk}$$

5.4.5 Beta

If a portfolio is well diversified, the unsystematic risk gets almost eliminated. The systematic risk arising from the wide movements of security prices in the market is very important to an investor. The modern portfolio theory defines the riskiness of a security as its vulnerability to its market risk. This vulnerability is measured by the sensitivity of the return of the security to the market return and is called Beta.

Thus, Beta measures non-diversifiable (systematic) risk. It shows how the price of a security responds to market forces. The beta of the overall market is said to be 1.00.

Computation of Beta

While there are various methods of measuring beta. In case of business valuation, Beta is often calculated using the regression equation.

Beta = Covariance of the stock with respect to market / Variance of market relative to its mean

Illustration (ICMAI Study Material): Beta of A Ltd vs S&P 500

An investor is looking to calculate the beta of A Ltd as compared to the S&P 500 Index (Market). Based on recent five-year data, the correlation between A and S&P 500 is 0.83. A has a standard deviation of returns of 23.42% and S&P 500 has a standard deviation of returns of 32.21%.

Solution (ICMAI Standard):

$\text{Beta}_A = 0.83 \times (0.2342 / 0.3221) =$ **0.6035**

In this case, A would be considered less volatile than S&P 500, as its beta of 0.6035 indicates the stock theoretically experiences 40% less volatility than the market. That is, if the market moves up (down) by 10 percent, the stock will move up (down) by 6 percent only.

Limitations of Beta

- (i) It is based on historical values
- (ii) Betas of individual securities have a tendency to move towards the market (or industry) Beta.

Multiple Choice Questions – 5.4

1. Which statement accurately describes the concept of Beta in risk evaluation?

A. Beta only measures diversifiable risk B. Beta depicts how the price of a security responds to market forces C. Beta is relevant only in loss situations D. Beta is the same for all types of investments

Answer: B. Beta depicts how the price of a security responds to market forces

2. In the general equation for calculating rate of return, what does 'D' represent?

A. Discount for future income B. Depreciation of the asset C. Dividends received in the holding period D. Derivatives of the security

Answer: C. Dividends received in the holding period

3. In the concept of financial risk, what type of risk is not affected by diversification?

A. Market Risk B. Business Risk C. Financial Risk D. Systematic Risk

Answer: D. Systematic Risk

4. Given the S&P index has a standard deviation of returns of 15%, and a stock A has a standard deviation of returns of 10%, with a correlation of 0.8, what would be the beta of stock A?

A. 0.53 B. 1.20 C. 0.75 D. 0.67

Answer: A. 0.53 (0.8 × 10/15 = 0.533)

5. Which of the following is not a type of risk assessed in valuation?

A. Systematic Risk B. Interest Rate Risk C. Market Risk D. Opportunity Risk

Answer: D. Opportunity Risk

Short Answer – 5.4

1. Explain the Markowitz's modern portfolio theory. How does it work in the decision-making process of a portfolio?

Answer: Portfolio theory is about minimizing the risk and maximizing the return achieved through diversification of investment. Investor is risk averse and prefers higher wealth. Considers the risk-return trade off and suggest ways to identify the optimal portfolio combination to get most return for a given risk level or least risk for a given return level.

2. Highlight the types and role of risk in investment decision-making. How can risk be reduced?

Answer: Risks include: Interest rate risk, market risk, inflation risk, business risk, financial risk, liquidity risk, systematic risk, and unsystematic risk. Each has different variability in a security's return. Risks can be reduced through diversification of investment among different securities and industries, which reduces unsystematic risk.

3. Calculate the beta of a stock given a correlation of 0.8 between it and S&P 500 Index, and the standard deviation of returns are 0.1 for the stock and 0.15 for S&P.

Answer: Beta = correlation × (standard deviation of stock / standard deviation of market) = 0.8 × (0.1 / 0.15) = 0.53.

4. In terms of the rate of return, define realised and expected returns. What is the general equation for calculating the rate of return?

Answer: Realised return is the return that an investor actually receives during the holding period. Expected return is the return that the investor expects to receive from an investment in the future. General equation is $R= [D_t + [(P_t - P_{t-1})] / P_{t-1}$.

5. Elaborate on volatility as a measure of risk. Explain how standard deviation is used in measuring risk.

Answer: Volatility represents the degree of variation of a trading price series over time. Risk is directly measured by the standard deviation, representing the dispersion of data from its mean. The higher the standard deviation, the higher the volatility, and therefore, the higher the risk.

6. Why is beta important in the investment decision-making process? Discuss its limitations.

Answer: Beta measures the volatility or systemic risk of a security or portfolio compared to the market. It's important in making investment decisions as it indicates the expected returns considering the market risks. However, limitations include its dependence on historical data and tendency to move towards the market Beta.

5.5 Financial Statement Analysis

5.5.1 Financial Statement Analysis Framework

The financial statement analysis framework consists of six steps:

1. (a) **State the objective and context:** Determine what questions the analysis seeks to answer, the form in which this information needs to be presented, and what resources and how much time are available to perform the analysis.
2. (b) **Gather data:** Acquire the company's financial statements and other relevant data on its industry and the economy. Ask questions about the company's management, suppliers, and customers, and visit company sites.
3. (c) **Process the data:** Make any appropriate adjustments to the financial statements. Calculate ratios. Prepare exhibits such as graphs and common-size balance sheets.
    - (i) Quickly review the balance sheet and profit and loss account to obtain a general idea of the size of the company, its capital structure and its profitability.
    - (ii) Look at the historical data to see if the company is growing, stagnant or declining.
    - (iii) Read carefully through the chairman's statement and the directors' report, highlighting any interesting points.
    - (iv) Identify the reporting framework. Go through the balance sheet and profit and loss account item by item, reading each accompanying "Note" as you go, highlighting anything unusual. Especially check for Contingent Liabilities that are outside the Balance Sheets.
    - (v) Check the accounting policies note for changes or anything abnormal.
    - (vi) Identify the business specific value drivers that drives the business value. Examples, Number of Stores, Average Order per user, Time spent on the app, etc.
    - (vii) Check the auditors' report for any qualifications.
    - (viii) Conduct Analysis:
        - **Trend Analysis (Horizontal Analysis):** A line by-line comparison between the current and previous year's financial statement line items
        - **Common Size Statements (Vertical Analysis):** Balance sheet items are expressed as a percentage of the balance sheet total, and profit and loss account items as a percentage of turnover, compared to the previous year
        - **Ratio Analysis:** Relationship between items in the balance sheet or profit and loss account in the same period compared to previous years, similar companies' ratios or industry averages.
4. (d) **Analyse and interpret the data:** Use the data to answer the questions stated in the first step. Decide what conclusions or recommendations the information supports.
5. (e) **Report the conclusions or recommendations:** Prepare a report and communicate it to its intended audience. Be sure the report and its dissemination comply with the Code and Standards that relate to investment analysis and recommendations.
6. (f) **Update the analysis:** Repeat these steps periodically and change the conclusions or recommendations when necessary.

5.5.2 Analysis of Financial Statements

It is often important to analyse the financial statements to derive meaningful information relevant for decision making. One of the most common ways of analysing financial statements is by calculating key accounting ratios.

An accounting ratio expresses the relationship between two or financial statement items. Ratios are used widely in the analysis of financial statements and are an essential tool in the measurement of performance, liquidity and solvency. They are particularly useful in inter-firm comparisons or comparison across periods. Due to varying accounting practices and conventions in use, it is essential to ensure that there are consistent definitions of terms and comparability of figures.

It must be emphasised that although accounting ratios are a useful guide in interpreting accounts, they are subject to limitations. Ratios are most useful over a period when they can show the trend of the relevant figures and give an indication of the effectiveness of the policies being pursued. Individual figures for one single period are not particularly helpful. Care must also be taken to ensure that the accounting information used is comparable.

Accounting ratios can be used for comparing companies within the same industry and for comparing divisions of the same company. Ratio analysis, of course only provides a historical picture and any conclusions about the company must only be made in the light of expectations of the company's performance in the future.

5.5.3 Ratio Analysis

1. Performance Ratios

These ratios help us assess company's profitability by expressing its profit as a percentage of something else such as Return on Equity (ROE) or Return on Capital Employed (ROCE) or Profit Margins such as Net Profit Margin or Operating Profit Margin.

Ratio	Numerator	Denominator	Comments
Return on Equity	Net Profit after Tax	Equity [Equity = Total Assets – Total Liabilities]	One of the most important ratios for shareholders who can assess how much profit has the company earned by using the shareholders' funds
Return on Capital Employed	Net Profit after Tax	Equity + Long Term Debt	ROCE explains the total profit earned based on the funds employed by the business, taking out the effect of changes in capital structure.
Net Profit Margin	Net Profit after Tax	Revenue from Operations	Explains the profit earned over sales after deducting all expenses of the business
Gross Profit Margin	Gross Profit [Gross Profit = Revenue from Operations – Cost of Goods Sold]	Revenue from Operations	Explains the profit earned on sales after deducting the core cost of goods sold

DuPont Analysis:

$$\text{Return on Equity} = \text{Net Profit Margin} \times \text{Asset Turnover} \times \text{Financial Leverage}$$
$$\text{Return on Equity} = \text{Net Profit} / \text{Sales} \times \text{Sales} / \text{Total Assets} \times \text{Total Assets} / \text{Total Equity}$$

2. Liquidity Ratios

These ratios help in assessing company's ability to meet current financial obligations such as Current Ratio and Quick Ratio.

Ratio	Numerator	Denominator	Comments
Current Ratio	Current Assets	Current Liabilities	The ratio explains the ability of the short term assets to meet the short term liabilities. This is to ensure that the company does not have to rely on debt or sell long term assets to meet short term obligations.
Quick ratio	Current Assets - Inventories	Current Liabilities	A more stringent measure of current ratio to ensure that the company doesn't have to sell its inventory under pressure to meet its short term obligations.

3. Solvency Ratios

These ratios help in assessing how extensively a company relies on debt such as Debt-Equity Ratio and Interest Coverage Ratio.

Ratio	Numerator	Denominator	Comments
Debt Equity Ratio	Total Debt [As a variation, one may use Long term Debt instead of Total Debt as well]	Total Equity	A high debt/equity ratio generally means that a company has been aggressive in financing its assets with debt. Aggressive leveraging practices are often associated with high levels of risk. This may result in volatile earnings as a result of the additional interest expense.
Interest Coverage Ratio	Earnings before Interest and Tax	Interest	This ratio reveals the number of times company can make its interest payments from its operating profit.

4. Market Value Ratios

These ratios indicate the relationship of the firm's share price to dividends and earnings. When we refer to the share price, we are talking about the Market value and not the Nominal value as indicated by the par value. For this reason, it is difficult to perform these ratios on unlisted companies as the market price for their shares is not freely available. One would first have to value the shares of the business before calculating the ratios. Market value ratios are strong indicators of what investors think of the firm's past performance and future prospects.

(a) Dividend Yield Ratio

The dividend yield ratio indicates the return that investors are obtaining on their investment in the form of dividends. This yield is usually fairly low as the investors are also receiving capital growth on their investment in the form of an increased share price. It is interesting to note that there is strong correlation between dividend yields and market prices. Invariably, the higher the dividend, the higher the market value of the share.

$$\text{Dividend Yield} = \text{Dividend Per share} / \text{Stock Price}$$

Dividend per Share = Total Dividend Per share / No. of shares outstanding

Generally, a very high dividend yield signals potential financial difficulties and possible dividend pay-out cut. The dividend per share is merely the total dividend by the number of shares issued. The price per share is the market price of the share at the end of the financial year.

(b) Price/Earning Ratio (P/E ratio)

P/E ratio is a useful indicator of what premium or discount investors are prepared to pay or receive for the investment. The higher the price in relation to earnings, the higher the P/E ratio which indicates the higher the premium an investor is prepared to pay for the share. This occurs because the investor is extremely confident of the potential growth and earnings of the share.

$$\text{P/E Ratio} = \text{Market Price per share} / \text{Earnings per share}$$

High P/E generally reflects lower risk and/or higher growth prospects for earnings. However, extremely high levels of P/E Multiple may indicate high risk for the company.

(c) Price to Book Value Ratio

The Price-to-book ratio, or P/B ratio, is used to compare a company's book value to its current market price. Book value denotes the portion of the company held by the shareholders; in other words, the company's total assets less its total liabilities. The ratio can be calculated in two ways.

$$\text{Price to Book Value Ratio} = \text{Market capitalisation} / \text{Book value}$$

Or

$$\text{Price to Book Value Ratio} = \text{Price per share} / \text{Book value per share}$$

(d) Price/Sales ratio

Price-to-sales ratio, P/S ratio, or PSR, is a valuation metric for stocks. It is calculated by dividing the company's market cap by the company's revenue in the most recent fiscal year (or the most recent four fiscal quarters); or, equivalently, divide the per-share stock price by the per-share revenue.

$$\text{Price to Sales Ratio} = \text{Price per share} / \text{Sales per share}$$

Or

$$\text{Price to Sales Ratio} = \text{Market Capitalisation} / \text{Total Revenue from Operations}$$

The metric can be used to determine the value of a stock relative to its past performance. It may also be used to determine relative valuation of a sector or the market as a whole.

PSRs vary greatly from sector to sector, so they are most useful in comparing similar stocks within a sector or sub-sector. Also, since sales are less easy to manipulate as compared to earnings, price-sales ratios are more indicative of performance as compared to price-earnings ratios.

(e) Dividend Cover

This ratio measures the extent of earnings that are being paid out in the form of dividends, i.e. how many times the dividends paid are covered by earnings (similar to times interest earned ratio discussed above).

A higher cover would indicate that a larger percentage of earnings are being retained and re-invested in the business while a lower dividend cover would indicate the converse.

$$\text{Dividend Cover (Times)} = \text{Earnings per Share} / \text{Dividend per Share}$$

(f) Dividend pay-out ratio

This ratio looks at the dividend payment in relation to net income and can be calculated as follows:

$$\text{Dividend Payout Ratio} = \text{Dividend per Share} / \text{Earnings per Share}$$

5. Activity Ratios (Working Capital Ratios)

If a business does not use its assets effectively, investors in the business would rather take their money and place it somewhere else. For the assets to be used effectively, the business needs a high turnover.

Unless, the business continues to generate high turnover, assets will be idle as it is impossible to buy and sell fixed assets continuously as turnover changes. Activity ratios are therefore used to assess how active various assets are in the business.

Note: Increased turnover can be just as dangerous as reduced turnover if the business does not have the working capital to support the turnover increase. As turnover increases more working capital and cash is required and if not, overtrading occurs.

(a) Inventory Turnover

This ratio measures the stock in relation to turnover in order to determine how often the stock turns over in the business.

It indicates the efficiency of the firm in selling its product. It is calculated by dividing the cost of goods sold by the average inventory.

$$\text{Inventory Turnover} = \text{Cost of Goods sold} / \text{Average Stock}$$

Sales figures can be used if Cost of Goods sold is not available.

$$\text{Average Inventory Period} = (\text{Average Stock} / \text{Cost of Goods Sold}) \times 365$$

Average Stock refers to the average of opening and closing stock during the year. i.e. (Opening Stock + Closing Stock)/2

The high stock turnover ratio would also tend to indicate that there was little chance of the firm holding damaged or obsolete stock.

(b) Creditors' Turnover Ratio (in days)

This ratio is an important one in working capital management (payables management) in order to determine the average time the company gets to repay its creditors. It indicates the efficiency of the firm in managing its creditors.

$$\text{Creditors Turnover Ratio} = \text{Average Creditors} / (\text{Cost of Sales} / 365)$$

Average Creditors refers to the average of opening and closing creditors during the year. i.e. (Opening Creditors + Closing Creditors)/2

(c) Debtors' Turnover Ratio (in days)

This ratio is an important one in working capital management (receivables management) in order to determine the average time the company takes to collect its receivables from the debtors. It indicates the efficiency of the firm in managing its debtors.

$$\text{Debtors Turnover Ratio} = \text{Average Debtors} / (\text{Credit Sales} / 365)$$

Average Debtors refers to the average of opening and closing debtors during the year. i.e. (Opening Debtors + Closing Debtors)/2

Average Collection Period measures the quality of debtors since it indicates the speed of their collection.

- The shorter the average collection period, the better the quality of debtors, as a short collection period implies the prompt payment by debtors.
- The average collection period should be compared against the firm's credit terms and policy to judge its credit and collection efficiency.
- An excessively long collection period implies a very liberal and inefficient credit and collection performance.

- The delay in collection of cash impairs the firm's liquidity. On the other hand, too low a collection period is not necessarily favourable, rather it may indicate a very restrictive credit and collection policy which may curtail sales and hence adversely affect profit.

(d) Total Assets Turnover

Asset turnover is the relationship between sales and assets.

The firm should manage its assets efficiently to maximise sales.

The total asset turnover indicates the efficiency with which the firm uses all its assets to generate sales.

It is calculated by dividing the firm's sales by its total Assets.

$$\text{Asset Turnover} = \text{Sales} / \text{Total Assets}$$

Generally, the higher the firm's total asset turnover, the more efficiently its assets have been utilised.

Generally, companies with low profit margins tend to have high asset turnover ratios and vice versa. Companies in retail industry are expected to have very high turnover ratio due to cut-throat competition and competitive pricing.

(e) Fixed Asset Turnover

The fixed assets turnover ratio measures the efficiency with which the firm has been using its fixed assets to generate sales.

It is calculated by dividing the firm's sales by its net fixed assets as follows:

$$\text{Fixed Asset Turnover} = \text{Sales} / \text{Total Fixed Assets}$$

Generally, high fixed assets turnovers are preferred since they indicate a better efficiency in fixed assets utilisation.

6. Financial Leverage (Gearing) Ratios

- The ratios indicate the degree to which the activities of a firm are supported by creditors' funds as opposed to owners.
- The relationship of owner's equity to borrowed funds is an important indicator of financial strength.
- The debt requires fixed interest payments and repayment of the loan and legal action can be taken if any amounts due are not paid at the appointed time. A relatively high proportion of funds contributed by the owners indicate a cushion (surplus) which shields creditors against possible losses from default in payment.

Note: The greater the proportion of equity funds, the greater the degree of financial strength. Financial leverage will be to the advantage of the ordinary shareholders as long as the rate of earnings on capital employed is greater than the rate payable on borrowed funds.

(a) Equity Ratio

$$\text{Equity Ratio} = \text{Shareholders Equity} / \text{Total Assets}$$

This ratio is generally multiplied by 100 to bring it to a percentage.

A high equity ratio reflects a strong financial structure of the company. A relatively low equity ratio reflects a more speculative situation because of the effect of high leverage and the greater possibility of financial difficulty arising from excessive debt burden.

(b) Debt Ratio

This is the measure of financial strength that reflects the proportion of capital which has been funded by debt, including preference shares.

$$\text{Debt Ratio} = \text{Total Debt} / \text{Total Assets}$$

Debt ratio is complementary to Equity Ratio as long as Debt (Long term Debt and Current Liabilities) plus Equity gives 100% of Total Assets. i.e. Debt Ratio = 1 – Equity Ratio. The higher the debt ratio the more difficult it becomes for the firm to raise debt.

5.5.4 Capital Structure Analysis

Investors like to invest in entities with strong and healthy Balance Sheet. One of the indicators of a healthy Balance Sheet is a appropriate use of capital structure, that is, Debt vs Equity. Capital structure describes the mix of a firm's long-term capital, which consists of a combination of debt and equity. Capital structure is a permanent type of funding that supports a company's growth and related assets.

Generally, there are three ratios that helps you assess the strength of a company's capital structure.

- (i) Debt Ratio i.e. Total Debt / Total Assets
- (ii) Debt-Equity Ratio i.e. Total Debt / Shareholders' Equity
- (iii) Capitalisation Ratio i.e. Long Term Debt / (Long Term Debt + Shareholders' Equity)

A lower Capitalisation Ratio is desirable as it indicates a healthy equity cushion.

5.5.5 Credit Analysis

Banks, Financial Institutions and Bond investors who lend money to the entities are often concerned about the credit worthiness of the entity. They are concerned if the entity will be able to repay their interest and principal amounts. Hence, they carry out a Credit Analysis to assess the default risk (the risk of default of repayment) of the entity.

While it's a long process where the credit analyst conducts a due diligence of the management, take representation letters, collects Income Tax documents, Financial Statements and more from the entity while evaluating the credit worthiness of the entity. In India, entities and individuals are provided with a Credit Rating (by Credit rating agencies) and CIBIL score to indicate the credit-worthiness of the entity or the individuals.

While the Solvency Ratios discussed above are useful in assessing the credit-worthiness of the entity, one of the better ways of assessing is Debt Service Coverage Ratio (DSCR). DSCR is a measure of cash available to pay current debt obligations. That is, it states the net operating income (usually EBIT) as a multiple of debt obligations due within one year including interest, principal and lease payments.

> Debt Service Coverage Ratio = EBIT / (Short Term Debt + Current Portion of long term Debt)

A DSCR of less than 1 indicates negative cash flow and implies that the entity (borrower) will be unable to cover or pay current debt obligations with its internal funds and may have to borrow more to pay its obligations. While, the expected DSCR will depend on economic situation and industry trends, generally, lenders will demand a very high DSCR (like 5 or 6 times) to get a reasonable comfort over the credit-worthiness of the entity.

5.5.6 Cash Flow Analysis

Cash is King. Since the accrual method of accounting doesn't provide enough light on cash flows, Cash Flow Analysis is an important part of company evaluation and for valuation as well. It involves examination of the entity's cash inflows and outflows during the specific period. Once a Cash Flow Statement is prepared, valuers find out key relevant information to assess cash flow position.

- Cash flow from operations should be positive to ensure that the entity is making cash profits from operations.
- Outstanding debtors should be observed to ensure that sales are not fictitious and the entity is able to recover money from the customers.
- Large amount of cash inflow could be because of non-operating sources fund raising or sale of assets. This needs to be considered appropriately.
- Large amount of cash outflow could be because of repayment of debt (good indicator) or investment in assets (usually a good indicator, but the quality of investment must be assessed.
- Operating Cash Flow/Net Sales Ratio is expressed as a percentage of a company's net operating cash flow to its revenue (from the Profit & Loss Statement). It indicates how much cash is generated for every rupee of sales. There is no exact percentage to look for, but the higher the percentage, the better.

Multiple Choice Questions – 5.5

1. What is the formula for Debt-Equity Ratio in financial analysis?

A. Total Debt / Total Equity B. Total Equity / Total Debt C. Total Assets / Net Income D. Net Income / Total Assets

Answer: A. Total Debt / Total Equity

2. Adams-Apex corp. has a net profit of $700,000, equity of $1,500,000, and long-term debt of $1,000,000. What is the company's Return on Capital Employed (ROCE)?

A. 0.32 B. 0.50 C. 0.24 D. 0.28

Answer: D. 0.28 (700,000 / (1,500,000 + 1,000,000) = 0.28)

3. Business X has total assets of $400,000, total liabilities of $250,000, and equity of $150,000. What is the Debt-Equity Ratio of business X?

A. 0.80 B. 2.34 C. 1.67 D. 1.5

Answer: C. 1.67 (250,000 / 150,000 = 1.67)

4. Which statement is true about the interpretation of Price-Earning (P/E) Ratio?

A. A lower P/E ratio indicates that the share is under-priced B. A higher P/E ratio shows that investors are willing to pay a higher price for the share due to confidence in its future prospects C. P/E Ratio is not a reliable measure of a company's performance D. A very high P/E ratio indicates a company is undervalued

Answer: B. A higher P/E ratio shows that investors are willing to pay a higher price for the share due to confidence in its future prospects

5. A company has a high fixed asset turnover rate. This may imply that:

A. The company has a large amount of fixed assets on its balance sheet B. The company has a small amount of fixed assets on its balance sheet C. The company uses its fixed assets efficiently to generate sales D. The company does not use its fixed assets efficiently to generate sales

Answer: C. The company uses its fixed assets efficiently to generate sales

Short Answer – 5.5

1. Define capital structure and explain its importance in the long-term growth of a company.

Answer: Capital structure refers to the mix of a firm's long-term capital, which consists of a combination of debt and equity. It is a permanent type of funding that supports a company's growth and related assets. An appropriate use of the capital structure is indicative of a healthy balance sheet which attracts investors.

2. Describe the debt ratio and how it influences a firm's ability to raise debt.

Answer: Debt Ratio is expressed as Total Debt divided by Total Assets. The higher the debt ratio, the more difficult it becomes for the firm to raise additional debt because it indicates a higher level of financial risk.

3. What is Debt Service Coverage Ratio (DSCR) and why is it important for assessing a company's ability to pay its debt obligations?

Answer: DSCR is a measure of cash available to pay current debt obligations expressed as net operating income (usually EBIT) as a multiple of debt obligations due within one year including interest, principal and lease payments. A DSCR of less than 1 suggests that the entity won't be able to cover or pay current debt obligations with its internal funds. It's important for lenders to assess the borrower's ability to repay the debt.

4. Given Company X has a net operating cash flow of 50 lakh rupees and revenue from Profit/Loss Statement of 200 lakh rupees. Calculate the Operating Cash Flow Net Sales Ratio.

Answer: Operating Cash Flow Net Sales Ratio is calculated by dividing net operating cash flow by revenue. Therefore, for Company X: (50/200) × 100 = 25%.

5. In context to company's financial health, reformulate a logical statement explaining the phrase 'Cash is King' with substantial justification.

Answer: 'Cash is King' is a phrase often used in analyzing businesses and implying that cash inflow (revenue from the operations of the business) is the life-blood of a business and its principles. Positive cash flow indicates that a company's liquid assets are increasing, enabling it to settle debts, reinvest in its business, return money to shareholders, pay expenses and provide a buffer against future financial challenges. Thus, a company with strong cash flows is considered to be robust and solvent.

5.6 Market Value and Enterprise Value

5.6.1 Market Value

Definition: Market value is the estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion.

Conceptual Framework of Market Value

The definition of market value must be applied in accordance with the following conceptual framework:

1. **(a) "The estimated amount"** refers to a price expressed in terms of money payable for the asset in an arm's length market transaction. Market value is the most probable price reasonably obtainable in the market on the valuation date in keeping with the market value definition. It is the best price reasonably obtainable by the seller and the most advantageous price reasonably obtainable by the buyer. This estimate specifically excludes an estimated price inflated or deflated by special terms or circumstances such as atypical financing, sale and leaseback arrangements, special considerations or concessions granted by anyone associated with the sale, or any element of value available only to a specific owner or purchaser.
2. **(b) "An asset or liability should exchange"** refers to the fact that the value of an asset or liability is an estimated amount rather than a predetermined amount or actual sale price. It is the price in a transaction that meets all the elements of the market value definition at the valuation date.
3. **(c) "On the valuation date"** requires that the value is time-specific as of a given date. Because markets and market conditions may change, the estimated value may be incorrect or inappropriate at another time. The valuation amount will reflect the market state and circumstances as at the valuation date, not those at any other date.
4. **(d) "Between a willing buyer"** refers to one who is motivated, but not compelled to buy. This buyer is neither over-eager nor determined to buy at any price. This buyer is also one who purchases in accordance with the realities of the current market and with current market expectations, rather than in relation to an imaginary or hypothetical market that cannot be demonstrated or anticipated to exist. The assumed buyer would not pay a higher price than the market requires. The present owner is included among those who constitute "the market".
5. **(e) "And a willing seller"** is neither an over-eager nor a forced seller prepared to sell at any price, nor one prepared to hold out for a price not considered reasonable in the current market. The willing seller is motivated to sell the asset at market terms for the best price attainable in the open market after proper marketing, whatever that price may be. The factual circumstances of the actual owner are not a part of this consideration because the willing seller is a hypothetical owner.
6. **(f) "In an arm's length transaction"** is one between parties who do not have a particular or special relationship, e.g., parent and subsidiary companies or landlord and tenant, that may make the price level uncharacteristic of the market or inflated. The market value transaction is presumed to be between unrelated parties, each acting independently.
7. **(g) "After proper marketing"** means that the asset has been exposed to the market in the most appropriate manner to effect its disposal at the best price reasonably obtainable in accordance with the market value definition. The method of sale is deemed to be that most appropriate to obtain the best price in the market to which the seller has access. The length of exposure time is not a fixed period but will vary according to the type of asset and market conditions. The only criterion is that there must have been sufficient time to allow the asset to be brought to the attention of an adequate number of market participants. The exposure period occurs prior to the valuation date.
8. **(h) "Where the parties had each acted knowledgeably, prudently"** presumes that both the willing buyer and the willing seller are reasonably informed about the nature and characteristics of the asset, its actual and potential uses, and the state of the market as of the valuation date. Each is further presumed to use that knowledge prudently to seek the price that is most favourable for their respective positions in the transaction. Prudence is assessed by referring to the state of the market at the valuation date, not with the benefit of hindsight at some later date. For example, it is not necessarily imprudent for a seller to sell assets in a market with falling prices at a price that is lower than previous market levels. In such cases, as is true for other exchanges in markets with changing prices, the prudent buyer or seller will act in accordance with the best market information available at the time.
9. **(i) "And without compulsion"** establishes that each party is motivated to undertake the transaction, but neither is forced or unduly coerced to complete it.

5.6.2 Enterprise Value

Enterprise value is one of the vital concepts in corporate valuation. It serves as a foundation for several Merger & Acquisition deals. There are several reasons why entities prefer enterprise value over other forms of valuation. To understand them easily, one needs to become familiar with all the fundamental aspects of EV first.

What is Enterprise Value?

Enterprise Value meaning can be described as the measure of a firm's total value and factors in the entire market value instead of the equity value. It directly ensures that all asset claims and ownership interests arising from debt and equity are included in the valuation. EV is considered to be an actual cost of purchasing a company or the theoretical price of a company before a takeover is considered. In fact, it is the minimum value that an entity would pay to purchase a company. However, in case of Mergers and Acquisitions, in a hypothetical acquisition, the acquirer would pay the enterprise value but would have access to the Cash of the target company. Therefore, we often subtract Cash and Cash Equivalents in calculation of Enterprise Value.

$$\text{EV} = \text{Market Capitalisation} + \text{Market value of Debt} - \text{Cash}$$

$$\text{EV} = (\text{Common Shares} + \text{Preferred Shares} + \text{Minority Interest}) + \text{Market Value of Debt} - \text{Cash}$$

Components of Enterprise Value

Component	Description
a) Equity value	The equity value of a company is generally determined by multiplying its fully-diluted shares outstanding with the current market price of a stock. Here, fully-diluted means they are inclusive of warrants and convertible securities besides basic shares outstanding. In the event of a company acquisition, the acquirer needs to pay the company's shareholder at least the market capitalization value. This alone is not deemed enough to provide a company's accurate value: as a result, other items are added in the EV equation.
b) Preferred stock	Being hybrid securities, these stocks have features of both debt and equity. Regardless, preferred stocks are treated more like debt as a component in EV. It is primarily because they pay out a fixed amount of dividend and are given more priority in terms of assets and earnings than common stocks. In case of an acquisition, they are paid off like debt.
c) Total debt	It can be described as the contribution made towards financial institutions and creditors. They make up the interest-bearing liabilities and include short-term and long term debt. The debt value is adjusted by simply deducting cash because when a company is acquired, acquires use the company's cash to pay off a share of assumed debt. The book value of debt is used in the case where its market value is unknown.
d) Non-controlling interest (minority interest)	It is a part of a subsidiary which is not owned by any parent company. Typically, the financial statements of such a subsidiary are consolidated with the financial report of their parent company. Generally, the minority interest is added in the calculation of EV because the parent company includes the total revenue earned, expenses incurred, and cash flow generated in its financial numbers.
e) Cash and Cash equivalents	These are among the most liquid assets in a company's financial statement. Cash and cash equivalents like short term investments, commercial paper, marketable securities, etc. are subtracted from EV. It is done because they tend to lower the acquiring cost of a company. It is believed that the acquirer uses the cash to pay off at least some portion of the theoretical price or to pay for buyback debt.

Significance of Enterprise Value

- EV enables business entities to find out the worth of a target company.
- It signifies the economic value of a business firm in question.
- It is more like the theoretical takeover price of a company in question and accounts for the cash and debt that will be pocketed by the acquirer.
- Enterprise value makes it possible to compare companies of different capital structures with greater ease.
- It comes in handy to neutralise the stock market risk and helps to compare expected returns more effectively.

Multiple Choice Questions – 5.6

1. What is the formula to calculate Enterprise Value?

A. Market Capitalisation + Market value of Debt – Cash B. Market Capitalisation + Book value of Debt – Cash C. Market Capitalisation + Book value of Equity – Cash D. Market Capitalisation + Market value of Equity – Cash

Answer: A. Market Capitalisation + Market value of Debt – Cash

Solved Case Study – 5.6

Solved Case Study (ICMAI Study Material): Parth Das – Valuation of Companies A and B

Parth Das is a valuer for a Professional Valuation Services Company. The company does independent valuation for actively traded listed companies. Das is responsible for conducting valuation for Company A and Company B. The appropriate valuation model for each company was chosen based on the following characteristics of each company:

- Company A is an employment services firm with no debt and has fixed assets consisting primarily of computers, servers, and commercially available software. Many of the assets are intangible, including human capital. The company has a history of occasionally paying a special cash dividend.
- Company B operates in three unrelated industries with differing rates of growth: tobacco (60% of earnings), shipbuilding (30% of earnings), and aerospace consulting (10% of earnings). The company pays a regular dividend that is solely derived from the earnings produced by the tobacco division.

Das considers the following development in making any necessary adjustments to the models before completing the valuation:

Company B has finalized the terms to acquire 70% of the outstanding shares of Company X, an actively traded tobacco company, in an all-stock deal.

Das assigns value to each of the companies and provides a rationale the same. The director of Valuation asks Das: "How did you arrive at these values? Describe how you used a top-down approach."

Das replies, "I arrived at my valuations through my due diligence process. I have studied all of the public disclosure documents; I have participated in the company conference calls, being careful with my questions in such a public forum; and I have studied the dynamics of the underlying industries. The valuation models are robust and use an extensive set of company-specific quantitative and qualitative inputs."

Questions:

1. Based on Company A's characteristics, which of the following absolute valuation models is most appropriate for valuing that company?
   a. Asset or Cost based b. Dividend discount c. Free cash flow to the firm
2. Based on Company B's characteristics, which of the following valuation models is most appropriate for valuing that company?
   a. Asset or Cost based b. Sum of the parts c. Dividend discount
3. Which of the following is most likely to be appropriate to consider in Company B's valuation of Company X?
   a. Blockage factor b. Control premium c. Lack of marketability discount
4. Based on Das response to the Director of Valuation, Das process could have been more consistent:
   a. Incorporating additional micro-level inputs into her valuation models.
   b. Evaluating the impact of general economic conditions on each company.
   c. Asking more probing questions during publicly available company conference calls

Solution (ICMAI Standard):

1. **Answer: (1) C is correct.** The free cash flow to the firm model is the most appropriate of the choices because it can be used whether the company has significant marketable assets or consistently pays a cash dividend. Much of Company A's assets are intangible and although the company has a history of paying a dividend, it has been only occasionally and in the form of a special dividend (i.e., not a consistent cash dividend).
2. **Answer: (2) B is correct.** Sum of Parts Valuation would be consistent with the characteristics of the company. Company B is a conglomerate operating in three unrelated industries with significantly different expected revenue growth rates. The sum-of-the-parts valuation model sums the estimated values of each of the company's businesses as if each business were an independent going concern. Sum-of-the-parts analysis is most useful when valuing a company with segments in different industries that have different valuation characteristics.
3. **Answer: (3) B is correct.** A control premium may be reflected in the value of a stock investment that would give an investor a controlling position. Company B acquired 70% of the outstanding stock of Company X; more than 50% is considered a controlling ownership position.
4. **Answer: (4) B is correct.** A top-down forecasting approach moves from macroeconomic forecasts to industry forecasts and then to individual company and asset forecasts. Valuers are expected to understand the general economic conditions before finalizing a research report and making a recommendation. According to Das's response, he did not comment on the general economic conditions and such considerations would be consistent with the firm's policy of using a top-down approach.

📌 Key Takeaways – Module 5

Section	Key Takeaway
5.1	Purpose of Business Valuation; Valuation is estimation, not precise; Value ≠ Price; Common purposes (15 instances); Regulations (Companies Act, SEBI, FEMA, Income Tax)
5.2	Valuation Premises: HABU, Current Use, Orderly Liquidation, Forced Sale, Going Concern; Businesses valued on Going Concern; Stressed businesses on Liquidation/Forced Sale
5.3	3 Principal Approaches: Market (Comparable Companies, Comparable Transactions), Income (DCF, PECV), Cost (Replacement, Reproduction, NAV); When to apply each
5.4	Markowitz assumptions; Return formula; Risk = SD; Diversification; 8 Types of Risk; Beta (Systematic Risk); CAPM
5.5	6-Step FS Analysis Framework; Ratio Analysis (Performance, Liquidity, Solvency, Market Value, Activity, Financial Leverage); Capital Structure Analysis; Credit Analysis (DSCR); Cash Flow Analysis
5.6	Market Value conceptual framework (9 elements); Enterprise Value = Market Cap + Debt – Cash; 5 Components of EV; Significance of EV

📐 Important Formulas – Module 5

Formula	Description
$R = [D_t + (P_t - P_{t-1})] / P_{t-1}$	Rate of Return
SD = √variance	Standard Deviation (Risk)
Beta = Cov(stock, market) / Var(market)	Beta (Systematic Risk)
$Beta = \rho_{im} \times (\sigma_i / \sigma_m)$	Beta from Correlation
$Systematic\ Risk = \beta^2\sigma^2$	Systematic Risk
Unsystematic Risk = Total Risk − Systematic Risk	Unsystematic Risk
ROE = NP / Equity	Return on Equity
ROCE = NP / (Equity + LT Debt)	Return on Capital Employed
Net Profit Margin = NP / Revenue	Net Profit Margin
Gross Profit Margin = GP / Revenue	Gross Profit Margin
ROE = NPM × Asset Turnover × Financial Leverage	DuPont Analysis
Current Ratio = CA / CL	Liquidity Ratio
Quick Ratio = (CA − Inventory) / CL	Acid Test Ratio
Debt-Equity = Total Debt / Equity	Solvency Ratio
Interest Coverage = EBIT / Interest	Interest Coverage
P/E = MPS / EPS	Price-Earnings Ratio
P/BV = Market Cap / Book Value	Price-to-Book Ratio
P/S = Market Cap / Total Revenue	Price-to-Sales Ratio
Dividend Yield = DPS / MPS	Dividend Yield
Dividend Cover = EPS / DPS	Dividend Cover
Dividend Payout = DPS / EPS	Dividend Payout
Inventory Turnover = COGS / Avg Stock	Inventory Turnover
Debtors Turnover = Avg Debtors / (Credit Sales/365)	Debtors Turnover (days)
Creditors Turnover = Avg Creditors / (Cost of Sales/365)	Creditors Turnover (days)
Asset Turnover = Sales / Total Assets	Total Asset Turnover
Fixed Asset Turnover = Sales / Net Fixed Assets	Fixed Asset Turnover
Equity Ratio = Equity / Total Assets	Equity Ratio
Debt Ratio = Total Debt / Total Assets	Debt Ratio
Capitalisation Ratio = LT Debt / (LT Debt + Equity)	Capitalisation Ratio
DSCR = EBIT / (ST Debt + Current Portion of LT Debt)	Debt Service Coverage Ratio
Operating Cash Flow/Net Sales = OCF / Revenue	Cash Flow Ratio
EV = Market Cap + Market Value of Debt − Cash	Enterprise Value
EV = (Common + Preferred + Minority) + Debt − Cash	EV Expanded Formula

✅ Revision Checklist – Module 5

- □ Define Business Valuation (CFA Institute) and explain its purpose
- □ Explain the 3 points to remember (estimation, value ≠ price, point in time)
- □ List 5 areas requiring good understanding (business, regulatory, accounting, methods, calculation)

- □ Define key valuation terms (Market Value, Liquidation, Investment, Fair, Fair Market, Equitable)
- □ List 15 common purposes of business valuation
- □ List 4 regulations requiring valuation
- □ Explain 5 Valuation Premises (HABU, Current Use, Orderly Liquidation, Forced Sale, Going Concern)
- □ Explain when to apply each premise
- □ Explain 3 Principal Valuation Approaches
- □ Explain Market Approach and its 3 methods
- □ Explain Income Approach (DCF, PECV) with 5 key steps
- □ Explain Cost Approach (Replacement, Reproduction, NAV)
- □ Explain Markowitz's Two Assumptions
- □ Solve Rate of Return formula
- □ Explain Risk (SD) and Diversification
- □ List 8 Types of Risk
- □ Explain Beta and Solve Beta calculation
- □ Explain 6-Step FS Analysis Framework
- □ Explain all Ratio categories with formulas
- □ Explain Capital Structure Analysis (3 ratios)
- □ Explain Credit Analysis (DSCR)
- □ Explain Cash Flow Analysis
- □ Explain Market Value conceptual framework (9 elements)
- □ Explain Enterprise Value, its 5 components, and significance
- □ Solve Parth Das valuation case study (4 questions)

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Disclaimer: These revision notes are for educational purposes only. Students are advised to refer to the official ICMAI study material and latest amendments for comprehensive preparation.

Next Module: Module 6 – Laws and Compliance in Business Valuation

CMA FINAL PAPER 20A

Strategic Performance Management & Business Valuation

SECTION B – MODULE 6: Laws and Compliance in Business Valuation

Complete Coverage as per ICMAI Study Material (Syllabus 2022)

For December 2026 Examination | CMA Knowledge Series – cmaknowledge.in

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5. Valuation Standards (IVSC)
6. Key Takeaways & Revision Checklist

Module Learning Objectives

- Understand and explain regulatory framework around valuation;
- Apply different regulations that govern valuation in India and globally.

6.1 Salient Features of the Insolvency and Bankruptcy Code, 2016

6.1.1 Introduction

While businesses are formed with the concept of perpetual succession, not every business runs for an infinite period. A business may close (wind up) for a variety of reasons such as temporary economic slowdown, failure in business or poor management control. Often when a business fails the founders, or the entrepreneurs are looked down upon as failures. For a country to have a flourishing business environment the businesses should be allowed to fail with dignity. Therefore, a strong insolvency and bankruptcy regime is required in any country. Insolvency and Bankruptcy Code represents the legal and institutional mechanisms in India for dealing with debt default of companies and limited liability entities, partnership firms and individuals. However, this does not automatically cover default by financial service providers, unless notified by the Government.

Term	Definition
Insolvency	When an entity (individual or an organisation) is unable to meet its outstanding financial debt towards its lender as it becomes due for a prolonged period with no foresight of being able to repay the debt, it is considered as insolvent. In some cases, Insolvency can be resolved by way of changing the repayment plan of the loans or writing off a part of the loan. In other cases, a legal action may be taken against the insolvent and its assets may be sold to pay off the outstanding debts. Generally, an official assignee/liquidator appointed by the Government of India, realizes the assets and allocates it among the lenders and creditors of the insolvent.
Bankruptcy	When an entity voluntarily declares itself as an insolvent and goes to the court, it is considered as Bankrupt. On declaring as 'bankrupt', the court is responsible to liquidate the property of the insolvent (including personal property of an individual) and hand it out to its creditors. It provides a fresh lease of life to the insolvent.

6.1.2 Objective of the Code

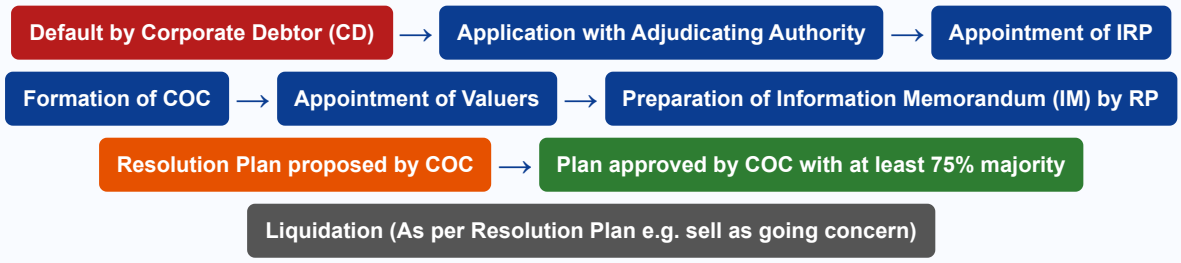
The Insolvency and Bankruptcy Code (IBC) 2016 aims to consolidate the laws relating to insolvency of companies and limited liability entities (including limited liability partnerships and other entities with limited liability), unlimited liability partnerships and individuals, contained in several legislations, into a single legislation and provide for their reorganization and resolution in a time bound manner for maximization of value of their assets. Such consolidation provides for a greater clarity in law and facilitates the application of consistent and coherent provisions to different stakeholders affected by business failure or inability to pay debt.

The Code separates commercial aspects of the insolvency proceedings from judicial aspects. The Code also provides a fast-track insolvency resolution process for corporates and LLPs. This is an enabler for start-ups and small and medium enterprises (SMEs) to complete the resolution process in 90 days (extendable to 45 days in deserving cases).

6.1.3 Insolvency Resolution Process

An application to initiate an Insolvency Resolution Process under the Code can be either made by the debtor (personally or through an insolvency resolution professional) or by a creditor (either personally or jointly with other creditors through an insolvency resolution professional). However, a partner of a partnership firm is not eligible to apply for an IRP unless a joint application is filed by majority of the partners of the partnership firm.

Fig 6.1: Insolvency Resolution Process



Where any corporate debtor commits a default, a financial creditor, an operational creditor or the corporate debtor itself may initiate CIRP in respect of such corporate debtor in the manner as provided under this Chapter.

- The minimum amount of default for being admitted into Corporate Insolvency Resolution Process (CIRP) is ₹1 crore.

- The CIRP shall be completed within a period of 180 days from the date of admission of the application to initiate such process. This can be extended if at least 66 percent voting of Committee of Creditors (COC).
- "Resolution plan" means a plan proposed by resolution applicant for insolvency resolution of the corporate debtor as a going concern. A resolution plan may include provisions for the restructuring of the corporate debtor, including by way of merger, amalgamation and demerger.
- From the date of appointment of the interim resolution professional, the management of the affairs of the corporate debtor shall vest in the interim resolution professional. The interim resolution professional shall make every endeavour to protect and preserve the value of the property of the corporate debtor and manage the operations of the corporate debtor as a going concern.

6.1.4 Liquidation

If the COC cannot agree on a workable resolution plan within the IRP Period (i.e., 180 days extendable once by another 90 days), the COC decides to liquidate the company, NCLT rejects the resolution plan; or the corporate debtor contravenes provisions of the resolution plan, the NCLT shall:

1. (i) pass an order requiring liquidation of corporate debtor;
2. (ii) make a public announcement of corporate debtor entering liquidation; and
3. (iii) require a liquidation order to be sent to the registering authority of the corporate debtor (for example Registrar of Companies in case of companies incorporated under Companies Act).

The IP acting as the resolution professional shall, upon commencement of liquidation shall be appointed as the liquidator for the process, unless replaced by NCLT.

Liquidation Process

The liquidation process starts with the winding up order and ends with the order of dissolution of the corporate debtor. It involves realization of the assets of the entity in liquidation and distribution of the realization proceeds among the creditors and other stakeholders who have claim to share the proceeds and other incidental activities by virtue of the liquidator being the trustee for the stakeholders as discussed hereunder:

Distribution of Assets and Other Aspects

Section 53 of the Code stipulates in case of liquidation, the assets of the corporate debtor will be sold and the proceeds will be distributed amongst the creditors in the following order of priority:

Priority	Category
(a)	Cost of the insolvency resolution process and liquidation;
(b)	Secured creditors (who choose to relinquish their security enforcement rights and workmen's dues relating to a period of 24 months preceding the liquidation commencement date);
(c)	Wages and unpaid dues of employees (other than workmen) for a period of 12 months preceding the liquidation commencement date;
(d)	Financial debts owed to unsecured creditors;
(e)	Statutory dues to be received on account of Consolidated Fund of India or Consolidated Fund of a State (relating to a period of whole or part of 2 years preceding the liquidation commencement date) and debts of secured creditors (remaining unpaid after enforcement of security);
(f)	Remaining debts and dues;
(g)	Dues of preference shareholders; and
(h)	Dues of equity shareholders or partners (as may be applicable)

Dissolution of Corporate Debtor

Where the assets of the corporate debtor have been completely liquidated, the liquidator shall make an application to NCLT for the dissolution of such corporate debtor and NCLT shall order that the corporate debtor shall be dissolved from the date of that order and the corporate debtor shall be dissolved accordingly.

Voluntary Liquidation of Corporate Persons

A corporate person (which includes companies as well as LLPs) may put the entity into voluntary winding up. The conditions and procedural requirements that may be specified by the Board.

Procedure for voluntary liquidation:

Declaration of Solvency to be made by the majority of Directors

Majority of directors of the company/entity must make a declaration verified by an affidavit stating that-

1. (a) they have made a full inquiry into the affairs of the company and they have formed an opinion that either the company has no debt or that it will be able to pay its debts in full from the proceeds of assets sold/ to be sold in the voluntary winding up; and
2. (b) the company is not being liquidated to defraud any person

6.1.5 Regulations Pertaining to Valuer

"Registered valuer" means a person registered as such in accordance with the Companies Act 2013 (18 of 2013) and rules made thereunder – Reg. 2(1)(m);

The interim resolution professional shall within seven days of his appointment, appoint two registered valuers to determine the liquidation value of the corporate debtor.

Liquidation Value - Reg. 35

1. (a) Liquidation value is the estimated realizable value of the assets of the corporate debtor if the corporate debtor were to be liquidated on the insolvency commencement date.
2. (b) Liquidation value shall be determined in the following manner:
    - (i) the two registered valuers appointed under Regulation 27 shall submit an estimate of the liquidation value computed in accordance with internationally accepted valuation standards, after physical verification of the inventory and fixed assets of the corporate debtor;
    - (ii) if in the opinion of resolution professional (RP), as the case may be, the two estimates are significantly different, he may appoint another registered valuer who shall submit an estimate computed in the same manner; and
    - (iii) the average of the two closest estimates shall be considered the liquidation value.

Insolvency and Bankruptcy Board of India (Liquidation Process) Regulation, 2016 - Valuation of Assets Intended to be Sold - Reg.35

The liquidator shall appoint at least two registered valuers to value the assets.

The registered valuers shall independently submit to the liquidator the estimates of the realizable value of the asset(s) computed in accordance with internationally accepted valuation standards, after physical verification of the assets of the corporate debtor.

Voluntary Liquidation of Corporate Person - Section 59(3)

Voluntary liquidation proceedings of a corporate person registered as a company shall be accompanied with:

- a declaration from majority of the directors of the company verified by an affidavit stating that they have made a full inquiry into the affairs of the company and they have formed an opinion that either the company has no debt or that it will be able to pay its debts in full from the proceeds of assets to be sold in the voluntary liquidation;
- a report of the valuation of the assets of the company, if any prepared by a registered valuer.

Insolvency and Bankruptcy Board of India (Voluntary Liquidation Process) Regulation, 2017

Final Report - Reg. 38(1)(c): On completion of the liquidation process, the liquidator shall prepare the Final Report consisting of a sale statement in respect of all assets containing:

1. (i) the realized value;
2. (ii) cost of realization, if any;
3. (iii) the manner and mode of Sale;
4. (iv) an explanation for the shortfall, if the value realized is less than the value assigned by the registered valuer in the report of the valuation of assets;
5. (v) the person to whom the sale is made; and
6. (vi) any other relevant details of the sale.

Multiple Choice Questions – 6.1

1. Under the Insolvency and Bankruptcy Code, which of the following does not lead to the liquidation of a company?

A. The COC cannot agree on a resolution plan within the IRP Period B. The corporate debtor contravenes provisions of the resolution plan C. NCLT approves the resolution plan D. NCLT rejects the resolution plan

Answer: C. NCLT approves the resolution plan

2. What is the purpose of appointing two registered valuers in the liquidation process under Insolvency and Bankruptcy Code?

A. To determine the liquidation value of the corporate debtor B. To decide the value of secured creditors C. To appraise the worth of the insolvent for future reference D. To estimate the total value of assets and debts of the insolvent

Answer: A. To determine the liquidation value of the corporate debtor

3. What does a resolution plan under the Insolvency and Bankruptcy Code include?

A. A repayment schedule for the corporate debtor B. Procedures for the restructuring of the corporate debtor C. Details of the winding up order D. Declaration of insolvency of the corporate debtor by the court

Answer: B. Procedures for the restructuring of the corporate debtor

4. Which of the following statements about the Insolvency and Bankruptcy Code is inaccurate?

A. The Code separates commercial aspects of the insolvency proceedings from judicial aspects B. The Code provides for a fast-track insolvency resolution process for corporates and LLPs C. An application to initiate an Insolvency Resolution Process under the Code can be made only by the debtor individually D. A resolution plan may include provisions for the restructuring of the corporate debtor

Answer: C. An application to initiate an Insolvency Resolution Process under the Code can be made only by the debtor individually

5. Under the Insolvency and Bankruptcy Code, if the two registered valuers' estimates are significantly different, the resolution professional...

A. has to choose the highest estimate B. must reduce the liquidation value by the difference C. is required to invalidate both estimates D. can appoint another registered valuer

Answer: D. can appoint another registered valuer

6.2 The Companies Act, 2013 – Select Sections

6.2.1 Section 192: Restriction on Non-Cash Transactions Involving Directors

Where a Company enters into an agreement by which-

1. (i) a director of the company or its holding, subsidiary or associate company or a person connected with him acquires or is to acquire assets for consideration other than cash, from the company; or
2. (ii) the company acquires or is to acquire assets for consideration other than cash, from such director or person so connected.

The company needs prior approval for such arrangement accorded by a resolution of the company in general meeting. In case the director or connected person is a director of its holding company, approval shall also be required to be obtained by passing a resolution in general meeting of the holding company. The notice for approval of the resolution by the company or holding company in general meeting shall include the particulars of the arrangement along with the value of the assets involved in such arrangement duly calculated by a **registered valuer**.

Any arrangement entered into by a company or its holding company in contravention of the provisions of this section shall be **voidable at the instance of the company**.

The arrangement will be valid if:

- the restitution of any money or other consideration which is the subject matter of the arrangement is no longer possible and the company has been indemnified by any other person for any loss or damage caused to it; or
- any rights are acquired bona fide for value and without notice of the contravention of the provisions of this section by any other person.

6.2.2 Sections 230-232: Compromise, Arrangement, Merger and Amalgamation

Section 230 to 240 of the Companies Act, 2013 cover the statutory provisions governing M&As including arrangements involving companies, their members and creditors. These sections deal comprehensively with all forms of compromises as well as arrangements, and extends to the reduction of share capital, buy-back, takeovers and corporate debt restructuring as well. Objection to any compromise or arrangement can be made only by persons holding not less than 10% of share holding or having an outstanding debt amounting to not less than 5% of the total outstanding debt as per the latest audited financial statements. The 2013 Act requires all companies undertaking any compromise or arrangement to obtain an auditor's certificate. This requirement helps in streamlining the varied practices as well as ensuring appropriate accounting treatment.

The Act simplified the procedures in two areas, firstly, for holding wholly owned subsidiaries and secondly, for arrangements between small companies (section 233). Small companies have defined capital and turnover thresholds, and have been given certain benefits, including simplified procedures.

Section 230(1): Tribunal to Order Meeting of Members/Creditors, etc.

When a compromise or arrangement is proposed—

1. (i) between a company and its creditors or any class of them; or
2. (ii) between a company and its members or any class of them,

the Tribunal may, on the application of the company, or any creditor or member of the company, or in the case of a company which is being wound up, of the liquidator, appointed under this Act or under Insolvency and Bankruptcy Code, 2016 order a meeting of the creditors or class of creditors, or of the members or class of members, as the case may be, to be called, held and conducted in such manner as the Tribunal directs.

For the purposes of this sub-section, arrangement includes a reorganisation of the company's share capital by the consolidation of shares of different classes or by the division of shares into shares of different classes, or by both these methods.

Section 230(2): Affidavit by the Applicant to Disclose Certain Material Facts

The company or any other person, by whom an application is made under 230(1), shall disclose to the Tribunal by affidavit—

1. (a) all material facts relating to the company, such as the latest financial position of the company, the latest auditor's report on the accounts of the company and the pendency of any investigation or proceedings against the company;
2. (b) reduction of share capital of the company, if any, included in the compromise or arrangement;
3. (c) any scheme of corporate debt restructuring consented to by not less than seventy-five per cent of the secured creditors in value, including—

- (i) a creditors' responsibility statement in the prescribed form;
- (ii) safeguards for the protection of other secured and unsecured creditors;
- (iii) report by the auditor that the fund requirements of the company after the corporate debt restructuring as approved shall conform to the liquidity test based upon the estimates provided to them by the Board;
- (iv) where the company proposes to adopt the corporate debt restructuring guidelines specified by the Reserve Bank of India, a statement to that effect; and
- (v) a valuation report in respect of the shares and the property and all assets, tangible and intangible, movable and immovable, of the company by a **registered valuer**.

Section 230(3): Notice of the Meeting

When a meeting is proposed to be called in pursuance of an order of the Tribunal under 230(1), a notice of such meeting shall be sent to all the creditors or class of creditors and to all the members or class of members and the debenture-holders of the company, individually at the address registered with the company which shall be accompanied by:

- a statement disclosing the details of the compromise or arrangement,
- a copy of the valuation report, if any, and
- explaining their effect on creditors, key managerial personnel, promoters and non-promoter members, and the debenture-holders, and
- the effect of the compromise or arrangement on any material interests of the directors of the company or the debenture trustees, and
- such other matters as may be prescribed:

Such notice and other documents shall also be placed on the website of the company, if any, and in case of a listed company, these documents shall be sent to the Securities and Exchange Board and stock exchange where the securities of the companies are listed, for placing on their website and shall also be published in newspapers in such manner as may be prescribed:

When the notice for the meeting is also issued by way of an advertisement, it shall indicate the time within which copies of the compromise or arrangement shall be made available to the concerned persons free of charge from the registered office of the company.

Section 231: Power of the Tribunal to Enforce Compromise or Arrangement

231(1): When the Tribunal makes an order under section 230 sanctioning a compromise or an arrangement in respect of a company, it—

- shall have power to supervise the implementation of the compromise or arrangement; and
- may, at the time of making such order or at any time thereafter, give such directions in regard to any matter or make such modifications in the compromise or arrangement as it may consider necessary for the proper implementation of the compromise or arrangement.

231(2): If the Tribunal is satisfied that the compromise or arrangement sanctioned under section 230 cannot be implemented satisfactorily with or without modifications, and the company is unable to pay its debts as per the scheme, it may make an order for winding-up the company and such an order shall be deemed to be an order made under section 273.

Section 232: Merger and Amalgamation of Companies

232(1) Tribunal's Power to Call Meeting of Creditors or Members: When an application is made to the Tribunal under section 230 for the sanctioning of a compromise or an arrangement proposed between a company and any such persons as are mentioned in that section, and it is shown to the Tribunal—

1. (i) that the compromise or arrangement has been proposed for the purposes of, or in connection with, a scheme for the reconstruction of the company or companies involving merger or the amalgamation of any two or more companies; and
2. (ii) that under the scheme, the whole or any part of the undertaking, property or liabilities of any company (hereinafter referred to as the transferor company) is required to be transferred to another company (hereinafter referred to as the transferee company), or is proposed to be divided among and transferred to two or more companies,

the Tribunal may on such application, order a meeting of the creditors or class of creditors or the members or class of members, as the case may be, to be called, held and conducted in such manner as the Tribunal may direct and the provisions of sub-sections (3) to (6) of section 230 shall apply mutatis mutandis.

232(2) Circulation of Documents for Members'/Creditors' Meeting: When an order has been made by the Tribunal under 232(1), merging companies or the companies in respect of which a division is proposed, shall also be required to circulate the following for the meeting so ordered by the Tribunal, namely:—

1. (i) the draft of the proposed terms of the scheme drawn up and adopted by the directors of the merging company;
2. (ii) confirmation that a copy of the draft scheme has been filed with the Registrar;
3. (iii) a report adopted by the directors of the merging companies explaining effect of compromise on each class of shareholders, key managerial personnel, promoters and non-promoter shareholders laying out in particular the share exchange ratio, specifying any special valuation difficulties;
4. (iv) the report of the expert with regard to valuation, if any;
5. (v) a supplementary accounting statement if the last annual accounts of any of the merging company relate to a financial year ending more than six months before the first meeting of the company summoned for the purposes of approving the scheme.

232(3) Sanctioning of Scheme by Tribunal: The Tribunal, after satisfying itself that the procedure specified in 232(1) and 232(2) has been complied with, may, by order, sanction the compromise or arrangement or by a subsequent order, make provision for the following matters, namely:—

1. (i) the transfer to the transferee company of the whole or any part of the undertaking, property or liabilities of the transferor company from a date to be determined by the parties unless the Tribunal, for reasons to be recorded by it in writing, decides otherwise;
2. (ii) the allotment or appropriation by the transferee company of any shares, debentures, policies or other like instruments in the company which, under the compromise or arrangement, are to be allotted or appropriated by that company to or for any person:

   A transferee company shall not, as a result of the compromise or arrangement, hold any shares in its own name or in the name of any trust whether on its behalf or on behalf of any of its subsidiary or associate companies and any such shares shall be cancelled or extinguished;
3. (iii) the continuation by or against the transferee company of any legal proceedings pending by or against any transferor company on the date of transfer;
4. (iv) dissolution, without winding-up, of any transferor company;
5. (v) the provision to be made for any persons who, within such time and in such manner as the Tribunal directs, dissent from the compromise or arrangement;
6. (vi) where share capital is held by any non-resident shareholder under the foreign direct investment norms or guidelines specified by the Central Government or in accordance with any law for the time being in force, the allotment of shares of the transferee company to such shareholder shall be in the manner specified in the order;
7. (vii) the transfer of the employees of the transferor company to the transferee company;
8. (viii) when the transferor company is a listed company and the transferee company is an unlisted company,—
   - (a) the transferee company shall remain an unlisted company until it becomes a listed company;
   - (b) if shareholders of the transferor company decide to opt out of the transferee company, provision shall be made for payment of the value of shares held by them and other benefits in accordance with a pre-determined price formula or after a valuation is made, and the arrangements under this provision may be made by the Tribunal:

The amount of payment or valuation under this clause for any share shall not be less than what has been specified by the Securities and Exchange Board under any regulations framed by it;

9. (ix) where the transferor company is dissolved, the fee, if any, paid by the transferor company on its authorised capital shall be set-off against any fees payable by the transferee company on its authorised capital subsequent to the amalgamation; and
10. (x) such incidental, consequential and supplemental matters as are deemed necessary to secure that the merger or amalgamation is fully and effectively carried out.

No compromise or arrangement shall be sanctioned by the Tribunal unless a certificate by the company's auditor has been filed with the Tribunal to the effect that the accounting treatment, if any, proposed in the scheme of compromise or arrangement is in conformity with the accounting standards prescribed under section 133.

232(4) Transfer of Property or Liabilities: An order under this section provides for the transfer of any property or liabilities, then, by virtue of the order, that property shall be transferred to the transferee company and the liabilities shall be transferred to and become the liabilities of the transferee company and any property may, if the order so directs, be freed from any charge which shall by virtue of the compromise or arrangement, cease to have effect.

232(5) Certified Copy of the Order to be Filed with the Registrar: Every company in relation to which the order is made shall cause a certified copy of the order to be filed with the Registrar for registration within thirty days of the receipt of certified copy of the order.

232(6) Effective Date of the Scheme: The scheme under this section shall clearly indicate an appointed date from which it shall be effective and the scheme shall be deemed to be effective from such date and not at a date subsequent to the appointed

date.

232(7) Annual Statement Certified by CA/CS/Cost Accountant to be Filed with Registrar Every Year: Every company in relation to which the order is made shall, until the completion of the scheme, file a statement in such form and within such time as may be prescribed with the Registrar every year duly certified by a chartered accountant or a cost accountant or a company secretary in practice indicating whether the scheme is being complied with in accordance with the orders of the Tribunal or not.

232(8) Punishment: If a transferor company or a transferee company contravenes the provisions of this section, the transferor company or the transferee company, as the case may be, shall be punishable with fine which shall not be less than one lakh rupees but which may extend to twenty-five lakh rupees and every officer of such transferor or transferee company who is in default, shall be punishable with imprisonment for a term which may extend to one year or with fine which shall not be less than one lakh rupees but which may extend to three lakh rupees, or with both.

Explanation under Section 232

For the purpose of the Section, —

1. (i) in a scheme involving a merger, where under the scheme the undertaking, property and liabilities of one or more companies, including the company in respect of which the compromise or arrangement is proposed, are to be transferred to another existing company, it is a **merger by absorption**, or where the undertaking, property and liabilities of two or more companies, including the company in respect of which the compromise or arrangement is proposed, are to be transferred to a new company, whether or not a public company, it is a **merger by formation of a new company**;
2. (ii) references to merging companies are in relation to a merger by absorption, to the transferor and transferee companies, and, in relation to a merger by formation of a new company, to the transferor companies;
3. (iii) a scheme involves a division, where under the scheme the undertaking, property and liabilities of the company in respect of which the compromise or arrangement is proposed are to be divided among and transferred to two or more companies each of which is either an existing company or a new company; and
4. (iv) property includes assets, rights and interests of every description and liabilities include debts and obligations of every description.

6.2.3 Section 247: Valuation by Registered Valuers

Where a valuation is required to be made in respect of any property, stocks, shares, debentures, securities or goodwill or any other assets ("assets") or net worth of a company or its liabilities under the provision of this Act, it shall be valued by a person having such qualifications and experience, registered as a valuer and being a member of an organisation recognised, in such manner, on such terms and conditions as may be prescribed and appointed by the audit committee or in its absence by the Board of Directors of that company.

(a) The valuer appointed under sub-section (1) shall—

1. (i) make an impartial, true and fair valuation of any assets which may be required to be valued;
2. (ii) exercise due diligence while performing the functions as valuer;
3. (iii) make the valuation in accordance with such rules as may be prescribed; and
4. (iv) not undertake valuation of any assets in which he has a direct or indirect interest or becomes so interested at any time during a period of three years prior to his appointment as valuer or three years after the valuation of assets was conducted by him.

(b) If a valuer contravenes the provisions of this section or the rules made thereunder, the valuer shall be liable to a penalty of fifty thousand rupees. Provided that if the valuer has contravened such provisions with the intention to defraud the company or its members, he shall be punishable with imprisonment for a term which may extend to one year and with fine which shall not be less than one lakh rupees but which may extend to five lakh rupees.

(c) Where a valuer has been convicted under 247(3), he shall be liable to—

1. (i) refund the remuneration received by him to the company; and
2. (ii) pay for damages to the company or to any other person for loss arising out of incorrect or misleading statements of particulars made in his report.

6.2.4 Section 281(1): Submission of Report by Company Liquidator (Extract)

Where the Tribunal has made a winding up order or appointed a Company Liquidator, such liquidator shall, within sixty days from the order, submit to the Tribunal, a report containing the following particulars, namely: —

1. (a) the nature and details of the assets of the company including their location and value, stating separately the cash balance in hand and in the bank, if any, and the negotiable securities, if any, held by the company: Provided that the

valuation of the assets shall be obtained from registered valuers for this purpose;

2. (b) amount of capital issued, subscribed and paid-up;
3. (c) the existing and contingent liabilities of the company including names, addresses and occupations of its creditors, stating separately the amount of secured and unsecured debts, and in the case of secured debts, particulars of the securities given, whether by the company or an officer thereof, their value and the dates on which they were given;
4. (d) the debts due to the company and the names, addresses and occupations of the persons from whom they are due and the amount likely to be realised on account thereof;
5. (e) guarantees, if any, extended by the company;
6. (f) list of contributories and dues, if any, payable by them and details of any unpaid call;
7. (g) details of trademarks and intellectual properties, if any, owned by the company;
8. (h) details of subsisting contracts, joint ventures and collaborations, if any;
9. (i) details of holding and subsidiary companies, if any;
10. (j) details of legal cases filed by or against the company; and
11. (k) any other information which the Tribunal may direct or the Company Liquidator may consider necessary to include.

Multiple Choice Questions – 6.2

1. In the context of Non-Cash Transactions Involving Directors, which of the following approvals are required?

A. Approval from the Board of Directors B. Approval from a resolution of the company in general meeting C. A written consent from all the stakeholders involved D. None of the above

Answer: B. Approval from a resolution of the company in general meeting

2. Which type of valuation report is required for the shares and the property and all assets tangible and intangible movable and immovable of the company?

A. A valuation report by a registered accountant B. A valuation report by a registered auditor C. A valuation report by a registered valuer D. A valuation report by a registered financial expert

Answer: C. A valuation report by a registered valuer

3. What is the punishment for contravening the provisions of section 361?

A. Fine not less than one lakh rupees but which may extend to twenty-five lakh rupees B. Imprisonment for a term which may extend to two years C. Both fine and imprisonment D. Only a formal warning.

Answer: A. Fine not less than one lakh rupees but which may extend to twenty-five lakh rupees

4. What is meant by a merger by absorption in the context of the Companies Act?

A. A scheme where the undertaking, property and liabilities of one or more companies are transferred to another existing company B. A scheme where the undertaking, property and liabilities of two or more companies are transferred to a new company C. A scheme where the values of the assets of two companies are added together D. A scheme where the liabilities of two or more companies are shared.

Answer: A. A scheme where the undertaking, property and liabilities of one or more companies are transferred to another existing company

5. According to section 247, who can conduct the valuation in respect of any property, stocks, shares, debentures, securities or goodwill or any other assets/assets or net worth of a company or its liabilities?

A. A registered accountant with specific qualifications and experience B. The company's auditor C. A registered valuer with specific qualifications and experience D. The company's chief financial officer.

Answer: C. A registered valuer with specific qualifications and experience

6.3 Companies (Registered Valuers and Valuation) Rules, 2017

The students are encouraged to go through the entire Rules from mca.gov.in or a credible source. An extract of the rules is summarised below.

6.3.1 Rule 2: Important Definitions

Rule	Definition
2(c) Asset Class	Means a distinct group of assets, such as land and building, machinery and equipment, displaying similar characteristics, that can be classified and requires separate set of valuers for valuation
2(e) Certificate of Registration	Means the certificate of recognition granted to a registered valuers organisation under sub-rule (5) of rule 13 and the term "recognition" shall be construed accordingly;
2(f) Partnership Entity	Means a partnership firm registered under the Indian Partnership Act, 1932 (9 of 1932) or a limited liability partnership registered under the Limited Liability Partnership Act, 2008 (6 of 2009)
2(j) Valuer	Means a person registered with the authority in accordance with these rules and the term "registered valuer" shall be construed accordingly.

6.3.2 Rule 3: Eligibility for Registered Valuers

(a) A person shall be eligible to be a registered valuer if he—

1. (i) is a valuer member of a RVO
2. (ii) is recommended by RVO
3. (iii) has passed the valuation examination under rule 5 within three years
4. (iv) possesses the qualifications and experience as specified in rule 4
5. (v) is not a minor
6. (vi) is not of unsound mind
7. (vii) is not an undischarged bankrupt, or has not applied to be adjudicated as a bankrupt
8. (viii) is a person resident in India (as per FEMA regulations)
9. (ix) has not been convicted by any competent court for an offence punishable with imprisonment for a term exceeding six months or for an offence involving moral turpitude, and a period of five years has not elapsed from the date of expiry of the sentence: Provided that if a person has been convicted of any offence and sentenced in respect thereof to imprisonment for a period of seven years or more, he shall not be eligible to be registered;
10. (x) has not been levied a penalty under section 271J of Income-tax Act, 1961 and time limit for filing appeal before Commissioner of Income-tax (Appeals) or Income-tax Appellate Tribunal, as the case may be has expired, or such penalty has been confirmed by Income-tax Appellate Tribunal, and five years have not elapsed after levy of such penalty; and
11. (xi) is a fit and proper person

(b) No partnership entity or company shall be eligible to be a registered valuer if—

1. (i) it has been set up for objects other than for rendering professional or financial services, including valuation services and that in the case of a company, it is a subsidiary, joint venture or associate of another company or body corporate;
2. (ii) it is undergoing an insolvency resolution or is an undischarged bankrupt;
3. (iii) all the partners or directors, as the case may be, are not ineligible under clauses (c), (d), (e), (f), (g), (h), (i), (j) and (k) of sub-rule (1);
4. (iv) three or all the partners or directors, whichever is lower, of the partnership entity or company, as the case may be, are not registered valuers; or
5. (v) none of its partners or directors, as the case may be, is a registered valuer for the asset class, for the valuation of which it seeks to be a registered valuer.

6.3.3 Rule 4: Qualification and Experience

Asset Class	Eligibility - Qualifications	Experience in specified discipline
Plant & machinery	(i) Graduate in Mechanical, Electrical, Electronic and Communication, Electronic and Instrumentation, Production, Chemical, Textiles, Leather, Metallurgy, or Aeronautical Engineering, or Graduate in Valuation of Plant and Machinery or equivalent;	5 Years
	(ii) Post-Graduate on above courses	3 Years
Land & Building	(i) Graduate in Civil Engineering, Architecture, Town Planning or equivalent;	5 Years
	(ii) Post-Graduate on above courses and also in valuation of land and building or Real Estate Valuation (a two-year full time post-graduation course).	3 Years
Securities & Financial Assets	(i) Member of Institute of Chartered Accountants of India, Member of Institute of Company Secretaries of India, Member of the Institute of Cost Accountants of India, Master of Business Administration or Post Graduate Diploma in Business Management (specialisation in finance) or	3 Years
	(ii) Post-Graduate in Finance	

Additional clarifications:

- Post-Graduate degree / diploma in the specified discipline with minimum 3 years of post-qualification experience
- Bachelors degree or equivalent in the specified discipline with minimum 5 years of post-qualification experience
- Member of a professional institute established by an act of parliament (i.e., CS, CMA, CA) with minimum 3 years of post-qualification experience

Specified discipline - shall mean the specific discipline which is relevant for valuation of an asset class for which the registration as a valuer or recognition as a registered valuers organisation is sought under these rules.

Qualifying education and experience and examination or training for various asset classes, is given in an indicative manner in Annexure—IV of these rules.

6.3.4 Rule 5: Valuation Examination

1. (a) The authority shall, either on its own or through a designated agency, conduct valuation examination for one or more asset classes, for individuals, qualifications and experience as specified in rule 4, and have completed their educational courses as member of a registered valuers organisation, to knowledge, skills, values and ethics in respect of valuation:
2. (b) The authority shall determine the syllabus for various valuation specific subjects or assets classes for the valuation examination on the recommendation Committee of experts constituted by the authority in this regard.
3. (c) The syllabus, format and frequency of the valuation examination, including qualifying marks, shall be published on the website of the authority.
4. (d) An individual who passes the valuation examination, shall receive acknowledgement of passing the examination.
5. (e) An individual may appear for the valuation examination any number of times.

[Currently, aspiring Registered Valuers must undergo 50 hours of educational course from their respective RVO].

6.3.5 Rule 6: Application for Certificate of Registration

1. (a) Eligible Individual: Application in Form A along with application fee of INR 5000
2. (b) Eligible Partnership Firm or Company: Application in Form-B with application fee of INR 10,000.
3. (c) 21 days to remove the deficiencies in application; additional documents or clarification within 21 days; 21 days to appear (in person or through representatives) for clarifications required for processing the application
4. (d) Authority to grant certificate in Form C of the Annexure II within 60 days, if satisfied
5. (e) Reasons for not granting to be communicated within 45 days from receipt of application (excluding the time given for clarifications)
6. (f) Applicant to reply within 15 days
7. (g) Accept or reject within 30 days

6.3.6 Rule 7: Conditions for Registration

The valuer shall:

1. (a) be always eligible as per rule 3 and 4
2. (b) must comply with the bye laws
3. (c) Not to conduct valuation of other classes other than for which he/it has been registered
4. (d) Take prior permission to port to another RVO
5. (e) Maintain records for 3 years
6. (f) Comply with code of conduct of each RVO
7. (g) Only partner or director to sign the documents
8. (h) Company/Partnership firm is jointly and severally liable along with Partner/Director who signs
9. (i) Company and director who signs are liable jointly and severally
10. (j) Inform the authority for any removal of Partners or Director immediately

6.3.7 Rule 8: Conduct of Valuation

The registered valuer shall conduct a valuation as per valuation standards as notified or modified under rule 18. Till notified, a valuer shall make valuations as per—

1. (i) internationally accepted valuation standards;
2. (ii) valuation standards adopted by any registered valuers organisation (RVO)

The registered valuer may obtain inputs for his valuation report or get a separate valuation for an asset class conducted from another registered valuer, in which case he shall fully disclose the details of the inputs and the particulars etc. of the other registered valuer in his report and the liabilities against the resultant valuation, irrespective of the nature of inputs or valuation by the other registered valuer, shall remain of the first mentioned registered valuer.

Contents of Valuation Report:

1. (i) background information of the asset being valued
2. (ii) purpose of valuation and appointing authority
3. (iii) identity of the valuer and any other experts involved in the valuation
4. (iv) disclosure of valuer interest or conflict, if any
5. (v) date of appointment, valuation date and date of report
6. (vi) inspections and/or investigations undertaken
7. (vii) nature and sources of the information used or relied upon
8. (viii) procedures adopted in carrying out the valuation and valuation standards followed
9. (ix) restrictions on use of the report, if any
10. (x) major factors that were taken into account during the valuation
11. (xi) conclusion
12. (xii) caveats, limitations and disclaimers

6.3.8 Other Rules

- (a) Temporary surrender
- (b) Functions of a Valuer
- (c) Transitional Arrangement
- (d) Eligibility for registered valuers organisations
- (e) Application for recognition
- (f) Conditions of Recognition
- (g) Cancellation or suspension of certificate of registration or recognition
- (h) Complaint against a registered valuer or registered valuers organisation
- (i) Procedure to be followed for cancellation or suspension of registration or recognition certificate
- (j) Valuation Standards
- (k) Committee to advise on valuation matters
- (l) Punishment for contravention
- (m) Punishment for false statement.

Multiple Choice Questions – 6.3

1. What does 'Asset Class' as mentioned in Important Definitions refer to?

A. A specific type of investment, such as stocks or bonds B. A distinct group of assets such as land and building machinery and equipment C. The class of assets that are non-depreciable D. The classification of assets based on their market volatility

Answer: B. A distinct group of assets such as land and building machinery and equipment

2. Under Rule for Eligibility for Registered Valuers, what is one of the conditions for a person to be eligible as registered valuer?

A. The person should be a minor B. The person should have been convicted of an offence involving moral turpitude C. The person should be a person resident outside India as per FEMA regulations D. The person should have passed the valuation examination under rule within three years

Answer: D. The person should have passed the valuation examination under rule within three years

3. What is the eligibility criteria specified under Rule for a company to be a registered valuer?

A. All the partners or directors should be ineligible under clauses (c to k) of sub-rule B. None of its partners or directors is a registered valuer for the asset class for the valuation of which it seeks to be registered C. It should be undergoing an insolvency resolution D. It should have been set up for objects other than for rendering professional or financial services

Answer: B. None of its partners or directors is a registered valuer for the asset class for the valuation of which it seeks to be registered

4. Under Rule of Conduct of Valuation, what is the professional responsibility of a registered valuer while conducting a valuation?

A. The valuer need not follow any specific standard while conducting valuation B. The valuer can conduct valuation of any classes, regardless of their registration C. The valuer should conduct valuation in accordance with valuation standards as notified or modified D. The valuer can use their discretion in choosing the valuation methods and procedures

Answer: C. The valuer should conduct valuation in accordance with valuation standards as notified or modified

5. Under Rule of Conditions for Registration, what is stated about the liability of the registered valuer?

A. The registered valuer is not responsible for any errors in valuation B. The Company and director who signs are not liable jointly and severally C. The registered valuer is solely responsible for the valuations conducted by them D. The Company and director who signs are liable jointly and severally.

Answer: D. The Company and director who signs are liable jointly and severally.

6.4 SARFAESI Act, 2002 on Valuation

6.4.1 Introduction

The Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act, 2002 is a legislation that helps financial institutions to ensure asset quality in multiple ways. The Act was framed to address the problem of Non-Performing Assets (NPAs) or bad assets through different processes and mechanisms. The enactment of the SARFAESI Act, 2002 enabled banks and financial institutions to sell off their NPAs to asset reconstruction companies registered with RBI.

The SARFAESI Act gives detailed provisions for the formation and activities of Asset Securitization Companies (ASCs) and Asset Reconstruction Companies (ARCs). RBI is the regulator for these institutions. As a legal mechanism to insulate assets, the Act addresses the interests of secured creditors (like banks). Several provisions of the Act give directives and powers to various institutions to manage the bad asset problem. The Act permits banks and other financial institutions to recover loans by auctioning off the defaulter's residential or commercial assets. Under this Act, India's first Asset Reconstruction Corporation (ARC), ARCIL, was established.

6.4.2 Objectives

The main purpose of the SARFAESI Act is to enable and empower the secured creditors to take possession of their securities and to deal with them without the intervention of the court and also alternatively to authorise any securitisation or reconstruction company to acquire financial assets of any bank or financial institution.

Following are the main objectives of the SARFAESI Act.

- The Act provides the legal framework for securitization activities in India
- It gives the procedures for the transfer of NPAs to asset reconstruction companies for the reconstruction of the assets.
- The Act enforces the security interest without Court's intervention
- The Act gives powers to banks and financial institutions to take over the immovable property that is hypothecated or charged to enforce the recovery of debt.

The Act provides three methods for recovery of NPAs, viz:

1. (a) Securitization;
2. (b) Asset Reconstruction; and
3. (c) Enforcement of Security without the intervention of the Court.

6.4.3 Key Terms

Term	Definition
"borrower"	Means any person who has been granted financial assistance by any bank or financial institution or who has given any guarantee or created any mortgage or pledge as security for the financial assistance granted by any bank or financial institution and includes a person who becomes borrower of a asset reconstruction company consequent upon acquisition by it of any rights or interest of any bank or financial institution in relation to such financial assistance or who has raised funds through issue of debt securities.
"debt"	Shall have the meaning assigned to it in clause (g) of section 2 of the Recovery of Debts Due to Banks and Financial Institutions Act, 1993 (51 of 1993) and includes – (i) unpaid portion of the purchase price of any tangible asset given on hire or financial lease or conditional sale or under any other contract; (ii) any right, title or interest on any intangible asset or licence or assignment of such intangible asset, which secures the obligation to pay any unpaid portion of the purchase price of such intangible asset or an obligation incurred or credit otherwise extended to enable any borrower to acquire the intangible asset or obtain licence of such asset;
"Debts Recovery Tribunal"	Means the Tribunal established under sub-section (1) of section 3 of the Recovery of Debts Due to Banks and Financial Institutions Act, 1993; name changed Recovery of Debts and Bankruptcy Act, 1993
"default"	Means – non-payment of any debt or any other amount payable by the borrower to any secured creditor consequent upon which the account of such borrower is classified as non-performing asset in the books of account of the secured creditor; or non-payment of any debt or any other amount payable by the borrower with respect to debt securities after notice of ninety days demanding payment of dues served upon such borrower by the debenture trustee or any other authority in whose favour security interest is created for the benefit of holders of such debt securities;
"financial asset"	Means debt or receivables and includes – (i) a claim to any debt or receivables or part thereof, whether secured or unsecured; or (ii) any debt or receivables secured by, mortgage of, or charge on, immovable property; or (iii) a mortgage, charge, hypothecation or pledge of movable property; or (iv) any right or interest in the security, whether full or part underlying such debt or receivables; or (v) any beneficial interest in property, whether movable or immovable, or in such debt, receivables, whether such interest is existing, future, accruing, conditional or contingent; or (vi) any beneficial right, title or interest in any tangible asset given on hire or financial lease or conditional sale or under any other contract which secures the obligation to pay any unpaid portion of the purchase price of such asset or an obligation incurred or credit otherwise provided to enable the borrower to acquire such tangible asset; or (vii) any right, title or interest on any intangible asset or licence or assignment of such intangible asset, which secures the obligation to pay any unpaid portion of the purchase price of such intangible asset or an obligation incurred or credit otherwise extended to enable the borrower to acquire such intangible asset or obtain licence of the intangible asset; or (viii) any financial assistance;
"financial lease"	Means a lease under any lease agreement of tangible asset, other than negotiable instrument or negotiable document, for transfer of lessor's right therein to the lessee for a certain time in consideration of payment of agreed amount periodically and where the lessee becomes the owner of the such assets at the expiry of the term of lease or on payment of the agreed residual amount, as the case may be;
"securitisation"	Means acquisition of financial assets by any asset reconstruction company from any originator, whether by raising of funds by such asset reconstruction company from qualified buyers by issue of security receipts representing undivided interest in such financial assets or otherwise;
"asset reconstruction"	Means acquisition by any [asset reconstruction company] of any right or interest of any bank or financial institution in any financial assistance for the purpose of realisation of such financial assistance.

"asset reconstruction company"	Means a company registered with Reserve Bank under section 3 for the purposes of carrying on the business of asset reconstruction or securitisation, or both;
"Non-Performing Asset"	Means an asset or account of a borrower, which has been classified by a bank or financial institution and sub-standard, doubtful or loss asset, in accordance with the directions or guidelines relating to asset classification issued by RBI.

6.4.4 Securitization and Asset Reconstruction

Securitization is the process of pooling and repackaging of financial assets (like loans given) into marketable securities that can be sold to investors. In the context of bad asset management, securitization is the process of conversion of existing less liquid assets (loans) into marketable securities. The securitization company takes custody of the underlying mortgaged assets of the loan taker. It can initiate the following steps:

1. (i) Acquisition of financial assets from any originator (bank), and
2. (ii) Raising of funds from qualified institutional buyers by issue of security receipts (for raising money) for acquiring the financial assets or
3. (iii) Raising of funds in any prescribed manner, and
4. (iv) Acquisition of financial asset may be coupled with taking custody of the mortgaged land, building etc.

Asset reconstruction is the activity of converting a bad or non-performing asset into performing asset. The process of asset reconstruction involves several steps including purchasing of bad asset by a dedicated asset reconstruction company (ARC) including the underlying hypothecated asset, financing of the bad asset conversion into good asset using bonds, debentures, securities and cash, realization of returns from the hypothecated assets etc. The Act also laid the framework to the constitution of Asset Reconstruction Companies (ARCs) specializing in securitizing distressed assets purchased from banks.

Asset Reconstruction Companies take over non-performing assets of banks at discounted rate and manage and dispose of such assets. Reconstruction, is to be done with the RBI regulations and the SARFAESI Act gives the following components for reconstruction of assets –

1. (i) taking over or changing the management of the business of the borrower,
2. (ii) the sale or lease of a part or whole of the business of the borrower;
3. (iii) rescheduling of payment of debts payable by the borrower;
4. (iv) enforcement of security interest in accordance with the provisions of this Act;
5. (v) settlement of dues payable by the borrower;
6. (vi) taking possession of secured assets in accordance with the provisions of this Act.

It empowers the Reserve Bank of India to regulate asset reconstruction companies in a changing business environment. It empowers the RBI to carry out Audit and conduct inspections of an ARC from time to time. The RBI may impose a penalty where an ARC fails to comply with any direction issued by RBI.

6.4.5 Other Functions of Securitisation Company or Reconstruction Company

Any Securitisation company or reconstruction company registered may –

1. (i) act as an agent for any bank or financial institution for the purpose of recovering their dues from the borrower on payment of such fees or charges as may be mutually agreed upon between the parties;
2. (ii) act as a manager on such fee as may be mutually agreed upon between the parties;
3. (iii) act as receiver if appointed by any court or tribunal.

Provided that no securitisation company or Reconstruction Company shall act as manager if acting as such gives rise to any pecuniary liability.

No securitisation company or reconstruction company which has been granted a certificate of registration, shall carry on, any business other than that of securitisation or asset reconstruction without prior approval of the Reserve Bank. If in case a securitisation company or reconstruction company is carrying any business other than the business of securitisation or asset reconstruction on or before the commencement of this Act, it will cease to carry on any such business within one year from the date of commencement of this Act.

6.4.6 Enforcement of Security Interests

The Act empowers the lender (banker), when the borrower defaults, to issue notice to the defaulting borrower and guarantor, calling to repay the debt within 60 days from the date of the notice. If the borrower fails to comply with the notice, the bank or the financial institution may enforce security interests (means interest of the bank/creditor) by following the provisions of the Act:

1. (i) Take possession of the security;
2. (ii) Sale or lease or assign the right over the security;
3. (iii) Appoint Manager to manage the security;
4. (iv) Ask any debtors of the borrower to pay any sum due to the borrower.

If there are more than one secured creditors, the decision about the enforcement of SARFAESI provisions will be applicable only if 75% of them are agreeing. The SARFAESI Act allows secured creditors to take steps to enforce their security interests in respect of any debt of a borrower that is classified as a non-performing asset without the intervention of a court or tribunal if certain conditions specified in the Act are met.

Rights of Borrower

A borrower can object to the measures taken under this Act within 45 days without depositing any amount with DRT. However for making application at the second appeal stage Debt Recovery Appellate Tribunal 50% of the amount outstanding has to be deposited which can also be reduced to 25% at the discretion of the Appellate Tribunal.

6.4.7 Establishment of a Central Registry

The functions relating to securitisation, asset reconstruction and creation of security interest is sought to be administered and regulated by a Central Registry. A Central Registrar shall head the Registry. The functions of the Central Registry are as under:

- Particulars relating to securitisation of assets, reconstruction of financial assets and creation of security interest are entered in a record called Central Register.
- The records can be kept in electronic form also.
- The particulars of every transaction of securitisation, asset reconstruction or creation of security interest shall be filed within 30 days of the transaction by SCO, RCO or the lender as the case may be.
- Modifications made in the security interest registered with the Registry are to be filed within 30 days of such modification.
- Satisfaction of security interest is required to be filed with the Registry within 30 days of satisfaction.
- Records maintained at the Central Registry are open to inspection for any person on payment of the prescribed fee.

Need for Central Registry

The RBI is the regulator of the major player in the Indian Financial System and has to ensure financial intermediaries engage in Securitisation prudently. To prevent fraud in loan cases involving, multiple lending from different banks on the same immovable property, the Central Electronic Registry under SARFAESI Act, 2002 has become operational since 31 March, 2011. The records maintained by the Central Electronic Registry will be available for search by any lender or any other person desirous of dealing with the property.

When the borrower is a company, there is a strong mechanism to verify the charges created by the company on its assets by searching its records maintained with the concerned Registrar of Companies. Therefore, the establishment of a Central Registry was a welcome idea under the Act and is a necessary step to maintain data relating to the charges created on any asset by any person.

Besides being beneficial to the lenders and innocent third parties, the establishment and notification of the Central Registry would result in advantages given below:

- a single source to verify charges, if any, on any asset created by any entity,
- charges/encumbrances created on the asset of an unregistered entity including individuals, HUF, Association of Persons can be easily traced and the information be readily available,
- chances of use of false title deeds or false representations on the title of the assets can be eliminated. Accordingly, fraud on title of properties can be controlled, minimised and eliminated,
- due diligence on portfolio securitisation can be eased out,
- due diligence on sale and purchase of assets/properties would become easy and transparent,
- gullible public and innocent buyers who are generally left in the hands of unscrupulous real estate brokers and builders can be saved and their interests protected,
- data on charged and encumbered properties can be made available in a transparent manner giving the industry reflection and exposure of the lenders on such assets, and

Since the land records are not computerized in all the states and tracing the title of properties is still a complex problem, the Central Registry would better equip the lender to make a fair assessment of risk undertaken while providing finance against the property, thus making lending more easy and safe.

Bureaucratic delays and fleecing which happens on account of lack of transparency and procedure to determine the (ICSI) encumbrances would be reduced or eliminated, restoring faith in the land record system as well in respect of assets other than

real estate.

6.4.8 Conclusion

Though the enactment of SARFAESI Act sought to mobilise blocked funds of the banks in the non-performing assets, the various provisions of the acts have created deep sorrows for the genuine buyers. The various provisions meant to balance the requirements of the borrowers and the banks, have their balance of favour tilted towards the banks. These powers are, at majority of the times, mis-utilized by the banks to appropriate their interests against the interests of the buyers. In such a situation it is pertinent for the civil courts to assume a more social responsibility for the larger interest of the borrowers on one hand and to share the responsibilities of the banks to mobilize their funds from the numerous non-performing assets.

6.4.9 (Updated) SARFAESI Act

The Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act, 2002 is a legislation that was framed to address the problem of Non-Performing Assets (NPAs) or bad assets through different processes and mechanisms. The enactment of the SARFAESI Act, 2002 enabled banks and financial institutions to sell off their NPAs to asset reconstruction companies registered with RBI.

Objectives of the Act

- To regulate securitisation and reconstruction of financial assets and
- Enforcement of security interest and to provide for a central database of security interests created on property rights

Section 31: Provisions of this Act not to apply in certain cases

The provisions of this act shall not apply to--

- A lien on any goods, money or security given by or under the Indian Contract Act, 1872 or the Sale of Goods Act, 1930 or any other law for the time being in force;
- A pledge of movables within the meaning of section 172 of the Indian Contract Act, 1872;
- Creation of any security in any aircraft as defined in clause (1) of section 2 of the Aircraft Act, 1934;
- Creation of security interest in any vessel as defined in clause (55) of section 3 of the Merchant Shipping Act, 1958;
- Any rights of unpaid seller under section 47 of the Sale of Goods Act, 1930;
- Any properties not liable to attachment (excluding the properties specifically charged with the debt recoverable under this act) or sale under the first proviso to sub-section (1) of section 60 of the Code of Civil Procedure, 1908;
- Any security interest for securing repayment of any financial asset not exceeding one lakh rupees;
- Any security interest created in agricultural land;
- Any case in which the amount due is less than twenty per cent of the principal amount and interest thereon.

6.4.10 Key Sections of SARFAESI Act

Section	Key Provisions
Sec 3: Registration of ARC	A company can commence or carry on the business of securitisation or asset reconstruction only after obtaining a certificate of registration granted under this section and having the net owned fund of not less than ₹100 Crore or such other higher amount as RBI may specify.
Sec 5: Acquiring Financial Assets	An ARC may acquire financial assets of any bank or financial institution by issuing a debenture or bond or any other security in the nature of debenture, for consideration agreed upon between such company and the bank or financial institution, or by entering into an agreement with such bank or financial institution for the transfer of such financial assets to such company on such terms and conditions as may be agreed upon between them. Exempted from Stamp Duty.
Sec 6: Notice to Obligor	The bank or financial institution may give a notice of acquisition of financial assets by any ARC to the concerned obligor and any other concerned person and to the concerned registering authority. On receipt of notice, the obligor shall make payment to the concerned ARC in discharge of any of the obligations in relation to the financial asset specified in the notice which will mean full discharge to borrower.
Sec 7: Issue of Security Receipts	Any ARC, may, after acquisition of any financial asset under section 5(1), offer security receipts to qualified buyers for subscription. An ARC may raise funds from the qualified buyers by formulating schemes for acquiring financial assets and shall keep and maintain separate and distinct accounts in respect of each such scheme.
Sec 9: Measures for Asset Reconstruction	ARC may provide for: Proper management of business of borrower; Sale or lease of part or whole of business of borrower; Rescheduling of payment of debts; Enforcement of security interest; Settlement of dues payable by borrower; Taking possession of secured assets; Conversion of portion of debt into shares of borrower.
Sec 13: Enforcement of Security Interest	Any security interest created in favour of any secured creditor may be enforced without intervention of any court or tribunal by such creditor. Where any borrower makes any default in repayment of secured debt, the secured creditor may require the borrower by notice in writing to discharge in full his liabilities within 60 days from the date of notice failing which the secured creditor shall be entitled to exercise all or any of the rights under 13(4).
Sec 14: CMM or DM to Assist Secured Creditor	The secured creditor may request, in writing, the Chief Metropolitan Magistrate (CMM) or the District Magistrate (DM) within whose jurisdiction any such secured asset may be situated, to take possession thereof, and the CMM or DM shall take possession of such asset and documents relating thereto; and forward such asset and documents to the secured creditor within a period of thirty days from the date of application.
Sec 15: Manner and Effect of Takeover of Management	When the management of business of a borrower is taken over by ARC or ASC, the secured creditor may appoint persons as directors/administrators. The shareholders of the company cannot appoint or nominate any person as director; the resolution passed by shareholders shall not have any effect unless approved by the secure creditor.
Sec 16: No Compensation	No director, manager or any person in charge of management of the business of the borrower shall be entitled to any compensation for the loss of office.
Sec 17: Application to DRT	Any person aggrieved by any of the measures taken by the secured creditor under section 13(4), may make an application with such fee to the DRT within 45 days from the date on which such measure had been taken. The DRT shall try to complete the proceeding within 60 days which may extend for maximum 4 months.
Sec 18: Appeal to DRAT	Any person aggrieved by any order made by the DRT under section 17, may prefer an appeal with fee to the appellate tribunal (DRAT) within 30 days from the date of receipt of the order. No appeal shall be entertained unless the borrower has deposited with the appellate tribunal 50% of the amount of debt due from him. The DRAT may reduce the amount to not less than 25% of debt referred.

Sec 20: Central Registry	The Central Government to set up a central registry with its own seal for the purposes of registration of transaction of securitisation and reconstruction of financial assets and creation of security interest under this act. All lenders are required to register any and all information with CERSAI with regards to security interests within a period of 30 days of the creation of security interests.
Sec 21: Central Registrar	The central government may appoint a person for the purpose of registration of transactions under this act to be known as the central registrar.
Sec 22: Central Register	The Central Register shall be kept at head office and entered the transactions such as securitisation of financial assets, reconstruction of financial assets, creation of security interest. The records shall be maintained in control and safeguard of central registrar.
Sec 23: Filing of Transactions	The particulars of every transaction of securitisation, asset reconstruction or creation of security interest shall be filed, with the central registrar in the manner and on payment of such fee as may be prescribed.
Sec 26E: Priority of Secured Creditors	After the registration of security interest, the debts due to any secured creditor shall be paid in priority over all other debts and all revenues, taxes, cesses and other rates payable to the central government or state government or local authority. On or after the commencement of the insolvency and bankruptcy code, 2016, in cases where insolvency or bankruptcy proceedings are pending, priority to secured creditors shall be subject to the provisions under IBC.
Sec 33: Offences by Companies	Where an offence under this act has been committed by a company, every person who at the time the offence was committed was in charge of, and was responsible to, the company, as well as the company, shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly.

Multiple Choice Questions – 6.4

1. What does the SARFAESI Act not apply to?

A. A lien on any securities under the Indian Contract Act B. A pledge of immovable property under Section 172 of the Indian Contract Act C. Creation of security in any land as defined in the Land Acquisition Act D. All of the above.

Answer: A. A lien on any securities under the Indian Contract Act

2. In the context of bad asset management, what does securitization refer to?

A. Pooling and repackaging of financial assets into marketable securities B. Acquisition by any asset reconstruction company of any right C. Act of acquiring a financial asset by the bank D. Creating security interests on the financial asset.

Answer: A. Pooling and repackaging of financial assets into marketable securities

3. What does the term asset reconstruction refer to in the SARFAESI Act?

A. Process of converting a performing asset into a non-performing asset B. Activity of converting a non-performing asset into a performing asset C. Acquisition of financial asset from the original lender D. Creation of security interest on the performing asset.

Answer: B. Activity of converting a non-performing asset into a performing asset

4. What does the term Non-Performing Asset mean under the SARFAESI Act?

A. An asset which is performing at its maximum potential B. An asset that has been classified by a bank or financial institution as sub-standard, doubtful or loss asset C. An asset that has been fully utilized and no longer has any value D. An asset that has not been put to use by the company.

Answer: B. An asset that has been classified by a bank or financial institution as sub-standard, doubtful or loss asset

6.5 Valuation Standards (IVSC)

6.5.1 Introduction

The International Valuation Standards (IVS) are standards for undertaking valuation assignments using generally recognised concepts and principles that promote transparency and consistency in valuation practice. The International Valuation Standards Council (IVSC) is an independent, not-for-profit organisation committed to advancing quality in the valuation profession and develops IVS.

The IVS consist of mandatory requirements that must be followed in order to state that a valuation was performed in compliance with the IVS. Certain aspects of the standards do not direct or mandate any particular course of action but provide fundamental principles and concepts that must be considered in undertaking a valuation.

When a statement is made that a valuation will be, or has been, undertaken in accordance with the IVS, it is implicit that the valuation has been prepared in compliance with all relevant standards issued by the IVSC. For a valuation to be compliant with IVS the valuer must comply with all the requirements contained within IVS. A "departure" is a circumstance where specific legislative, regulatory or other authoritative requirements must be followed that differ from some of the requirements within IVS.

6.5.2 Core Principles of Valuation

Principle	Description
a) Ethics	Valuers must follow the ethical principles of integrity, objectivity, impartiality, confidentiality, competence and professionalism to promote and preserve the public trust.
b) Competency	At the time the valuation is submitted, valuers must have the technical skills and knowledge required to appropriately complete the valuation assignment.
c) Compliance	Valuers must disclose or report the published valuation standards used for the assignment and comply with those standards.
d) Basis (ie, Type or Standard) of Value	Valuers must select the basis (or bases) of value appropriate for the assignment and follow all applicable requirements. The basis of value (or bases) must be either defined or cited.
e) Date of Value	Valuers must disclose or report the date of value that is the basis of their analyses, opinions or conclusions. Valuers must also state the date they disclose or report their valuation
f) Assumptions and Conditions	Valuers must disclose significant assumptions and conditions specific to the assignment that may affect the assignment result.
g) Intended Use	Valuers must disclose or report a clear and accurate description of the intended use of the valuation.
h) Intended User(s)	Valuers must disclose or report a clear and accurate description of the intended user(s) of the valuation.
i) Scope of Work	Valuers must determine, perform, and disclose or report a scope of work that is appropriate for the assignment that will result in a credible valuation.
j) Identification of Subject of Valuation	Valuers must clearly identify what is being valued.
k) Data	Valuers must use appropriate information and data inputs in a clear and transparent manner so as to provide a credible valuation.
l) Valuation Methodology	Valuers must properly use the appropriate valuation methodology(ies) to develop a credible valuation.
m) Communication of Valuation	Valuers must clearly communicate the analyses, opinions and conclusions of the valuation to the intended user(s).
n) Record Keeping	Valuers must keep a copy of the valuation and a record of the valuation work performed for an appropriate period after completion of the assignment.

6.5.3 IVS 101 Scope of Work

A scope of work (sometimes referred to as terms of engagement) describes the fundamental terms of a valuation, such as the asset(s) being valued, the purpose of the valuation and the responsibilities of parties involved in the valuation.

All valuation advice and the work undertaken in its preparation must be appropriate for the intended purpose.

A valuer must ensure that the intended recipient(s) of the valuation advice understand(s) what is to be provided and any limitations on its use before it is finalised and reported.

A valuer must communicate the scope of work to its client prior to completion of the assignment including:

- Identity of the valuer
- Identity of the client
- Identity of other intended users (if any)
- Assets being valued
- Valuation currency
- Purpose of valuation
- Bases of value used
- Valuation date
- The nature and extent of the valuer's work and any limitations thereon
- The nature and sources of information upon which the valuer relies
- Significant assumptions and/or special assumptions
- The type of report being prepared
- Restrictions on use, distribution and publication of the report
- That the valuation will be prepared in compliance with IVS and that the valuer will assess the appropriateness of all significant inputs

6.5.4 IVS 102 Investigations and Compliance

To be compliant with IVS, valuation assignments, including valuation reviews, must be conducted in accordance with all of the principles set out in IVS that are appropriate for the purpose and the terms and conditions set out in the scope of work.

Investigation made during the assignment must be appropriate for the purpose of the valuation assignment and the basis of value.

Sufficient evidence must be assembled by means such as inspection, inquiry, computation and analysis to ensure that the valuation is properly supported.

Limits may be agreed on the extent of the valuer's investigation.

Information received by the valuer from other sources (third parties, management, owner), such inputs should be considered, investigated and/or corroborated. In cases where credibility or reliability of information supplied cannot be supported, consideration should be given as to whether or how such information is used.

A record must be kept of the work performed on which the conclusion were reached for a reasonable period after completion of the assignment, having regard to any statutory or legal requirement.

6.5.5 IVS 103 Reporting

It is essential that the valuation report communicates the information necessary for proper understanding of the valuation or valuation review. A report must provide the intended users with a clear understanding of the valuation.

Where the report is the result of an assignment involving the valuation of an asset or assets, the report must convey the following, at a minimum:

1. (i) the scope of the work performed,
2. (ii) intended use,
3. (iii) intended users,
4. (iv) the purpose,
5. (v) the approach or approaches adopted,
6. (vi) the method or methods applied,
7. (vii) the key inputs used,
8. (viii) the assumptions made,
9. (ix) the conclusion(s) of value and principal reasons for any conclusions reached, and
10. (x) the date of the report (which may differ from the valuation date).

6.5.6 IVS 104 Bases of Value

Bases of value (sometimes called standards of value) describe the fundamental premises on which the reported values will be based. It is critical that the basis (or bases) of value be appropriate to the terms and purpose of the valuation assignment, as a basis of value may influence or dictate a valuer's selection of methods, inputs and assumptions, and the ultimate opinion of value.

In addition to the IVS-defined bases of value listed below, the IVS have also provided a non-exhaustive list of other non-IVS-defined bases of value prescribed by individual jurisdictional law or those recognised and adopted by international agreement:

(a) IVS-defined bases of value:

- Market value (section 30),
- Market rent (section 40),
- Equitable value (section 50),
- Investment value/worth (section 60),
- Synergistic value (section 70), and
- Liquidation value (section 80).

(b) Other bases of value (non-exhaustive list):

- Fair value (International Financial Reporting Standards) (section 90),
- Fair market value (Organisation for Economic Co-operation and Development) (section 100),
- Fair market value (United States Internal Revenue Service) (section 110), and
- Fair value (Legal/Statutory) (section 120):

Market Value

Market value is the estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion. IVS provides a conceptual framework for applying Market Value as a base that must be applied.

Market Rent

Market rent is the estimated amount for which an interest in real property should be leased on the valuation date between a willing lessor and a willing lessee on appropriate lease terms in an arm's length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion. Market rent may be used as a basis of value when valuing a lease or an interest created by a lease. In such cases, it is necessary to consider the contract rent and, where it is different, the market rent.

Equitable Value

Equitable value is the estimated price for the transfer of an asset or liability between identified knowledgeable and willing parties that reflects the respective interests of those parties. It requires the assessment of the price that is fair between two specific, identified parties considering the respective advantages or disadvantages that each will gain from the transaction. In contrast, market value requires any advantages or disadvantages that would not be available to, or incurred by, market participants generally to be disregarded. Equitable value is a broader concept than market value.

Examples:

- (a) determination of a price that is equitable for a shareholding in a non-quoted business, where the holdings of two specific parties may mean that the price that is equitable between them is different from the price that might be obtainable in the market, and
- (b) determination of a price that would be equitable between a lessor and a lessee for either the permanent transfer of the leased asset or the cancellation of the lease liability.

Investment Value

Investment value is the value of an asset to a particular owner or prospective owner for individual investment or operational objectives. Investment value is an entity-specific basis of value. This basis of value reflects the benefits received by an entity from holding the asset and, therefore, does not involve a presumed exchange. It is often used for measuring investment performance.

Synergistic Value

Synergistic value is the result of a combination of two or more assets or interests where the combined value is more than the sum of the separate values. If the synergies are only available to one specific buyer then synergistic value will differ from market value, as the synergistic value will reflect particular attributes of an asset that are only of value to a specific purchaser.

Liquidation Value

Liquidation value is the amount that would be realised when an asset or group of assets are sold on a piecemeal basis. Liquidation value should consider the costs of getting the assets into saleable condition as well as those of the disposal activity. Liquidation value can be determined under two different premises of value:

- (a) an orderly transaction with a typical marketing period
- (b) a forced transaction with a shortened marketing period

6.5.7 Premise of Value/Assumed Use

A premise of value or assumed use describes the circumstances of how an asset or liability is used. Different bases of value may require a particular premise of value or allow the consideration of multiple premises of value. Some common premises of value are:

- (a) highest and best use,
- (b) current use/existing use,
- (c) orderly liquidation, and
- (d) forced sale.

Highest and Best Use

Highest and best use is the use, from a participant perspective, that would produce the highest value for an asset. Although the concept is most frequently applied to non-financial assets as many financial assets do not have alternative uses, there may be circumstances where the highest and best use of financial assets needs to be considered. The highest and best use must be physically possible (where applicable), financially feasible, legally allowed and result in the highest value. If different from the current use, the costs to convert an asset to its highest and best use would impact the value. The highest and best use for an asset may be its current or existing use when it is being used optimally. However, highest and best use may differ from current use or even be an orderly liquidation.

The determination of the highest and best use involves consideration of the following:

- (a) To establish whether a use is physically possible, regard will be had to what would be considered reasonable by participants.
- (b) To reflect the requirement to be legally permissible, any legal restrictions on the use of the asset, e.g., town planning/zoning designations, need to be considered as well as the likelihood that these restrictions will change.
- (c) The requirement that the use be financially feasible considers whether an alternative use that is physically possible and legally permissible will generate sufficient return to a typical participant, after taking into account the costs of conversion to that use, over and above the return on the existing use.

Current Use/Existing Use

Current use/existing use is the current way an asset, liability, or group of assets and/or liabilities is used. The current use may be, but is not necessarily, also the highest and best use.

Orderly Liquidation

An orderly liquidation describes the value of a group of assets that could be realised in a liquidation sale, given a reasonable period of time to find a purchaser (or purchasers), with the seller being compelled to sell on an as-is, where-is basis.

Forced Sale

This premise is often used in circumstances where a seller is under compulsion to sell and proper marketing period is not possible and buyers may not be able to undertake adequate due diligence. Unless the nature of, and the reason for, the constraints on the seller are known, the price obtainable in a forced sale cannot be realistically estimated. The price that a seller will accept in a forced sale will reflect its circumstances, rather than those of the hypothetical willing seller in the market value definition.

6.5.8 Entity Specific Factors and Synergies

For most bases of value, entity specific factors are not included in assessment of valuation. Examples of entity-specific factors that may not be available to participants include:

- additional value or reduction in value derived from the creation of similar assets,
- unique synergies between the asset and other assets owned by the entity,
- legal rights or restrictions applicable only to the entity,
- tax benefits or tax burdens unique to the entity, and
- an ability to exploit an asset that is unique to that entity.

Synergies

"Synergies" refer to the benefits associated with combining assets. When synergies are present, the value of a group of assets and liabilities is greater than the sum of the values of the individual assets and liabilities on a stand-alone basis. Synergies typically relate to a reduction in costs, and/or an increase in revenue, and/or a reduction in risk.

Whether synergies should be considered in a valuation depends on the basis of value. An assessment of whether synergies are available to other participants may be based on the amount of the synergies rather than a specific way to achieve that synergy.

Assumptions: Valuer must state the assumptions used during valuation. All assumptions and special assumptions must be reasonable under the circumstances, be supported by evidence, and be relevant having regard to the purpose for which the valuation is required.

Transaction Costs and Taxes: Most bases of value represent value without considering the transaction cost to buyer or seller and without considering taxes payable by either party as a direct result of the transaction.

6.5.9 IVS 105 Valuation Approaches and Methods

Consideration must be given to the relevant and appropriate valuation approaches. One or more valuation approaches may be used in order to arrive at the value in accordance with the basis of value. The three approaches described and defined below are the main approaches used in valuation. They are all based on the economic principles of price equilibrium, anticipation of benefits or substitution.

The principal valuation approaches are:

- (a) market approach,
- (b) income approach, and
- (c) cost approach

Key principles:

- If high degree of confidence in accuracy and reliability of a single method is available, no need to apply multiple methods / approaches.
- Should consider the use of multiple approaches/methods to arrive at an indication of value, particularly when there are insufficient factual or observable inputs for a single method to produce a reliable conclusion.
- If more than one approach is used, the conclusion of value based on those multiple approaches and/or methods should be reasonable and the process of analysing and reconciling the differing values into a single conclusion, without averaging, should be described by the valuer in the report.
- It is the valuer's responsibility to choose the appropriate method(s) for each valuation engagement.
- It is generally not appropriate to simply weight two or more divergent indications of value. Valuer should re-assess the methods or inputs that provide a better indication of value.
- Valuers should maximise the use of relevant observable market information in all three approaches.
- price information from an active market is generally considered to be the strongest evidence of value.
- In certain circumstances, the valuer and the client may agree on the valuation approaches, methods and procedures the valuer will use or the extent of procedures the valuer will perform. Depending on the limitations placed on the valuer and procedures performed, such circumstances may result in a valuation that is not IVS compliant.

Market Approach

The market approach provides an indication of value by comparing the asset with identical or comparable (that is similar) assets for which price information is available.

Applicability (high weight):

- (a) the subject asset has recently been sold in a transaction appropriate for consideration under the basis of value,

- (b) the subject asset or substantially similar assets are actively publicly traded, and/or
- (c) there are frequent and/or recent observable transactions in substantially similar assets.

Consider Market Approach along with other approaches in following circumstances:

- (a) Transactions involving the subject asset or substantially similar assets are not recent enough considering the levels of volatility and activity in the market.
- (b) The asset or substantially similar assets are publicly traded, but not actively.
- (c) Information on market transactions is available, but the comparable assets have significant differences to the subject asset, potentially requiring subjective adjustments.
- (d) Information on recent transactions is not reliable (ie, missing information, synergistic purchaser, not arm's-length, distressed sale, etc).
- (e) The critical element affecting the value of the asset is the price it would achieve in the market rather than the cost of reproduction or its income-producing ability

Comparable Transactions Method

The comparable transactions method, also known as the guideline transactions method, utilises information on transactions involving assets that are the same or similar to the subject asset to arrive at an indication of value.

Guideline Publicly-Traded Comparable Method

The guideline publicly-traded method utilises information on publicly-traded comparables that are the same or similar to the subject asset to arrive at an indication of value.

Income Approach

The income approach provides an indication of value by converting future cash flow to a single current value. Under the income approach, the value of an asset is determined by reference to the value of income, cash flow or cost savings generated by the asset.

Applicability:

- (i) the income-producing ability of the asset is the critical element affecting value from a participant perspective, and/or
- (ii) reasonable projections of the amount and timing of future income are available for the subject asset, but there are few, if any, relevant market comparables.

Consider along with other approaches in following circumstances:

- (i) the income-producing ability of the subject asset is only one of several factors affecting value from a participant perspective,
- (ii) there is significant uncertainty regarding the amount and timing of future income-related to the subject asset,
- (iii) there is a lack of access to information related to the subject asset (for example, a minority owner may have access to historical financial statements but not forecasts/budgets), and/or
- (iv) the subject asset has not yet begun generating income, but is projected to do so.

Discounted Cash Flow (DCF) Method

Under the DCF method the forecasted cash flow is discounted back to the valuation date, resulting in a present value of the asset.

Cost Approach

The cost approach provides an indication of value using the economic principle that a buyer will pay no more for an asset than the cost to obtain an asset of equal utility, whether by purchase or by construction, unless undue time, inconvenience, risk or other factors are involved. The approach provides an indication of value by calculating the current replacement or reproduction cost of an asset and making deductions for physical deterioration and all other relevant forms of obsolescence.

Applicability:

- (i) participants would be able to recreate an asset with substantially the same utility as the subject asset, without regulatory or legal restrictions, and the asset could be recreated quickly enough that a participant would not be willing to pay a significant premium for the ability to use the subject asset immediately,
- (ii) the asset is not directly income-generating and the unique nature of the asset makes using an income approach or market approach unfeasible, and/or
- (iii) the basis of value being used is fundamentally based on replacement cost, such as replacement value.

Consider along with other approaches:

- (i) participants might consider recreating an asset of similar utility, but there are potential legal or regulatory hurdles or significant time involved in recreating the asset,
- (ii) when the cost approach is being used as a reasonableness check to other approaches (for example, using the cost approach to confirm whether a business valued as a going-concern might be more valuable on a liquidation basis), and/or
- (iii) the asset was recently created, such that there is a high degree of reliability in the assumptions used in the cost approach.

Broadly, there are three cost approach methods:

- (i) **replacement cost method:** a method that indicates value by calculating the cost of a similar asset offering equivalent utility,
- (ii) **reproduction cost method:** a method under the cost that indicates value by calculating the cost to recreating a replica of an asset, and
- (iii) **summation method:** a method that calculates the value of an asset by the addition of the separate values of its component parts.

6.5.10 Asset Standards

- IVS 200 Businesses and Business Interests
- IVS 210 Intangible Assets
- IVS 220 Non Financial Liabilities
- IVS 230 Inventory
- IVS 300 Plant & Machinery
- IVS 400 Real property Interests
- IVS 410 Development Property
- IVS 500 Financial Instruments

6.5.11 Rule 11UA (1)(c): Fair Market Value of Shares and Securities

a) The fair market value of quoted shares and securities shall be determined in the following manner, namely,—

1. (i) if the quoted shares and securities are received by way of transaction carried out through any recognized stock exchange, the fair market value of such shares and securities shall be the transaction value as recorded in such stock exchange;
2. (ii) if such quoted shares and securities are received by way of transaction carried out other than through any recognized stock exchange, the fair market value of such shares and securities shall be,—
    - (A) the lowest price of such shares and securities quoted on any recognized stock exchange on the valuation date, and
    - (B) the lowest price of such shares and securities on any recognized stock exchange on a date immediately preceding the valuation date when such shares and securities were traded on such stock exchange, in cases where on the valuation date there is no trading in such shares and securities on any recognized stock exchange;

b) The fair market value of unquoted equity shares shall be the value, on the valuation date, of such unquoted equity shares as determined in the following manner, namely:—

$$\text{Fair market value of unquoted equity shares} = (A + B + C + D - L) \times (PV) / (PE)$$

Where,

- **A** = book value of all the assets (other than jewellery, artistic work, shares, securities and immovable property) in the balance-sheet as reduced by,—
    - (i) any amount of income-tax paid, if any, less the amount of income-tax refund claimed, if any; and
    - (ii) any amount shown as asset including the unamortised amount of deferred expenditure which does not represent the value of any asset;
- **B** = the price which the jewellery and artistic work would fetch if sold in the open market on the basis of the valuation report obtained from a registered valuer;
- **C** = fair market value of shares and securities as determined in the manner provided in this rule;
- **D** = the value adopted or assessed or assessable by any authority of the Government for the purpose of payment of stamp duty in respect of the immovable property;

- **L** = book value of liabilities shown in the balance sheet, but not including the following amounts, namely:—
  - (i) the paid-up capital in respect of equity shares;
  - (ii) the amount set apart for payment of dividends on preference shares and equity shares where such dividends have not been declared before the date of transfer at a general body meeting of the company;
  - (iii) reserves and surplus, by whatever name called, even if the resulting figure is negative, other than those set apart towards depreciation;
  - (iv) any amount representing provision for taxation, other than amount of income-tax paid, if any, less the amount of income-tax claimed as refund, if any, to the extent of the excess over the tax payable with reference to the book profits in accordance with the law applicable thereto;
  - (v) any amount representing provisions made for meeting liabilities, other than ascertained liabilities;
  - (vi) any amount representing contingent liabilities other than arrears of dividends payable in respect of cumulative preference shares;
- **PV** = the paid up value of such equity shares;
- **PE** = total amount of paid up equity share capital as shown in the balance-sheet;

[For the purposes of Sec 56(2)(viib) Explanation (a)(i), the FMV of unquoted equity shares will be calculated as (A – L) x PV / PE or it should calculated by a Merchant Banker using DCF Method]

c) The fair market value of unquoted shares and securities other than equity shares in a company which are not listed in any recognized stock exchange shall be estimated to be price it would fetch if sold in the open market on the valuation date and the assessee may obtain a report from a merchant banker or an accountant in respect of which such valuation.

6.5.12 Rule 11UAB: Determination of Fair Market Value for Inventory

11UAB. (1) For the purposes of clause (via) of section 28 of the Act, the fair market value of the inventory,—

1. (a) being an immovable property, being land or building or both, shall be the value adopted or assessed or assessable by any authority of the Central Government or a State Government for the purpose of stamp duty in respect of such immovable property on the date on which the inventory is converted into, or treated, as a capital asset;
2. (b) being jewellery, archaeological collections, drawings, paintings, sculptures, any work of art, shares or securities referred to in rule 11UA, shall be the value determined in the manner provided in sub-rule (1) of rule 11UA and for this purpose the reference to the valuation date in the rule 11U and rule 11UA shall be the date on which the inventory is converted into, or treated, as a capital asset;
3. (c) being the property, other than those specified in clause (i) and clause (ii), the price that such property would ordinarily fetch on sale in the open market on the date on which the inventory is converted into, or treated, as a capital asset.

6.5.13 Ind AS 113 – Fair Value Measurement

Ind AS 113 – Fair Value Measurement is an important standard around valuation. It applies to other IND AS's that require or permit fair value measurements. E.g., Ind AS 105 (Discontinued Operations), 109 (Financial instruments), 107 (Financial instruments – Disclosures). It does not apply to Ind AS that themselves prescribe a valuation methodology E.g., Ind AS 102 (Share-based payment transactions), Ind AS 17 (Leasing transactions), Ind AS 2 (Inventories), Ind AS 36 (Impairment of Assets), Ind AS 19 (Employee Benefits). It also applies to measurements such as fair value less costs to sell, based on fair value or disclosures about those measurements.

This Ind AS defines fair value as "the price that would be received to sell an asset or paid to transfer a liability, in an orderly transaction between market participants at the measurement date."

The standard assumes that Market price factors in many aspects such as known restrictions on use of assets, and ignores Transaction costs and entity specific synergies.

An Orderly transaction is a transaction that assumes that the seller has exposure to the market for a period before the measurement date to allow for marketing activities; that are usual and customary for transactions involving such assets or liabilities; it is not a forced transaction (eg a forced liquidation or distress sale).

Market Participants are those that are:

- Knowledgeable of the asset in question and of market conditions
- Able i.e., not restricted in any way
- Willing i.e., have desire to maximise their economic benefits
- Independent i.e., there is no cartel or collusion amongst the participants

The standard states the concept of Principal Market or the Most Advantageous Market. Transaction takes place either in the principal market for the asset or liability; i.e. the market wherein the maximum volume of trade occurs shall be the Principal

market or, in the absence of a principal market, in the most advantageous market (MAM) for the asset or liability. The market wherein the highest price is obtained but not the highest volume, shall be the MAM.

If there is a principal market, the fair value measurement shall be the price in that market, even if the price in a different market is potentially more advantageous at the measurement date. But it needs to be ensured that the entity must have access (but not necessarily to actually buy or sell) to the principal (or most advantageous) market at the measurement date.

The standard prescribes use of valuation techniques that maximise the use of observable inputs (level 1 inputs) and minimise the use of unobservable inputs (level 3 inputs). Observable inputs are publicly available information about actual events or transactions. Such inputs include those developed using market data. Unobservable inputs are inputs for which there is no market data available. They are developed using the best information available about the assumptions that market participants would use when pricing the asset or liability. They reflect the entity's own view on the assumptions that market participants would use.

Level 1 Inputs	Level 2 Inputs	Level 3 Inputs
Quoted price of shares traded on Stock exchanges	Quoted price of similar assets in active markets	Financial forecasts
	Quoted price of similar/identical assets in inactive markets	Historical viability
	Other observable inputs	Adjustment to mis-market consensus
	Market corroborated inputs	

Factors that need to be considered while selecting a valuation technique to measure fair value are:

- Appropriateness in the given facts and circumstances
- Availability of sufficient data
- Maximising the use of relevant observable inputs and minimising the use of unobservable inputs and as a result, multiple-valuation techniques can be applied.

Three widely used valuation techniques are:

- Market approach
- Cost approach
- Income approach

If multiple valuation techniques are used to measure fair value, the results should be evaluated considering the reasonableness of the range of values. Fair value is the point within the range that is most representative of the fair value in the given scenario.

Change in Valuation Techniques

Valuation techniques used to measure fair value shall be applied consistently. However, a change in the valuation technique or application of multiple valuation techniques is appropriate if the change results in a measurement that is equally or more representative of fair value in the circumstances.

Examples:

- New markets develop or market conditions change
- New information is available
- Information previously used is no longer available
- Valuation techniques improve

Disclosures

Ind AS 113 aims to equip the users of financial statements with additional transparency with respect to the following:

- The extent of usage of fair value in valuation of assets and liabilities
- Valuation techniques, inputs and assumptions used in measuring fair value
- The impact of level 3 fair value measurements on profit and loss account or Other Comprehensive Income (OCI).

The standard has set broad disclosure objectives and has also stipulated the minimum disclosures an entity must make.

Illustration 1 (ICMAI Study Material): Pankaj – Fair Value of Investment in Peehoo

Pankaj is an investor who invested ₹10,000 @ ₹5 per share and consequently bought 2,000 shares of Peehoo, a private limited company, on 1st June 2022. Since he does not hold a controlling stake, he does not have access to the forecasts or budgets of the company. He wants to assess the fair value of the investment as on 31st March 2023.

Solution (ICMAI Standard):

Since Pankaj does not have access to the details of forecasts, the amount paid (transaction price) for the unquoted equity shares in June 2022 may be a reasonable starting point to assess the fair value of the investment at measurement date (31st March 2023). However, Pankaj should assess if there are any factors that indicates that the transaction price may not be representative of the fair value of the investment. For example, if the market forces have changed significantly that it could affect Peehoo's growth prospects or if the company may have shown significant changes in its financial results, these may affect the fair value of the investment.

6.5.14 Solved Case Study

Solved Case Study (ICMAI Study Material): Human Resources Management Ltd – Further Issue of Shares

Human Resources Management is a mid-sized company is considering expansion into related field, for which it requires to raise fund. Board of director of company decides to raise fund through further issue of shares. For further issue of share, company needs to assess the fair value of its share.

Balance Sheet of the company as on 31.3.23

Equity & Liabilities	Amount
Equity Share Capital (1,10,000 equity share of INR 10 each)	11,00,000
Other Equity	(68,81,956)
Total Equity	(57,81,956)
Liabilities	
Non-Current Liabilities	
Borrowings	3,96,94,670
Total Non-Current Liabilities	3,96,94,670
Current Liabilities	
Trade Payables	87,903
Other Current Liabilities	1,31,320
Duties & Taxes	(68,21,862)
Total Current Liabilities	(66,02,639)
Total Equity & Liabilities	**2,73,10,075**
Assets	
Non-Current Assets	
Property, Plant & Equipment	80,676
Total Non-Current Assets	80,676
Current Assets	
Inventories	1,93,38,292
Trade Receivables	5,02,370
Cash & Cash Equivalents	35,99,873
Deferred Tax Assets (Net)	15,44,953
Other Current Assets	22,43,911
Total Current Assets	2,72,29,399
Total Assets	**2,73,10,075**

Questions:

1. a. As a Valuer assess the value of per share for further issue of share by the company
2. b. Different approaches to value the share, method used to value present scenario and provide the rationale for the same.
3. c. Briefly discuss the relevant section in relation to the issue of share.

Solution (ICMAI Standard):

Net Asset Value of per share = (Book Value of Assets – Book Value of Liabilities) / No. of share

A. Calculation of Net Asset Value of Human Resources Management

Particulars	Amount (INR)
Total Assets	2,73,10,075
Less: Total Outside liabilities	3,30,92,031
Value of Equity	(57,81,956)
Number of shares	1,11,000
Value per share	**(52.09)**
Value per share (Considering Sec 53 of Companies Act, 2013)	**10.00**

Although arrived value per share is INR (52.09), since Sec 53 of the Companies Act, 2013 prohibits issue of shares at a discount to par value, the value per share for the purpose of issue of shares may be considered at par value. i.e., INR 10.00 per share.

B. Different Valuation Approaches

- **Market Approach:** Market approach is a valuation approach that uses prices and other relevant information generated by market transactions involving identical or comparable (i.e., similar) assets, liabilities or a group of assets and liabilities, such as a business. Market approach can be applied where the asset to be valued or a comparable or identical asset is traded in the active market; there is a recent, orderly transaction in the asset to be valued; or there are recent comparable orderly transactions in identical or comparable asset and information for the same is available and reliable.
- **Income Approach:** Income Approach provides an indication of value by converting future cash flow to a single current value. Under this approach, the value of an asset is determined by reference to the value of income, cash flow or cost savings generated by the asset.
- **Cost Approach:** Cost approach is a valuation approach that reflects the amount that would be required currently to replace the service capacity of an asset (often referred to as current replacement cost). This approach provides an indication of value using the economic principle that a buyer will pay no more for an asset than the cost to obtain an asset of equal utility. The Cost Approach can be used when Market Approach and Income Approach are not appropriate to value the assets or companies.

Under the Net Asset Value approach, total value is based on the sum of book values as recorded on the consolidated balance sheet of the respective companies. We have used Net Asset Value method for the company.

Valuation Rationale:

- **Income Approach:** The Valuer have not relied on the Income Approach to value the company because past working results do not indicate true potential of the company, and financial forecasts cannot be reliably drawn at this stage of business restructuring. Therefore, not used the Income approach for valuation of shares.
- **Market Approach:** There are no comparable listed companies that could be identified that would consistently value the company using the market approach, therefore valuer have not considered market approach as valuation method.
- **Cost Approach:** Under the Cost Approach, Valuer have considered Adjusted Net Asset Value (ANAV) Method of Valuation. Arrived at the Net Asset Value by deducting all book value of liabilities from book value of assets.

C. Relevant Extracts of the Companies Act, 2013

Section 62. Further issue of share capital—

(1) Where at any time, a company having a share capital proposes to increase its subscribed capital by the issue of further shares, such shares shall be offered—

to any persons, if it is authorized by a special resolution, whether or not those persons include the persons referred to in clause (a) or clause (b), either for cash or for a consideration other than cash, if the price of such shares is determined by the valuation report of a registered valuer subject to such conditions as may be prescribed.

Section 53. Prohibition on Issue of Shares at Discount.

(1) Except as provided in section 54, a company shall not issue shares at a discount.

(2) Any share issued by a company at a discount price shall be void.

Multiple Choice Questions – 6.5

1. Which of the following describes the 'Investment Value' as per the International Valuation Standards?

A. Value of an asset to a particular owner or prospective owner for individual investment or operational objectives B. Value of an asset or liability in an ordered sale after applying necessary costs to make it saleable C. Value obtained from combining two or more assets where combined value is greater than individual assets D. Value that describes the circumstances of how an asset or liability is used.

Answer: A. Value of an asset to a particular owner or prospective owner for individual investment or operational objectives

2. Which of the following is NOT a principle as per the Core Principles of Valuation in the International Valuation Standards?

A. Disclosing the published valuation standards used for the assignment B. Valuing based on the liquidity of the asset C. Keeping a copy of the valuation and a record of the valuation work for an appropriate period D. Clearly communicating the analyses, opinions and conclusions of the valuation.

Answer: B. Valuing based on the liquidity of the asset

3. Orderly liquidation value considers which factors as per the International Valuation Standards?

A. What would be realized in a sale with a shortened marketing period B. Value that could be achieved in a sale given a reasonable time to find purchasers C. Value that could be realized in a sale without considering any costs D. Value calculated considering the asset's market availability and transactional ease.

Answer: B. Value that could be achieved in a sale given a reasonable time to find purchasers

4. Which of the following valuation approaches are based on the economic principle 'price equilibrium'?

A. Market approach B. Income approach C. Cost approach D. All of the above.

Answer: D. All of the above.

📌 Key Takeaways – Module 6

Section	Key Takeaway
6.1	IBC 2016 consolidates insolvency laws; CIRP (180 days + 90 extension); Minimum default ₹1 crore; Liquidation priority (Section 53); Registered Valuers (2 appointed within 7 days); Liquidation Value = Average of two closest estimates
6.2	Section 192 (Non-Cash Transactions with Directors); Section 230 (Compromise/Arrangement); Section 231 (Tribunal Enforcement); Section 232 (Merger & Amalgamation – merger by absorption vs formation); Section 247 (Valuation by Registered Valuers – penalty ₹50,000); Section 281(1) (Liquidator Report within 60 days)
6.3	Registered Valuer Rules 2017: Eligibility (Rule 3), Qualifications (Rule 4 – Asset Class specific), Valuation Exam (Rule 5), Registration (Rule 6 – Form A ₹5,000 / Form B ₹10,000), Conditions (Rule 7 – records 3 years, joint & several liability), Conduct of Valuation (Rule 8 – 12 contents of report)
6.4	SARFAESI Act 2002: Objectives, 3 recovery methods (Securitization, Asset Reconstruction, Enforcement); Enforcement (60 days notice); Central Registry (30 days filing); Section 31 exclusions; Priority to secured creditors
6.5	IVS Core Principles (14 principles); IVS 101 (Scope of Work); IVS 102 (Investigations & Compliance); IVS 103 (Reporting – 10 contents); IVS 104 (Bases of Value – 6 IVS-defined + 4 others); IVS 105 (Approaches & Methods); Rule 11UA (FMV of Shares); Rule 11UAB (Inventory); Ind AS 113 (Fair Value – 3-level hierarchy)

📐 Important Formulas – Module 6

Formula	Description
Liquidation Value = Average of two closest estimates	IBC Reg 35
FMV of unquoted equity shares = (A + B + C + D − L) × (PV / PE)	Rule 11UA
Capital Adequacy Ratio = (Tier I + Tier II) / Risk Weighted Assets	Basel Regulations

✅ Revision Checklist – Module 6

- □ Explain Insolvency vs Bankruptcy
- □ Describe Objective of IBC 2016
- □ Explain Insolvency Resolution Process (stages)
- □ Explain Liquidation priority (Section 53)
- □ Explain Voluntary Liquidation procedure
- □ Describe role of Registered Valuer under IBC
- □ Explain Section 192 (Non-Cash Transactions with Directors)
- □ Explain Section 230(1), (2), (3) (Compromise/Arrangement)
- □ Explain Section 231 (Tribunal Enforcement)
- □ Explain Section 232 (Merger & Amalgamation – all 8 sub-sections)
- □ Explain Section 247 (Valuation by Registered Valuers – penalties)
- □ Explain Section 281(1) (Liquidator Report)
- □ Explain Rule 2 Definitions (Asset Class, Certificate of Registration, Partnership Entity, Valuer)
- □ Explain Rule 3 (Eligibility for Registered Valuers – Individual & Entity)
- □ Explain Rule 4 (Qualifications for 3 Asset Classes)
- □ Explain Rule 5 (Valuation Examination)
- □ Explain Rule 6 (Application for Certificate)
- □ Explain Rule 7 (Conditions for Registration – 10 conditions)
- □ Explain Rule 8 (Conduct of Valuation – 12 report contents)
- □ Explain SARFAESI Act Objectives
- □ Explain 3 Recovery Methods (Securitization, Asset Reconstruction, Enforcement)
- □ Explain Key Terms (Borrower, Debt, Default, Financial Asset, NPA)
- □ Explain Enforcement of Security Interest (60 days notice)

- □ Explain Rights of Borrower (45 days DRT, 50% for appeal)
- □ Explain Central Registry (30 days filing)
- □ Explain Section 31 (Exclusions from SARFAESI)
- □ Explain IVS Core Principles (14 principles)
- □ Explain IVS 101 (Scope of Work)
- □ Explain IVS 102 (Investigations & Compliance)
- □ Explain IVS 103 (Reporting – 10 contents)
- □ Explain IVS 104 (Bases of Value – 6 IVS + 4 others)
- □ Explain Premise of Value (4 types)
- □ Explain IVS 105 (Approaches & Methods)
- □ Explain Rule 11UA (FMV of Shares – Quoted & Unquoted)
- □ Solve Rule 11UA formula with illustration
- □ Explain Rule 11UAB (Inventory FMV)
- □ Explain Ind AS 113 (Fair Value – 3-level hierarchy)
- □ Solve Pankaj's Fair Value illustration
- □ Solve Human Resources Management Ltd case study

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Disclaimer: These revision notes are for educational purposes only. Students are advised to refer to the official ICMAI study material and latest amendments for comprehensive preparation.

Next Module: Module 7 – Business Valuation Methods and Approaches

CMA FINAL PAPER 20A

Strategic Performance Management & Business Valuation

SECTION B – MODULE 7: Business Valuation Methods and Approaches

Complete Coverage as per ICMAI Study Material (Syllabus 2022)

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Module Learning Objectives

- Explain the different approaches and methods of valuation.
- Apply the methods of valuation under different scenarios while applying detailed calculations and applying qualitative factors affecting valuation.
- Prepare financial forecasts, estimate Free cash flows and assess the cost of capital or discount rate while applying income approach.
- Assess and apply the relative valuation multiples affecting valuation.

Introduction to Business Valuation Methods

The value of a business is determined by various factors such as the quality of the business, the profit potential, the economic environment and the industry influence, to name a few. The economic environment, the industry influence and company analysis are the 3 key steps in valuation of a company. The value of an asset is the present value of its expected returns. Specifically, we expect an asset to provide a stream of returns during the period a holder owns it. To convert this estimated stream of returns to a value for the security we must discount this stream at our required rate of return. This process of valuation requires estimates of:

1. (1) The stream of expected returns and
2. (2) the required rate of return on the investment.

Because of the complexity and importance of valuing shares various techniques have been revised overtime. These techniques fall into one of the three approaches:

Approach	Description
a) Income Approach	Under this approach, we commonly apply the discounted cash flow (DCF) techniques where the value of the company is estimated based on the present value of some measure of cash flow, operating cash flow and free cash flow.
b) Market Approach	Under this approach, we value companies using relative valuation techniques where the value of a company is estimated based upon its current price relative to variables considered to be significant to valuation such as earnings, cash flow, book value or sales.
c) Cost Approach	Under this approach, the value of the company is based on replacement cost or reproduction cost where the company is either very new and has fewer future potential or it is in stage of liquidation.

7.1 Discounted Cash Flow Analysis (DCF) and Other Important Valuation Methods

Students should understand that application of income approach heavily relies on the concept of discounting or application of capital budgeting techniques. It is advisable for the students to brush up their concepts for a better understanding of valuation under Income Approach.

While valuing companies, there are three predominant definitions of future cash flows: dividends, free cash flow, and residual income. Under Income Approach, a company's value is estimated as the present value of cash distributed to shareholders (dividend discount model) or the present value of cash available to shareholders after the company meets its necessary capital expenditures and working capital expenses (free cash flow model).

7.1.1 Discount Rates

The discount rate represents the rate used by investors to calculate the present value of a future cash flow. The most basic forms of discount rates are applicable in case of Time Value of Money applications. In an inflationary economy, a rupee earned today is more valuable than a rupee earned in future. This happens due to decline in the purchasing power of money. The principle of the time value of money explains why interest is paid or earned - Interest compensates the depositor or lender for the time value of money. It also underlies investment. Investors are willing to forgo spending their money now if they expect a favourable return on their investment in the future.

The discount rate is usually calculated as the risk-free rate plus a spread that reflects the risk associated with the cash flow. The investor asks a question that how much return they should expect from the respective investment depending on the nature of investment. The discount rate is, therefore, based on the characteristics of the investment. However, it may be adjusted by investors to reflect their expectations.

In case of business valuation, the discount rates are often represented by the Cost of Capital. Cost of capital represents a minimum benchmark rate that a company must overcome before it can generate value for its financers (lenders, preference shareholders, and equity shareholders).

Cost of Capital

Cost of Capital (Kc) represents the cost of funds used for financing the business. It is the rate of return that the suppliers of capital—bondholders and owners—require as compensation for their contributions of capital.

- If business is financed solely through Equity, Kc is the same as Cost of Equity (Ke)
- If business is financed solely through Debt, Kc is the same as Cost of Debt (Kd)

Usually, companies use a mix of Debt and Equity while financing their business, thus the overall cost of capital is derived from a weighted average of cost of all capital sources, known as the Weighted Average Cost of Capital (WACC).

Points to Remember While Using Discounted Cash Flow Techniques

- Cost of capital should be weighted average cost of capital (WACC) since free cash flows represents the cash available to all stakeholders i.e., contributors of capital.
- Discounted should be computed after taxes since free cash flows are estimated after taxes.
- The weights assigned should ideally be based on Market Values. However, in the absence of market values, book values are used as a proxy.
- While calculating Weights of Debt, Equity and Preference shares, a 'Target Capital Structure' in the mature stage should be considered.
- Discount rates should be real or nominal if free cash flows are real or nominal respectively. Nominal cash flows and nominal discount rates are preferred.
- Systematic risk borne by each provider of capital should be adjusted since each provider of capital expects a return that compensated the risk taken.

$$\mathbf{WACC = W_e \times K_e + W_d \times K_d(1 - t) + W_p \times K_p}$$

Where:

- W_e = Value of Equity / (MV of Debt + MV of Equity + MV of Preference Capital)
- W_d = Value of Debt / (MV of Debt + MV of Equity + MV of Preference Capital)

- W_p = Value of Preference Capital / (MV of Debt + MV of Equity + MV of Preference Capital)

It should be noted that under IFRS / Ind AS environment, Preference Shares are increasingly being classified as either Debt or Equity, depending on their terms of issue. Thus, in most practical cases, there may be Debt and Equity only.

> WACC = Cost of Debt × (MV of Debt / (MV of Debt + MV of Equity)) + Cost of equity × (MV of Equity / (MV of Debt + MV of Equity))

Example 1 (ICMAI Study Material): WACC Calculation – Alpha Ltd

Suppose Alpha Ltd has a capital structure composed of the following:

Particulars	Amount
Debt	₹30 million
Equity	₹45 million

If the before-tax cost of debt is 11% (Pre-tax Kd), the required rate of return on equity is 16.5% (Ke), and the marginal tax rate is 30%, what is Alpha Ltd.'s weighted average cost of capital?

Solution (ICMAI Standard):

W_d = 30 / (30+45) = 0.40

W_e = 45 / (30+45) = 0.60

We can also be calculated as residual proportion i.e., (1 - 0.40) = 0.60

WACC = [W_d × Post Tax K_d] + [W_e × K_e]

WACC = [(0.40) × (0.11)(1 – 0.30)] + [(0.60)(0.165)] = 0.1298 or **12.98%**

Cost of Debt

The Cost of Debt (Kd) is the interest rate paid by the company on such debt. The cost of Debt is the rate at which the company can borrow funds as on the valuation date. In the absence of such information, different approaches are adopted.

The cost of debt measures the current cost of borrowing funds to finance projects. In general terms, it is determined by the following variables:

- The risk-free rate: As the risk-free rate increases, the cost of debt for companies will also increase.
- The default risk (and associated default spread) of the company. As the default risk of a company increases, the cost of borrowing money will also increase. The default spread can vary according to maturity period.
- Since interest expense is tax-deductible, we use the after-tax Cost of Debt for discounting purposes. The after-tax cost of debt is calculated as Pre-Tax Cost of Debt × (1 – Tax rate).

Valuers may sometimes apply an analytical approach to calculate Effective Interest Rate and Effective Tax Rate. It can be calculated as Interest Expense as it appears in the Profit & Loss Statement divided by Average Debt as it appears in the Balance Sheet. Similarly, Effective Tax rate may be calculated as Tax expense divided by Profit Before Tax on the Profit & Loss Statement.

Example 2 (ICMAI Study Material): Post-Tax Cost of Debt

If the rate at which the company can borrow funds from the financial institutions is 11% and the tax rate applicable to the company is 30%. The Post Tax Cost of Debt would be:

Solution (ICMAI Standard):

11% × (1 – 0.30) = **7.7%**

Cost of Equity

Although the rate of return demanded by equity investors is not as clearly defined as it is by lenders, equity investors do expect a return on their investment. There are various models that attempt to estimate the Cost of Equity.

Capital Asset Pricing Model (CAPM)

One of the most used models is Capital Asset Pricing Model (CAPM). The major insight of the capital asset pricing model (CAPM) is that only systematic (non-diversifiable) risk is priced.

$$\text{Cost of Equity} = \text{Risk Free Rate} + (\text{Beta} \times \text{Equity Risk Premium})$$

- **Risk Free Rate:** a return on an investment that has least likelihood of default e.g., 10 Year Government Bond Yield
- **Company's Beta:** Sensitivity of stock return with respect to the market return
- **Equity Risk Premium:** The equity risk premium (ERP) refers to the additional return (or premium) required by investors to invest in equities (e.g., broad market index like Nifty 50) rather than a risk-free asset (e.g., Government Bond). It equals the difference between the return on a broad equity market index and the risk-free rate of return. Risk premium is what a particular market (E.g., BSE Sensex) earned over the rate that a risk-free asset (e.g., Govt bond) earned. i.e. [Market Return – Risk Free Rate of Return]

Example 3 (ICMAI Study Material): Required Return on Equity

If the 10 Year Government bond yield is 7.5% and the BSE Sensex return over the last one year is 15%. Assuming the company's Beta is 1.2, what is the Required return on Equity?

Solution (ICMAI Standard):

K_e = 7.5% + (15% – 7.5%) × 1.2

K_e = **16.5%**

Unsystematic Risk, Systematic Risk (Beta)

An investor should not keep all his investments in a single stock. Diversification plays an important role in reducing the risk. When an investor diversifies across assets that are not perfectly correlated, the portfolio's risk is less than the weighted average of the risks of the individual securities in the portfolio. The risk that is eliminated by diversification is called unsystematic risk (also called unique, diversifiable, or firm-specific risk). Because the market portfolio contains all risky assets, it must be a well-diversified portfolio. It is often advised and assumed that the investor is a diversified investor and has already eliminated that risk. The risk that remains cannot be diversified away and is called the systematic risk (also called non-diversifiable risk or market risk). The concept of systematic risk applies to individual securities as well as to portfolios. Some securities' returns are highly correlated with overall market returns. Examples of companies that are highly correlated with market returns are luxury goods. These companies have high systematic risk (i.e., they are very responsive to market). Other companies, such as utility companies, respond very little to changes in the systematic risk factors. These companies have very little systematic risk. Hence, total risk (as measured by standard deviation) can be broken down into its component parts: unsystematic risk and systematic risk. Mathematically:

$$\text{Total Risk} = \text{Systematic Risk} + \text{Unsystematic Risk}$$

Understanding Beta

The sensitivity of an asset's return to the return on the market index is referred to as its beta. Beta is a measure of Systematic Risk and is a standardized measure of the covariance of the asset's return with the market return. For example, if beta is 1.8 and the market is expected to move up by 10%, then the stock should move up by 18% (1.8 x 10).

Beta can be calculated as follows:

$$\text{Beta} = \text{Covariance of assets return with market return / variance of market return} = \text{Cov}_{\text{stock market}} / \sigma^2_{\text{market}}$$

Example 4 (ICMAI Study Material): Beta of Company A

The standard deviation of the return on the market index is estimated as 25%. If the covariance of Company A's returns with the returns on the market index is 0.05, what is the beta of Company A?

> **Solution (ICMAI Standard):**
>
> Beta = $Cov_{stock\ market}$ / σ^2_{market} = 0.05 / 0.25^2 = **0.8**

In most cases, Beta is calculated using the regression equation based on market prices of the company being valued and a relative index. It is difficult to estimate Beta in case of Private companies, but some models have been devised to calculate the same.

Build-up Model

The build-up method is usually applied to companies where betas are not readily available. It starts with the risk-free rate and adds one or more premiums for different risks. However, it does not apply beta adjustments to factor risk premiums.

A traditional build-up model is given as:

$$K_e = \text{Risk-free rate} + \text{Equity risk premium} + \text{Size premium} + \text{Company-specific premium}$$

- The equity risk premium is usually estimated with reference to equity indices of listed companies.
- The size premium is usually inversely related to the size of the company being valued,
- The company-specific risk premium may also include a premium for unsystematic risk based on the premise that the risk associated with private companies cannot easily be diversified away.

Further, when estimating the required return for private companies, valuers should also consider:

- The relative values of a controlling versus minority interest in the company; and
- The impact of lack of marketability on share value.

Adjusted Cost of Equity

Various researchers and authors believe that the CAPM does not adequately incorporate all relevant factors while calculating the Cost of Equity. Under CAPM, the primary determinant of risk is Beta (β). It represents the extent of risk, in terms of volatility in return, associated with the stock under valuation. β is used as a multiplier to assess the risk premium expected by an investor over risk free return. This is determined with reference to the rate of return from the overall secondary capital market index and / or that of the industry sector to which the company belongs. Certain additional risk factors can be incorporated into calculation of Cost of Equity. Such additions by way of %age of additional return should be considered for specific risks. The same should be based on assessment of mostly intangible factors, as explained above, and impacts thereof on returns generated by a company. The revised CAPM formula could be as under:

$$K_e = R_f + \beta \times (MRR - R_f) + K_s + K_i + K_z + K_t + K_l + K_m + K_{cyclical}$$

Where:

- K_s = Sovereign risk if the entity under valuation is in a different country.
- K_i = Industry or sector specific risk in case the β considered is that of the overall Market index.
- K_z = Size specific risk as compared to the average industry size in terms of capacity of production and / or annual turnover.
- K_t = State of technology applied by the company vis-à-vis other players and risk of getting disrupted by a start-up.
- K_l = Location specific risk, e. g., if the company's assets are in a risky location.
- K_m = Management specific risk if findings from due diligence are grossly adverse.
- $K_{cyclical}$ = Cyclical risk if the company's product is on the downslide stage of product life cycle.

Consideration of and ascribing a value in %age terms for most of the above additional risks related returns are of critical importance, if the decision by the investor is with reference to a hurdle rate of return. That rate is generally the average of rates of returns from other businesses of the investor. Such investors for example could be a conglomerate investing for a merger or acquisition transaction, or a Private Equity Fund deciding the floor rate of return at the point of exit via IPO failing which some other condition would apply.

For the purposes of this curriculum, we are not covering Cost of Preference Capital. However, its calculation is similar to that of Cost of Debt, but without tax benefits.

7.1.2 Dividend Discount Model

Dividends: Dividends are cash flows received by the shareholders. The value of a company from a shareholders' perspective is given the by the present value of dividends expected to be received by the shareholders.

The shareholder's investment today is worth the present value of the future cash flows she expects to receive, and ultimately, she will be repaid for his investment in the form of dividends. Even if the investor sells the stock at any time prior to the liquidation of the company, before all the dividends are paid, she will receive from the buyer of the shares the present value of the expected future dividends. Further, the value derived under this method is usually less volatile and reflect the long-term earning potential of the company.

Disadvantages of DDM

- This method cannot be applied for companies that don't currently pay dividends. While it is theoretically possible to expect that the companies will start paying dividends, there are various factors that affect dividend payment by a company.
- Further, this method takes the perspective of an investor who owns a minority stake in the company and cannot control the dividend policy. If the dividend policy dictated by the controlling interests bears a meaningful relationship to the company's underlying profitability, then dividends are appropriate. However, if the dividend policy is not related to the company's ability to create value, then dividends are not an appropriate measure of expected future cash flow to shareholders.

Dividends may be appropriate as a measure of cash flow in the following cases:

- The company has a history of dividend payments.
- The dividend policy is clear and related to the earnings of the company.
- The perspective is that of a minority shareholder.

Perpetual Dividend

If we extend the holding period indefinitely, the value simply becomes the present value of an infinite stream of dividends. We would arrive at the value as follows:

$$V_0 = \Sigma D_t / (1 + r)^t$$

Where V_0 = Value of shares at present date; D_t = dividend in the time period t; r = required return on equity

Example 5 (ICMAI Study Material): Perpetual Dividend

Let's assume that the shareholder Ms Alka holds the shares of A Ltd for an infinite period. A Ltd is a matured company giving a constant dividend of ₹3 per share every year. Ms Alka expects 12% return from her investment in A Ltd. The value of A Ltd for Ms Alka would be given by the present value of dividend received forever.

Solution (ICMAI Standard):

We would simply need to apply the perpetuity formula to calculate the value.

$V_0 = D_1 / r = 3 / 12\%$ = **₹25 per share**

We should understand that application of this method would require the valuer to expect that the dividends would be constant forever, which may be a difficult assumption to make.

The Gordon Growth Model

The Gordon Growth Model assumes that dividends will increase at a constant rate for an indefinite period. When applying the present value concepts, this would mean that dividend amount would change every year (grow at a constant rate every year) and each year's cash flow need to be discounted at a discount rate.

$$V_0 = D_1 / (r - g)$$

Where V_0 = Value of shares at present date; D_0 = dividend just paid in current period; D_1 = dividends expected to be received at end of Year 1; r = required return on equity; g = dividend growth rate

Example 6 (ICMAI Study Material): Gordon Growth Model

Extending our previous example, Ms Alka hopes that A Ltd will give dividend of ₹3 per share next year and this is expected to grow at a constant rate of 6% forever. The value of A Ltd today (V_0) for Ms Alka would be given as follows.

Solution (ICMAI Standard):

V_0 = 3 / (12% - 6%) = **₹50 per share**

Fundamentally, the perpetual growth rate should be lower than the required return on equity. It is unrealistic to assume that any company can continue to grow indefinitely at a rate higher than the long-term growth rate in real gross domestic product (GDP) plus the long-term inflation rate.

Advantages of Gordon Growth Model

- It is applicable to stable, mature, dividend-paying companies.
- It is appropriate for valuing market indices and listed companies.
- It is easy to understand and is straightforward.
- It can be used to determine price-implied growth rates and required rates of return.
- It can be used to supplement other, more complex valuation methods.

Limitations of Gordon Growth Model

- Gordon Growth model is highly sensitive to estimated values such as dividend expectations, growth rates and required rates of return. These are all difficult to estimate with precision.
- The model cannot be easily applied to non-dividend-paying companies.
- In case of unstable companies with unpredictable growth patterns, the model is difficult to apply, and the resulting valuations can be highly unreliable.

Multi-stage Model

For most companies, the Gordon growth model assumption of constant dividend growth that continues into perpetuity may not be realistic. For example, many companies experience high growth rates for short periods of time because of a competitive advantage. Eventually, the high growth rates fade away and the companies earn normal growth rates in maturity stage.

Most companies go through a pattern of growth that includes several phases:

- **Initial growth phase,** where the company has increasing profits, little or no dividends, and heavy reinvestment.
- **Transition phase,** in which profits and dividends are still increasing but at a slower rate as competitive forces reduce profit opportunities and the need for reinvestment.
- **Mature phase,** in which profits grow at a stable but slower rate, and dividend pay-out ratios are stabilizing as reinvestment matches depreciation and asset maintenance requirements.

Two-Stage Dividend Discount Model: The two-stage DDM assumes that the company will grow at a high rate for a relatively short period of time (the first stage) and will then revert to a long-run perpetual growth rate (the second stage). The length of the high-growth phase is a function of the visibility of the company's operations to the valuer.

H-Model: The problem with the basic two-stage DDM is that it is usually unrealistic to assume that a company will experience high growth for a short period, then immediately fall back to a perpetual growth level. The H-model utilizes a more realistic assumption: the growth rate starts at a high and then declines 'linearly' over the high-growth stage until it reaches the long-run average growth rate.

While the multi-stage model can be further extended into three stage model, all these models would apply the same concept of Gordon Growth model with different periods of growth.

Illustration 1 (ICMAI Study Material): Python Ltd – Multi-stage DDM

Python Ltd currently pays a dividend of ₹2 per share. A valuer forecasts growth of 15% for the next three years, followed by 4% growth in perpetuity thereafter. The required return is 13%. Calculate the current value per share.

Solution (ICMAI Standard):

Value per share of Python Ltd would be given by the following equation:

$V_0 = [D_0 \times (1 + g_1) / (1 + r)^1] + [D_0 \times (1 + g_1)^2 / (1 + r)^2] + [D_0 \times (1 + g_1)^3 / (1 + r)^3] + [D_0 \times (1 + g_1)^4 / (1 + r)^4]$

The Present Value Factors for the first 3 years are as follows:

Year	PV Factor
Year 1	0.8850
Year 2	0.7832
Year 3	0.6931

$V_0 = 2.30/(1.13)^1 + 2.65/(1.13)^2 + 3.04/(1.13)^3 + 3.50/[(1.13)^3 \times (0.13 - 0.04)]$

The value would be given by:

$V_0 = (2.30 \times 0.8850) + (2.65 \times 0.7832) + (3.04 \times 0.6931) + ((3.50 \times 0.6931) \div 0.09)$

$V_0 = 2.04 + 2.07 + 2.11 + 26.94$

V_0 = ₹33.15

7.1.3 Discounted Cash Flow Models

Free cash flow is the actual cash that would be available to the company's investors after making all investments necessary to maintain the company as an ongoing enterprise. These are internally generated funds that can be distributed to the company's investors (e.g., shareholders and bondholders) without impairing the value of the company.

The free cash flow method can be applied to most types of companies regardless of their dividend policies and capital structures. However, companies that have significant capital requirements (or investments) may have negative free cash flows for multiple years during the explicit forecast period. This negative free cash flow complicates the DCF method and makes less reliable. The value of such companies, if positive, is largely embedded into the Terminal Value. Free cash flow method is most appropriate:

- For companies that do not pay dividends or whose dividend policies are not related to earnings
- Since dividends are paid at the discretion of the board of directors, it may reflect poorly on the company's long-run profitability.

Valuers usually use the following two definitions of free cash flow (FCF) for valuation purposes:

1. (a) Free cash flow to the firm (FCFF) and
2. (b) Free cash flow to the equity (FCFE)

Free Cash Flow to the Firm (FCFF)

Free cash flow to the firm (FCFF) is the cash flow available to all the company's suppliers of capital after operating expenses (excluding interest expense, net of taxes) have been paid, and necessary investments in fixed and working capital have been made. In other words, it represents the cash flow available to be distributed to a company's debt holders (in the form of interest payments or debt repayments), equity shareholders, and even preference shareholders.

To calculate the value of the company, FCFF are discounted at the company's weighted average cost of capital (WACC), that is the cost of both Equity and Debt.

Value of the firm is given by the following equation:

$$\text{Firm Value}_0 = \text{FCFF}_1/(1+K_c)^1 + \text{FCFF}_2/(1+K_c)^2 + \ldots + \text{FCFF}_n/(1+K_c)^n + \text{Terminal Value}_n/(1+K_c)^n$$

FCFF is the Free Cash Flow to the Firm for each period; K_c represents Weighted Average Cost of Capital (WACC); n represents the explicit forecast period; Terminal Value is the value for the perpetual period.

FCFF is calculated as follows:

Profit After Tax
Add: Non-Cash Charges
Less: Capital Expenditure
Less: Working Capital Investment
Add: Tax Adjusted Interest Expense
Free Cash flows to the Firm (FCFF)

Profit After Tax (PAT) is the bottom line of the Profit & Loss Statement. It represents profit after depreciation, amortization, interest expense, income taxes, and preference dividends (but not equity dividends).

Non-cash charges (NCC) reflect the net effect of non-cash expenses and non-cash gains on net profit. Non-cash expenses are those that do not result in an outflow of cash but are subtracted from revenue to arrive at net profit. Since the objective is to determine cash flows, non-cash charges must be added back to net profit. E.g., Depreciation, Amortization, Losses on sales of assets, non-cash restructuring charges, and increases in non-reversible deferred tax liabilities.

Non-cash gains are those that do not result in an inflow of cash but are added to revenue to arrive at net profit. Non-cash gains should be subtracted from net profit. E.g., Gains on sales of assets, reversals of restructuring charges, and increases in non-reversible deferred tax assets.

Capital Expenditure, also referred to Investment in fixed capital over the period refers to outflows of cash to purchase fixed assets (e.g., Property, plant and equipment or P&E, trademarks, research, and development among others). Investments in fixed assets must be netted off with the amount of cash proceeds from sales of fixed assets. The net amount spent on acquiring fixed capital cannot be distributed to the company's providers of capital, hence it should be deducted from net profit in calculating FCFF.

For calculations, Capital expenditure may be assessed from the Cash Flow Statement (Investing Activities) that contains the amount of cash spent on fixed assets and operating investments. Alternatively, the Capital Expenditure may be calculated as the Change in Gross Fixed Assets between the two period. Or it may be calculated as the difference between the Net Fixed Assets between the two periods plus, depreciation charged during the period.

Illustration 2 (ICMAI Study Material): Capital Expenditure Calculation

With the given the financial statement extracts, calculate Capital Expenditure for Years 2 and 3.

Balance sheet extracts	Year 1	Year 2	Year 3
Fixed Assets - Gross Block	1,588	1,773	1,837
Accumulated Depreciation	408	478	551
Fixed Assets - Net Block	1,180	1,295	1,286
Capital Work in Progress	185	121	123
Operating Investments	0	0	0
Total	1,365	1,416	1,409

Solution (ICMAI Standard):

(using Gross Fixed Assets):

Particulars	Year 2	Year 3
Change in Gross Block	185	64
Change in Capital Work in Progress	-64	2
Change in Operating Investment	-	-
Capital Expenditure	**121**	**66**

(using Net Fixed Assets):

Particulars	Year 2	Year 3
Depreciation	70	73
Change in Net Block	115	-9
Change in Capital Work in Progress	-64	2
Change in Operating Investment	-	-
Capital Expenditure	**121**	**66**

Working capital Investment refers to the changes in Non-Cash Working Capital. It is net increase (or decrease) in working capital over the period. Although working capital is generally defined as current assets minus current liabilities, for the valuation purposes, we exclude cash and short-term debt (Short term debt and current portion of long-term debt) from the calculation to compute investment in working capital.

$$\text{Non-Cash Working capital} = \text{Current assets (exc. cash)} - \text{Current liabilities (exc. short-term debt)}$$
$$\text{Working capital Investment} = \text{Non-Cash Working Capital (n)} - \text{Non-Cash Working Capital (n-1)}$$

Note that Cash and cash equivalents are excluded because it is the change in cash that we are trying to explain. Short Term Debt and current portion of long-term debt are excluded because they are liabilities that carry explicit interest costs and are therefore financing rather than operating items. Amounts spent on acquiring additional working capital cannot be distributed to the company's providers of capital, hence should be deducted from net profit in calculating FCFF.

Illustration 3 (ICMAI Study Material): Working Capital Investment Calculation

With the given the financial statement extracts, calculate Working Capital Investment for Years 2 and 3.

Projected Balance sheet as on	Year 1	Year 2	Year 3
Current Liabilities			
Short Term Borrowing	243.23	468.75	471.63
Other Current Liabilities	60.92	47.65	48.25
Trade Payables	193.07	169.99	176.24
Provisions	0.32	0.26	0.26
Total Current Liabilities	**497.55**	**686.65**	**696.38**
Current Assets			
Trade Receivables	97.46	132.54	140.40
Inventory	634.52	807.60	830.61
Other current assets	65.57	70.00	85.00
Cash and Cash Equivalents	38.02	40.89	111.49
TOTAL CURRENT ASSETS	**835.57**	**1,051.02**	**1,167.50**

Solution (ICMAI Standard):

Particulars	Year 1	Year 2	Year 3
Total Current Assets	835.57	1,051.02	1,167.50
Less: Cash and Cash Equivalents	38.02	40.89	111.49
Non-Cash Current Assets (A)	**797.55**	**1,010.13**	**1,056.01**
Total Current Liabilities	497.55	686.65	696.38
Less: Short term Borrowings	243.23	468.75	471.63
Less: Provisions	0.32	0.26	0.26
Non-Cash Current Liabilities (B)	**253.99**	**217.64**	**224.49**
Non-Cash Working Capital (A – B)	**543.55**	**792.50**	**831.52**
Change in Non-Cash Working Capital		**248.94**	**39.02**

Tax Adjusted interest expense on net profit must be added because it is already deducted while calculating Profit After Tax. Since we are trying to calculate FCFF (which represents cash flow available to all the company's providers of capital) and interest payments are due to one of the company's capital providers (bondholders) who have already received it (as per PAT). Therefore, interest expense net of the interest tax shield, or after-tax interest expense, Interest (1 - Tax rate), is added back to net profit to determine FCFF to avoid providing this amount twice to lenders.

Valuers may use Cash Flow from Operating Activities (CFOA) taken from the Cash Flow Statement as a starting point to calculate FCFF because CFOA already accounts for adjustments for non-cash charges and investment in working capital.

Thus, FCFF while calculating from Cash Flow from Operating Activities may be calculated as:

$$\text{FCFF} = \text{Cash Flows from Operations} + \text{Interest} \times (1 - \text{Tax Rate}) - \text{Capital Expenditure}$$

Depending on Accounting regulations, Interest paid may be classified as an operating or a financing activity in the Cash Flow Statement. If it is classified as a financing activity, after-tax interest expense has not been deducted from CFOA, so no interest-related adjustment to CFOA is required. If it is classified as an operating activity, after-tax interest expense must be added back to CFOA to calculate FCFF.

Free Cash Flow to Equity (FCFE)

Free cash flow to equity (FCFE) represents the potential amount of cash that could be paid out to equity shareholders. That is, FCFE reflects the company's capacity to pay dividends. FCFE is also useful for companies that do not currently pay dividends. FCFE is defined as the cash remaining after a company meets all its debt obligations and provides for the capital expenditures necessary to maintain existing assets and to purchase the new assets needed to support the assumed growth of the company. In other words, it is the cash available to the company's equity shareholders after it meets all its other obligations.

FCFE is calculated as follows:

Profit After Tax
Add: Non-Cash Charges
Less: Capital Expenditure
Less: Working Capital Investment
Add: Net Borrowing
Free Cash flows to Equity (FCFE)

If you observe between FCFF and FCFE, the key difference here is that instead of adding tax adjusted Interest Expense, we are adding the Net Borrowing. Net borrowing is the increase in debt during the period (i.e., amount borrowed minus amount repaid) and is assumed to be available to shareholders. Since the starting point is Profit After Tax, that is, interest for the period has already been paid off, for the current period, the amount is freely available to equity shareholders.

FCFE can also be calculated from Cash Flows from Operating Activities and would be given by:

$$\text{FCFE} = \text{Cash Flows from Operations} - \text{Capital Expenditure} + \text{Net borrowing}$$

FCFE can also be calculated from FCFF and would be given by:

$$\text{FCFE} = \text{FCFF} - \text{Tax Adjusted Interest Expense} + \text{Net borrowing}$$

Terminal Value

The Terminal Value as calculated is calculated as at the end of the explicit forecast period (year n). We need to calculate the present value of the Terminal Value and the same needs to be added to the Present Value of explicit forecast period.

Companies that reinvest substantial portions of their profits and earn high returns on these investments should be able to grow at high rates. However, companies cannot grow at very high rates for a prolonged period. As the business grows, it becomes more difficult for it to maintain high growth and it eventually will grow at a rate less than or equal to the growth rate of the economy in which it operates. There are various methods to assess the Terminal Value.

No Growth: If the company is not expected to grow beyond the explicit forecast period, the terminal value is given by:

$$\text{Terminal Value} = \text{FCF} / r$$

Where FCF is the applicable Free Cash Flow i.e., FCFF or FCFE; r is the applicable discount rate i.e., WACC in case the cash flows are FCFF and Cost of Equity if the cash flows are FCFE

Stable growth: Normally, companies may be expected to grow in line with the expected long-term inflation or GDP growth rate of the economy in which the company operates. In such stable growth case, Terminal Value may be given by:

$$\text{Terminal Value} = \text{FCF}_{n+1} / (r - g)$$

Where FCF_{n+1} is the applicable Free Cash Flow for the terminal period; r is the applicable discount rate and g is the expected growth rate for perpetual period.

You should observe that mathematically, the perpetual growth rate should be lower than the discount rate.

Illustration 4 (ICMAI Study Material): Terminal Value Calculation – Super Ltd

A valuer Super Ltd has anticipated that the expected profit of Super Ltd at the end of 5 years from now would be ₹293.26 million. The company is expected to grow at 4.5% for perpetual period after that. The Post Tax interest expense is expected to be ₹45.50 million. Non-Cash charges includes Depreciation of ₹118.97 million that will be offset against Capital Expenditure. The investment in Non-Cash Working Capital is expected to be ₹2.6 million. Assuming the Discount rate of 10%, you are required to calculate:

1. Terminal Cash Flows
2. Terminal Value
3. Present Value of Terminal Value

Solution (ICMAI Standard):

Particulars	Workings	Amount (₹ Million)
Net profit After Tax	293.26 x 1.045	306.46
Add: Net Non-Cash Charges (Depreciation)		118.97
Add: Interest Expense x (1 - Tax Rate)		45.50
Less: Capital Expenditure		118.97
Less: Investment in Non-Cash Working Capital		2.60
Terminal Cash Flows		**349.36**
Terminal Value	349.36 / (0.10 – 0.045)	**6,374.59**
PV of Terminal Value	$6374.59/(1.1)^5$	**3,961.61**

Relative Value Multiple

Valuers can apply a multiple to earnings (Price to Earnings Multiple), revenues (Price to Sales multiple), or book value (Price to Book Value Multiple) to estimate the value in the terminal year.

Illustration 5 (ICMAI Study Material): Terminal Value using P/S Multiple – Ashiana Ltd

Ashiana Ltd currently earns a Revenue of INR 20 million. It is expected to grow at a compounded Annual Growth Rate of 15% for the next 5 years. After 5 years, it is expected that comparable companies will trade at a Price to Sales Multiple of 6x. Calculate the Terminal Value. What is the Present Value if Terminal Value assuming a discount rate of 14%?

Solution (ICMAI Standard):

The expected Revenue of Ashiana Ltd after 5 years is given by $20 \times 1.15^5 = 20 \times 2.0114$ that is, ₹40.23 million.

Given the P/Sales Multiple of 6x, the Terminal Value is given by 40.23×6 = **₹241.38 million**.

PV of Terminal Value = $241.38 / (1.14)^5 = 241.38 \times 0.5194$ = **₹125.37 million**

Difference between the Application of FCF Models and Dividend Discount Models

FCF Models consider the "controlling interest" perspective as Free Cash Flows reflects cash flow that can be redeployed by the controlling interest without affecting the company's capital investments. A minority interest may also use the free cash flow approach when there is a chance that the company will be acquired, in which case the stock price would be expected to reflect the price that the acquirer (prospective controlling interest) will pay for the company. The dividend discount model takes the perspective of a minority shareholder who does not have any control over the timing and amount of dividend payments. If an acquirer is willing to pay a premium for control over the firm, there may be a difference in the values obtained from the discounted dividend and FCF models.

Adjustment for Cash, and Non-Operating Assets

The present value of explicit forecast period and present value of terminal value provides the value of the company. To arrive at the equity value, valuers should add Cash and Cash Equivalents as this cash will be available to the acquirer. Also, since the FCF model values the Operating assets of the company, any non-operating assets, not covered in Free Cash Flows, should be added to the company's value.

FCFF Approach	FCFE Approach
Profit After Tax	Profit After Tax
Add: Non-Cash Charges	Add: Non-Cash Charges
Less: Capital Expenditure	Less: Capital Expenditure
Less: Investment in Non-Cash Working Capital	Less: Investment in Non-Cash Working Capital
Add: Interest (post tax)	Add: Net Borrowing
Free Cash flows to the Firm (FCFF)	**Free Cash flows to Equity (FCFE)**
PV of FCFF Discounted at WACC	PV of FCFE Discounted at Cost of Equity
PV of Terminal Value	PV of Terminal Value
Add: Cash and Cash equivalents	Add: Cash and Cash equivalents
Add: Value of Non-Operating Assets	Add: Value of Non-Operating Assets
Value of the Firm (Company)	N.A.
Less: Debt (Current Value)	N.A.
Value of Equity	**Value of Equity**

Illustration 6 (ICMAI Study Material): Panther Ltd – FCFE Calculation

The following information is available for Panther Ltd.

Particulars	0	1	2	3	4	5	6
Revenue (INR Million)	25						
Revenue Growth (%)		35.0%	30.0%	25.0%	20.0%	15.0%	10.0%
Net profit Margin (%)		8.5%	8.0%	7.5%	7.0%	6.5%	6.0%
Capital Expenditure as a % of Increase in Sales (adjusted for Depreciation)		25.0%					
Investment in Working Capital as a % of Increase in Sales		8.0%					
Long Term constant growth rate							6.0%
Cost of Equity							13.0%
Debt Ratio							30.0%

Solution (ICMAI Standard):

Particulars (₹ Million)	0	1	2	3	4	5	Terminal
Revenue	25.00	33.75	43.88	54.84	65.81	75.68	83.25
Net Profit		2.87	3.51	4.11	4.61	4.92	5.00
Less: Capital Expenditure		2.19	2.53	2.74	2.74	2.47	1.89
Less: Investment in Working Capital		0.70	0.81	0.88	0.88	0.79	0.61
Add: Net Borrowing (Note 1)		0.87	1.00	1.09	1.09	0.98	0.75
FCFE		**0.85**	**1.17**	**1.58**	**2.07**	**2.64**	**3.25**
Terminal Value (Note 2)							**46.38**
PV Factor @ 13%		0.885	0.783	0.693	0.613	0.543	
PV of Cash Flows		0.750	0.917	1.095	1.272	26.609	
Value of Equity						**30.642**	

Note 1: Net Borrowing is calculated as (Capital Expenditure + Working Capital Investment) x Debt Ratio

Note 2: Terminal Value is calculated as FCFE for 6th Year discounted at (Ke – g) i.e., 3.25 / (0.13 – 0.06) = 46.38. This value is arrived at Year 5.

Multiple Choice Questions – 7.1

1. Which is NOT an approach used in valuation of a company?

A. Income Approach B. Market Approach C. Cost Approach D. Thematic Approach

Answer: D. Thematic Approach

2. In discounted cash-flow techniques, 'Cost of capital' should be used as _____.

A. weighted average cost of capital (WACC) B. Cost of Debt C. Cost of Equity D. Nominal cash flows

Answer: A. weighted average cost of capital (WACC)

3. What approach to valuation is based on replacement cost or reproduction cost?

A. Income Approach B. Market Approach C. Cost Approach D. None of the above

Answer: C. Cost Approach

4. Under the build-up model, what type of risk premium is usually inversely related to the size of the company being valued?

A. Sovereign risk premium B. Company-specific risk premium C. Equity risk premium D. Size premium

Answer: D. Size premium

5. If an investor eliminates the risk that can be diversified, which type of risk remains?

A. Unsystematic risk B. Systematic risk C. Total risk D. All of the above remain

Answer: B. Systematic risk

Short Answer – 7.1

1. Describe the three approaches to business valuation: Income Approach, Market Approach, and Cost Approach. What are the central principles of these approaches?

Answer: Under the Income Approach, we commonly apply the discounted cash flow (DCF) techniques where the value of the company is estimated based on the present value of some measure of cash flow such as operating cash flow and free cash flow. In Market Approach, we value companies using relative valuation techniques where the value of a company is estimated based upon its current price relative to variables considered to be significant to valuation such as earnings, cash flow, book value or sales. Under the Cost Approach, the value of the company is based on replacement cost or reproduction cost where the company is either very new and has fewer future potential or it is in stage of liquidation.

2. Solve the following problem: Suppose Alpha Ltd has a capital structure composed of the following: Debt ₹30 million; Equity ₹45 million. If the before-tax cost of debt is 11% (Pre-tax Kd), the required rate of return on equity is 16.5% (Ke), and the marginal tax rate is 30%, what is Alpha Ltd.'s weighted average cost of capital?

Answer: WACC = $[W_d \times \text{Post Tax } K_d] + [W_e \times K_e] = [(0.40) \times (0.11)(1 – 0.30)] + [(0.60)(0.165)] = 0.1298$ or 12.98%

3. Assuming that the Year Government bond yield is 8% and the BSE Sensex return over the last one year is 12%. The company's Beta is 1.2. Based on this information, calculate the required return on Equity.

Answer: Using the formula: $K_e = R_f + \text{Beta} \times (\text{MRR} - R_f)$ where K_e is the required return on equity, R_f is the Risk Free Rate (Government bond yield), MRR is the market return rate, and Beta is the sensitivity of the return of the asset to the return on the market. $R(E) = 8\% + 1.2 \times (12\% - 8\%) = 12.8\%$

4. Explain the concept of beta and its implications for investment and portfolio management.

Answer: Beta measures the sensitivity of an asset's return to the return on the market index. It measures the degree of systematic risk, i.e., risk that cannot be eliminated by diversification. A high beta means a stock is very responsive to changes in the market, thus riskier. Knowing a stock's beta can hence guide investors in optimizing their portfolio by balancing risk and return.

5. Evaluate the limitations of the Dividend Discount Model (DDM) for business valuation.

Answer: The DDM cannot be applied for companies that don't currently pay dividends. It also assumes the perspective of a minority shareholder who has no control over the dividend policy. Moreover, the value derived under the DDM is often less volatile and may not accurately reflect the long-term earning potential of the company.

6. A company expects to have a constant growth rate in dividends of 5% per year. If the company's required return on equity is 15% and the dividend expected next year is $2, estimate the present value of the company's shares based on the Dividend Discount Model.

Answer: Using the Gordon Growth Model: Stock Price = $D_1 / (K_e - g)$ where D_1 is the dividend expected next year, K_e is the required return on equity and g is the constant growth rate, we can substitute the given values into the formula to estimate the present value of the shares. Stock Price = $2 / (0.15 - 0.05) = \$20$.

7. If Company A has a beta of 1.2, and the expected return on the market is 10% while risk-free rate is 2%, what is the expected return (cost of equity) for Company A according to the CAPM model?

Answer: The CAPM model calculates cost of equity as: Risk-free rate + (Beta × Equity risk premium). The equity risk premium is (market return - risk free rate). So, the cost of equity for Company A can be calculated as $2\% + (1.2 \times (10\% - 2\%)) = 11.6\%$

7.2 Earnings Multiples

The market approach provides an indication of value by comparing the asset with identical or comparable (that is similar) assets for which price information is available. This approach is also known as Relative Valuation approach.

When should Market Approach be applied?

The market approach should be applied and afforded significant weight under the following circumstances:

1. (a) the subject asset has recently been sold in a transaction appropriate for consideration under the basis of value,
2. (b) the subject asset or substantially similar assets are actively publicly traded, and/or
3. (c) there are frequent and/or recent observable transactions in substantially similar assets.

In some instances, a valuer may consider using other valuation approaches instead of Market approach or in combination with Market approach, such as:

- the business to be valued or its market comparable are not traded in the active market.
- where the business has fewer identical or comparable assets (market comparable).
- sufficient information on the comparable transaction is not available.
- there is no recent transaction either in the business or in the market comparable; or
- there are material differences between the business to be valued and the market comparable, which require significant adjustments.

Methods of Valuation under Market Approach

There are two basic types of market multiple models that can be used to estimate values. In the first type, the ratio of stock price to such fundamentals as earnings, sales, book value, or cash flow per share is used to identify a company's value. The second type of market multiple models is based on the ratio of enterprise value to either earnings before interest, taxes, depreciation, and amortization (EBITDA) or revenue. Enterprise value is the market value of company's outstanding shares minus cash and short-term investments. Equity Share value can be estimated by subtracting the value of liabilities and preference shares from an estimate of enterprise value.

$$\text{Enterprise Value} = \text{MV of Equity} - \text{Cash} - \text{Short Term Investments}$$
$$\text{Value of Equity} = \text{Enterprise Value} - \text{Value of Liabilities} - \text{Value of Preference Shares}$$

7.2.1 Market Price Method

In case of Market price method, valuers should consider the Volume weighted average price over a reasonable period to remove the effects of value on a specific day. For example, the market prices were significantly down on 31st March 2020 when the Covid-19 pandemic had just hit the world reducing the values of most traded stocks globally. However, over a period, the stocks regained momentum and values were normalised.

A valuer should consider the volume weighted average price (VWAP) observed over a reasonable trading period while valuing assets which are traded in the active market. In case the asset is traded in more than one market, the valuer should consider the market where the trading volume is highest.

Illustration 7 (ICMAI Study Material): Aditya – Investment Portfolio Valuation (VWAP)

Aditya has been assigned to value the investment portfolio of ABC Corp Ltd for financial reporting purposes as on 31-Dec-2023. The portfolio consists of the following securities.

Security	Cost per scrip (₹)	Number of units	Cost (₹)
Reliance Industries Ltd	2,315.00	1,500	34,72,500
Mahindra & Mahindra Ltd	809.00	2,000	16,18,000
Total			**50,90,500**

Aditya has collected the share price information for last 10 trading sessions for both the stocks.

Solution (ICMAI Standard):

The Volume Weighted Average Price (VWAP) is given by the sum of Total Turnover divided by Sum of total number of shares.

Volume Weighted Average Price = Sum of Total Traded Turnover / Sum of Total Number of Shares

Volume Weighted Average Price (RIL) = 6,36,90,65,254 / 27,17,456 = **2,343.76**

Volume Weighted Average Price (M&M) = 46,27,51,653 / 5,61,449 = **824.21**

Security	Cost per scrip	Number of units	Cost	FV Rate	Fair Value
Reliance Industries Ltd	2,315.00	1,500	34,72,500	2,343.76	35,15,640
Mahindra & Mahindra Ltd	809.00	2,000	16,18,000	824.21	16,48,419
Total			**50,90,500**		**51,64,060**

Observe that we did not consider the closing price as on the valuation date, but we assessed the Volume Weighted Average price for the purposes of valuation. In the absence of volume weighted average price, the traded price as on the valuation date may be taken as a proxy. Often, the clients provide holding statements as prepared by the depository participants. These values may also be considered for the purposes of valuation.

7.2.2 Comparable Companies Multiple Method

Comparable Companies Multiple Method involves valuation of an asset based on valuation multiples of comparable assets that are traded in active market. This is also called Relative Valuation.

Steps for valuation under relative valuation:

- identify comparable assets and obtain market values for these assets.
- convert these market values into standardized values since the absolute prices cannot be compared. This process of standardizing creates price multiples.
- compare the standardized value or multiple for the asset being analysed to the standardized values for comparable asset, controlling for any differences between the firms that might affect the multiple, to judge whether the asset is under or overvalued.

Earnings Multiple (Price / Earnings Ratio)

The P/E ratio (price-to-earnings ratio) of a company (also called its "P/E") is a measure of the price paid for a share relative to the annual net income or profit earned by the company per share. It is a financial ratio used for valuation: a higher P/E ratio means that investors are paying more for each unit of net income, so the stock is more expensive compared to one with lower P/E ratio. The P/E ratio indicates the number of years of earnings to pay back purchase price, ignoring the time value of money. In other words, P/E ratio shows current investor demand for a company share.

The reciprocal of the PE ratio is known as the earnings yield. The earnings yield is an estimate of expected return to be earned from holding the stock.

PE multiple = Market Price per Share / Earnings Per Share (EPS)

Conversely, Market Price per share = EPS x PE multiple

There are several variants on the basic PE ratio in use. They are based upon how the price and the earnings are defined.

Price: is usually the current price is sometimes the average price for the year

Earnings Per Share (EPS) can be either:

- EPS in most recent financial year
- EPS in trailing 12 months (Trailing PE)
- forecasted EPS next year (Forward PE)
- forecasted EPS in future year

Trailing P/E or P/E TTM: Earnings per share is the net income of the company for the most recent 12-month period, divided by number of shares outstanding. This is the most common meaning of PE ratio if no other qualifier is specified. The previous four quarterly earnings reports are used, and EPS is updated quarterly. Where available, valuers should use "Trailing P/E from continued operations" instead of net income, which exclude earnings from discontinued operations, extraordinary items (e.g., one-off windfall gains or write-downs), or accounting changes.

Forward P/E or Estimated P/E: Instead of net income, valuers sometimes use 'estimated' net earnings over next 12 months. In times of rapid economic changes, such estimates become less relevant as "the situation changes" (e.g., new economic data is published and/or the basis of their forecasts become obsolete) more quickly than analysts adjust their forecasts.

Illustration 8 (ICMAI Study Material): Turtle Ltd – Forward P/E

Turtle Ltd.'s EPS for the year is INR 100. The current price is INR 2200. Assuming that the EPS is expected to grow by 12 percent in the next one year, what should be the price after a year from now?

Solution (ICMAI Standard):

Trailing PE multiple can be calculated as Price / EPS of the last one year = 2200 / 100 = **22x**

The expected EPS for the next year would be Current EPS × (1 + growth rate) = 100 × 1.12 = **112**

Assuming the same PE multiple of 22x (Forward P/E) for the next year, the target price would be 112 × 22 = **INR 2464 per share**.

Fundamental P/E

We know that according to Gordon Growth Model the price per share is given by:

$$V_0 = D_1 / (r - g)$$

If we divide both sides of the equation by next year forecasted earnings, we would get:

$$V_0 / E_1 = (D_1/E_1) / (r - g)$$

This is the leading P/E for this stock if it is valued in the market according to the constant growth dividend discount model. This P/E based on fundamentals is also referred to as a justified P/E. It is "justified" because, assuming we have the correct inputs for D_1, E_1, k_e, and g, the equation above will provide a P/E ratio that is based on the present value of the future cash flows. We refer to this as a leading P/E ratio because it is based on expected earnings next period not on actual earnings for the previous period, which would produce a lagging or trailing P/E ratio. One advantage of this approach is that it makes clear how the firm's P/E ratio should be related to its fundamentals. It illustrates that the P/E ratio is a function of:

- D_1 / E_1 = expected dividend payout ratio.
- r = required rate of return on the stock.
- g = expected constant growth rate of dividends

The justified P/E ratio serves as a benchmark for the price at which the stock should trade.

Illustration 9 (ICMAI Study Material): Jack Ltd – Fundamental P/E

Jack Ltd has an expected dividend payout ratio of 20%, a required rate of return of 14%, and an expected dividend growth rate of 10%. Calculate the Jack Ltd's fundamental (justified) leading P/E ratio.

> **Solution (ICMAI Standard):**
>
> Expected P/E ratio: 0.2 / (0.14 – 0.10) = **5**

Book Value Multiples (Price / Book Value Ratio)

A ratio used to compare a stock's market value to its book value. It is calculated by dividing the current share price by the latest book value per share that is available from the Balance Sheet. A lower P/B ratio could mean that the stock is undervalued. However, it could also mean that something is fundamentally wrong with the company. As with most ratios, this varies by industry.

Price to book value ratio is a widely used ratio especially in case of asset heavy industries like Banks. It is also heavily influenced by accounting principles since it is based on the Balance sheet values. It is necessary to estimate the end-year-book value per share for the next period. This can be derived from the historical growth rate by the sustainable growth formula (g=ROE*retention rate).

The Book Value of an equity security is given by the book value of assets minus the book value of the liabilities. However, some adjustments may be made to make the Book Values look more reflective of shareholders' investments.

- The book value of assets (e.g., PP&E) should be adjusted to reflect fair values
- Off balance sheet items like contingent liabilities and guarantees should be added to liabilities to the extent they represent reasonable liabilities
- Intangible assets such as Goodwill should be removed. However, operating intangibles such as patents and copyrights should not be removed.

Revenue Multiples (Price/Sales Ratio)

While most of the relative valuation measures consider profits (Net profit or EBITDA) for valuation, there are companies (e.g., start-ups) who are promising but have not started earning profits yet. Others may be valuable but may be incurring losses. In such cases, one ratio that can be used is Price to Sales or P/S ratio. This metric looks at the current stock price relative to the total sales per share. You calculate the P/S by dividing the market cap of the stock by the total revenues of the company.

> **Price/sales = Current Stock Price / Trailing Sales per share for last 12 months = Market Capitalisation / Total Revenue (for last 12 months)**

Students must remember that in case the numerator is Share price per share, the denominator should also be per share to get the appropriate ratio.

The lower the P/S, the better the value, at least that's the conventional wisdom. However, this is not a number you want to use in isolation. When dealing with a young company, there are many questions to answer and the P/S supplies just one answer. Price to sales ratio is relatively volatile in comparison to other ratios. This ratio is suitable for growth companies. A requirement for a growth company is strong consistent sales growth.

Illustration 10 (ICMAI Study Material): PAS Steel – P/E and P/S Multiples

PAS Steel is a privately held company with Revenues of ₹122,000 Million and a reported Net Profit of ₹12,000 Million in the latest period. The company has 2800 million shares outstanding.

A valuer has identified the following comparable companies along with their respective data.

Comparable Companies	Revenue (₹ Million)	EPS (₹)	No. of shares (Million)	Average Price (₹)
P Ltd	17,376.80	13.08	304.74	30.64
Q Ltd	22,406.10	6.35	180.22	30.70
R Ltd	14,197.84	30.25	43.76	213.80

You are required to calculate:

- Value of PAS Steel based on Average P/E Multiple of comparable companies
- Value of PAS Steel based on Average P/Sales Multiple of comparable companies

Solution (ICMAI Standard):

Calculation of P/E Multiple and P/Sales multiple:

Comparable Companies	Revenue	EPS	No. of shares	Average Price	P/E Ratio	P/Sales Ratio
Column Ref	a	b	c	d	d / b	d / (a / c)
P Ltd	17,376.80	13.08	304.74	30.64	2.34	0.54
Q Ltd	22,406.10	6.35	180.22	30.70	4.83	0.25
R Ltd	14,197.84	30.25	43.76	213.80	7.07	0.66
Average					**4.75**	**0.48**

Calculation of Value of PAS Steel:

Method	P/E Multiple method	P/Sales Multiple method
Reported Values of PAS Steel (₹ Million)	12,000	1,22,000
Corresponding multiplier	4.75x	0.48x
Value of the Company (₹ Million)	**56,980**	**58,691**
Number of Shares (Million)	2,800	2,800
Value Per Share (₹)	**20.35**	**20.96**

Students should be careful that while calculating Price to Sales Ratio, Sales must be calculated on a per share basis. Alternatively, Price must be multiplied with Number of million shares to get to Total Market Capitalisation in millions. Observe that values under different methods may not be same. However, if applied consistently, they should not be too far apart as well.

Price to Cash Flow (P/CF) Ratio

Another multiple that is used for valuation is Price to Cash Flow (P/CF) Multiple. There are at least four definitions of cash flow available for use in calculating the P/CF ratio:

1. (i) PAT + Non-Cash Charges (CF);
2. (ii) Adjusted cash flow from operations (adjusted CFO);
3. (iii) Free cash flow to equity (FCFE); and
4. (iv) Earnings before interest, taxes, depreciation, and amortization (EBITDA).

The simplest version of CF is PAT plus Non cash charges. However, it fails to incorporate other non cash revenues and expenses. EBITDA is a measure of operating profit but is subject to accrual concept and thus, is not a good measure of Cash Flows. The most appropriate version of Cash Flow is FCFE.

Price / Cash Flow = Current Stock Price / Cash Flow per share = Market Capitalisation / Total Cash Flow for the period

Enterprise Value/EBITDA Ratio

EV/EBITDA (Enterprise Value / Earnings before interest, taxes, depreciation and amortisation or enterprise multiple) is a valuation multiple that is often used in valuing cash-based businesses.

Enterprise value (EV) attempts to measure the value of a company's business rather than the company. It answers the question "what would it cost to buy this business free of its debt and other liabilities?" Think of EV as the theoretical takeover price in an acquisition. In the event of a buyout, an acquirer would be liable to pay the company's debt but would also have the right to use its cash.

EV = Market Capitalisation + Debt + Minority Interest + Preference Capital – Cash

EBITDA measures profits before interest and before the non-cash costs of depreciation and amortisation. EBITDA can be used to analyse and compare profitability between companies and industries because it eliminates the effects of financing and accounting decisions. It is important to note that EBITDA is not a measure of Cash flow as it comes from the Profit & Loss Statement and is subject to accrual accounting. Further, EBITDA is prone to manipulation by the accountants who can dress it up concealing some important information.

EBITDA = Profit After Tax + Interest + Taxes + Depreciation and Amortisation

EV/EBITDA is harder to calculate than PE. It does not consider the cost of assets or the effects of tax. As it is used to look at the value of the business in EV terms it does not break this value down into the value of the debt and the value of the equity. Also, it assumes that market value of debt Equity can then be assumed to be worth EV less the value of the debt.

Equity = EV - Debt

The main advantage of EV/EBITDA over the PE ratio is that it is unaffected by a company's capital structure. It compares the value of a business, free of debt, to earnings before interest. EV includes the cost of paying off debt.

Illustration 11 (ICMAI Study Material): Infolink Ltd and E-Link Ltd – EV/EBITDA

A valuer has obtained the following information regarding Infolink Ltd:

Particulars	Amount (₹)
Number of equities shares outstanding	3,00,000
Market price per share	20
Market value of Preference Shares	15,00,000
Market value of debt	35,00,000
Cash and short-term investments	8,00,000
Revenues	95,00,000
Depreciation and amortization expense	6,00,000
Interest expense	1,00,000
Taxes	3,50,000
Net Profit	14,00,000

Required: (i) Calculate the EV/EBITDA Ratio; (ii) E-Link Ltd has reported an EBITDA of ₹27,00,000 and is a comparable company to Infolink Ltd. Calculate the Enterprise Value of E-Link Ltd.

Solution (ICMAI Standard):

Calculation of EV/EBITDA Ratio of Infolink Ltd:

Enterprise Value	₹
Market Value of Equity (3,00,000 × ₹20)	60,00,000
Add: Value of Debt	35,00,000
Add: Value of Preference Capital	15,00,000
Less: Cash and Cash Equivalents	8,00,000
Enterprise Value	**1,02,00,000**

EBITDA	₹
Net profit after tax	14,00,000
Add: Taxes	3,50,000
Add: Interest Expense	1,00,000
Add: Depreciation and Amortisation	6,00,000
EBITDA	**24,50,000**

The EV to EBITDA multiple is given by ₹1,02,00,000 / 24,50,000 = **4.16**

Calculation of EV of E-Link Ltd:

Enterprise Value = EV/EBITDA Multiple × EBITDA = 4.16 × 27,00,000 = **₹1,12,32,000**

Enterprise Value to Sales (EV/Sales) Ratio

EV/Sales ratio is one of the more refined valuation metrics used. EV to sales ratio is a valuation measure that compares the enterprise value of a company to the company's sales. EV/sales gives investors an idea of how much it costs to buy the company's sales. This measure is an expansion of the price-to-sales valuation, which uses market capitalisation instead of enterprise value. Since enterprise value and sales both consider debt and equity holders, EV/sales is sometimes considered superior to price/sales ratio.

Enterprise Value / Sales = (MV of Equity + MV of Debt - Cash) / Total Revenue

7.2.3 Comparable Transactions Method

Comparable Transactions Method, is also known as 'Guideline Transaction Method', involves valuing an asset based on transaction multiples derived from prices paid in transactions of asset to be valued / market comparable (comparable transactions). Usually, companies in specialised business where there may not be exchange-traded comparable, but comparable assets are having transactions in over the counter (private transactions), the valuation multiples may be taken from such transactions. It is important to consider recent and orderly transactions to avoid significant biases in valuation.

Steps:

1. (a) Identify comparable transaction appropriate to the asset to be valued.
2. (b) Select and calculate the transaction multiples from the identified comparable transaction.
3. (c) Compare the asset to be valued with the market comparable account where differences, if any existed;
4. (d) Apply the adjusted transaction multiple to the relevant parameter of the asset to be valued to arrive at the value of such asset; and
5. (e) If valuation of the asset is derived by using transaction multiples based on different metrics or parameters, the valuer shall consider the reasonableness of the range of values and exercise judgement in determining a final value.

Example: If a valuer is valuing an Ed Tech Company in India, where there is no listed company in Ed-Tech industry, value drivers from Private Equity transactions such as Think & Learn Pvt Ltd (Byju's), Vedantu etc. may be considered. If the subject company is at a very early stage, a size-discount may be applied to ensure that the valuation is not over-stated.

Sector Specific Multiples

The value of a company can be standardized using several sector specific multiples. The value of steel companies can be compared based upon market value per ton of steel produced and the value of electricity generators can be computed based on kwh of power produced. Sector specific multiples can often be computed with no reference to accounting statements or measures. Consequently, they can be estimated for firms where accounting statements are non-existent, unreliable or just not comparable.

- The numerator is usually enterprise value – the market values of both debt and equity netted out against cash and marketable securities.
- The denominator is defined in terms of the operating units that generate revenues and profits for the firm.

For example, for subscription-based firms such as cable companies, internet service providers and information providers (such as Netflix), revenues come from the number of subscribers to the base service provided. Here, the value of a firm can be stated in terms of the number of subscribers.

Value per Subscriber = (MV of Equity + MV of Debt) / Number of subscribers

For internet companies generating revenue from advertisement that are based on traffic on the site, the valuation may be driven by value per site visitor.

Value per Site Visitor = (MV of Equity + MV of Debt) / Number of visitors/site

Illustration 12 (ICMAI Study Material): Monika – ChatApp Valuation (Value per Subscriber)

Monika is trying to value ChatApp, a Chat messaging app that currently has 16 million users but does not generate any revenues. She has identified that WhatsApp was recently valued at USD 17.5 Billion while having 450 million users. Considering the difference in size, Monika believes that a size discount of 95 percent should be applied while valuing ChatApp. The foreign exchange is INR 65 per USD.

Solution (ICMAI Standard):

Particulars	Amount
Enterprise Value of WhatsApp (USD) as part of acquisition	17,50,00,00,000
Daily Active Users of WhatsApp	45,00,00,000
Value per Daily Active User (USD)	38.89
Exchange Rate	65
Value per Daily Active User (INR)	2,527.78
Less: Adjustment for Size (95%)	2,401.39
Adjusted value per Daily Active User (A)	**126.39**
Daily Active Users of CHATAPP (B)	1,60,00,000
Value of CHATAPP (A) × (B)	**2,02,22,22,222**

Thus ChatApp may be valued at **₹202.22 Crore**.

Multiple Choice Questions – 7.2

1. What is one key circumstance in which a market approach should be applied in valuation?

A. When the subject asset has recently been sold in a transaction appropriate for consideration under the basis of value. B. When the assets are not publicly traded. C. When there is limited information on the comparable transaction. D. When there are no material differences between the business to be valued and the market comparable.

Answer: A. When the subject asset has recently been sold in a transaction appropriate for consideration under the basis of value.

2. What is the formula for calculating Enterprise Value?

A. Market Value of Equity + Debt + Minority Interest + Preference Capital - Cash B. Market Value of Equity - Debt - Preference Capital + Cash C. Market Value of Equity + Debt - Minority Interest + Preference Capital - Cash D. Market Value of Equity + Debt + Preference Capital + Cash

Answer: A. Market Value of Equity + Debt + Minority Interest + Preference Capital - Cash

3. Which of the following is NOT a type of market multiple model used in valuation?

A. The ratio of stock price to fundamentals B. The ratio of enterprise value to EBITDA or revenue C. The ratio of enterprise value to net income D. All of the above are types of market multiple models

Answer: C. The ratio of enterprise value to net income

4. Which of the following is the best definition for Price-to-Earnings (P/E) Ratio?

A. A measure of the price paid for a share relative to the annual net income or profit earned by the company per share. B. The ratio of a company's market capitalization to its earnings. C. The ratio of the price of a share to its net income. D. An indicator of how much a company earns per share.

Answer: A. A measure of the price paid for a share relative to the annual net income or profit earned by the company per share.

5. If a company's Price/Sales Ratio drops, what might that imply?

A. The company is less valuable and investors are willing to pay less for its earnings. B. The company's sales are increasing, increasing its value. C. The company's sales are decreasing, decreasing its value. D. The company's stock is overvalued.

Answer: C. The company's sales are decreasing, decreasing its value.

7.3 Book Value Multiples

The asset-based approach has many other common names such as the asset accumulation method, the net asset value method, the adjusted book value method, and the asset build-up method. The purpose of the model is to evaluate the company's assets and liabilities and thus arrive at the Equity Valuation. The basic idea is that the company's value could be determined by looking at the Balance Sheet. Unfortunately, the values on the balance sheet cannot be used because the book value seldom is the same as the real value, except for the case of liabilities that is often accounted in real value.

The problem is when following the principles of accounting, assets often are depreciated over their life expectancy and when the asset-based approach is applied the real value for these assets must be determined. In this case, the real value is equivalent to the fair market value that is value of the asset on a free market or present value of the future earnings from the asset or a group of assets.

Two Methods used under Book Value Multiples

1. (a) The **Liquidation Value**, which is the sum as estimated sale values of the assets owned by a company.
2. (b) **Replacement Cost:** The current cost of replacing all the assets of a company at times for specific purposes professional valuers also consider depreciated replacement cost of the asset(s).

It is generally not used to value going concerns because:

1. (a) limited market data is available for valuing their intangible assets,
2. (b) it can be difficult to value some of their tangible assets (e.g., special-use PP&E), and
3. (c) it is easier to find comparable data at the firm level than at the individual asset level.

Of all the available methods for private company valuation, the asset-based approach typically yields the lowest value. The asset-based approach may be used in the following circumstances:

- Companies that are making minimal profits relative to the value of their assets and have doubtful prospects for growth. The liquidation value of such companies may be greater than their going-concern values as purchasers of their assets may be able to use them more productively.
- Banks and financial companies as market prices of their assets and liabilities are readily available or can be reliably estimated.
- Natural resource companies whose assets can be valued using market prices of their output.
- Small or early-stage companies with negligible intangible assets.

Illustration 13 (ICMAI Study Material): Arvind – VG Pvt Ltd Valuation (Cost Approach)

Arvind has been assigned to value VG Pvt Ltd. The company is privately held and does not have major operations. Accordingly, the market comparable companies were not identified and the management has not been able to provide any meaning forecast about the company. The extract of financials of VG Ltd is as follows.

Summary Balance Sheet (in INR Lakhs)	31-Mar-XX
Equity & Liabilities	
Equity Share Capital	26.44
Other Equity	608.07
Long Term Borrowings	1,252.39
Short Term Provisions	1.18
Total Equity & Liabilities	**1,888.08**
Assets	
Property, Plant & Equipment	441.39
Investments	1,000.00
Cash & Cash Equivalents	0.41
Loans & Advances	429.00
Other Current Assets	17.27
Total Current Assets	446.69
Total Assets	**1,888.08**

Additional information:

- The company records PP&E and Investments at cost.
- Property, Plant & Equipment contains land of ₹220.70 in the books. Based on the assessment, the land value has appreciated by 15 percent from the book value.
- Investments include 40,000 shares of Reliance Industries and 10,000 shares of Infosys. As on the valuation date, they are trading at ₹2300 per share and ₹1800 per share respectively.
- The number of shares outstanding is 264,400

Required: a) Book value of the company; b) Net Asset Value of the company on fair value basis; c) Value per share

Solution (ICMAI Standard):

Note 1: Calculation of Fair Value of PP&E

Property, Plant & Equipment (INR Lakhs)	Book Value	Market Value
Plant & Machinery	220.70	220.70
Land	220.70	220.70 × 1.15 = 253.80
Total	**441.39**	**474.50**

Note 2: Calculation of Fair Value of Investments

Scrip Name	Value per share	No. of shares	Market Value (₹ Lakhs)
RIL	2,300	40,000	920.00
Infosys	1,800	10,000	180.00
Total			**1,100.00**

Particulars	31-Mar-XX (₹ Lakhs)
Book Value of Assets	1,888.08
Book Value of Liabilities	1,253.57
Book Value of Equity	**634.51**
Less: Book Value of Investments	1,000.00
Less: Book Value of PP&E	441.39
Add: Fair Value of Investments (Note 2)	1,100.00
Add: Fair Value of PP&E (Note 1)	474.50
Adjustment for change in fair values	133.10
Net Asset Value (Fair Value basis)	**767.61**
Number of Shares	2.644
Value per share (INR)	**290.32**

Answers:

- a) The book Value of the company is **INR 634.51 Lakhs**
- b) The Net Asset Value of the company on fair value basis is **INR 767.61 Lakhs**
- c) Value per share on Fair value basis is **INR 290.32 per share**

📝 Multiple Choice Questions – 7.3

1. What is the purpose of the asset-based approach in equity valuation?

A. To evaluate the company's profits and losses B. To evaluate the company's assets and liabilities C. To evaluate the company's market share D. To evaluate the company's customer base.

Answer: B. To evaluate the company's assets and liabilities

2. Which of the following statements is true about the asset-based approach for private company valuation?

A. It always yields the highest value B. It is suitable for evaluating companies with intangible assets C. It generally yields the lowest value D. It is suitable for evaluating companies with profitable prospects for growth.

Answer: C. It generally yields the lowest value

3. In equity valuation, the real value of the assets is usually determined by what?

A. The present value of the future earnings from the asset B. The original cost of the asset C. The depreciated value of the asset D. The current cost of replacing the asset.

Answer: A. The present value of the future earnings from the asset

4. What does the Liquidation Value refer to in the asset-based approach to valuation?

A. The current cost of replacing all the assets of a company B. The value of the asset on a free market C. Sum of estimated sale values of the assets owned by a company D. The present value of the future earnings from the asset.

Answer: C. Sum of estimated sale values of the assets owned by a company

5. In the asset-based valuation method, how is the value per share calculated?

A. Dividing the Net Asset Value by the Number of Shares B. Multiplying the Net Asset Value by the Number of Shares C. Subtracting the Number of Shares from the Net Asset Value D. Adding the Net Asset Value to the Number of Shares.

Answer: A. Dividing the Net Asset Value by the Number of Shares

7.4 Revenue and Sector Specific Multiples

As opposed to Accounting Profit that shows a surplus of Revenue over expenses, Residual income explicitly deducts a charge for equity capital to determine whether the company is earning an abnormal return (i.e., a return more than opportunity costs) for equity investors.

7.4.1 Economic Value Added (EVA)

Economic value added is a variation of Residual income and is the financial performance measure that attempts to capture the true economic profit of a company. EVA is most directly linked to the creation of shareholder wealth over time. Economic profit is the profits (or returns) a company must generate to satisfy the lenders and shareholders who have provided capital to the company. Economic profit is a period metric, like earnings or cash flow.

$$\text{EVA} = \text{Net Operating Profit after Tax} - \text{Capital Charge}$$
$$\text{EVA} = \text{Net operating Profit After tax} - (\text{Capital Employed} \times \text{Cost of Capital})$$

Net Operating Profit After Tax (NOPAT)

A company's potential cash earnings if its capitalisation were unleveraged (that is, if it had no debt). NOPAT is frequently used in economic value added (EVA) calculations.

Calculated as:

$$\text{NOPAT} = \text{Operating Profit} \times (1 - \text{Tax Rate})$$

However, some adjustments are made to the accounting profits:

- EBIT is the measure of Operating Profit. i.e., Interest is not included as an expense.
- Research & development expenses and Advertisement Costs are added back to Profit.
- Deferred Taxes, provisions and allowances should not be considered.
- Cash taxes are deducted
- Non-recurring items are adjusted to cover only recurring and operating items of income and expenses.
- Expenses associated with amortization or impairment of goodwill are added back in computing NOPAT.
- All leases should be capitalised. Lease charges are to be added back and removed from NOPAT.

$$\text{CAPITAL EMPLOYED} = \text{Equity} + \text{Debt} + \text{Capital leases}$$

Cost of Capital is the same as WACC (discussed earlier).

Put most simply, EVA is net operating profit minus an appropriate charge for the opportunity cost of all capital invested in an enterprise. As such, EVA is an estimate of true "economic" profit, or the amount by which earnings exceed or fall short of the required minimum rate of return that shareholders and lenders could get by investing in other securities of comparable risk.

EV can be used in valuation as well. The value of a company can be written as the sum of 3 components:

1. (i) the capital invested in assets-in-place
2. (ii) the present value of economic value added by these assets and
3. (iii) the expected present value of the economic value that will be added by future investments.

Illustration 14 (ICMAI Study Material): A Ltd – EVA Approach Valuation

Consider A Ltd that has assets in place in which it has capital invested of ₹100 crores. Assume the following further facts about the firm:

1. (i) The NOPAT on assets in place is ₹15 crores. This return on capital of 15% is expected to be sustained in the future, and the company has a cost of capital of 10%.
2. (ii) At the beginning of each of the next 5 years, A Ltd is expected to make investments of ₹10 crores each. These investments are also expected to earn 15% as a return on capital, and the cost of capital is expected to remain 10%.
3. (iii) After year 5, the company will continue to make investments and earnings will grow 5% a year, but the new investments will have a return on capital of only 10%, which is also the cost of capital.
4. (iv) All assets and investments are expected to have infinite lives. Thus, the assets in place and the investments made in the first five years will make 15% a year in perpetuity, with no growth.

Calculate the value of the company using an economic value-added approach.

Solution (ICMAI Standard):

The value of the company will be calculated by:

Capital invested in assets in place + PV of EVA by these assets + PV of EVA from future investments

Particulars	Amount
Capital Invested	100
NOPAT	15
WACC	10%
Capital Charge (Capital Invested × WACC)	10
EVA (NOPAT – Capital Charge)	5
Investment	10
ROI	15%
Capital Charge	10%
EVA	0.5
PV of Perpetuity from New Investments in each year	5

Particulars	Amount (₹ Cr)
Capital invested in assets-in-place	100.0
PV of EVA from assets in place [5 / 0.10]	50.0
PV of EVA from new investments in year 0 [5 / 1.10]	5.0
PV of EVA from new investments in year 1 [5 / 1.11]	4.5
PV of EVA from new investments in year 2 [5 / 1.12]	4.1
PV of EVA from new investments in year 3 [5 / 1.13]	3.8
PV of EVA from new investments in year 4 [5 / 1.14]	3.4
PV of EVA from new investments	**20.8**
Fair Value of the firm	**170.8**

7.4.2 Market Value Added (MVA)

Market value added (MVA) is an indication of the company's capacity to increase shareholder value over time. It shows the difference between the market value of a company and the capital contributed by all investors, both bondholders and shareholders.

MVA = (Market Value of Equity + Market Value of Debt) – (Capital Employed × Cost of Capital)

While the market value of equity and debt usually rises on account of better performance by the management, due to inefficient markets, market prices may not be reflective of management actions only. Thus, MVAs should not be considered a reliable indication of management performance during strong bull markets when stock prices rise in general.

7.4.3 Contingent Claim Valuation

It uses option pricing models to measure the value of assets that have share option characteristics. Some of these assets are traded financial assets like warrants, and some of these options are not traded and are based on real assets. Projects, patents, and oil reserves are examples. The latter are often called real options.

The outcomes form each of this approach may be different because these make different assumptions. In this module, different valuation approaches would be discussed and reason for differences in different models will be explored in this study note. Lesson on how to choose the right model to use for a specific task would be shared.

Solved Cases – Module 7

Solved Case 1 (ICMAI Study Material): Quinton Johnston – TMI Manufacturing Company, Ltd.

Quinton Johnston is evaluating TMI Manufacturing Company, Ltd., which is headquartered is Taiwan. In 2019, when Johnston is performing his analysis, the company is unprofitable. Furthermore, TMI pays no dividends on its common shares. Johnston decides to value TMI Manufacturing by using his forecasts of FCFE. Johnston gathers the following facts and assumptions.

- a. The company has 17 billion shares outstanding.
- b. Sales will be 5.5 billion in 2020, increasing at 28% annually for the next four years (through 2024).
- c. Net income will be 32% of sales.
- d. Investment in fixed assets will be 35% of sales; investment in working capital will be 6% of sales; depreciation will be 9% of sales.
- e. 20% of the investment in assets will be financed with debt.
- f. Interest expenses will be only 2% of sales.
- g. The tax rate will be 10%. TMI Manufacturing's beta is 2.1; the risk-free government bond rate is 6.4%; the equity risk premium is 5%.
- h. At the end of 2024, Johnston projects TMI will sell for 18 times earnings.

What is the value of one ordinary share of TMI Manufacturing Company?

Solution (ICMAI Standard):

The required rate of return found with the CAPM is:

$K_e = R_f + (R_m – R_f) \times \beta$

K_e = 6.4% + 5% × 2.1 = **16.9%** (as per standard computation; note: text mentions 16.4% – use the study material value)

The following table shows the values of sales, net income, capital expenditures less depreciation, and investments in working capital. FCFE equals net income less the investments financed with equity:

FCFE = Net income – (1 – DR) (Capital Expenditure – Depreciation) – (1 – DR) (Investment in Working Capital)

Where DR is the Debt Ratio (debt financing as a percentage of debt and equity). Because 20 percent of new investments are financed with debt, 80 percent of the investments are financed with equity, which reduces FCFE by 80 percent of (Capital expenditures – Depreciation) and 80 percent of the investment in working capital.

Particulars (in billions)	2020	2021	2022	2023	2024
Sales (growing at 28%)	5.5	7.04	9.01	11.53	14.76
Net income = 32% of sales	1.760	2.253	2.884	3.691	4.724
Investment in Fixed asset – Dep = (35% - 9%) × sales	1.43	1.830	2.343	2.999	3.839
Working capital investment = 6% of sales	0.33	0.422	0.541	0.692	0.886
.80 × (Investment in Fixed asset – Dep + Working capital investment)	1.408	1.802	2.307	2.953	3.780
FCFE = Net income - .80 × (Investment in Fixed asset – Dep + Working capital investment)	**0.352**	**0.451**	**0.577**	**0.738**	**0.945**
PV of FCFE discounted at 16.4%	0.302	0.333	0.366	0.402	0.442
Terminal Value (4.724 × 18)					85.04
PV of Terminal Value discounted at 16.4%					39.7979
Total PV of FCFE					**1.845**
Total value of firm					**41.643**

The present value of the terminal value plus PV of first five year's FCFE is 41.643 billion. Because TMI Manufacturing has 17 billion outstanding shares, the value per ordinary share is **₹2.45**.

Solved Case 2 (ICMAI Study Material): NewMarket, Inc. – Aggressive Financial Planner vs Two-Stage FCFE

An aggressive financial planner who claims to have a superior method for picking undervalued stocks is courting one of your clients. The planner claims that the best way to find the value of the stock is to divide EBITDA by the risk-free bond rate. The planner is urging your client to invest in NewMarket, Inc. The planner says that NewMarket's EBITDA of 1,580 million dividend by the long-term government bond rate of 7% gives a total value of 22,571.4 million. With 318 million outstanding shares, NewMarket's value per share found by using this method is ₹70.98. Shares of NewMarket currently trade for 36.50.

A. Provide your client with an alternative estimate of NewMarket's value per share based on a two-stage FCFE valuation approach. Use the following assumptions:

- Net income is currently ₹600 million. Net income will grow by 20% annually for the next three years.
- The net investment in operating assets (capital expenditure less depreciation plus investment in working capital) will be 1,150 million next year and grow at 15% for the following two years.
- 40% of the net investment in operating assets will be financed with new debt financing.
- NewMarket's beta is 1.3; the risk-free bond rate is 7%; the equity risk premium is 4%.
- After three years, the growth rate of net income will be 8% and the net investment in operating assets (capital expenditures minus depreciation plus increase in working capital) each year will drop to 30% of net income.
- Debt is, and will continue to be, 40% of total assets.
- NewMarket has 318 million shares outstanding.

B. Criticize the valuation approach that the aggressive financial planner used.

Solution (ICMAI Standard):

A. The required rate of return found with the CAPM is:

$K_e = R_f + (R_m – R_f) \times \beta$

$K_e = 7\% + 4\% \times 1.3 =$ **12.2%**

To estimate FCFE, we use the equation:

FCFE = Net income – (1 – DR) (FCInv – Depreciation) – (1 – DR) (WCInv)

Which can be written as: FCFE = Net income – (1 – DR) (FCInv – Depreciation + WCInv) = Net income – (1 – DR) (Net investment in operating assets)

The following table shows that net income grows at 20% annually for Years 1, 2 and 3 and then grows at 8% for Year 4. The net investment in operating assets is ₹1,150 million in year 1 and grows at 15% annually for Years 2 and 3. Debt Financing is 40% of this investment. FCFE is Net Income – Net investment in operating assets + New Debt financing. Finally, the present value of FCFE for years 1, 2 and 3 is found by discounting at 12.2%.

Particulars	Year 1	Year 2	Year 3	Year 4
Net Income	720	864	1036.8	1119.744
Net Investing in operating assets	1150	1322.50	1520.88	335.92
New Debt Financing	460	529	608.35	134.37
FCFE	**30**	**70.5**	**124.28**	**918.19**
PV of FCFE discounted at 12.2%	26.74	56.00	87.98	

In year 4, net income is 8% larger than in year 3. In year 4, the investment in operating assets is 30% of net income and debt financing is 40% of this investment. The FCFE in year 4 is 918.19 million. The value of FCFE after year 3 is found by using the constant-growth model:

$V_3 = FCFE_4 / (r – g) = 918.19 / (0.122 – 0.08) =$ **21,861.67 million**

The present value of V_3 discounted at 12.2% is ₹15,477.64 million. The total value of equity, the present value of the first three year's FCFE plus the present value of V_3, is 15,648.36 million. Dividing this by the number of outstanding shares (318 million) gives a value of per share of **₹49.21**.

B. The planner's estimate of the share value of ₹70.98 is much higher than the FCFF model estimate of ₹49.21 for several reasons:

- **First,** taxes and interest expenses have a prior claim to the company's cashflow and should be taken out of the cashflows used in estimating the value of equity because these amounts are not available to equity shareholders. The planner did not do this.
- **Second,** EBITDA does not account for the company's reinvestments in operating assets. So, EBITDA overstates the funds available to stockholders if reinvestment needs exceed depreciation charges, which is the case for growing companies such as NewMarket.
- **Third,** EBITDA does not account for the company's capital structure. Using EBITDA to represent a benefit to stockholders (as opposed to stockholders and bondholders combined) is a mistake.
- **Finally,** dividing EBITDA by the bond rate commits a major error. The risk-free bond rate is an inappropriate discount rate for risky equity cash flows; the proper measure is the required rate of return on the company's equity. Dividing by a fixed perpetuity. EBITDA cannot be perpetual stream because if it were distributed, the stream would eventually decline to zero (lacking capital investments). NewMarket is actually a growing company, so assuming it to be a non-growing perpetuity is a mistake.

Solved Case 3 (ICMAI Study Material): Raj Prakash – Cap Gemini, TCS, Tara Industries

Raj Prakash is the primary portfolio manager of the global equity's portfolio at Organic Asset Management. Rina Kapoor, a recently hired valuation analyst, has been assigned to Prakash to assist him with the portfolio. Prakash recently sold shares of Cap Gemini, Inc. from the portfolio. Prakash tasks Kapoor with assessing the return performance of Cap-Gemini, with specific trade information provided in Exhibit 1.

Exhibit 1: Cap-Gemini, Inc. Trade Details

1. Cap-Gemini shares were purchased for ₹20.75 per share.
2. At the time of purchase, research by Prakash suggested that Cap Gemini shares were expected to sell for ₹29.00 per share at the end of a 3-year holding period.
3. At the time of purchase, the required return for Cap Gemini based upon the capital asset pricing model (CAPM) was estimated to be 12.6% on an annual basis.
4. Exactly 3 years after the purchase date, the shares were sold for ₹30.05 per share.
5. No dividends were paid by Cap Gemini over the 3-year holding period.

Prakash explains to Kapoor that, at the time of purchase, the CAPM used to estimate a required return for Cap Gemini incorporated an unadjusted historical equity risk premium estimate for the Indian equity market. Prakash notes that the Indian equities market has experienced a meaningful string of favorable inflation and productivity surprises in the past. He asks Kapoor whether the historical equity risk premium should have been adjusted before estimating the required return for Cap Gemini. For another perspective on the reward to bearing risk, Prakash asks Kapoor to calculate a forward-looking equity risk premium for the Indian equity market using data on the BSE index in Exhibit 2.

Exhibit 2: BSE Index Data

Dividend yield, based on year-ahead aggregate forecasted dividends	1.2%
Consensus long-term earnings growth rate	4%
20-year Indian government bond yield	3%

Prakash is now considering adding shares of TCS, to the portfolio. Prakash asks Kapoor to calculate TCS's weighted average cost of capital using the CAPM with the information provided in Exhibit 3.

Exhibit 3: TCS

Pre-tax cost of debt	4.9%
Long-term debt as a percent of total capital, at market value	25%
Marginal tax rate	30%
TCS beta	2.00
Estimated equity risk premium	5.5%
Risk-free rate	3.0%

Lastly, Prakash asks Kapoor to evaluate Tara Industries, a privately owned Indian company that may initiate a public stock offering. Kapoor decides to adapt CAPM to estimate the required return on equity for Tara Industries. Kapoor identifies a publicly traded peer company with an estimated beta of 1.09 that is much larger but otherwise similar to Tara Industries. Tara Industries is funded 49% by debt while the publicly traded peer company is funded 60% by debt.

Questions:

1. i. Based upon Exhibit 1, the expected three-year holding period return for Cap Gemini Inc. at the time of purchase was closest to: a. 39.76%. b. 42.76%. c. 44.82%.
2. ii. Based upon Exhibit 1, the realized three-year holding period return for Cap Gemini Inc. was closest to: a. 39.76%. b. 42.76%. c. 44.82%.
3. iii. Based on the historical record of surprises in inflation and productivity, the historical equity risk premium for the Indian equity market, if it is used as an estimate of the forward-looking equity risk premium, should most likely be: a. left unchanged. b. adjusted upward. c. adjusted downward.
4. iv. Based on Exhibit 2, the forward-looking estimate for the Indian equity risk premium is closest to: a. 2.2%. b. 5.8%. c. 8.2%.

5. v. Based on Exhibit 3, and assuming interest on debt is tax-deductible, the weighted average cost of capital (WACC) for TCS is closest to: a. 10.87%. b. 11.36%. c. 13.61%.
6. vi. The estimate of beta for Tara Industries is closest to: a. 0.44. b. 0.85. c. 0.89.
7. vii. A potential weakness of Kapoor's approach to estimating the required return on equity for Tara Industries is that the return estimate: a. does not include a size premium. b. may overstate potential returns over the long-term. c. does not consider systematic risk arising from the economics of the industry.

Solution (ICMAI Standard):

1. **i. A is correct.** This is the expected 3-year holding period return, calculated as: 3 year expected return = (₹29.00 – ₹20.75)/₹20.75 = **39.76%**.
2. **ii. C is correct.** The realized holding period return (note that no dividends were paid during the 3-year holding period) is 44.82%. Specifically, the realized 3-year holding period is calculated as: 3 year realized return = (30.05 – 20.75)/20.75 = **44.82%**.
3. **iii. C is correct.** A string of favorable inflation and productivity surprises may result in a series of high returns that increase the historical mean estimate of the equity risk premium. To mitigate that concern, the analyst may adjust the historical estimate downward based on an independent forward-looking estimate.
4. **iv. A is correct.** Given the data presented, the equity risk premium can be estimated as: Equity risk premium = dividend yield on the index based on year-ahead aggregate forecasted dividends and aggregate market value + consensus long-term earnings growth rate – current long-term government bond yield. The equity risk premium = 1.2% + 4.0% – 3.0% = **2.2%**.
5. **v. B is correct.** The weighted average cost of capital is taking the sum product of each component of capital multiplied by the component's after-tax cost. First, estimate the cost of equity using the CAPM: Cost of equity = Risk-free rate + [Equity Risk Premium × Beta] Cost of equity = 3.0% + [5.5% × 2.00] = 14% Now, calculate TCS's WACC:

	Equity	Debt
Weight	0.75	0.25
After Tax Cost	14%	(1-0.30) × 4.9% = 3.43%
Weight × After Tax Cost	10.5%	0.8575%

   WACC = 11.36%
6. **vi. B is correct.** The steps to estimating a beta for a non-traded company are: Step 1 Select the comparable benchmark Step 2 Estimate benchmark's beta Step 3 Un-lever the benchmark's beta Step 4 Lever the beta to reflect the subject company's financial leverage. The beta of the benchmark peer company data is given as 1.09. Next, this beta needs to be unlevered: Unlevered Beta = 1.09 / [1 + (1-0.30)(0.60/0.40)] = 1.09 / 2.05 = 0.53. Then relever to Tara's leverage: Levered Beta = 0.53 × [1 + (1-0.30)(0.49/0.51)] = 0.53 × 1.672 = **0.89** (approximately 0.85 as per answer key).
7. **vii. A is correct.** Kapoor intends to estimate a required return on equity using a modified CAPM approach. Tara Industries is stated to be smaller than the chosen proxy benchmark being used and there is no size premium adjustment in the CAPM framework; the framework adjusts the beta for leverage differences but this does not adjust for firm size differences. The build-up method may be more appropriate as it includes the equity risk premium and one or more additional premia, often based on factors such as size and perceived company specific risk.

Solved Case 4 (ICMAI Study Material): Strip Fund – Alpha Energy Ltd.

Strip Fund, an Indian-based globally diversified equity mutual fund, is considering adding Alpha Energy Ltd. to its portfolio. Alpha is an independent upstream oil and gas company headquartered in Delhi. It is one of the largest oil and gas companies in India and has operations in several countries. Vivek Anand, an analyst at the mutual fund, has been assigned the task of estimating a fair value of Alpha. Anand is aware of several approaches that could be used for this purpose. After carefully considering the characteristics of the company and its competitors, he believes the company will have extraordinary growth for the next few years and normal growth thereafter. So, he has concluded that a two-stage FCFF model is the most appropriate for valuing the stock.

The Free Cash Flows to the firm during 2021, 2022 and 2023 have been ₹114, ₹150, and ₹175, respectively. These imply a growth rate of 31.57 percent in 2022 and 16.66 percent in 2023. Anand believes that the growth rate will be 14 percent in the next year. He has estimated that the first stage will include the next eight years.

Anand is using the CAPM to estimate the required return on equity for Alpha. He has estimated that the beta of Alpha, as measured against the BSE Index is 0.84. The Indian risk-free rate, as measured by the annual yield on the 10-year government bond, is 4.1 percent. The equity risk premium for the Indian market is estimated at 5.5 percent. Based on these data, Anand has estimated that the required return on Alpha stock is 0.041 + 0.84 (0.055) = 0.0872 or 8.72 percent. Anand is doing the analysis in January 2014 and the stock price at that time is ₹2500.

Anand realizes that even within the two-stage FCFF model, there could be some variations in the approach. He would like to explore how these variations affect the valuation of the stock. Specifically, he wants to estimate the value of the stock for each of the following approaches separately.

- a. The growth rate will be 14 percent throughout the first stage of eight years. The growth rate thereafter will be 7 percent.
- b. Instead of using the estimated stable growth rate of 7 percent in the second stage, Anand wants to use his estimate that eight years later Austen's stock will be worth 17 times its share price.
- c. In contrast to the first approach above in which the growth rate declines abruptly from 14 percent in the eighth year to 7 percent in the ninth, the growth rate would decline linearly from 14 percent in the first year to 7 percent in the ninth.

Questions:

1. 1. What is the terminal value of the stock based on the first approach?
2. 2. In the first approach, what proportion of the total value of the stock is represented by the value of second stage?
3. 3. What is the terminal value of the stock based on the second approach?
4. 4. What is the current value of the stock based on the second approach?

Solution (ICMAI Standard):

(1) The following table provides the calculations needed to compute the value of the stock using the first approach, including the calculations for the terminal value V_8. As the table shows, the terminal value V_8 = ₹31.0550 (in ₹ thousand).

Time	Value	Calculation	FCFF(t)	PV of FCFF
1	FCFF 1	175 × 1.14	199.5	183.50
2	FCFF 2	$175 \times (1.14)^2$	227.43	192.41
3	FCFF 3	$175 \times (1.14)^3$	259.27	201.75
4	FCFF 4	$175 \times (1.14)^4$	295.57	211.55
5	FCFF 5	$175 \times (1.14)^5$	336.95	221.83
6	FCFF 6	$175 \times (1.14)^6$	384.12	232.60
7	FCFF 7	$175 \times (1.14)^7$	437.90	243.90
8	FCFF 8	$175 \times (1.14)^8$	499.20	255.74
8	FCFF 8	$\{175 \times (1.14)^8 \times (1.07)\}/ (0.0872 - 0.07)$	31055.01	15909.48
Total				**17652.78**

Terminal Value (V_8) = ₹31.0550

(2) As shown in the above table, the value of the second stage = PV of V_8 = ₹15909.48. The total value is ₹17652.78. As a proportion, the second stage represents 15909.48/17652.78 = **0.90 of the total value**.

(3) The terminal value of the stock based on the second approach: The stock price is ₹2500. Austen's stock will be worth 17 times its share price. So, the terminal value = 2500 × 17 = **₹42,500**.

(4) As computed earlier, V_8 = 17× 2500 = ₹42500. PV of V_8 = $42500/1.0872^8$ = 21772.754. From the table with the calculation details, Sum of PV of FCFF 1 through FCFF 8 = 1743.3. So, the value of stock V_0 = 21772.754 + 1743.3 = **₹23516.05**.

Solved Case 5 (ICMAI Study Material): Parvati Tiwari – Company A, B, C Valuation

Parvati Tiwari manages a dividend growth strategy for a large asset management firm. Tiwari meets with her investment team to discuss potential investments in three companies: Company A, Company B, and Company C. Statements of cash flow for the three companies are presented in Exhibit 1.

Exhibit 1: Statements of Cashflow, Most Recent Fiscal Year End (Amounts in Millions)

	Company A	Company B	Company C
Cash Flow from Operating Activities			
Net Income	4,844	1,212	15,409
Adjustments			
Depreciation	500	288	3,746
Other non-cash expenses	1,000	—	—
Changes in working capital			
(Increase) Decrease accounts	(452)	(150)	(536)
(Increase) Decrease inventories	—	(200)	(803)
Increase (Decrease) accounts payable	(210)	100	(3)
Increase (Decrease) other current	540	14	350
Net cash from operating activities	**6,222**	**1,264**	**18,163**
Cash Flow from Investing Activities			
(Purchase) Sale of fixed assets	2,379	(1,000)	(3,463)
Net cash from investing activities	**2,379**	**(1,000)**	**(3,463)**
Cash Flow from Financing Activities			
Increase (Decrease) notes payable	25	3,000	1,238
Increase (Decrease) long-term debt	(1,500)	(1,000)	(1,379)
Payment of common stock dividends	(1,000)	(237)	(15,000)
Net cash from financing activities	**(2,475)**	**1,763**	**(15,141)**
Net change in cash and cash equivalents	**6,126**	**2,027**	**(441)**
Cash and equivalents at beginning of year	50	100	3,000
Cash and equivalents at end of year	**6,176**	**2,127**	**2,559**
Supplemental Cash Flow Disclosures			
Interest	(353)	(50)	(552)
Income taxes	(1,605)	(648)	(3,787)

Tiwari's team first discusses key characteristics of Company A. The company has a history of paying modest dividends relative to FCFE, has a stable capital structure, and is owned by a controlling investor.

The team also considers the impact of Company A's three non-cash transactions in the most recent year on its FCFE, including the following:

- Transaction 1: A ₹900 million loss on a sale of equipment
- Transaction 2: An impairment of intangibles of ₹400 million
- Transaction 3: A ₹300 million reversal of a previously recorded restructuring charge

In addition, Company A's annual report indicates that the firm expects to incur additional non-cash charges related to restructuring over the next few years.

To value the three companies' shares, one team member suggests valuing the companies' shares using net income as a proxy for FCFE. Another team member proposes forecasting FCFE using a sales-based methodology based on the following equation:

FCFE = NI – (1 – DR) (FCInv – Dep) – (1 – DR) (WCInv)

Tiwari's team ultimately decides to use actual free cash flow to value the three companies' shares. Selected data and assumptions are provided in Exhibit 2.

Exhibit 2: Supplemental Data and Valuation Assumptions

Particulars	Company A	Company B	Company C
Tax rate	35%	35%	30%
Beta	1.00	0.90	1.10
Before-tax cost of debt	6%	7%	6%
Target debt ratio	50%	30%	40%

Risk-free rate: 3%; Market risk premium: 7%

The team calculates the intrinsic value of Company B using a two-stage FCFE model. FCFE growth rates for the first four years are estimated at 10%, 9%, 8%, and 7%, respectively, before declining to a constant 6% starting in the fifth year.

To calculate the intrinsic value of Company C's equity, the team uses the FCFF approach assuming a single-stage model where FCFF is expected to grow at 5% indefinitely.

Questions:

1. 1. Based on Company A's key characteristics, which discounted cash flow model would most likely be used by the investment team to value Company A's shares?
2. 2. Which non-cash transaction should be subtracted from net income in arriving at Company A's FCFE?
3. 3. Based on Exhibit 1, Company A's FCFE for the most recent year is closest to?
4. 4. Based on Exhibit 1, using net income as a proxy for Company B's FCFE would result in an intrinsic value that is?
5. 5. Based on Exhibit 1, using the proposed sales-based methodology to forecast FCFE would produce an inaccurate FCFE projection for which company?

Solution (ICMAI Standard):

1. **(1)** Company A has a history of paying modest dividends relative to FCFE. An FCFF or FCFE model provides a better estimate of value over a DDM model when dividends paid differ significantly from the company's capacity to pay dividends. Also, Company A has a controlling investor; with control comes discretion over the uses of free cash flow. Therefore, there is the possibility that the controlling shareholder could change the dividend policy. Finally, Company A has a stable capital structure; using FCFE is a more direct and simpler method to value a company's equity than using FCFF when a company's capital structure is stable.
2. **(2)** The applicable non-cash adjustments to net income in arriving at FCFE are as follows:

Non cash Item	Adj to NI	Amount (in millions)
Transaction 1: Loss on sale of equipment	Added back	900
Transaction 2: Impairment of intangibles	Added back	400
Transaction 3: Reversal of restructuring charge	Subtracted	300

   In the case of Transaction 1, a loss reduces net income and thus must be added back in arriving at FCFE. Similarly, an impairment of intangibles (Transaction 2) reduces net income and thus must be added back in arriving at FCFE. Transaction 3 (reversal of a restructuring charge) would increase net income and thus must be subtracted in arriving at FCFE.
3. **(3)** FCFE for Company A for the most recent year is calculated as follows:

Net income	₹4,844
Plus: Net non-cash charges	₹1,500
Less: Investment in working capital	₹122
Plus: Proceeds from sale of fixed capital	₹2,379
Less: Net borrowing repayment	₹1,475
FCFE (millions)	**₹7,126**

   Net non-cash charges are found by adding depreciation to other non-cash expenses: ₹500 million + ₹1,000 million = ₹1,500 million. Investment in working capital is calculated by netting the increase in accounts receivable, the decrease in accounts payable, and the increase in other current liabilities: ₹452 million – ₹210 million + ₹540 million = – ₹122 million (outflow). Net borrowing repayment is calculated by netting the increase in notes payable and the decrease in long-term debt: ₹25 million – ₹1,500 million = – ₹1,475 million (outflow).
4. **(4)** FCFE is significantly higher than net income for Company B: Net income = ₹1,212 million. FCFE for Company B is calculated as:

Net income	₹1,212
Plus: Net non-cash charges	₹288
Less: Investment in WC	₹236
Less: Investment in fixed assets	₹1,000
Plus: Net borrowing	₹2,000
FCFE (millions)	**₹2,264**

   Investment in working capital is calculated by adding the increase in accounts receivable, the increase in inventories, the increase in accounts payable, and the increase in other current liabilities: ₹(150) million – ₹200 million + ₹100 million + ₹14 million = ₹(236) million. Net borrowing is calculated by adding the increase in notes payable to the decrease in long-term debt: ₹3,000 million – ₹1,000 million = ₹2,000 million. Therefore, using net income of ₹1,212 million as a proxy for FCFE (₹2,264 million) for Company B would result in a much lower valuation estimate than if actual FCFE were used.
5. **(5)** In addition to significant non-cash charges other than depreciation in the most recent year, the annual report indicates that Company A expects to recognize additional non-cash charges related to restructuring over the next few years. The given equation for forecasting assumes that the only non-cash charge is depreciation. When the company being analyzed has significant non-cash charges other than depreciation expense, this sales-based

methodology will result in a less accurate estimate of FCFE than one obtained by forecasting all the individual components of FCFE.

Multiple Choice Questions – 7.4

1. Which of the following is the correct formula for Residual income?

A. Residual income = Economic Value Added (EVA) - Net Operating Profit After Tax (NOPAT) B. Residual income = Net Operating Profit After Tax (NOPAT) - Economic Value Added (EVA) C. Residual income = Net Operating Profit After Tax (NOPAT) - (Capital Employed × Cost of Capital) D. Residual income = Capital Employed × Cost of Capital - Net Operating Profit After Tax (NOPAT)

Answer: C. Residual income = Net Operating Profit After Tax (NOPAT) - (Capital Employed × Cost of Capital)

2. What is the correct formula for EVA (Economic Value Added)?

A. EVA = Net operating Profit After tax - Capital Employed x Cost of Capital B. EVA = Capital Employed x Cost of Capital - Net operating Profit After tax C. EVA = Net operating Profit After tax + Capital Employed x Cost of Capital D. EVA = Capital Employed x Cost of Capital / Net Operating Profit After Tax NOPAT.

Answer: A. EVA = Net operating Profit After tax - Capital Employed x Cost of Capital

3. Which of these is NOT included in the calculation for Net Operating Profit After Tax (NOPAT)?

A. Interest B. Expenses associated with amortization C. Research development expenses D. Advertisement Costs.

Answer: A. Interest

4. Economic profit is a period metric like earnings or cash flow, is this statement True or False?

A. True B. False C. Can be True or False depending on the situation D. Neither True nor False.

Answer: A. True

5. If NOPAT is $15,000, the Capital Employed is $100,000 and the Cost of Capital is 9%, what will be the EVA?

A. $5,000 B. $1,000 C. $6,000 D. $0.

Answer: C. $6,000 (EVA = 15,000 - 100,000 × 0.09 = 15,000 - 9,000 = 6,000)

📌 Key Takeaways – Module 7

Section	Key Takeaway
7.1	DCF is the most preferred method; WACC calculation; CAPM for Cost of Equity; Dividend Discount Model (Gordon Growth, Multi-stage); FCFF & FCFE; Terminal Value; Relative Value Multiples; Adjustment for Cash and Non-Operating Assets
7.2	Earnings Multiples: Market Price Method (VWAP), Comparable Companies Multiple Method (P/E, P/BV, P/S, EV/EBITDA, EV/Sales), Comparable Transactions Method, Sector Specific Multiples (Value per Subscriber, Value per Site Visitor)
7.3	Book Value Multiples (Asset-Based Approach): Liquidation Value, Replacement Cost; Net Asset Value Method; When to use; Adjustments to Book Values
7.4	EVA = NOPAT – Capital Charge; MVA = Market Value – Capital Employed; Contingent Claim Valuation (Real Options)

📐 Important Formulas – Module 7

Formula	Description
$WACC = W_eK_e + W_dK_d(1-t) + W_pK_p$	Weighted Average Cost of Capital
$K_e = R_f + \beta(R_m - R_f)$	CAPM (Cost of Equity)
$K_e = R_f + ERP + Size\ Premium + Company\text{-}Specific\ Premium$	Build-up Model
$\beta = Cov_{stock\ market} / \sigma^2_{market}$	Beta
Total Risk = Systematic Risk + Unsystematic Risk	Risk Decomposition
$V_0 = D_1 / (r - g)$	Gordon Growth Model
$V_0 = \Sigma\ D_t / (1 + r)^t$	Perpetual Dividend
$FCFF = PAT + NCC + [Int \times (1-t)] - FC_{inv} - WC_{inv}$	Free Cash Flow to Firm
$FCFF = CFO + [Int \times (1-t)] - FC_{inv}$	FCFF from CFO
$FCFE = PAT + NCC - FC_{inv} - WC_{inv} + Net\ Borrowing$	Free Cash Flow to Equity
$FCFE = CFO - FC_{inv} + Net\ Borrowing$	FCFE from CFO
$FCFE = FCFF - [Int \times (1-t)] + Net\ Borrowing$	FCFE from FCFF
$TV = FCF / r$	Terminal Value (No Growth)
$TV = FCF_{n+1} / (r - g)$	Terminal Value (Stable Growth)
P/E = MPS / EPS	Price-Earnings Ratio
Justified P/E = Payout Ratio / (r – g)	Fundamental P/E
P/BV = Market Cap / Book Value	Price-to-Book Ratio
P/S = Market Cap / Total Revenue	Price-to-Sales Ratio
P/CF = Market Cap / Total Cash Flow	Price-to-Cash Flow
EV = Market Cap + Debt + Minority Interest + Preference Capital – Cash	Enterprise Value
EV/EBITDA = EV / EBITDA	Enterprise Multiple
EV/Sales = EV / Total Revenue	EV/Sales Ratio
Value per Subscriber = EV / No. of Subscribers	Sector-Specific Multiple
Value per Site Visitor = EV / No. of Visitors	Sector-Specific Multiple
NAV = (Fair Value of Assets – Book Value of Liabilities) / No. of Shares	Net Asset Value per Share
EVA = NOPAT – (Capital Employed × WACC)	Economic Value Added
NOPAT = Operating Profit × (1 – Tax Rate)	NOPAT
MVA = Market Value – Capital Employed	Market Value Added

✅ Revision Checklist – Module 7

- □ Explain Discount Rate and Cost of Capital
- □ Solve WACC calculation (Alpha Ltd)
- □ Explain Cost of Debt (Post-Tax)
- □ Explain Cost of Equity (CAPM, Build-up Model, Adjusted Cost of Equity)
- □ Solve Required Return on Equity (Example 3)
- □ Solve Beta calculation (Example 4)
- □ Explain Dividend Discount Model (Perpetual, Gordon Growth, Multi-stage)
- □ Solve Perpetual Dividend, Gordon Growth Model, Python Ltd Multi-stage DDM

- □ Explain FCFF and FCFE with calculations
- □ Solve Capital Expenditure Calculation (Illustration 2)
- □ Solve Working Capital Investment (Illustration 3)
- □ Solve Terminal Value (Super Ltd, Ashiana Ltd)
- □ Explain FCF vs Dividend Discount Models
- □ Solve Panther Ltd FCFE Calculation
- □ Explain Market Price Method (VWAP)
- □ Solve Aditya VWAP Illustration
- □ Explain Comparable Companies Multiple Method (P/E, P/BV, P/S, P/CF, EV/EBITDA, EV/Sales)
- □ Solve Turtle Ltd Forward P/E, Jack Ltd Fundamental P/E
- □ Solve PAS Steel P/E and P/S Multiples
- □ Solve Infolink Ltd EV/EBITDA
- □ Explain Comparable Transactions Method
- □ Solve ChatApp Value per Subscriber
- □ Explain Book Value Multiples (Liquidation, Replacement, NAV)
- □ Solve Arvind VG Pvt Ltd Valuation
- □ Explain EVA, MVA, Contingent Claim Valuation
- □ Solve A Ltd EVA Approach Valuation
- □ Solve TMI Manufacturing Company FCFE
- □ Solve NewMarket Inc. Two-Stage FCFE
- □ Solve Raj Prakash Cap Gemini, TCS, Tara Industries
- □ Solve Strip Fund Alpha Energy Ltd Two-Stage FCFF
- □ Solve Parvati Tiwari Company A, B, C Valuation

Disclaimer: These revision notes are for educational purposes only. Students are advised to refer to the official ICMAI study material and latest amendments for comprehensive preparation.

Next Module: Module 8 – Valuation of Assets and Liabilities

CMA FINAL PAPER 20A

Strategic Performance Management & Business Valuation

SECTION B – MODULE 8: Valuation of Assets and Liabilities

Complete Coverage as per ICMAI Study Material (Syllabus 2022)

For December 2026 Examination | CMA Knowledge Series – cmaknowledge.in

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Module Learning Objectives

- Value different assets and liabilities while applying the global best practices in valuation.

8.1 Valuation of Plant & Machinery

8.1.1 Introduction

Plant and Equipment are tangible assets, other than realty, that:

1. (a) are held by an entity for use in the production or supply of goods or services, for rental by others, or for administrative purposes; and
2. (b) are expected to be used over a period of time.

Categories of Plant and Equipment

- **Plant:** Assets that are inextricably combined with others and that may include specialised buildings, machinery, and equipment.
- **Machinery:** Individual machines or a collection of machines. A machine is an apparatus used for a specific process in connection with the operation of the entity.
- **Equipment:** Other assets that are used to assist the operation of the enterprise or entity

IFRS Definition (IAS 16, para. 6): Property, Plant and Equipment are tangible items that:
(a) are held for use in the production or supply of goods or services, for rental to others, or for administrative purposes; and
(b) are expected to be used during more than one (accounting) period.

When valuing all assets, the valuer must determine which of the three standards of value (Fair Market Value, Fair Value (ASC 820) and Fair Value (Statutory)) to utilize and which of three general approaches to value that can be applied to determine an opinion of value. One of the major differences that sets a Machinery and Equipment (M&E) valuation apart from other tangible asset appraisals is the cost of installation. For many assets, the installation costs can exceed the costs of the equipment or machinery. Accordingly, used market machinery transactions may not represent an asset's value to the enterprise.

8.1.2 Methods of Valuation

There are three recognized ways to determine value in appraisal analysis:

1. The Cost Approach

The Cost Approach is the starting point for many appraisals and is based upon the principle of substitution, meaning the maximum value of a property to a knowledgeable buyer would be the amount currently required to construct or purchase a new asset of equal utility. When the subject asset is not new, the current cost must be adjusted for all forms of depreciation as of the effective date of the appraisal.

Illustration 1 (ICMAI Study Material): Equipment Valuation – Cost Approach

You are appointed to value an equipment that was purchased 6.5 years ago INR 471,974. It has a total useful life of 13 years. The index value for the year of purchase was 254 and the current year index value is 317. Assuming straight line depreciation and a scrap value of 5 percent, what should be the Fair value of the assets.

Solution (ICMAI Standard):

Current Replacement cost = Purchase Cost × Current Year Index / Year of Purchase Index

Current Replacement Cost = 471974 × 317 / 254 = **₹589,038**

Since the equipment is 6.5 years old, the notional depreciation is calculated as:

Accumulated Depreciation = Current Replacement Cost × (1-Scrap Value percent) × Age / Life

Accumulated Depreciation = 589,038 × 95% × 6.5 / 13 = **₹2,79,793**

The Fair Value is given by Current Replacement cost – Accumulated depreciation

i.e., ₹5,89,038 – ₹2,79,793 = **₹3,09,245**

2. The Direct Market or Sales Comparison Approach

The Direct Market or Sales Comparison Approach assumes that the value of an asset can be determined through the examination of transactions of identical or similar items selling in a secondary or used market, and adjusted for differences in age, condition, capacity, utility, location, the date of the sale, the type of sale, and/or the costs of transportation, assembly and installation at a new site.

3. The Income Approach

The Income Approach examines the earning capacity of the business assets being investigated and can be very useful but is the least common method of valuing individual pieces of machinery and equipment.

It is important to keep in mind that a credible opinion of value cannot always be obtained with the application of a single methodology. It is through the judicious application of these methodologies that is gained through the proper surveying and inspection of the subject property, when combined with the experience and judgment of an objective, qualified, independent and certified professional appraiser that yields a quality appraisal.

8.1.3 Types of Depreciation

Once the proper level of current cost new has been determined, deductions from this value must be taken for all forms of depreciation. Three types or causes of depreciation must be considered by appraisers:

Type of Depreciation	Description
Physical Deterioration	Is the loss in value or usefulness of an asset that occurs as a result of the using up or expiration of its' useful life over time, exposure to natural elements or the process area environment, internal defects from vibration and operating stress, and other similar factors.
Functional Obsolescence	Is the loss in value or usefulness of an asset that is caused by inefficiencies or inadequacies of the asset itself, when compared to more efficient less costly replacement technology.
Economic Obsolescence	Is the loss in value or usefulness of an asset that is caused by factors that are external to the asset, for example- increased cost of raw materials, labor or utilities (without an offsetting increase in product price), new environmental regulations, reduced demand for the product, increased competition, inflation, high interest rates or other similar contributing factors.

8.1.4 Direct Market Comparison Approach to Value

Machinery and Equipment valuers use the Direct Market Comparison (or Sales Comparison) approach to indicate value by analyzing recent sales (or offering) prices of assets that are comparable to the subject assets. The transaction or offering dates of comparable assets must be scrutinized for applicability (active/verifiable market) to ensure that they are relevant. Additionally, if characteristics of the comparable assets are not identical to the subject, the comparable selling prices must be adjusted to place the comparable and subject assets on an equal basis.

As with the Cost and Income approaches to value, the Direct Market Comparison method to value assumes that an informed purchaser would pay no more for the asset than the cost of purchasing a comparable asset with the same utility elsewhere. Often in a Cost Approach to value, the valuer will seek values of selected assets using the Direct Market Comparison method to validate the values that were obtained using the cost approach.

8.1.5 Income Approach to Value

The value of an asset can be estimated by the anticipated future benefit to the owner. The Income Approach to value is not widely utilized by Machinery and Equipment valuers because of the difficulty associated with attributing a sites' or business' income to individual assets. When properly applied the income approach can confirm or enhance the credibility of the values arrived at when using the Cost or Direct Market approaches to value.

Two methods are often used to value machinery and equipment by the income approach:

1. (a) the Direct Capitalization approach and
2. (b) the Discounted Cash Flow (DCF) approach.

When applying the Direct Capitalization method, a projected income stream is divided by a capitalization rate. The Discounted Cash Flow approach projects quantity, variability, timing, period of duration and residual value and discounts them to a present value using a discount rate.

These approaches establish the value of an asset or collection of assets assuming an ongoing concern or business. This implies that the subject assets will remain in place and in use as a continuing or on-going concern at their highest and best use.

8.1.6 Conclusion

Quality valuations are the direct result of selecting and applying the proper definition of value to meet the needs of a client. While the client may define their needs and the intended use of the appraisal, it is the valuer's responsibility to determine and apply the proper premise of value in order to match the intended use. The goal of the valuation process is to deliver a well-supported opinion of value that shows that the valuer has considered all factors materially affecting the asset being valued.

Multiple Choice Questions – 8.1

1. What is the definition of Property, Plant and Equipment as per IFRS?

A. Tangible items held for use in the production of goods B. Tangible items for rental to others C. Tangible items for administrative purposes D. All of the above.

Answer: D. All of the above.

2. What is the formula for calculating Accumulated Depreciation?

A. (Current Replacement Cost - Scrap Value) × Age / Life B. (Current Replacement Cost + Scrap Value) × Age / Life C. (Current Replacement Cost - Scrap Value) / Age × Life D. (Current Replacement Cost + Scrap Value) / Age × Life.

Answer: A. (Current Replacement Cost - Scrap Value) × Age / Life

3. What method of valuing individual pieces of machinery and equipment is the least common?

A. The Cost Approach B. The Direct Market or Sales Comparison Approach C. The Income Approach D. All methods are equally common.

Answer: C. The Income Approach

4. What are the three types or causes of depreciation that must be considered by appraisers?

A. Physical Deterioration, Functional Obsolescence, Economic Obsolescence B. Physical Deterioration, Functional Outstanding, Economic Outstanding C. Political Deterioration, Function Obsolescence, Economic Obsolescence D. Physical Deterioration, Functional Obsolescence, Economical Obsolescence.

Answer: A. Physical Deterioration, Functional Obsolescence, Economic Obsolescence

5. What is the core responsibility of a valuer in a valuation process?

A. Determine the value of an asset B. Match the intended use C. Consider all factors materially affecting the asset D. All of the above.

Answer: D. All of the above.

Short Answer – 8.1

1. Explain the three standards of value: Fair Market Value, Fair Value (ASC), and Fair Value (Statutory). How does the valuer determine which standard to use?

Answer: Fair Market Value is the price that property would sell for on the open market. Fair Value (ASC) is the price paid to transfer liability or received to sell an asset in an orderly transaction between market participants at the assessment date. Fair Value (Statutory) is the value of an asset according to its price in the marketplace. The valuer determines which standard to use based on the purpose of the valuation and the specific characteristics of the asset.

2. Provide a detailed breakdown of the three general approaches to value: The Cost Approach, The Direct Market or Sales Comparison Approach, and The Income Approach. How does the valuer decide which approach to use?

Answer: i) The Cost Approach: value based on the cost to construct or purchase a new asset. ii) Direct Market or Sales Comparison Approach: value determined by comparing the asset to similar assets sold in the marketplace. iii) The Income Approach: value based on the earning capacity of the asset. The valuer decides which approach to use based on the type of asset, its purpose, and the available data.

3. Discuss the concept of economic obsolescence and give an example how external factors can lead to this type of depreciation.

Answer: Economic Obsolescence refers to a loss in value or usefulness caused by external factors in relation to the asset, like an increase in raw materials costs, labor costs, regulatory shifts, inflation, etc. For instance, an increased cost of raw materials without an offsetting increase in product price can lead to economic obsolescence.

8.2 Valuation of Inventory

Inventory is among the top few current assets in a business. From accounting perspective, Inventory is valued at lower of Cost and Net Realisable Value.

The Inventory Valuation Involves Two Major Aspects:

- The costs of the purchased and / or fully and partly manufactured / processed inventory have to be determined and
- Such costs are retained in the inventory accounts of the company until the product is sold.

8.2.1 Costs of Inventories

Cost of inventory can be classified as:

1. (a) Costs of purchase,
2. (b) Costs of conversion, and
3. (c) "Other costs" incurred in bringing the inventories to their present location and condition.

(a) Costs of Purchase

The costs of purchase includes:

1. (i) Purchase price, inclusive of government levies,
2. (ii) Import duties and import related expenses if procured from overseas sources,
3. (iii) All logistics costs, including warehousing and stock keeping expenses,
4. (iv) Handling costs directly pertaining to the acquisition of the goods

(b) Costs of Conversion of Inventory

Cost of conversion of inventory includes costs directly attributable to the units of production, for example, direct labour. The conversion costs could also include variable and fixed manufacturing overhead incurred in converting raw materials into finished goods. Fixed overhead costs remain constant irrespective of the units of production. Variable costs are those costs that vary directly with the volume of production. Allocation of overhead to the cost of conversion is based on the "normal capacity" of the facility or in proportion to actual quantity manufactured vs. quantity in stock, as is appropriate. Normal capacity is the production that is normally achieved on average over a number of periods.

(c) Other Costs in Valuing Inventories

Valuing inventories include those costs that are incurred in bringing inventories to their present location and condition in other cost. For example cost for designing a product on the basis of specific customer needs or transport costs to an interim position for certain logistics activity prior to acceptance and actual passing of property to the goods to the customer.

8.2.2 Costs that are Excluded from Inventory Valuation

Certain costs are excluded in valuing inventory are:

1. (a) Abnormal amounts of wasted materials, labour, or other production costs
2. (b) Storage costs unless they are essential to the production process
3. (c) Administrative overheads that do not contribute to bringing inventories to their present location and condition
4. (d) Selling costs.

📝 Multiple Choice Questions – 8.2

1. Which of the following is not considered in the cost of purchase in inventory valuation?

A. Import duties B. Administrative overheads C. Logistics costs D. Purchase price.

Answer: B. Administrative overheads

2. What factors are included in the cost of conversion of inventory?

A. Direct labour B. Selling costs C. Storage costs D. Both A and C.

Answer: A. Direct labour

3. How is the allocation of overhead calculated in the case of costing inventory?

A. Based on the normal capacity of the facility B. In proportion to actual quantity manufactured vs quantity in stock C. Both A and B D. None of the above.

Answer: C. Both A and B

4. Can administrative overheads be included in the valuation of inventory?

A. Yes, always B. Yes, if they contribute to bringing inventories to their present location and condition C. No, never D. It depends on the method of inventory valuation used.

Answer: B. Yes, if they contribute to bringing inventories to their present location and condition

5. Which of the following costs are excluded from inventory valuation?

A. Costs directly attributable to the units of production B. Costs for designing a product for specific customers C. Costs of wasted materials D. Both B and C.

Answer: D. Both B and C.

8.3 Valuation of Investments – Shares and Bonds/Debentures

8.3.1 Valuation of Investments in Shares

There may be various types of investments in an entity. Some of the most common investments include Shares and Bonds. We will use the word Bonds and Debentures interchangeably. Investments may be held for long term purposes or short term purposes. Further, an entity may hold some minority shares of companies (e.g., 1000 shares of Reliance Industries Ltd) or a majority stake in other companies (e.g., shares of a subsidiary companies). The Valuation techniques may differ depending on the purpose and nature of investments. While Accounting Standards require investments to be recorded at cost in the Financial Statements, Ind AS requires investments to be valued at Fair Value in select cases.

Cost of Investments

The cost of an investment includes acquisition charges such as brokerages, fees, duties and bank fees. If an investment is acquired, or partly acquired, by the issue of shares or other securities, the acquisition cost is the fair value of the securities issued and not their nominal or par value. If an investment is acquired in exchange, or part exchange, for another asset, the acquisition cost of the investment is determined by reference to the fair value of the asset given up. It may be appropriate to consider the fair value of the investment acquired if it is more clearly evident.

Interest, royalties, dividends and rentals receivable in connection with an investment are generally regarded as income, being the return on the investment. However, in some circumstances, such inflows represent a recovery of cost and do not form part of income. For example, when unpaid interest has accrued before the acquisition of an interest-bearing investment and is therefore included in the price paid for the investment, the subsequent receipt of interest is allocated between pre-acquisition and post-acquisition periods; the pre-acquisition portion is deducted from cost. When dividends on equity securities are declared from pre-acquisition profits a similar treatment applies. If it is difficult to make such an allocation, the cost of an investment is normally reduced by dividends receivable only if they clearly represent a recovery of part of cost.

Investment in Quoted Securities

Where an entity holds minority investment in quoted securities, such securities should be valued based on their available market quotes. While in most cases, the available quote as on the date of valuation may be taken, some regulations require taking Volume Weighted Average Price (VWAP) over past few trading sessions as more representative of market value.

Illustration 2 (ICMAI Study Material): Reliance Industries Ltd – VWAP vs Last Trading Price

The share trading details of Reliance Industries Ltd from stock exchange is available as follows. If an entity holds 100 shares of Reliance Industries Ltd. What is the value of investment as on 31st March 2023 based on:

1. a) Last Trading Price
2. b) Volume Weighted Average Price for last 12 trading sessions

Date	Close	No. of shares	Total Turnover
15-03-2023	2,363.45	4,12,984	98,89,74,056
16-03-2023	2,403.25	2,76,207	66,17,72,652
17-03-2023	2,479.65	2,86,443	70,07,59,761
21-03-2023	2,467.15	2,07,916	51,27,90,049
22-03-2023	2,531.10	3,04,284	76,54,04,981
23-03-2023	2,539.70	2,00,221	51,04,00,664
24-03-2023	2,577.90	3,27,758	83,82,94,305
25-03-2023	2,596.70	1,95,991	50,89,99,760
28-03-2023	2,621.65	3,42,191	89,32,24,623
29-03-2023	2,622.15	1,28,043	33,58,27,492
30-03-2023	2,673.00	1,54,596	41,09,92,274
31-03-2023	2,633.95	1,88,426	49,85,17,224
Total			**7,62,59,57,841**

Solution (ICMAI Standard):

a) The closing price per share as on 31st March 2023 was ₹2633.95. Accordingly, the value of investment based on 100 shares is:

₹2633.95 × 100 = **₹2,63,395**

b) The volume weighted average price is given by Sum of Turnover / Sum of No. of shares

Sum of Total Turnover = ₹7,62,59,57,841

Sum of No. of shares = 30,25,060

Volume Weighted Average Price = ₹7,62,59,57,841 / 30,25,060 = **₹2520.93**

Value of Investment = 2520.93 × 100 = **₹2,52,093**

Investment in Unquoted Shares

When an entity invests in unquoted shares (e.g. privately held company) of a company, the valuation of investments become difficult. For financial reporting purposes, these may be carried at Cost in the Financial Statements. Nevertheless, valuation of such investments may be required. Valuers may have to carry out extensive valuation of such investments using Cost Approach, Income Approach or Market Approach or a combination of multiple approaches.

In the absence of any information, valuers must consider valuing such unquoted investments at their Net Asset Values under cost approach. That is, taking the Value of Assets, less Liabilities, and adjust them for changes in fair value of assets and liabilities. Some of the common areas of adjustments may be for Land, underlying investments, contingent liabilities among others.

Illustration 3 (ICMAI Study Material): Panda Ltd – AMGI Ltd Investment Valuation (Cost Approach)

Panda Ltd holds 4,00,000 shares of AMGI Ltd at a cost of ₹48,00,000.

The following is the latest available Balance Sheet of AMGI Ltd.

Particulars	₹
Equity Share Capital	1,00,00,000
Other Equity	2,40,47,110
Non-Current Liabilities	22,30,898
Total Liabilities and Equity	**3,62,78,008**
Non-Current Assets	2,40,13,129
Net Working Capital	1,22,64,879
Total Assets	**3,62,78,008**

Additional information includes:

- a) The Face value per share is ₹10.
- b) Non-Current Asset of AMGI Ltd includes Land at a cost of ₹1,00,00,000. The Fair Value of such Land is estimated at ₹1,75,00,000.
- c) AMGI Ltd has a contingent liability of ₹12,00,000 which is not reflected in the Balance Sheet. As a valuer, you believe that this contingent liability is likely to be incurred.

Required:

1. a) Estimate the fair value per share of AMGI Ltd.
2. b) Estimate the fair value of investments in AMGI Ltd in the books of Panda Ltd.
3. c) Estimate the Compounded Annual Growth Rate (CAGR) change in value of investment if the investment was made 4 years ago.

Solution (ICMAI Standard):

a) Calculation of Value per share of AMGI Ltd using Cost Approach

Particulars	Amount (₹)
Total Asset	3,62,78,008
Less: Total Liability	22,30,898
Net Asset Value	**3,40,47,110**
Less: Book Value of Land	1,00,00,000
Add: Fair Value of Land	1,75,00,000
Less: Contingent Liability	12,00,000
Adjusted Net Asset Value	**4,03,47,110**
No. of shares (Note 1)	10,00,000
Value Per Share	**40.35**

Note 1: The Number of shares of AMGI Ltd = 1,00,00,000 / 10 = 10,00,000 shares

b) The Fair value of investments in AMGI Ltd in the books of Panda Ltd:

Number of shares × Fair Value per share

4,00,000 × 40.35 = **₹1,61,40,000**

c) Cost of Investment = ₹48,00,000

Fair Value of investment = ₹1,61,40,000

Compounded Annual Growth Rate = [(FV / Cost)^((1/n)-1)] = (16140000/4800000)^(1/4)-1 = **35%**

[Students may note that calculation of CAGR may require PV tables or Financial calculator. This may not be available during the examination]

8.3.2 Valuation of Bonds

Bonds are fixed income securities that usually carry a fixed rate of interest. Bonds can be issued by government or corporate. Foreign entity that issues bonds it acts as a liability for the issuer. The interest paid on bonds is a tax-deductible expense.

Terminology

- **Coupon:** bonds typically pay interest periodically at a pre specified rate of interest the rate at which this interest is paid is known as the coupon rate. Interest may be paid half yearly monthly quarterly, annually or at some other frequency. For example a bond of the face value of ₹1000 with a 10% coupon payable semi-annually will pay ₹50 as interest every 6 months.
- **Bond Yield:** It is very important to understand that the coupon rate may not be the same as the required rate of return on the bond by the bond holders. The rate of return required by the bond holders from the bond is known as the bond yield. This is used as the discount rate while calculating the value of the bond.
- **Face value:** the face value or nominal value of the bond can be thought of as the principal amount on which the interest is paid by the issuer. In many cases the bonds may be issued or redeemed or both at face value, however it is not a rule.
- **Maturity date:** The maturity date on which the bond is repaid and extinguished. In case the repayment of principal is done over multiple installments, The date of the last installment may be considered as the maturity date.
- **Redemption premium:** bonds are not always redeemed at power on maturity date. Some bonds be a redemption premium in addition to the face value. For example in case of a bond with a face value of ₹1000 and a redemption premium of 5% amount repaid on maturity will be ₹1050.
- **Bond price:** the price of a bond in the market is often expressed as a %age of face value. For example, if the price of a bond with a face value of ₹5000 is stated as 105, the actual price would be ₹5000 x 105 / 100 that is ₹5250.
- **Call Option:** bonds may contain a call option which entitles the issuer to call back the bonds and redeem them before maturity. For example, in 2020 a company issues a bond with a majority of 10 years (2030) which is callable any time after 5 years (2025). Suppose the bond has a coupon of 12% while in 2026 interest rates have come down and the company can issue new bonds at a coupon of only 9%, the company could then issue fresh bonds at 9% and call back the earlier

issue report more expensive 12% bonds if the bonds do not have a call option the company cannot do this and that bondholders will continue to enjoy the benefit of the higher coupon rate till maturity

- **Put Option:** bonds may contain a put option which entitles the bondholders to put the bonds back to the issuer for redemption before the maturity date. For example, in 2020 a company issues a bond with the maturity of 10 years which is portable at anytime after 3 years (i.e., after 2023). Suppose the bond has a coupon of 11% while in 2025, interest rates have gone up and a similar company is issuing new bonds 14%. The bondholder could then buy these fresh bonds and put his existing 11% bonds back to the issuer for redemption. If the bonds do not have a put option, the bondholders cannot do this and would therefore be stuck with the lower coupon rate 2030.

Bonds may be secured or unsecured. The secured bond holders are entitled to take possession of the security given to them and realise their dues by selling these assets. This makes the bond more secure. Unsecured bonds are not backed by any such security and may not be able to realise their dues in case the issuer defaults in repayment of principal or interest or both. But the bondholder does not need to worry about this if he believes that the company is financially very sound and is unlikely to default.

Bonds can also be classified into convertible and non-convertible depending on whether they carry a conversion feature or not. Convertible bonds are the ones which can be converted into equity shares at the option of the bond holders or the issuer. Convertible bonds can be either fully convertible or partly convertible. In the case of partly convertible bonds converted portion will carry interest until it is repaid as per the provisions in the indenture. In almost all cases the terms of the bond be clearly mentioned in the bond indenture.

8.3.3 Valuation of Bonds

In general terms the value of a bond is given by the annual interest receivable multiplied by the present value Annuity factor plus the redemption value multiplied by the discount factor.

> **Value of the Bond = Annual Interest × PV Annuity Factor + Redemption Value × Discount Factor**

Illustration 4 (ICMAI Study Material): Bond Valuation – Annual Interest

A debenture of ₹100 face value that carries an interest rate of 14% is redeemable after 6 years at a premium of 2%. If you require a rate of return of 16% from this dimension what should be the present value of the debenture to you?

Solution (ICMAI Standard):

Annual interest = 100 × 14% = ₹14

Redemption Value = 100 + 100 × 2% = ₹102

Value of the Bond = 14 PVIF(16%, 6 Years) + 102 DF(16%, 6 Years)

= 14 × 3.685 + 102 × 0.41

= **₹93.41**

Expanding the above into a more detailed form:

Year	0	1	2	3	4	5	6
Cash Flow	-100	14	14	14	14	14	116
Discount Factor @ 16%		0.8621	0.7432	0.6407	0.5523	0.4761	0.4104
Discounted Cash Flow		12.07	10.40	8.97	7.73	6.67	47.61
Value of the Bond	**93.45**						

Illustration 5 (ICMAI Study Material): Bond Valuation – Semi-annual Interest

If the above example is applied for a bond that pays interest semi-annually. That is, Coupon Rate of 14% p.a. (payable semi-annually), maturity period of 6 years, Redemption premium of 2% and a discount rate of 16% p.a. (8% for 6 months), the value of the bond would be calculated as:

Solution (ICMAI Standard):

Year	-	1	2	3	4	5	6	7	8	9	10	11	12
Cash Flow	-100	7	7	7	7	7	7	7	7	7	7	7	109
Discount Factor		0.93	0.86	0.79	0.74	0.68	0.63	0.58	0.54	0.50	0.46	0.43	0.40
Discounted Cash Flow		6.48	6.00	5.56	5.15	4.76	4.41	4.08	3.78	3.50	3.24	3.00	43.29
Value of the Bond	**93.26**												

The return to the bond investor can be measured in terms of the following:

- Current Yield (CY)
- Yield to Maturity (YTM)
- Realised Yield (RY)

Current Yield

Current yield is measured by comparing the interest payments with the prevailing market price.

$$\text{CY} = \text{Coupon Interest} / \text{Current Market Price}$$

Current yield of bonds selling at par would be equal to the coupon interest rate. Current yield of bonds selling at a premium would be less than the coupon interest rate. Current yield of bonds selling at a discount would be more than the coupon interest rate. An important limitation of current yield is that it considers only coupon income as a source of return to the investors ignoring interest and capital gains or losses that might also accrue to the investor.

Illustration 6 (ICMAI Study Material): Current Yield Calculation

An 8% bond of Face Value ₹100 is selling for ₹96. What would be its Current Yield?

Solution (ICMAI Standard):

Current Yield = 8 / 96 = **8.33%**

Yield to Maturity (YTM)

The ideal way of computing the return on any asset involves considering the entire sequence of cash flows and their timing and calculating the internal rate of return (IRR). In case of a bond, there is a cash outflow when the bond is bought and there are cash inflows when the periodic interest coupons are received and when the redemption value is received on maturity. Calculating the IRR of this stream of cash flows is the true return on the bond, which is known as yield to maturity (YTM). It is the annualised rate of return on the investment that the investor expects to earn from the date of the investment to the date of maturity. It is also referred to as the required rate of return. Theoretically it is equal to current market interest rate.

[NOTE: Students should note that fundamentally, YTM is the same as IRR and can be calculated by applying the concept of Interpolation. Professionals often use spreadsheets to calculate IRR and in Excel, RATE function is used to arrive at the exact calculation].

Assumptions underlying YTM

The YTM of a bond represents the expected or required rate of return on a bond. While computing the YTM the following assumptions are made:

- All coupon and principal payments are made on schedule.

- The bond is held to maturity.
- The coupon payments are fully and immediately reinvested at precisely the same rate of interest as promised YTM.

Illustration 7 (ICMAI Study Material): YTM Calculation – Interpolation

A 4-year Bond with 10% coupon rate maturity value ₹1000, is currently selling at ₹900. Calculate its YTM.

Solution (ICMAI Standard):

Average return per year per Bond = (400 + 100)/4 = ₹125

Approximate annual rate = 125 / 900 × 100 = 13.89%

We need to calculate the Internal Rate of Return (or YTM).

Net Present Value at 14% discount rate = -900 + 100 × 2.914 + 1000 × 0.592 = -16.60

Net Present Value at 13% discount rate = -900 + 100 × 2.794 + 1000 × 0.613 = 10.40

Thus, the exact return on investment is calculated through interpolation:

YTM = Lower Rate + [Lower Rate NPV / (Lower Rate NPV - Higher rate NPV)] × Difference in Rates

YTM = 13 + [10.40 / (10.40 - (-16.60))] × 1 = **13.39%**

YTM Approximation Formula

There is an approximation formula for YTM which is given by:

$$\text{YTM} = [C + (F - P)/n] / [(F + P)/2]$$

Where C = Coupon, F = Redemption Value and P = Purchase Price

Using the same example above, the YTM would be calculated as:

YTM = (100 + (1000 – 900) / 4) / ((100+900)/2) = **13.15%**

Realised Yield

Realised yield is the yield actually earned by the investor on his investment and depends on the reinvestment rate and the holding period chosen by him. The realised yield can be stated as the rate that equates the future value of the purchase price to the total cash flow realised on the bond. The realised yield measures the expected rate of return of a bond that an investor expects to sell prior to its maturity. It can be represented as:

$$P_0 \times FVIF_{r,n} = \text{Total Return} + \text{Purchase Price}$$

Total Return includes coupon payments, interest on interest and capital gains realised on sale.

The realised yield will always lie between YTM and the reinvestment rate. If the reinvestment rate is equal to YTM, Realised Yield will also be equal to YTM. If the reinvestment rate is greater than YTM, the Realised Yield will also be greater than YTM and vice versa.

Valuation of Zero Coupon Bonds

Zero Coupon bonds are those that don't pay any coupon payments. The entire interest is accumulated and is paid at maturity. Normally, Zero Coupon Bonds are issued at a discount and is redeemed at par.

Illustration 8 (ICMAI Study Material): Zero Coupon Bond Valuation

A zero coupon bond is going to be redeemed at ₹1,00,000 after 25 years. If the investors expect a 12 % return on the bond, what should be the price of the bond?

Solution (ICMAI Standard):

Price of Zero Coupon Bond = Redemption Price / $(1 + r)^n$

Where r = required rate of return; n = number of years to maturity

Price of Zero Coupon Bond = 100000 / $(1.12)^{25}$ = **₹5,900**

Normally, you may be getting a traded Zero Coupon bond whose maturity date and price is available, but the rate is not. To make investment decisions, investors calculate the realised yield on such bonds and compare the same with their expected returns.

Price-Yield Relationship

For a bond, the relationship between the price and the required yield is opposite. The price of the bond is the present value of its cash flows. The required yield increases the present value of the cash flow declines and hence the bond value also declines.

Price-Time Relationship

Price remains constant when the bond moves towards its maturity, and if the interest rates remain constant. If the bond is quoted at a premium, the price of the bond decreases when it approaches maturity. Discount bonds increase their prices when they approach maturity. In both cases, the bonds will reach par value at the time of maturity.

Coupon Price – Yield Relationship

The market price of the bond will be equal to the par value of the bond if the YTM equals its coupon rate. If YTM increases (decreases) above the coupon rate then the market value is less (more) than the face value.

Duration

Duration is the weighted average time within which an investor gets back the promised principle and the promised YTM. Duration is a measure of interest rate risk. Duration is the price sensitivity of a bond to changes in yield. It is interpreted as a %age change in bond price for 1% change in yield. We can also interpret duration as the ratio of the %age change in price to the change in yield in %. Given the duration of a bond and its market value, the rupee price change can be computed for a given change in interest rates.

Duration = Percentage change in bond Price / Percentage change in Yield

Coupon bearing bond always has a duration which is lesser than its maturity. Higher the coupon rate lesser would be the duration and higher the yield to maturity lower will be the duration of the bond. It measures how quickly a bond will repay its true cost. The longer the time it takes the greater exposure the bond has to changes in the interest rate environment and hence higher interest rate risk. Duration is also a measure of interest rate risk. Higher duration employees higher interest rate risk and lower duration means lower interest rate risks.

- Shorter maturity bonds would have a lower duration.
- Higher the coupon lower is the duration
- Higher the YTM lower would be the duration.

Macaulay Duration

Macaulay duration is a weighted average of the times until the cash flows of a fixed-income instrument are received. The concept was introduced by Canadian economist Frederick Macaulay. It is a measure of the time required for an investor to be repaid the bond's price by the bond's total cash flows. The Macaulay duration is measured in units of time (e.g., years).

The Macaulay duration for coupon-paying bonds is always lower than the bond's time to maturity. For zero-coupon bonds, the duration equals the time to maturity.

The formula for the calculation of Macaulay duration:

$$\text{Macaulay Duration} = \Sigma\, t_i \times PV_i / V$$

Where t_i – the time until the i^{th} cash flow from the asset will be received; PV_i – the present value of the i^{th} cash flow from the asset; V – the present value of all cash flows from the asset

Modified Duration

Relative to the Macaulay duration, the modified duration metric is a more precise measure of price sensitivity. It is primarily applied to bonds, but it can also be used with other types of securities that can be considered as a function of yield.

The modified duration figure indicates the %age change in the bond's value given an X% interest rate change. Unlike the Macaulay duration, modified duration is measured in %ages.

The modified duration is often considered as an extension of the Macaulay duration. It is supported by the following mathematical formula:

$$\text{Modified Duration} = \text{Macaulay Duration} / (1 + YTM/n)$$

Where YTM – the yield to maturity of a bond; n – the frequency of compounding

Risks of Investing in Bonds

Type of Risk	Description
a) Interest rate risk	Refers to the risk that bond prices will fall as interest rates rise. Bonds prices are inversely related to interest rates. For the bond holder, typically it is the risk that interest rates will rise because if the interest rates increase, the price of bonds decreases. By buying a bond, the bondholder has committed to receiving a fixed rate of return for a fixed period. Should the market interest rate rise from the date of the bond's purchase, the bond's price will fall accordingly. The bond will then be trading at a discount to reflect the lower return that an investor will make on the bond. A bond's interest rate risk depends on the features of the bond such as maturity, coupon rate, yield, and embedded options. All other factors constant, the longer the bond's maturity, the greater is the bond's price sensitivity to changes in interest rates.
b) Reinvestment Risk	Refers to the risk that the proceeds from a bond will be reinvested at a lower rate than the bond originally provided. For example, an investor bought a ₹1,000 bond with an annual coupon of 12%. Each year the investor receives ₹120 (12%×₹1,000) which can be reinvested back into other investment avenues (or even other bonds). But if the market rate falls by 1% over time, that Rs. 120 received from the bond can only be reinvested at 11%, instead of the 12% rate of the original bond. From an investor's perspective, the disadvantages to call and prepayment provisions are (i) the cash flow pattern is uncertain, (ii) reinvestment risk increases because proceeds received will have to be reinvested at a relatively lower interest rate, and (iii) the capital appreciation potential of a bond is reduced. For an amortising security, reinvestment risk can be significant because of the right to prepay principal. Also, interest and principal are repaid monthly which further enhances reinvestment risk. A zero-coupon bond has no reinvestment risk but has greater interest rate risk than a coupon bond of the same maturity.
c) Call Risk	Refers to the risk that a bond will be called by its issuer. This is applicable for Callable Bonds that contain 'call' provisions, which allow the bond issuer to purchase the bond back from the bondholders and retire (redeem) the bonds. This is usually done when interest rates have fallen substantially since the issue date. Call provisions allow the issuer to retire the old, high-rate bonds and sell low-rate bonds in a bid to lower debt costs.
d) Default Risk	Refers to the risk that the bond's issuer will default in payment of coupon payments (and also redemption amount). Credit ratings agencies (Moody's, Standard & Poor's and ICRA, CRISIL) give credit ratings to bond issues, which helps to give investors an idea of how likely it is that a payment default will occur. For example, most government bonds have very high credit ratings as they have the government support which is unlikely to default. However, small, emerging and private companies have generally do not have such good credit ratings. They are much more likely to default on their bond payments, in which case bondholders will likely lose all or most of their investment.
e) Inflation Risk	Is the risk that the yield on a bond will not keep pace with purchasing power (in fact, another name for inflation risk is purchasing power risk). For instance, if you buy a five-year bond in which you can realise a coupon rate of 5%, but the rate of inflation is 8%, the purchasing power of your bond interest has declined. This has the greatest effect on fixed bonds, which have a set interest rate from inception. The interest rates of floating-rate bonds (floaters) are adjusted periodically to match inflation rates, limiting investors' exposure to inflation risk. E.g. TIPS in the US
f) Yield curve risk	For a portfolio occurs when, if interest rates increase by different amounts at different maturities, the portfolio's value will be different than if interest rates had increased by the same amount. One measure of yield curve risk is rate duration, which is the approximate %age price change for a 100 basis point change in the interest rate for one maturity, holding all other maturity interest rates constant. A portfolio's duration measures the sensitivity of the portfolio's value to changes in interest rates assuming the interest rates for all maturities change by the same amount. Call risk and prepayment risk refer to the risk that a security will be paid prior to the scheduled principal payment dates.
g) Liquidity risk	Is the risk that the investor will have to sell a bond below its indicated value. The primary measure of liquidity is the size of the spread between the bid and ask price quoted by dealers. A market bid-ask spread is the difference between the highest bid price and the lowest ask price from among dealers. The liquidity risk of an issue changes over time.
h) Exchange rate risk	Is the risk that the currency in which the interest and principal payments are denominated will decline relative to the domestic currency of the investor. Exchange rate risk arises when interest and principal payments of a bond are not denominated in the domestic currency of the investor.

i) Volatility risk	Is the risk that the price of a bond with an embedded option will decline when expected yield volatility changes. For a callable bond, volatility risk is the risk that expected yield volatility will increase; for a putable bond, volatility risk is the risk that expected yield volatility will decrease.
j) Event risk	Is the risk that the ability of an issuer to make interest and principal payments changes dramatically and unexpectedly because of certain events such as a natural catastrophe, corporate takeover, or regulatory changes.
k) Sovereign risk	Is the risk that a foreign government's actions cause a default or an adverse price decline on its bond issue. Bond issues that are assigned a rating in the top 4 categories such as AAA, AA, A and BB are considered investment grade bonds. Below these grades, bonds are assumed not to be investment grade and fall in speculative or high yield or junk bonds.

8.3.4 Bonds with Options (Convertible Bonds)

Callable Bond: Many bond issues have a call provision granting the issuer an option to retire all or part of the issue prior to the stated maturity date. A call provision is an advantage to the issuer and a disadvantage to the bondholder. When a callable bond is issued, if the issuer cannot call the bond for a number of years, the bond is said to have a deferred call.

Call Date - For bonds which are callable, i.e., bonds which can be redeemed by the issuer prior to maturity, the call date represents the date at which the bond can be called.

Call Price - The amount of money the issuer has to pay to call a callable bond. When a bond first becomes callable, i.e., on the call date, the call price is often set to equal the face value plus one year's interest.

A puttable bond is one in which the bondholder has the right (not an obligation) to sell the issue back to the issuer at a specified price on designated dates.

The presence of embedded options makes the valuation of fixed income securities complex and requires the modelling of interest rates and issuer/borrower behaviour in order to project cash flows. An investor can borrow funds to purchase a security by using the security itself as collateral.

When interest rates rise, the price of a callable bond will not fall by as much as an otherwise comparable option-free bond because the price of the embedded call option decreases.

The price of a puttable bond is equal to the price of an option-free bond plus the price of the embedded put option.

A conversion option (Call option) grants the bondholder the right to convert the bond into a specified number of issuing company's shares. The terms of a convertible security usually are structured so that there is no immediate benefit available from a conversion. For example, it is unlikely that a bondholder would convert a bond with a par value of ₹ 1,000, convertible into 25 shares, if the market price per share was ₹ 38. However, if the common share price were to rise above ₹ 40, conversion would be considered.

The value of a convertible bond is tied closely to the value of the underlying shares as long as the per-share price multiplied by the conversion ratio (i.e., the number of the shares represented by the convertible option) is greater than or equal to the par value of the bond. When the value of the shares multiplied by the conversion ratio is substantially lower than the par value of the bond, the value of the bond more closely approximates the straight debt amount.

Note that it is difficult to determine the convertible bonds for a private (non listed) company as compared with a listed entity. The simplest way to deal with this issue is to determine the value of the straight, nonconvertible debt (simple bond value calculation) and the value of the convertible option separately (e.g. using Black Scholes model).

8.3.5 Valuation of Warrants

A warrant is an option issued by a company to buy a stated number of shares of stock at a specified price. Warrants are generally distributed with debt, or preferred stock, to induce investors to buy those securities at lower cost. A detachable warrant is one that can be detached and traded separately from the underlying security. Most warrants are detachable.

A convertible security is a debenture or preferred stock that can be converted into common stock at the owner's discretion. A warrant, on the other hand, is similar to a long-term right, in that it is merely an option to purchase common stock at a stated price. When a convertible is exercised, it is exchanged directly for common stock; however, with a warrant, both money and the warrant are exchanged for the common stock.

The minimum price of a warrant is equal to zero until the price of the stock rises above the warrant's exercise price. After that, the warrant's minimum price takes on positive values. The degree to which the warrant price rises with increases in the common stock price depends upon the exercise ratio. In addition, investors are willing to pay a premium for warrants because only a small loss is possible, in that the warrant price is less than that of the common stock and has large return possibilities.

Several factors affect the size of the warrant premium including:

- a) The stock price/exercise price-ratio. As the ratio of the stock price to the exercise price climbs, the warrant premium falls, because the leverage ability of the warrant declines.
- b) The time left to the warrant expiration date. As the expiration date approaches the size of the warrant premium shrinks.
- c) Investors' expectations concerning the capital gains potential of the stock. If investors feel favourably about the stock, the warrant premium is larger.
- d) The degree of price volatility on the underlying common stock. The more volatile the common stock, the higher the warrant premium.

Illustration 9 (ICMAI Study Material): HDC Ltd – Warrant Valuation

HDC Ltd. has announced issue of warrants on 1:1 basis for its equity shareholders. The current price of the stock is ₹10 and warrants are convertible at an exercise price of ₹11.71 per share. Warrants are detachable and are trading at ₹3.

1. a) What is the minimum price of the warrant?
2. b) What is the warrant premium?
3. c) Now had the current price been ₹16.38, what is the minimum price and warrant premium? (Consider warrants are tradable at ₹9.75)

Solution (ICMAI Standard):

Minimum Price = (Market Price of Common Stock - Exercise Price) × Exchange Ratio

= ₹(10.00 - 11.71) × 1.0 = -₹1.71

Thus, the minimum price on this warrant is considered to be zero, because the price cannot be negative. Since shares are traded at ₹10, the warrant holders will not pay ₹11.71 to purchase the same stock.

Warrant premium = Market price of warrant - Minimum price of warrant = 3 - 0 = **₹3**

Minimum price = (Market price of common stock - Exercise price) × (Exercise ratio)

= (16.38 - 11.71) × 1.0 = **₹4.67**

Warrant premium = Market price of warrant - Minimum price of warrant

= ₹9.75 - ₹4.67 = **₹5.09**

8.3.6 Valuation of Preference Shares

Preferred stock is an element of shareholder equity that has characteristics of both equity and debt. A preference share carries additional rights above and beyond those conferred by equity shares. Preference shareholders may have an advantage over equity shareholders in dissolution, bankruptcy or liquidation. Preference shares also generally have a dividend requirement, which makes them appear like debt. The dividend structure usually has rights attached to it, such as whether the dividends are cumulative or whether the shares participate in enterprise earnings.

Since preference shares generally pay a constant dividend over its lifetime the value of a share of preferred stock is derived from the following formula:

Value of preference shares = Preference Dividend / Required rate of Return

This formula is applicable globally assuming that preference shares have an infinite life like Equity Shares. In India, Preference Shares have a maximum life of 20 years. That is, Preference shares must either be redeemed (redeemable preference shares) or converted into any other security like Equity Shares (convertible preference shares).

Characteristics of Preferred Stock

When comparing characteristics of preferred shares to characteristics of similar securities look at the following:

An important characteristic of preferred shares is its dividend. The variations could be of the following types:

- Whether the dividends accrue if they are not paid on time,
- Whether they cumulative or non-cumulative preference shares.
- Whether the preference shares holders have the right to participate in earnings or value over and above the stated rate decided
- Whether the preferred shares are participating vs. non-participating.

Another characteristic is a preferred share would generally entail a distribution upon liquidation before the equity shareholders. At times preferred shares come with voting rights. At some other times facility of put options are granted where, the preferred holder make the company repurchase the shares for a fixed price (usually par value). Remember, each specific characteristic affects value based on the advantage or disadvantage associated with it.

Increases Value	Decreases Value
Convertible	Non Convertible
Cumulative	Non-cumulative
Participating	Non-participating
Put Option	No Option
High call price (redeemable)	Low Call price
Voting	Non-voting

Multiple Choice Questions – 8.3

1. Which of the following statements accurately describes the practice of valuing unquoted shares?

A. Valuing unquoted shares is straightforward as market prices are readily available B. Unquoted shares cannot be valued due to lack of market data C. In the absence of any information, unquoted shares can be valued at their Net Asset Values under cost approach D. Unquoted shares are always valued at face value.

Answer: C. In the absence of any information, unquoted shares can be valued at their Net Asset Values under cost approach

2. What is the formula to compute the Yield to Maturity (YTM) through interpolation in bond valuation?

A. YTM = Lower Rate NPV / Lower Rate NPV - Higher rate NPV B. YTM = Lower Rate + ((Lower Rate NPV / (Lower Rate NPV - Higher rate NPV)) × Difference in Rates C. YTM = Lower Rate / (Lower Rate NPV - Higher rate NPV) D. YTM = Lower Rate × (Lower Rate NPV - Higher rate NPV).

Answer: B. YTM = Lower Rate + ((Lower Rate NPV / (Lower Rate NPV - Higher rate NPV)) × Difference in Rates

3. Suppose the face value of a bond is $1000, which pays an annual interest of $100 and is selling for $900. What is the current yield?

A. 11.11% B. 10.00% C. 9.00% D. 12%.

Answer: A. 11.11% (100/900)

4. A company issues bonds with a face value of $5000 that are offerings without a call option. What does this imply?

A. The company can buy back the bonds at any time B. The company can never buy back the bonds C. The company cannot buy back the bonds before the maturity date D. The company can exchange the bonds for equity shares.

Answer: C. The company cannot buy back the bonds before the maturity date

5. In bond valuation, what does the value of a bond generally represent?

A. The face value of the bond B. The current market rate of the bond C. The present value of anticipated future cash flows D. The total value of coupons paid over the life of the bond.

Answer: C. The present value of anticipated future cash flows

Short Answer – 8.3

1. Explain the terminology of the bond. Define terms such as current yield, yield to maturity, realised yield.

Answer: Current yield is coupon interest over current market price, YTM is the return rate from bond investment to date of maturity, Realised Yield is yield actually earned- refer to the definitions given in the prompt.

2. Describe your procedure for valuing Zero Coupon Bonds.

Answer: Zero Coupon Bond value comes from redemption price discounted by growth rate and investment duration.

3. How do 'Call Option' and 'Put Option' affect bond holders?

Answer: Call Option allows issuer to call back the bonds and redeem them before maturity, potentially at lower rates. Put Option allows bondholders to put the bonds back to the issuer for redemption and thus potentially benefit from higher current rates.

8.4 Valuation of Intangibles – Copy Rights, Goodwill, Brand

Intangible assets (intangibles) are long lived assets used in the production of goods and services but do not have a physical existence. However, they represent legal rights or competitive advantages developed or acquired by the holder of the intangible. To have value, intangible assets should generate some measurable amount of economic benefit to the owner, such as incremental turnover or earnings (pricing, volume and better delivery, amongst others), cost savings (process economies and marketing cost savings) and increased market share or visibility.

International Glossary of Business Valuation Terms (IGBVT): Intangibles are "non-physical assets such as franchises, trademarks, patents, copyrights, goodwill, equities, mineral rights, securities and contracts (as distinguished from physical assets) that grant rights and privileges, and have value for the owner."

Ind AS 38: "An intangible asset is an identifiable non-monetary asset without physical substance." Examples of intangibles include Goodwill, Brand, Patent, Copyrights, Customer lists, Domain names, Customer contracts, Non-compete agreements, Mining rights, Broadcasting rights, Secret formulae among others.

8.4.1 Identifying Intangibles as per Accounting Regulations

Ind AS 38 requires an entity to recognise an intangible asset, when purchased or self created if, and only if:

- It is probable that the future economic benefits that are attributable to the asset will flow to the entity; and
- The cost of the asset can be measured reliably.

In case an intangible item does not meet both of the above criteria, Ind AS 38 requires the expenditure on this item to be recognized as an expense when it is incurred. Where the item meets the recognition criteria, the intangible asset will be recorded as follows:

Condition	Value at which recorded in financial statements
If asset is acquired separately	At acquisition cost
If asset is acquired in a business combination or through a government grant	At fair value of the asset
If asset is generated internally	Expenditure incurred during development phase

8.4.2 Identifying Fair Value of Intangibles

Just like other assets, intangibles can be valued using the Market, Income and Cost Approach. Under the market approach, the value of an intangible asset is determined by reference to market activity. It is rarely possible to find market evidence of transactions involving similar and identical assets. However, in some cases (such as brands), valuers may identify market based transactions of similar assets (brands) and value brands using multiples.

Under Income Approach, some of the commonly used valuation methods are:

1. (i) excess earnings method,
2. (ii) relief-from-royalty method,
3. (iii) premium profit method or with-and-without method,
4. (iv) greenfield method, and
5. (v) distributor method.

Relief from Royalty Method

Under relief-from-royalty-method, the value of an intangible asset is determined by estimating the value of total costs saved that would have otherwise been paid by the user as royalty payments, if had been taken on lease from another party. Alternatively, it could also indicate the value of an intangible asset that could have fetched cash flows in the form of royalty payments, had it been leased to a third party. Any associated costs expected to be incurred by the licensee needs to be adjusted from the forecasted revenues.

In using this method, arm's-length royalty or license agreements for comparable assets are analysed. The net revenue expected to be generated by the intangible asset during its expected remaining life are then multiplied by the selected benchmark royalty

rate (can be obtained from similar transactions or profit split method).

The estimated royalty stream is adjusted for expenses and taxes. The resultant value is then discounted to present value, which results in an indication of the value of owning the intangible asset.

Multi Period Excess Earnings Method (MEEM)

The MEEM is used to value an intangible asset which is the primary intangible asset of the business. For example, for valuation of two intangible assets, say customer contracts and intellectual property rights, MEEM should be considered for valuation of one of the intangible asset while the other intangible asset should be valued using another method, unless both intangible assets are significant for the business.

Under this method, the value of an intangible asset is equal to the present value of the incremental after-tax cash flows ('excess earnings') attributable to the intangible asset to be valued over its remaining useful life. In other words, it is the present value of the excess cash flows attributable to the intangible asset to be valued (based on attrition rate of customers) as adjusted by the associated expenses required for the generation of the cash flows and cash flows pertaining to contributory assets (assets that contribute to the cash flows relating to the intangible asset to be valued).

With and Without Method (WWM)

The value of an intangible asset using the with and Without Method (WWM) is computed by comparing the scenarios in which the business:

1. a) Utilises the intangible asset to be valued ('With' scenario); and
2. b) Does not utilise the intangible asset to be valued ('Without' scenario)

It should be noted that all other factors relating to valuation should remain constant. Under this method, the value of the intangible asset to be valued is equal to the present value of the difference between the projected cash flows over the remaining useful life of the asset under the above two scenarios:

> **Value of the intangible = Value of business with the intangible – Value of business without the intangible**

Greenfield Method

Greenfield method is primarily used to value franchise agreements and certain licenses. The basic assumption for valuation using the Greenfield method is that the intangible asset to be valued is the only asset with all other tangible or intangible assets being created, leased or acquired. Instead of the contributory asset charge generally deducted from the cash flows, a valuer is required to subtract replacement cost of the asset that is required to be built or bought.

Distributor Method

This is a variation of MEEM and is adopted for valuation of customer based intangible assets when MEEM is applied to value another intangible asset (considered to be more significant). The fundamental assumption used in this method is that cash flows of each segment of a particular business are expected to generate profits.

Cost Approach

The cost approach relies upon the principle of substitution and recognises that a prudent investor will pay no more for an asset than the cost to replace it new with an identical or similar unit of equal utility. Cost approach is a valuation approach that reflects the amount that would be required currently to replace the service capacity of an asset (often referred to as current replacement cost).

Cost method is commonly used to value acquired or internally generated intangible assets like software, technology, assembled workforce, etc. The cost approach should be used with discretion and generally for intangible assets that are not the primary business drivers and for which a market participant may not be willing to pay a significant premium.

8.4.3 Copyrights

Copyright is a government granted right to authors, sculptors, painters, and other artists for their creations. A copyright is granted for the life of the creator plus 70 years. It gives the creator and heirs an exclusive right to reproduce and sell the artistic work or published work.

Cost of Copyright: If purchased, the cost includes the purchase price plus any legal fees. If developed by the owner (the creator), no cost can be assigned and capitalized. Amortization is by Straight-line method or a unit-of-production method. However, for calculation of Fair Value of copyright, valuer must consider the cash flows from the copyright.

Illustration 10 (ICMAI Study Material): V. Goel – Copyright Valuation

Let's say V. Goel, the current Copyright holder of the book "Business Valuation, Practitioners' Guide valuation of Companies" is willing to sell the copyrights of his book to a publisher who is keen to buy the copyrights. The following assumptions may be relevant.

Currently, 2500 copies of the book are sold at an annual price of ₹1,750 per book. The cost of production, distribution and author royalties amount to 70% of Sales. The book is becoming popular and the publisher estimates that the sales of the book may increase by 5 % every year for the next 5 years and for 2 % from year 6 to 10. This is including the newer editions of the same book. However, after 5 years, given the introduction of other books on the same subject, dilution of exclusivity, violation of copyrights and plagiarism, there may not be any special advantage from the book beyond year 10. Assuming a discount rate of 10 %, we can assess the value of the copyrights as follows.

Solution (ICMAI Standard):

The copyrights valuation can be done using the Market or Income or even cost approach. Let's say we apply the Income approach to value the copyrights.

Particulars	0	1	2	3	4	5	6	7	8	9	10	
Annual Increase		5%	5%	5%	5%	5%	2%	2%	2%	2%	2%	
Book Price (₹)	1750											
Unit Sales per Year	2500											
Revenue	43.75											
Less: Costs @ 70%	30.63											
Cash Flows		13.13	13.78	14.47	15.19	15.95	16.75	17.09	17.43	17.78	18.13	18.49
PV Factor @ 10%			0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467	0.424	0.386
PV of Cash Flows			12.53	11.95	11.41	10.90	10.40	9.64	8.94	8.30	7.69	7.14
Value of Copyrights	**98.89**											

8.4.4 Goodwill

When a business earns profits at a rate higher than that at which a similar business earns, the former business is said to possess goodwill. Though valuers are often assigned to value Goodwill of an entity, from an accounting perspective, internally generated goodwill may not be recognised as an asset because it is not an identifiable resource. That is, it is not separable nor does it arise from contractual or other legal rights that are controlled by the entity and that are reliably measurable.

As per IFRS, Goodwill is present where the aggregate of the fair value of consideration transferred, the acquisition date fair value of any previously held interest and any non-controlling interest exceeds the fair value of the assets and liabilities acquired.

Goodwill appears in the Financial Statements only in case of acquisition and is measured as:

Goodwill = Purchase Consideration in an acquisition – Fair Value of Assets acquired

Remember, value of Goodwill is usually embedded in the value of the company and need not be valued separately.

Goodwill is required to be tested for impairment under accounting regulations. However, under Income Tax regulations, Goodwill was available for depreciation like any other intangible asset. Finance Act 2021 has withdrawn this benefit and goodwill is not eligible for depreciation under Income Tax regulations going forward. This may reduce the attractiveness of Mergers & Acquisitions in the absence of tax benefits on goodwill depreciation.

Traditional Methods of Goodwill Calculation

Traditionally, for private businesses, Goodwill is calculated using some methods such as Super Profits Method, Average Profits method and Annuity method.

Under this method average super profit is ascertained. Goodwill is calculated at a few years' purchase of the super profit of the concern. The number of years to be taken for consideration depends upon the nature of the business, the steady or fluctuating

nature of the profit and also the nature of goodwill.

First, ascertain the average capital employed during the year. For this purpose, take the total of the closing real assets of the concern as revalued (excluding the non-trading assets and goodwill already appearing in the balance sheet unless such goodwill represented the payment to the vendor)

In order to find out the average capital employed it is necessary to deduct from the above the current liabilities and 50% of the profits for the year after tax. The profit should also be excluding non-operating income, if any. The average capital employed in this way excludes the long term loans, debentures and preference shares.

The idea of capital employed is not suitable for the purpose of valuation of goodwill of an individual company where valuation is to be done to the advantage of the equity shareholders. In this case, from the above total assets we deduct the current liabilities, long term loans, preference capital, etc, also 50% of the profit for the year after excluding non-operating income and after charging interest on long term loans and debentures, preference dividend, etc.

The average capital employed is the mean of the opening and closing capitals. As we have taken the closing net assets which include the profits for the year it is necessary to deduct 50% of the profit in order to get the capital at the middle of the year. If, however, the closing net assets are after the payment of dividend or after setting aside a portion of the profit to proposed dividend account, necessary adjustments must be done so that the average capital ascertained includes only 50% of the profit after tax.

Now we calculate the normal average annual trading profit after tax, but before charging interest on debentures and long-term loans and also preference dividend. From this average profit reasonable managerial remuneration should also be deducted. The profit as obtained after the above adjustments is to be compared with the reasonable return on the average capital employed, calculated at the rate of return earned by similar businesses. If the former exceeds the latter the balance represents the super profit.

A few years' purchase of the super profit is taken as the value of goodwill.

Illustration 11 (ICMAI Study Material): ST Ltd – Goodwill Valuation (Super Profits Method)

The following information is available for ST Ltd

Liabilities	31.3.20×4	31.3.20×5	31.3.20×6
Equity Share Capital (3,20,000 shares)	32,00,000	32,00,000	32,00,000
Reserves & Surplus	26,80,000	31,20,000	36,80,000
Trade Payables	12,00,000	16,00,000	20,00,000
Total Liabilities and Equity	**70,80,000**	**79,20,000**	**88,80,000**
Assets			
Property, Plant & Equipment (Net)	28,00,000	32,00,000	32,00,000
Inventory	20,00,000	24,00,000	28,00,000
Trade Receivables	40,000	3,20,000	8,80,000
Cash and Bank Balance	22,40,000	20,00,000	20,00,000
Total Assets	**70,80,000**	**79,20,000**	**88,80,000**

Additional information:

- Capital Employed as on 1-Apr-20×4 was ₹73,20,000
- Normal Return on Capital Employed is 12.5%.

Particulars as on	31.3.20×4	31.3.20×5	31.3.20×6
Fair Value of Property, Plant & Equipment	36,00,000	40,00,000	44,00,000
Fair Value of Inventory	24,00,000	28,00,000	32,00,000
Net Profit	8,40,000	12,40,000	16,40,000

If goodwill is calculated as 5 years' purchase based on average super profit, calculate Goodwill and Value of the business.

Solution (ICMAI Standard):

Particulars	1-Apr-20×4	31.3.20×4	31.3.20×5	31.3.20×6
Property, Plant & Equipment (revalued)		36,00,000	40,00,000	44,00,000
Stock (revalued)		24,00,000	28,00,000	32,00,000
Trade Receivable		40,000	3,20,000	8,80,000
Bank Balance		2,40,000	4,00,000	8,00,000
Total Assets		**62,80,000**	**75,20,000**	**92,80,000**
Less: Trade Payable		12,00,000	16,00,000	20,00,000
Capital Employed	73,20,000	**50,80,000**	**59,20,000**	**72,80,000**
Average Capital Employed		**62,00,000**	**55,00,000**	**66,00,000**
Normal Profit (A) @12.50%		7,75,000	6,87,500	8,25,000
Net Profit		8,40,000	12,40,000	16,40,000
Add: Undervaluation of Inventory		4,00,000	4,00,000	4,00,000
Adjusted Net Profit (B)		**12,40,000**	**16,40,000**	**20,40,000**
Super Profit (B – A)		**4,65,000**	**9,52,500**	**12,15,000**
Average Super Profit	**8,77,500**			
Goodwill @ 5 Years Purchase	**43,87,500**			

Particulars	Amount (₹)
Total Assets (Fair Values)	92,80,000
Less: Total Liabilities	20,00,000
Net Asset Value	72,80,000
Add: Goodwill	43,87,500
Value of the business	**1,16,67,500**

8.4.5 Brand

A 'brand' is often considered to be a marketing-related intangible asset that may include logos, names, and terms that are intended to identify products and services. It helps create distinctive images and associations in the minds of consumers and other stakeholders, and consequently may create economic benefits for the owner of the brand. The term 'brand' is used in many instances; it may be referred to as a Trademark, or a bundle of intellectual property rights (IPR) such as formulae, recipes, and design rights. Strong brands usually enhance business performance by influencing three key stakeholder groups – Customers, Employees, and Investors.

Valuation of Brand

Market Approach: The market approach, also referred to as Sales Comparison Approach, attempts to value the brand in comparison to similar brand(s). This approach requires considers various factors such as operating markets, legal protection, economic environment and relative brand strength. This approach requires a detailed evaluation of the comparability of the two brands, considering factors such as the markets in which they operate, relative brand strength, legal protection, and the economic outlook at the times of the transactions.

Cost Approach: This approach measures the value of a brand based on the cost invested in building the brand, or its replacement or reproduction cost. It is based on the premise that a prudent investor would not pay more for a brand than the cost to replace or reproduce it. The cost approach may not be relied upon to when determining a brand's value. But it may be used to validate the value as per Income Approach.

Income Approach: The income approach values a brand as the present value of the future earnings that it is expected to generate over its remaining useful economic life. This is a commonly used approach to value businesses and other assets. The valuer would need to carry out an analytical review of the current and potential size of the market in which the brand operates. It is often necessary to separately evaluate all key market segments in which the brand operates, in order to take account of differences in competitive forces and market trends. Specific assumptions that require research and analysis include the brand's current cash flows, forecast growth (short term and long term), the risk associated with future earnings, the discount rate, the brand's useful economic life, and tax considerations. The information requirements would vary depending upon the valuation approach and method that have been selected.

Brand Valuation using Relief from Royalty Approach: The method assumes that the brand is not owned, but rather is licensing from another company, and attempts to calculate how much the firm would have to pay in the open market in licensing fees to obtain the rights to use the brand. The amount of Royalty Saved is further separated into Brand specific revenues and other factors. This method requires analysing licensing agreements among companies for the use of comparable brands to determine an appropriate royalty rate to apply. The method also requires forecasting and discounting the future cash flows of the company, which requires making assumptions about future growth and discount rates. The value of the brand is then calculated as the net present value of the royalty payments that the company is saving by owning the brand itself.

Illustration 12 (ICMAI Study Material): Logos Ltd – Brand Valuation (Relief from Royalty)

Logos Ltd is considering evaluating its brand value. It has projected the revenues for the next 5 years as follows:

Year	1	2	3	4	5
Revenues (₹)	20,000	22,000	24,200	26,600	29,300

The Royalty rate for similar businesses is 10 %. The company believes that Brand specific revenue is 3 % of the Royalty factor. Assuming that the company will not enjoy superior brand power for more than 5 years, and a discount rate of 12 %, what should be the value of the brand?

Solution (ICMAI Standard):

Year	0	1	2	3	4	5
Revenue (₹)		20,000	22,000	24,200	26,600	29,300
Royalty Expense @10% (₹)		2,000	2,200	2,420	2,660	2,930
Cash Flows @ 3% (₹)		60.00	66.00	72.60	79.80	87.90
PV Factor		0.893	0.797	0.712	0.636	0.567
PV of Cash Flows (₹)		53.58	52.60	51.69	50.75	49.84
Net present Value (Brand Value) (₹)	**258.47**					

8.4.6 Other Intangibles

Trademarks & Trade Names

Trademarks and trade names refer to a word, a phrase, or a symbol that distinguishes a product or an enterprise from another (i.e., company names such as Coca Cola, Microsoft). Cost is similar to that of copyrights. The owner should register at the Patent Office for 10 years life. The registration can be renewed every 10 years for unlimited times. Amortization is over the shorter of the useful or legal life, not to exceed 40 years.

Leaseholds

By signing a contract, the lessee acquires an exclusive right to use the property. Leasehold improvements denote the improvements made to the leased property.

Incorporation Costs: Organization costs refer to costs associated with the formation of a corporation including fees to underwriters (for stock issuance), legal fees, promotional expenditures, etc.

Ind AS 116 / 17 provides detailed guidance on accounting and valuation of Leases. A Lease hold property may give rise to "Right to Use" asset that is an intangible with a corresponding Lease Liability.

Present Value of Lease Liability
Add: Initial Direct costs
Add: Estimated cost to dismantle, remove or restore (per Ind AS 37)
Add: Prepaid Lease Payments (e.g. Deposits)
Less: Lease incentives received
Equals Right to Use Asset

Illustration 13 (ICMAI Study Material): JDM Ltd – Right of Use (ROU) Asset

JDM Ltd has entered into a lease agreement to use an equipment for 7 years. The initial cost paid is INR 50,000 and the lease rental is INR 20,000 per year. The incremental borrowing rate for the lessee is 9 % p.a. What should be the Right Of Use (ROU) Asset as per Ind AS?

Solution (ICMAI Standard):

Year	0	1	2	3	4	5	6	7
Cash Flow (INR)		20,000	20,000	20,000	20,000	20,000	20,000	20,000
PV Factor		0.917	0.842	0.772	0.708	0.65	0.596	0.547
PV (INR)		18,340	16,840	15,440	14,160	13,000	11,920	10,940
PV of Cash Flows	**1,00,640**							
Add: Initial Cost	50,000							
ROU Asset	**1,50,640**							

Franchise & License

A franchise is a contractual agreement under which the franchiser grants the franchisee the right to sell certain products or service or to use certain trade names or trademarks.

A license is a contractual agreement between a governmental body and a private enterprise to use public property to provide services. Costs should be capitalized.

Amortization is done over the shorter of the contractual life or the useful life, not to exceed 40 years.

When central or state government permits any entity to use some national property for commercial use, a Concessional Right agreement is entered upon against certain capital fees without or without usage based fees. For example, when radio spectrum is granted to telecom companies or any sea shore is licensed to a private company for developing and running ports. The one-time initial fee paid upon signing the contract is recognised as an intangible asset, and the recurring payment against usage is considered as a revenue expenditure.

Research and Development (R&D)

R&D related expenditures are expensed and disclosed, if they are incurred for internal use.

Costs of R&D performed under contracts are capitalized as inventory. Income from these contracts can be recognized based on %age-of completion or complete contract method as discussed for the long-term construction contracts.

R&D expenditures include salaries of personnel involved in R&D, costs of materials used, equipment, facilities and intangibles used in R&D activities. If equipment has an alternative usage, only the depreciation expense will be included in the R&D expense.

Computer Software Costs

If the software is to be sold, most of the costs need to be expensed. Costs include designing, coding, testing, documentation and preparation of training materials. All these costs should be expensed as R&D expenses.

Costs occurred after technological feasibility of the product is established (i.e., the costs of design to suit the needs of customers) should be capitalized as an intangible asset.

Costs occurred after the software is ready for general release and production: These costs should be product costs.

Multiple Choice Questions – 8.4

1. Which valuation method is primarily used to value franchise agreements and certain licenses?

A. Relief-from-royalty method B. Multi period excess earnings method C. Greenfield method D. With and without method.

Answer: C. Greenfield method

2. Which of the following intangible assets are valued using the cost approach?

A. Customer contracts B. Copyrights C. Brand D. Goodwill.

Answer: B. Copyrights

3. What is the fundamental assumption made for the Distributor method of valuation?

A. Cash flows of each segment of a particular business are expected to generate profits B. All cash flows of a business are relevant C. The intangible asset to be valued is the only asset with all other assets being leased D. The business does not utilise the intangible asset to be valued.

Answer: A. Cash flows of each segment of a particular business are expected to generate profits

4. As per Ind AS, when can an entity recognise an intangible asset?

A. When it is probable that the future economic benefits that are attributable to the asset will flow to the entity and the cost of the asset can be measured reliably B. When the asset is projected to generate higher returns than the current returns C. When the asset is purchased from the market D. When the cost of the asset can be measured reliably.

Answer: A. When it is probable that the future economic benefits that are attributable to the asset will flow to the entity and the cost of the asset can be measured reliably

5. Identify the correct order of steps in the calculation of Goodwill using the Super Profits Method.

A. Calculate average capital employed, Normal Profit, Super Profit and then Goodwill B. Calculate Normal Profit, average capital employed, Goodwill and then Super Profit C. Calculate Normal Profit, Super Profit, average capital employed and then Goodwill D. Calculate Super Profit, Normal Profit, average capital employed and then Goodwill.

Answer: A. Calculate average capital employed, Normal Profit, Super Profit and then Goodwill

8.5 Valuation of Human Resources

Unlike other resources, human beings cannot be 'purchased' or owned by the entity, and hence are relatively free to either serve or turnover. From the entity's viewpoint, this suggests a dual aspect to an individual's value: one aspect is the amount that entity could potentially realise from his or her services if he or she stays with the entity during his/her service period. The other aspect is the amount of value expected to be realised from the human resource.

In knowledge–driven economies, it is imperative that the human resources be recognized as an integral part of the total worth of an organisation. However, to estimate and project the worth of the human capital, it is necessary that some method of quantifying the worth of the knowledge, motivation, skills, and contribution of the human element as well as that of the organisational processes, like recruitment, selection, training etc., which are used to build and support these human aspects, is developed. Human resource management activities include attraction, selection, acquisition, utilization retention, development and utilization for next higher level of value additions.

8.5.1 Cost Approach

Under this model, the actual cost of recruiting, selecting, hiring, placing and developing the employees of an organisation are capitalized and amortized over the expected useful life of the asset concerned. The sum of the cost as mentioned above for all the employees of the enterprise is taken to represent the total value of human resources. If the assets are liquidated permanently, losses are recorded and if the asset has longer life than estimated, are made in the amortized value. If an employee's leaves the firm before the expiry of expected service life of the employees the net asset value to that extent is charged to current revenue.

It capitalizes only recruiting training, development, placement and inducting cost but ignores the future expected costs to incurred for their maintenance. Secondly, estimation of the number of years over which the capitalized expenditure is to be taken and is likely to be largely subjective. It is difficult to calculate the rate which total expenditure on human resources is to be amortized.

8.5.2 Income Approach

This approach is applicable for skilled resources and considers contribution of resources to the entity.

Flamholtz's Stochastic Rewards Valuation Model assumes that an individual generates work value as he or she occupies and moves along organisation roles and renders service to the enterprise. The model presupposes that a person will move from one state (role) of the system (organisation) to any other state during a specified time period. Exit also is considered a state in this model.

Lev and Schwartz model is based on the economic concept of recognising humans as wealth-providing sources of income and relies on measurement of such wealth as a present value of future income streams. Valuations of Human Resources of homogenous group can be done by aggregating the present values of wages and salary payable to individual employees during the stay with the organisation. Measurement of HRs under this method involves:

1. (a) division of employee according to their age, grade of pay and designation
2. (b) determination of average per year
3. (c) calculating of total earnings based on the remaining tenure of the service life
4. (d) discounted total earning on the basis of average rate of return.

The biggest challenge of this approach is the determination of average rate of return. Normally, this would vary depending on the purpose of valuation. It could range from average inflation rate to the rate of return expected from the employees' skills in overall business.

Illustration 14 (ICMAI Study Material): Mr D – Human Resource Valuation

Mr D, a 55 year old employee is currently earning a salary of ₹40,00,000 per annum. He retires in 5 years and expects annual increment of 8 percent every year. The cost of capital applicable to the company is 11 percent. What is the value of Mr D to the company?

Solution (ICMAI Standard):

Year	Annual Income	PV Factor	PV of Annual income
1	40,00,000	0.901	36,03,604
2	43,20,000	0.812	35,06,209
3	46,65,600	0.731	34,11,447
4	50,38,848	0.659	33,19,245
5	54,41,956	0.593	32,29,536
Value of the resource	**1,70,70,041**		

While this approach computes the value of the human resource based on their income, it does not capture the contribution of the human resource to the organisation.

Multiple Choice Questions – 8.5

1. According to the income approach of valuation, how is human resources of homogenous group valued?

A. By comparing to market competitors B. By using the cost of recruitment and training C. By aggregating the present values of wages and salary payable to individual employees during their stay D. None of the above.

Answer: C. By aggregating the present values of wages and salary payable to individual employees during their stay

2. What is the major drawback of the cost approach for human resource valuation?

A. It does not consider the value of future expected costs for maintenance B. It includes future expected costs for maintenance C. It is not recognised as a legitimate valuation method D. None of the above.

Answer: A. It does not consider the value of future expected costs for maintenance

3. In Flamholtz's Stochastic Rewards Valuation Model, what does it presume?

A. An individual generates more value when they leave the organisation B. An individual generates work value as they occupy and move along organisational roles C. An individual generates value only during their tenure in the firm D. None of the above.

Answer: B. An individual generates work value as they occupy and move along organisational roles

4. Lev and Schwartz model determines the value of human resource based on what principle?

A. Their contribution to the company revenue B. Their length of service C. Their position in the company hierarchy D. The present value of their future income streams.

Answer: D. The present value of their future income streams.

5. You are the HR manager of a company and given the following data: an employee currently earning $80,000 per annum, expected to retire in 15 years with an expected annual increment of 5 percent and the company's cost of capital is 10 percent. Using the income approach, what is the value of the employee to the company?

A. $903,702 B. $935,800 C. $856,621 D. $942,567.

Answer: A. $903,702

8.6 Valuation of Real Estate

8.6.1 Principles of Valuation

The major principles that govern valuation of real estate are:

Principle	Description
a) Progression	A property's value may increase due to the existence of similar properties in similar locations, containing better quality.
b) Regression	A property's value may decrease due to the existence of similar properties in similar locations, containing poor quality.
c) Conformity	A property is most likely to appreciate in value along with other, similar properties in the same neighbourhood.
d) Substitution	A property's greatest potential market value is limited by the market value of other, similar properties.
e) Change	No condition remains the same indefinitely; change is part of the economic cycle.
f) Anticipation	Market value often is affected by expectations about future events.
g) Contribution	Improvements add to market value as a factor of current supply and demand, and not necessarily based on actual cost.
h) Plottage	Land values tend to increase when adjacent lots are combined into single ownership and put to a single zoning or use.
i) Highest and best use	Real estate valuation is maximized when land is utilized in the best possible way.
j) Competition	Opportunities for profitable investment lead to competition.

In case of valuation of real estate, price is usually a good starting point in valuation analysis. But valuation contains many additional elements of risk and reward; the current price of any real estate reflects a mix of factors, both advantageous and disadvantageous.

8.6.2 Cost Method

The cost approach to valuation calculates what it would cost to duplicate the existing improvements in today's rupees. A distinction must be made between cost and replacement, especially for older structures with exceptional architectural or handwork features. A replacement of such attributes would be more expensive than merely replacing a structure of the same square footage and other internal features.

The cost approach includes a calculation of construction costs, minus an estimate of depreciation and special site features, such as view, topography, or lot shape. Depreciation is an estimate of the difference between notional new construction (cost or replacement) and the current condition of property. So a run-down property will be given a higher allowance for depreciation than one that is newer and in better condition.

> **Value of Property = Replacement Cost of construction – allowance for depreciation + value based on property features**

Cost of construction = Area of the property (e.g. Sq ft) × Rate (e.g. per sq ft)

The rate is usually obtained from reputable sources (market data or government rates)

Depreciation allowance is calculated to adjust for age and condition of the property to assess its economic life. An age/life method for calculating depreciation involves dividing 100 by the economic life to arrive at annual depreciation. For example, if the valuer believes that the economic life of a property is 40 years, the depreciation calculation would begin with:

100 ÷ 40 = 2.5% depreciation per year

Considering the effective age (not necessarily the legal/actual age) based on current condition of improvements, (e.g. 5 years) depreciation rate is:

Depreciation per year x effective age

i.e. 2.5% x 5 years = 12.5%

If the current replacement cost of the property is calculated at ₹30,00,000, the calculation would be:

Particulars	₹
Current replacement cost of construction	30,00,000
Depreciation 12.50%	3,75,000
Net Cost Value	**26,25,000**

The valuer adds value for advantageous property features. By comparing the subject property to other properties in the area, the valuer may add a factor to compensate for differences. For example, if the property is larger than other lots, the valuer may add a percentage to the net cost value e.g. 5 percent to the value of the property for property value:

Particulars	₹
Net Cost Value	26,25,000
Add: Property features premium 5.0%	1,31,250
Net Cost Value	**27,56,250**

Often a valuer is supplied with a cost estimate by the developer. The cost estimate should be crosschecked against the actual development costs of similar subdivisions and perhaps against cost service estimates. The cost method is also often used for valuation of industrial properties that may have specialized equipment and do not have an easily observed rental market. As such, the cost method may be more applicable than the income approach in such cases.

8.6.3 Market Approach

The Market Approach is an exercise in comparison between the subject property and other, similar properties with recent transactions. Recent sales reveal current market value and make a convincing argument in support of this valuation method. However, some adjustments may be required. For example, adjustments may be required due to difference in property features such as age, area, condition among others.

Alternatively, a Gross Rent Multiplier is also used for valuing properties. This is a factor developed from a study of comparable sales prices of properties and the annual income from those properties.

Gross Rent Multiplier = Sale price / Gross Annual Income

Illustration 15 (ICMAI Study Material): Residential Property Valuation – GRM

A valuer is trying to assess the value of a residential property. He has identified the comparable property sales in recent past from the neighbourhood.

Sale Price (₹)	Annual income (₹)	GRM
93,75,000	5,04,000	18.60
99,45,000	5,40,000	18.42
1,00,50,000	6,00,000	16.75
1,06,12,000	4,80,000	22.11
1,08,75,000	5,76,000	18.88
Average		**18.95**

Solution (ICMAI Standard):

If the expected annual income from the property is INR 6,00,000, then the value of the property will be assessed as:

6,00,000 × 18.95 = **INR 1,13,70,000**

8.6.4 Income Approach

The Income Approach applies the income from the property and uses the discounting factors to assess the value of the property.

Capitalisation rate: As an alternative to Gross Rent Multiplier method, valuer may also use Capitalisation rate method. The calculation of cap rate involves calculation of Net Operating Income [Rent, less, vacancy factor, taxes, insurance, management fee, repairs, maintenance etc] and a comparison between the subject property and cap rates on comparable properties in the similar area.

For example, in valuing an apartment complex with net operating income (rents less vacancy factor, taxes, insurance, management fees, repairs and utilities) of INR 6,36,000 per year, the current value of the complex can be calculated by comparison with other apartment complexes with a similar number of units, similar neighbourhood, and similar condition and age.

Net Operating Income (₹)	Value (₹)	Cap Rate
7,65,000	75,00,000	10.20%
7,85,400	80,00,000	9.82%
6,63,000	70,00,000	9.47%
Average		**9.83%**

Given the Average Cap Rate of 9.83%, the value can be assessed as:

636000 / 0.0983 = **₹64,69,990**

Multiple Choice Questions – 8.6

1. What is the Gross Rent Multiplier (GRM) method in property evaluation?

A. It is the ratio of the selling price to the annual gross income. B. It is the ratio of the selling price to the annual net income. C. It is the process of identifying the value of a property based on its area. D. It is the process of identifying the value of a property based on its age and condition.

Answer: A. It is the ratio of the selling price to the annual gross income.

2. A property is in an area where the market rate is $200,000 for 1000 sq ft. If the property occupies an area of 1500 sq.ft, what would be the replacement cost of construction?

A. $300,000 B. $350,000 C. $400,000 D. $450,000.

Answer: A. $300,000

3. A 10-year-old property is expected to have a life of 50 years. If the replacement cost is $500,000, what will be the adjusted valuation considering annual depreciation?

A. $400,000 B. $450,000 C. $350,000 D. $300,000.

Answer: B. $450,000

4. In the income approach of property valuation, the net operating income is $50,000 and the average cap rate is 5%. What is the estimated value of the property?

A. $500,000 B. $1,000,000 C. $2,000,000 D. $1,500,000.

Answer: B. $1,000,000

8.7 Value Added, Economic Value Added, Market Value Added

8.7.1 Value Added

Value-added generally refers to the additional features or economic value that a company adds to its products and services before offering them to customers. This helps them attract more customers, which can boost revenue and profits. However, in the context of corporate finance, Value-added is in the context of enhancing the shareholders' value. The actions a company takes can affect value in various ways. This includes impact on cash flows from existing assets, growth rates, cost of capital or length of growth period.

The Net Present Value (NPV) reflects the amount of value created by a project over and above the expectations of the providers of capital (Cost of Capital). Investing in positive NPV projects enhances the value of the company and vice versa. However, considering the assumptions underlying any NPV (or DCF) exercise may be complicated as the number of inputs increases. Thus, assuming efficient markets, a company is said to have created more value when the market capitalisation increases and where the stock prices fall, the company is said to have destroyed value.

In the recent past, new mechanisms of creating value have emerged which are simpler to estimate and do not require heavy dependence on market movements or estimates. These are Economic Value Added (EVA), and Market Value Added (MVA).

8.7.2 Economic Value Added (EVA)

Economic Value added (EVA) is the financial performance measure that comes closer than any other to capturing the true economic profit of an enterprise. EVA also is the performance measure most directly linked to the creation of shareholder wealth over time.

Economic profit is NOPAT minus a capital charge, which represents a sort of rental fee charged to the company for its use of capital. In other words, economic profit is the profits (or returns) our company must generate in order to satisfy the lenders and shareholders who have "rented" capital to the company. Keep in mind that economic profit is a period metric, like earnings or cash flow.

$$\text{EVA} = \text{Net Operating Profit After Tax} - \text{Currency Cost of Capital}$$
$$\text{EVA} = \text{Net operating Profit After tax} - (\text{Capital Employed} \times \text{Cost of Capital})$$

Net Operating Profit After Tax (NOPAT)

A company's potential cash earnings if its capitalization were unleveraged (that is, if it had no debt). NOPAT is frequently used in economic value added (EVA) calculations.

Calculated as:

$$\text{NOPAT} = \text{Operating Income} \times (1 - \text{Tax Rate})$$

To get into details, EVA =

Particulars	Description
(A) Adjusted Operating Profits before Taxes	
Minus (B) Cash Operating Taxes	
Equals (C) Net Operating Profits After Taxes (NOPAT)	
Minus (D) Currency Cost of Capital (Capital Employed × Cost of Capital)	
Equals (E) Economic Value Added (EVA)	

OPERATING PROFIT (AFTER DEPRECIATION AND AMORTIZATION)

- Add: Implied Interest on Operating Leases
- Add: Goodwill Amortization
- Equals: (A) Adjusted Operating Profits before Taxes

INCOME TAX EXPENSE

- Add: Decrease in Deferred Taxes

- Add: Tax Benefit from Interest Expenses
- Add: Tax Benefit from Interest on Leases
- Less: Taxes on Nonoperating Income
- Equals: (B) Cash Operating Taxes

(A) minus (B) equals: (C) Net Operating Profit After Taxes (NOPAT)

CAPITAL EMPLOYED =

- Net Working Capital (current assets less non-interest-bearing liabilities)
- Add: Net Plant, Property, and Equipment
- Add: Other Assets
- Add: Goodwill
- Add: Accumulated Goodwill Amortized
- Add: Present Value of Operating Leases
- Equals: Capital Employed

Alternatively, Capital Employed = Equity + Preference Capital + Long Term Debt

WEIGHTED AVERAGE COST OF CAPITAL (WACC)

- = (Book Value of Debt/Total Book Value) × (the Market Cost of Debt) (1 – Tax Rate)
- = (Book Value of Equity/Total Book Value) × (Cost of Equity)
- = (Cost of equity is based on the CAPM using the prevailing 10-year Treasury bond as the Risk-Free Rate, a calculated beta, and a market risk premium)

(D) Currency Cost of Capital = Capital Employed × WACC

(E) Economic Value Added (EVA) = (C) Net Operating Profits After Taxes (NOPAT) Minus (D) Currency Cost of Capital

Put most simply, EVA is net operating profit minus an appropriate charge for the opportunity cost of all capital invested in an enterprise. As such, EVA is an estimate of true "economic" profit, or the amount by which earnings exceed or fall short of the required minimum rate of return that shareholders and lenders could get by investing in other securities of comparable risk.

> Terminal Value = (NOPAT - Gross Capital Expenditure - Change in Working Capital + Increase in non-interest bearing liabilities - Total depreciation) / (Net Sales growth × NOPAT) × Capital Invested

Capital Invested for all years = Total equity + Interest bearing liabilities + Convertibles - Total interest bearing financial assets.

Illustration 16 (ICMAI Study Material): A Ltd – EVA Approach Valuation

Consider a firm that has assets in place in which it has capital invested of ₹100 crores. Assume the following further facts about the firm:

- a) The after-tax operating income on assets in place is ₹15 crores. This return on capital of 15% is expected to be sustained in the future, and the company has a cost of capital of 10%.
- b) At the beginning of each of the next 5 years, the firm is expected to make investments of ₹10 crores each. These investments are also expected to earn 15% as a return on capital, and the cost of capital is expected to remain 10%.
- c) After year 5, the company will continue to make investments and earnings will grow 5% a year, but the new investments will have a return on capital of only 10%, which is also the cost of capital.
- d) All assets and investments are expected to have infinite lives. Thus, the assets in place and the investments made in the first five years will make 15% a year in perpetuity, with no growth.

Solution (ICMAI Standard):

The value of the firm would be assessed based on three parts: Capital Invested + EVA from Existing assets + EVA from new investments

Remember: the investments are made at the beginning of each year. So 1st Year investment is effectively at year zero i.e. today.

Particulars	Amount (₹)
Capital Invested	100.00
EVA from Existing Assets [100 × (15% - 10%) / 10%]	50.00
EVA from 1st Year Investment [10 × (15% - 10%) / (10%)]	5.00
EVA from 2nd Year investment [10 × (15% - 10%) / (10% × 1.10)]	4.55
EVA from 3rd Year investment [10 × (15% - 10%) / (10% × 1.10^2)]	4.13
EVA from 4th Year Investment [10 × (15% - 10%) / (10% × 1.10^3)]	3.76
EVA from 5th Year Investment [10 × (15% - 10%) / (10% × 1.10^4)]	3.42
Total Value of the Firm	**170.86**

8.7.3 Market Value Added (MVA)

Market value Added (MVA) is the difference between the current market value of a firm and the capital contributed by investors. If MVA is positive, the firm has added value. If it is negative the firm has destroyed value.

To find out whether management has created or destroyed value since its inception, the firm's MVA can be used:

$$\text{MVA} = \text{Market value of equity capital} - \text{capital employed}$$

The higher the MVA, the better. A high MVA indicates the company has created substantial wealth for the shareholders. A negative MVA means that the value of the actions and investments of management is less than the value of the capital contributed to the company by the capital markets, meaning wealth or value has been destroyed.

The aim of the company should be to maximize MVA. The aim should not be to maximize the value of the firm, since this can be easily accomplished by investing ever-increasing amounts of capital.

8.7.4 Relationship Between EVA and Market Value Added

The market value of a firm reflects not only the Expected EVA of Assets in place but also the Expected EVA from future projects. To the extent that the actual economic value added is smaller than the expected EVA the market value can decrease even though the EVA is higher.

This does not imply that increasing EVA is bad from a corporate finance stand point. In fact, given a choice between delivering a "below-expectation" EVA and no EVA at all, the firm should deliver the "below-expectation" EVA. It does suggest that the correlation between increasing year-to-year EVA and market value will be weaker for firms with high anticipated growth (and

excess returns) than for firms with low or no anticipated growth. It does suggest also that "investment strategies" based upon EVA have to be carefully constructed, especially for firms where there is an expectation built into prices of "high" surplus returns.

Multiple Choice Questions – 8.7

1. EVA =

A. Net Operating Profit After Tax – Currency Cost of Capital B. Net operating Profit After tax – (Capital Employed x Cost of Capital) C. Net Operating Profit After Tax + Currency Cost of Capital D. Both a and b

Answer: D. Both a and b

2. Market value Added (MVA) is the difference between the _____ of a firm and the _____contributed by investors.

A. Current market value, Capital B. Book value, Capital C. Book Value, Debt D. None of the above

Answer: A. Current market value, Capital

3. If MVA is positive, the firm has added value. If it is negative the firm has destroyed value. Is it correct or not?

A. Incorrect B. Partly Correct C. Partly Incorrect D. Correct

Answer: D. Correct

4. A _____ MVA means that the value of the actions and investments of management is less than the value of the capital contributed to the company by the capital markets, meaning wealth or value has been destroyed.

A. Positive B. Negative C. Constant D. None of the above

Answer: B. Negative

5. The aim of the company should be to maximize _____.

A. MVA B. EVA C. Both D. None of the above

Answer: A. MVA

8.8 Valuation of Liabilities

8.8.1 Liabilities

As per IFRS, and Ind AS, A liability is a present obligation of the entity arising from past events, the settlement of which is expected to result in an outflow from the entity of resources embodying economic benefits.

Liabilities may be defined as currently existing obligation which a business enterprise intends to meet at some time in future. Such obligations arise from legal or managerial considerations and impose restrictions on the use of assets by the enterprise for its own purposes. Liabilities also include certain deferred credits that are not obligations but that are recognised and measured in conformity with generally accepted accounting principles.

Actual liabilities valuation can be done on the basis of true and fair financial position of the business entity. Valuation should be properly disclose, otherwise it can make disturb to show actual financial health of the company. More clearly under valuation or over valuation of liabilities may not only affect the operating result and financial position of the current period but will also affect these for the next accounting period.

8.8.2 Determinants of Liabilities Valuation

1. (a) The obligation must, of course, exist at the present time. That is, it must arise out of some past transaction or event. It may arise from the acquisition of goods or services, from losses already sustained for which the firm is liable, or from the expectation of losses for which the firm has obligation itself.
2. (b) Equitable obligations or duties should be included if they are based on the necessity of making future payment to maintain good business relationship or if they are in accordance with normal business practice.
3. (c) There should be little or no discretion to avoid the future sacrifice. It is necessary that the amount of the obligation be known with certainty so long as a future sacrifice is probable.
4. (d) There should be a determinable maturity value or the expectation that payment of an amount determined by reasonable estimation will be required at some specific time in the future, even through the exact thing is not known at present. The time of payment may be extended by the substitution of new liabilities, or the obligation may be terminated by their conversion into stockholder equities.
5. (e) Normally, the payee would be known or be identifiable either specifically or as a group. However, so long the payee becomes identifiable by the settlement date, it is not necessary that the payer knows the identity of payee or that the creditor professes the claim or has knowledge of it at the present time.

The valuation of liabilities is part of the process of measuring both capital and income, and is important to such problems as capital maintenance and the ascertainment of a firm's financial position. According to Borton, the requirements for an accurate measurement of the financial position and financial structure should determine the basis for liability valuation. Their valuation should be consistent with the valuation of assets and expenses. The need for consistency arises from the objectives of liability valuation, which are similar to those to asset valuation. Probably the most important of these objectives is the desire to record expenses and financial losses in the process of measuring income. However, the valuation of liabilities should also assist investors and creditors in understanding the financial position.

8.8.3 Liabilities may be valued

- (a) at their discounted net values in accordance with the manner of valuing assets in economics;
- (b) in accordance with accounting conventions, they may be recorded at their historic value, that is, the valuation attached to the contractual basis by which they were created. There is no difference between the two methods of valuation as regards liabilities which are payable immediately and it is only as the maturity date of liabilities, that makes the difference. While accounting conventions dictate that the valuation of liabilities should be based on the sum which is payable, it is accounting practice to make a distinction between current and long-term liabilities. As regard current liabilities there is little difference between the discounted net value and the contractual value of liabilities. In this connection, current liabilities are defined as those which will mature during accounting period. The gap between the two methods of valuation is significant as regard long term liabilities. Long term liabilities are valued on the basis of their historical value, that is, by reference to the contract from which they originated, and hence, during periods of inflation or where the interest payable is less than the current market rate of interest, the accounting valuation will certainly be overstated by comparison with the discounted net value.

8.8.4 Different Processes involved in Liabilities Valuation

- **Historical Cost:** The value of liabilities are recorded at the amount of proceeds received in exchange for the obligation, or in some situation, at the amount of cash equivalents expected to be paid to satisfy the liabilities in the normal course of business.
- **Current Cost:** Liabilities are carried at the undiscounted amount of cash equivalents that would be required to settle the obligation currently.
- **Settlement Value:** The undiscounted amounts of cash equivalents expected to be required to settle the liabilities in the normal course of business.
- **Present Value:** Liabilities are carried at the present value of the future cash flow that are expected to be required to settle the liabilities in the normal course of business.
- **External Liabilities - Debentures:** Creditors, Bills Payable, Bank over Draft etc. Fixed or long term liabilities: Debentures, Loan or Mortgage
- **Current Liabilities:** Creditors, Bills Payable, Bank Over Draft
- **Deferred Liabilities:** The liabilities which are payable after one month but within one year are called Deferred liabilities.
- **Liquid Liabilities:** The liabilities which are payable within one month called liquid liabilities.

8.8.5 Contingent Liability

A Contingent Liabilities is not a actual liability. Instead, it is a potential liability that depends on a future event arising out of a past transaction. For example, a town Government may sue the company that setup new light, claiming that the electrical wiring is fault. The past transaction is the street light installation. The future event is the court case that will decide the suit. The light companies thus face a contingent liability, which may or may not become a actual obligation.

Sometimes this liability has a definite amount. Discounting a note receivable creates a contingent that is, a potential liability for the endorser. If the market of the note pays at maturity, the contingent liability ceases to exist. However if the maker defaults the payee, who sold the note, must pay its maturity value to the purchaser. Another contingent liability of know amount arise from guaranteeing that another company will pay a note payable that the other company owes a third party, this practice is called consignment a note.

The line between contingent liabilities and real liabilities is heard to draw. The contingent liabilities appear in the body of the balance sheet of total liability, but with no amount. Generally, an explanatory note accompanies a short presentation.

As a practical guide, the FASB says to record an actual liability if:

1. a) it is probable that the business has suffered a loss and
2. b) it amount can be reasonably estimated.

If both of these conditions are met, the FASB reasons that the obligation has passed from contingent to real, even if its amount is estimated.

8.8.6 Contingent Claim Valuation

A contingent claim is a derivative that gives the owner the right, but not the obligation, to a payoff based on an underlying asset, rate, or other derivative. Contingent claims include options.

In valuation, the value of a firm is the present value of the expected cash flows from the assets of the firm. The net present value of a project does not capture the values of the options to delay, expand or abandon a project. When comparing across investments, the traditional approach of picking the investment with the highest return or net present value may short-change investments that offer a firm more flexibility in operations and investing.

A financing model that focuses on minimising the current cost of capital does not consider the value of financial flexibility that comes from having excess debt capacity. In a similar vein, firms that hold back on returning cash to their stockholders and accumulate large cash balances might also be guided by the desire for financing flexibility.

The value of equity, obtained from a discounted cash flow valuation model, does not measure the option to control, and if necessary, liquidate the firm that equity investors possess, and it ignores other options that might be owned by the firm, including patents, licenses and rights to natural reserves. In light of these options that seem to be everywhere, these options should be considered when analysing corporate decisions. We should try to quantitatively estimate the value of these options, and build them into the decision process. The value of an asset may not be greater than the present value of expected cash flows if the cash flows are contingent on the occurrence or non-occurrence of an event.

Multiple Choice Questions – 8.8

1. Which of the following factors is not a determinant of liabilities valuation?

A. The obligation must exist at the present time B. Equitable obligations should be included C. The amount of the obligation must be known with certainty D. The payee should always be unknown.

Answer: D. The payee should always be unknown.

2. Current cost liability valuation refers to which of the following?

A. Liabilities are carried at the present value of the future cash flow B. Liabilities are valued on the basis of their historical value C. Liabilities are recorded at the amount of proceeds received in exchange for the obligation D. Liabilities are carried at the undiscounted amount of cash equivalents that would be required to settle the obligation currently.

Answer: D. Liabilities are carried at the undiscounted amount of cash equivalents that would be required to settle the obligation currently.

3. Which of the following is a deferred liability?

A. A liability which is payable after one month but within one year B. A liability which is payable within one month C. A potential liability that depends on a future event arising out of a past transaction D. A liability which is payable after one year.

Answer: A. A liability which is payable after one month but within one year

4. According to IFRS and Ind AS, a liability is a present obligation of the entity arising from past events. True or False?

A. True B. False C. Cannot be determined D. Both A and B

Answer: A. True

5. Considering the flexibility and scalability in operations and investing, which is the best approach for asset valuation?

A. Picking the investment with the highest return B. Considering the value of financial flexibility that comes from having excess debt capacity C. Using a financing model that focuses on minimising the current cost of capital D. All of the above.

Answer: B. Considering the value of financial flexibility that comes from having excess debt capacity

📌 Key Takeaways – Module 8

Section	Key Takeaway
8.1	Plant & Machinery valuation: 3 Approaches (Cost, Market, Income); 3 Types of Depreciation (Physical, Functional, Economic); Formula: Current Replacement Cost – Accumulated Depreciation = Fair Value
8.2	Inventory valuation: Costs Included (Purchase, Conversion, Other); Costs Excluded (Abnormal wastage, Storage, Admin overheads, Selling costs); Lower of Cost or NRV
8.3	Investment valuation: Quoted (VWAP), Unquoted (NAV); Bond valuation: Terminology (Coupon, Yield, Face Value, Maturity, Call/Put, Convertible); Bond Value = Int × PVAF + Redemption × PVF; YTM (Interpolation); Duration (Macaulay, Modified); 11 Types of Bond Risks; Warrants (Minimum Price, Premium); Preference Shares (Value = Dividend / Required Return)
8.4	Intangibles: Ind AS 38 Recognition; Valuation Methods (Relief from Royalty, MEEM, WWM, Greenfield, Distributor, Cost); Copyrights; Goodwill (Super Profits Method); Brand (Relief from Royalty); Other Intangibles (Trademarks, Leaseholds, Franchise, R&D, Software)
8.5	Human Resources: Cost Approach (Capitalize recruitment/training costs); Income Approach (Lev & Schwartz, Flamholtz Stochastic Model); Value = PV of Future Income Streams
8.6	Real Estate: 10 Principles (Progression, Regression, Conformity, Substitution, Change, Anticipation, Contribution, Plottage, HABU, Competition); Cost Method; Market Method (GRM); Income Method (Cap Rate)
8.7	EVA = NOPAT – Capital Charge; MVA = Market Value – Capital Employed; Relationship between EVA and MVA
8.8	Liabilities: Determinants (5), Valuation Bases (Historical, Current, Settlement, Present Value); Types (External, Current, Deferred, Liquid); Contingent Liability (FASB criteria); Contingent Claim Valuation

📐 Important Formulas – Module 8

Formula	Description
Current Replacement Cost = Purchase Cost × (Current Index / Purchase Index)	Plant & Machinery Valuation
Accumulated Depreciation = CRC × (1 – Scrap%) × (Age / Life)	Depreciation Calculation
Fair Value = CRC – Accumulated Depreciation	Plant & Machinery Fair Value
VWAP = Sum of Total Turnover / Sum of Total Shares	Quoted Securities Valuation
NAV per share = (Fair Value of Assets – Liabilities) / No. of Shares	Unquoted Shares Valuation
Bond Value = Annual Interest × PVAF + Redemption Value × PVF	Bond Valuation
Current Yield = Coupon Interest / Current Market Price	Bond Current Yield
YTM = Lower Rate + [(Lower Rate NPV / (Lower Rate NPV - Higher rate NPV)) × Difference in Rates]	YTM Interpolation
YTM Approximation = [C + (F-P)/n] / [(F+P)/2]	YTM Approximation
Price of Zero Coupon Bond = Redemption Price / (1+r)^n	Zero Coupon Bond
Macaulay Duration = Σ t_i × PV_i / V	Macaulay Duration
Modified Duration = Macaulay Duration / (1 + YTM/n)	Modified Duration
Minimum Warrant Price = (Market Price of Stock - Exercise Price) × Exchange Ratio	Warrant Valuation
Warrant Premium = Market Price of Warrant - Minimum Price of Warrant	Warrant Premium
Value of Preference Shares = Preference Dividend / Required Rate of Return	Preference Share Valuation
Goodwill = Purchase Consideration – Fair Value of Net Assets	Goodwill (Acquisition)
Super Profit = Adjusted Average Profit – Normal Profit	Goodwill (Super Profits Method)
Value of Intangible = Value with Intangible – Value without Intangible	With and Without Method
Brand Value = PV of Royalty Saved	Relief from Royalty Method
Value of Human Resource = PV of Future Income Streams	Lev & Schwartz Model
GRM = Sale Price / Gross Annual Income	Real Estate (Market Method)
Value = Net Operating Income / Capitalisation Rate	Real Estate (Income Method)
EVA = NOPAT – (Capital Employed × WACC)	Economic Value Added
NOPAT = Operating Income × (1 – Tax Rate)	NOPAT
MVA = Market Value – Capital Employed	Market Value Added

✅ Revision Checklist – Module 8

- □ Explain Plant & Machinery categories and IFRS definition
- □ Explain 3 Approaches to M&E valuation (Cost, Market, Income)
- □ Solve Equipment Valuation (Cost Approach)
- □ Explain 3 Types of Depreciation (Physical, Functional, Economic)
- □ Explain Inventory Costs (Included vs Excluded)
- □ Explain Cost of Investments (Acquisition charges)
- □ Solve RIL VWAP vs Last Trading Price
- □ Solve Panda Ltd – AMGI Ltd Investment Valuation
- □ Explain Bond Terminology (Coupon, Yield, Face Value, Maturity, Call/Put, Convertible)
- □ Solve Bond Valuation (Annual and Semi-annual Interest)
- □ Solve Current Yield, YTM (Interpolation & Approximation)
- □ Solve Zero Coupon Bond Valuation

- □ Explain Duration (Macaulay, Modified)
- □ Explain 11 Types of Bond Risks
- □ Explain Bonds with Options (Convertible, Callable, Puttable)
- □ Solve HDC Ltd Warrant Valuation
- □ Explain Preference Shares Characteristics
- □ Explain Intangible Assets (Ind AS 38 Recognition)
- □ Explain Valuation Methods (Relief from Royalty, MEEM, WWM, Greenfield, Distributor, Cost)
- □ Solve V. Goel Copyright Valuation
- □ Explain Goodwill (IFRS, Super Profits Method)
- □ Solve ST Ltd Goodwill Valuation
- □ Explain Brand Valuation (Market, Cost, Income, Relief from Royalty)
- □ Solve Logos Ltd Brand Valuation
- □ Explain Other Intangibles (Trademarks, Leaseholds, Franchise, R&D, Software)
- □ Solve JDM Ltd ROU Asset
- □ Explain Human Resource Valuation (Cost, Income)
- □ Solve Mr D Human Resource Valuation
- □ Explain 10 Principles of Real Estate Valuation
- □ Explain Cost Method (Replacement Cost – Depreciation + Features)
- □ Solve Real Estate Market Method (GRM)
- □ Explain Income Method (Cap Rate)
- □ Explain EVA, MVA, Contingent Claim Valuation
- □ Solve A Ltd EVA Approach Valuation
- □ Explain Liabilities Determinants (5)
- □ Explain Liabilities Valuation Bases (Historical, Current, Settlement, Present Value)
- □ Explain Liabilities Types (External, Current, Deferred, Liquid)
- □ Explain Contingent Liability (FASB criteria)
- □ Explain Contingent Claim Valuation

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Disclaimer: These revision notes are for educational purposes only. Students are advised to refer to the official ICMAI study material and latest amendments for comprehensive preparation.

Next Module: Module 9 – Valuation in Mergers and Acquisitions

CMA FINAL PAPER 20A

Strategic Performance Management & Business Valuation

SECTION B – MODULE 9: Valuation in Mergers and Acquisitions

Complete Coverage as per ICMAI Study Material (Syllabus 2022)

For December 2026 Examination | CMA Knowledge Series – cmaknowledge.in

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1. Acquisition Pricing
2. Acquisition Outcome
3. Financial Modelling
4. Key Takeaways & Revision Checklist

Module Learning Objectives

- Explain the concept and scenarios of Mergers and Acquisitions.
- Evaluate a potential target company while assessing its qualitative and quantitative factors.
- Value a potential Acquirer and Target Company, arrive at Share Exchange Ratio, evaluate synergies and calculate Goodwill.

Introduction to Mergers and Acquisitions

Companies often 'restructure' their business in their quest for efficiency and competitiveness. To achieve their ambitious business goals, organisations may restructure the business organically (Internal) or inorganically (External). Organic activities include aggressive marketing, geographical expansion, and new product development. Inorganic Restructuring may be done in the form of Mergers and Acquisitions. They are often considered to be faster means of achieving the desired goals.

Mergers

Mergers (also known as Amalgamation) two or more companies (amalgamating or transferor companies) choose to merge into a single company (amalgamated or transferee company). In a merger, the company being bought is absorbed into the other, so it ceases to exist as a separate entity once the merger is complete.

Type of Merger	Description	Example
Horizontal merger	When merger is between two companies that are into the same products or services, it is called a horizontal merger.	In 2017, Vodafone India and Idea Cellular merged to form Vodafone Idea (Vi). It was a horizontal merger amongst the two biggest players in the telecom industry. This merger deal was worth USD 23 billion.
Vertical merger	In a vertical merger, the companies are in different points in the value chain.	In 2006, Walt Disney acquired Pixar Animation Studios for USD 7.4 billion. Pixar was an innovative animation studio and had talented people. Walt Disney was a mass media and entertainment company. By 'acquiring' Pixar, Walt Disney got access to high quality content which is essential for any mass-media company. A vertical merger may be done between a supplier and customer.
Forward integration	If the acquirer moves up the value chain towards the ultimate consumer it is called Forward Integration	(e.g., an ice cream manufacturer acquires restaurants where it can serve ice cream).
Backward integration	If the acquirer moves down the value chain towards raw materials	(e.g., of the ice cream manufacturer acquires a dairy farm to have better access to milk).
Conglomerate merger	A conglomerate or diagonal merger is one where the merging companies are neither into the same products or services, nor in the same business. It may be part of the diversification strategy of the company.	—

Acquisition

When both the acquiring and acquired companies still exist as separate entities at the end of the transaction. The company making the purchase is known as the acquiring company or acquirer. The company that is bought is known as the target company or target. Some of the examples of acquisitions:

- In 2018, Walmart acquired 77 percent stake in Flipkart India for USD 16 billion.
- In 2013 Facebook acquired WhatsApp for USD 19 billion.
- In 2008, Tata Motors acquired the Jaguar Land Rover businesses from Ford Motor Company for a net consideration of USD 2.3 billion, in an all-cash transaction.
- Think & Learn Pvt Ltd (Byju's) acquired several companies such as Aakash Educational Services Ltd (Aakash Institute), Great Learning, Epic, Tynker, Scholr, Toppr, Gradeup, Hashlearn, Whodat, GeoGebra, WhitehatJr among others in 2021 alone in its pursuit to grow exponentially in EdTech space.

The company which is being acquired is known as the Target or Acquired company and the company that buys the other company is known as the Acquirer.

Motives for Mergers and Acquisitions

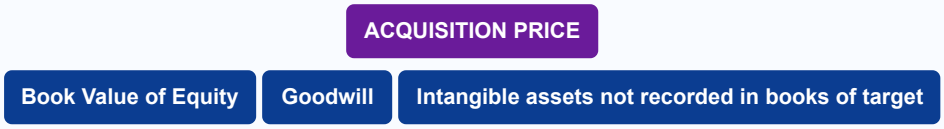
There are various motives for external restructuring.

- **Growth:** An ambitious company may be able to grow faster with mergers and acquisitions than with its own internal capabilities. Usually, external growth makes more sense if the target possesses the competencies and resources necessary to capitalize on emerging opportunities.
- **Creation of synergy:** Synergies are realized when the value of the combined entity that is formed because of the merger exceeds the value of the simple sum of its parts. These synergies can be in the form of Cost Synergies or Revenue Synergies. The synergy can also be expressed as the present value of any performance improvements to be achieved after the acquisition, which will show up as improved cash flows for the target's business or the acquirer's business.
- **Increasing market power:** By acquiring a competitor, a company can increase its pricing power in an industry that has a small number of firms. Vertical integration may give the acquirer greater market power if it allows the acquirer to gain control over a critical production input by merging with a dominant supplier.
- **Acquiring unique capabilities and resources:** Mergers or acquisitions may also be undertaken as an alternative to developing capabilities internally such as R&D capabilities, effective marketing, and talent.
- **Diversification:** Companies may engage in mergers and acquisitions activity to diversify their businesses.

9.1 Acquisition Pricing

In case of Mergers or Acquisitions, the acquirer needs to pay an amount to acquire the target. The shareholders of the target company get the compensation for dispensing with their shares in the target against cash or shares of Acquirer. The acquisition price is the price that is paid by the acquiring company for each of the target company's shares. The acquirer may offer a price which may or may not be accepted by the shareholders of the target. The final price is usually based upon negotiations between the acquiring company and the target company shareholders.

Fig 9.1: Acquisition Price



The acquirer can pay for the merger with cash, securities, or some combination of the two. In a cash offering, the cash might come from the acquiring company's existing assets or from a debt issue. In the most general case of a securities offering, the target shareholders receive shares of the acquirer's shares as compensation. In a stock offering, the exchange ratio determines the number of shares that shareholders in the target company receive in exchange for each of their shares in the target company. Each shareholder of the target company receives new shares based on the number of Target's shares he or she owns multiplied by the exchange ratio.

In a hostile acquisition, the target company's management does not want to be acquired. The acquirer offers a price higher than the target company's market price prior to the acquisition and invites shareholders in the target firm to tender their shares for the price. The difference between the acquisition price and the market price prior to the acquisition is called the acquisition premium. From an accounting perspective, this acquisition premium is treated as Goodwill in the books of the acquirer. That the price that is paid over and above the fair value of the target company being acquired. From a Corporate Finance perspective, the acquirer must justify this premium through synergies that they will get after the acquisition.

The intrinsic value of the target or acquirer would be done in the same manner as any other company using either of the valuation approaches e.g., Income, Market or Cost Approach.

9.1.1 Value Creation

Acquisitions create value when the cash flows of the combined companies are greater than the sum of their individual values. If the acquirer doesn't pay too much for the acquisition, some of that value will accrue to the acquirer's shareholders. The value created for an acquirer's shareholders equals the difference between the value received by the acquirer and the price paid (Purchase Consideration) by the acquirer:

$$\text{Value Created for Acquirer} = \text{Value Received} - \text{Price paid for acquisition}$$

$$\text{Value Created for Acquirer} = (\text{Standalone Value of Target} + \text{Value of Performance Improvements}) - (\text{Market Value of Target} + \text{Acquisition Premium})$$

Fig 9.2: Value Gap & Synergy Value

Concept	Description
Intrinsic Value	The most basic value of the company is its intrinsic value based principally on the net present value of expected future cash flows completely independent of any acquisition. This assumes the company continues under current management with whatever revenue growth and performance improvements have already been anticipated by the market.
Market value	On top of the intrinsic value the market may add a premium to reflect the likelihood that an offer of the company will be made. Alternatively, a higher offer may be tendered than one currently on the table. Market value commonly called current market capitalization is the same as the share price. It reflects the market participants valuation of the company.
Purchase price	This is considered as the anticipated take out value. It's the price that a bidder anticipates having to pay to be accepted by the target shareholders.
Synergy value	The net present value of the cashflows that will result from improvements made when the companies are combined. These are improvements above and beyond those the market already anticipates each company would make if the acquisition didn't occur, since those are already incorporated into the intrinsic value of each company.
Value gap	The difference between intrinsic value and the purchase price

9.1.2 Analysing Premium offered to Target Stockholders

A "purchase premium" in the context of mergers and acquisitions refers to the excess that an acquirer pays over the market trading value of the target company's shares being acquired. "Premiums Paid Analysis" is the name of a common investment banking analysis that reviews comparable transactions and averages the premiums paid for those transactions. Looking at historical premiums when negotiating the acquisition of a public company is a key part of framing the purchase price range. Additionally, the target company's management analyses historical premiums paid on comparable transactions to demonstrate to their shareholders that they have done their duty of maximizing value to shareholders.

Premiums tend to be higher in strategic deals (one company acquiring another company) as opposed to financial deals (a private equity firm acquiring a company). That's because a strategic acquirer often gains cost savings (synergies) from the newly combined company that increases how much it can afford to pay. Example, When Microsoft acquired LinkedIn on June 13, 2016, it paid USD 196 per share, representing a 49.5% premium over LinkedIn's closing share price of USD 131.08 per share the day prior to the deal announcement.

Estimating Acquisition Premium

The acquisition premium represents the amount (per share) above the current market price that shareholders would accept to approve the merger transaction (give up ownership of the target to the acquirer). The takeover premium is usually expressed as a percentage of the stock price and is calculated as:

$$\text{Target Shareholders' Gain} = \text{Deal price} - \text{Premerger Market Price of Target}$$

$$\text{Acquisition Premium (\%)} = [(\text{Deal price} - \text{Premerger price of Target}) / \text{Premerger price of target}]$$

Acquisition premiums paid in recent acquisitions of similar companies (as the target) are used to estimate the acquisition premium.

Illustration 1 (ICMAI Study Material): Aruna – Mani Ltd Acquisition Price

Aruna has been assigned the task of estimating a fair acquisition price for Mani Ltd. She decides to use comparable company analysis to determine a fair acquisition price and gathers the following information regarding three comparable companies.

Particulars	Company A	Company B	Company C
Price Per share (₹)	240.00	150.00	300.00
Earnings Per Share (₹)	14.50	9.57	19.00

She has also gathered the following information relating to recent acquisitions of companies that are like Mani Ltd.

Particulars	Company P	Company Q	Company R
Market Price	92.45	357.50	224.00
Deal price	117.00	425.00	290.00

The expected EPS of Mani Ltd is ₹15. Calculate the expected Deal Price that should be offered for the acquisition.

Solution (ICMAI Standard):

The Average P/E can be calculated as:

Particulars	Company A	Company B	Company C	Average
Price Per share (₹)	240.00	150.00	300.00	
Earnings Per Share (₹)	14.50	9.57	19.00	
P/E	16.55	15.67	15.79	**16.0**

Accordingly, the Intrinsic value of Mani Ltd can be calculated based on P/E Multiple.

Intrinsic Price = Expected EPS × Average P/E Multiple of comparable companies

= ₹15 × 16 = **₹240.06**

The Average Acquisition Premium is calculated based on recent comparable transactions:

Particulars	Company P	Company Q	Company R	Average
Market Price (₹)	92.45	357.50	224.00	
Deal price (₹)	117.00	425.00	290.00	
Acquisition Premium	(117-92.45)/92.45 = 26.6%	18.9%	29.5%	**25.0%**

Deal price = Intrinsic Price × (1 + Acquisition Premium)

= ₹240.06 × (1+25%) = **₹300**

Illustration 2 (ICMAI Study Material): Yasmin – HBR Ltd (Comparable Transaction Method)

Yasmin has been assigned to evaluate the acquisition price of HBR Ltd. The information about HBR Ltd is given below.

Particulars	Amount
Price per share (₹)	11
Shares (₹ Million)	50
Debt (₹ Million)	500
Revenue LTM (₹ Million)	700
EBITDA (₹ Million)	125
EPS (₹)	0.9

Yasmin has assessed some recent comparable transactions:

Acquirer	Target	Equity	EV	EV / LTM Sales	EV / LTM EBITDA	Equity / LTM PE
A	P	200	500	1.0	9.0	17.0
B	Q	125	250	1.7	12.0	15.0
C	R	700	100	2.2	14.5	20.0
D	S	1200	1000	0.9	8.5	14.0
E	T	200	400	2.5	11.0	22.0

You are required to assess the acquisition price and its premium against the current market price using average values.

Solution (ICMAI Standard):

Step 1: Calculation of average multiples

Acquirer	Target	EV / LTM Sales	EV / LTM EBITDA	Equity / LTM PE
A	P	1.0	9.0	17.0
B	Q	1.7	12.0	15.0
C	R	2.2	14.5	20.0
D	S	0.9	8.5	14.0
E	T	2.5	11.0	22.0
Average		**1.7**	**11.0**	**17.6**

Step 2: Calculation of value per share:

Particulars	EBITDA Multiple	Sales Multiple	Earnings Multiple
Reported Value	125.0	700.0	0.9
Value multiplier	11.0	1.7	17.6
Enterprise Value	1,375.0	1,162.0	
Less: Debt	500.0	500.0	
Equity Value	**875.0**	**662.0**	
No. of shares	50	50	50
Value per share	**17.5**	**13.2**	**15.8**
Premium over Current Price	**59.1%**	**20.4%**	**44.0%**

9.1.3 Analysing Value of the Target to the Acquirer

The reason that any acquirer would be willing to pay a takeover price more than the target's market value is because it believes that the benefits (e.g., improved sales or reduced costs) it would derive from the merger exceed the premium paid for the target. All other factors remaining the same, synergies increase the acquirer's gain from the merger, while the takeover premium paid to target shareholders offsets any gains to the acquirer.

$$\textbf{Acquirer's gain} = \textbf{Synergies} - \textbf{Premium}$$
$$= S - (P_T - V_T)$$

S = Synergies created by the transaction; P_T = Price paid for the target or the Deal price; V_T = Pre-merger value of the target or the Pre-merger price of target

When evaluating a merger offer, the minimum bid that target shareholders would accept is the pre-merger market value of the target company, while the maximum amount that any acquirer would be willing to pay is the pre-merger value of the target plus the value of potential synergies. Thus, the bidding prices normally lie between these two amounts. This also implies that analysis of a merger not only depends on the assessment of pre-merger target value, but also assessments of estimated synergies.

Value of Acquirer (pre-merger)
Add: Value of Target (pre-merger)
Add: Synergy created by the merger
Less: Cash paid to target shareholders
Equals Value of Combined Entity (post-merger)

Acquirers usually prefer to include stock in the consideration paid to target shareholders because it effects the distribution of the risk and rewards of a merger between the acquirer and the target. The choice of payment method depends on estimated synergies and relative value of the acquirer's shares.

If the acquirer is confident about its estimates of the target's value, the more it would prefer to pay in cash and the more the target would prefer to receive stock. Based on various empirical studies, in the short term, merger transactions generally benefit target company shareholders. Since the acquirer's almost always tend to give a premium to the target and there is a dilution in the acquirer's existing shareholding due to issue of shares or pay-out of cash, acquirers' share price tends to go down on the announcement of a merger or an acquisition. Further, both the acquirer and the target tend to see higher stock returns under a cash acquisition as opposed to a stock acquisition.

Illustration 3 (ICMAI Study Material): Ace Ltd – Base Ltd Acquisition

Ace Ltd is considering the acquisition of Base Ltd. Ace's management estimates that the acquisition will create a synergy worth ₹110 million. The following information is provided.

Particulars	Ace Ltd	Base Ltd
Value of the Company (₹ Million)	1,920	525
Number of Shares (Million)	80	35
Value Per Share (₹)	24	15

The Management of Ace Ltd is evaluating three options for Base Ltd.

- Option 1: Cash Offer of ₹17 per share
- Option 2: Share Exchange ratio of 0.7 shares of Ace against each share of Base Ltd
- Option 3: Share Exchange ratio of 0.5 shares of Ace against each share of Base, plus ₹5 per share

You are required to evaluate the option that will best suit Ace Ltd and the one that will best suit Base Ltd.

Solution (ICMAI Standard):

Option 1

Being the Cash offer, the shareholders of Base Ltd will get cash compensation.

Consideration paid = Offer Price × Number of shares of Base Ltd

= ₹17 × 35 million = **₹595 million**

Acquisition Premium = (Deal Price – Premerger Price of Target) × Number of shares of Base

Or Consideration Paid – Pre-merger value of the Target

= (17 – 15) × 35 or ₹(595 – 525) million = **₹70 million**

Acquirer's Gain = Value of Synergy – Acquisition Premium paid

= 110 – 70 = **₹40 million**

Option 2

Being stock offer, the shareholders of Base Ltd will get the shares of Ace Ltd. Their compensation would be valued based on the post-merger value of Ace Ltd.

Share Exchange ratio of 0.7 shares of Ace against each share of Base Ltd

Number of shares to be issued = Share Exchange Ratio × Number of Shares of Base Ltd

= 0.7 × 35 million = **24.5 million**

Value of Combined Entity = Pre-Merger Value of Acquirer + Pre-Merger Value of Target + Expected synergies from transaction + Cash Paid

= 1920 + 525 + 110 – 0 = **₹2,555 million**

Total Number of shares of the Combined Entity = Pre-merger shares of Acquirer + Number of shares issued as part of transaction

= 80 + 24.5 = **104.5 million**

Post-Merger Value per share = Value of Combined Entity / Number of shares of combined entity

= ₹2,555 million / 104.5 million = **₹24.4 per share**

Total Value paid to Target (Base Ltd) = Number of shares issued × Post Merger value per share

= 24.5 million × ₹24.4 per share = **₹599 million**

Acquisition Premium = Value paid to Target – Pre-Merger Value of Target

= ₹599 million – ₹525 million = **₹74 million**

Acquirer's Gain = Total Expected Synergy – Acquisition Premium paid to Target

= ₹110 million – ₹74 million = **₹36 million**

Option 3

In this option, the Acquirer is paying both Cash and shares of its own company to the shareholders of the Target Company.

Total Cash consideration Paid = Cash offer per share × Number of Shares of Target

= ₹5 per share × 35 million shares = **₹175 million**

Shares issued by Acquirer (Ace) = Share Exchange Ratio × Number of shares of Base

= 0.5 × 35 = **17.5 million shares**

Pre-Merger Value of Acquirer	₹1,920.0
Pre-Merger Value of Target	₹525.0
Expected synergies from transaction	₹110.0
Cash Paid	₹175.0
Post-Merger Value of Combined Entity (₹ Mn)	**₹2,380.0**

Number of shares of combined entity = Pre-merger shares of Ace + Number of shares issued

= 80 + 17.5 = **97.5 million shares**

Post-Merger Value per share of combined entity = 2380 / 97.5 = **₹24.4 per share**

Value Paid to the Target = Cash paid + Value of Shares paid

= ₹175 million + ₹24.4 per share × 17.5 million shares

= **₹602.2 million**

Acquisition Premium = Value Paid – Pre-merger value of Target

= ₹602.2 million – ₹525 million = **₹77.2 million**

Acquirer's Gain = Total Synergy – Acquisition Premium

= 110 – 77.2 = **₹32.8 million**

Summary of Three Options

Option	Acquisition Premium	Acquirer's Gain	Preference
Option 1 – Cash	70.0	40.0	Acquirer's Preference
Option 2 – Stock	74.0	36.0	
Option 3 - Mix	77.2	32.8	Target's Preference

9.1.4 Accretion / Dilution Analysis

Accretion (Dilution) analysis measures the effects of a transaction on a potential acquirer's earnings assuming a given financing structure. As part of this analysis, we compare the acquirer's post-merger earnings per share (EPS) for the transaction with its pre-merger EPS on a stand-alone basis. If the combined EPS is lower than the acquirer standalone EPS the transaction is set to be dilutive, conversely if the EPS is higher, the transaction is said to be accretive. A Rule of thumb for 100% stock transactions is that when an acquirer purchases a target with a lower P/E, the acquisition is accretive. When a company pays a lower multiple for the target's earnings than the multiple at which its own earnings trade the transaction is de-facto accretive conversely transactions where an acquired purchases higher P/E target are dilutive. Acquirers usually target accretive transactions as they create value for their shareholders.

Illustration 4 (ICMAI Study Material): Acquirer Ltd – Target Ltd (Accretion/Dilution)

Acquirer Ltd is proposing to acquire Target Ltd.

Particulars	Amount
Expected Post Merger Combined Profit of Acquirer	₹2000
Pre-merger Profit of Acquirer	₹1200
Standalone number of shares of Acquirer	₹200
New shares to be issued in transaction	₹50
Tax Rate	25%

Calculate: 1. Combined EPS; 2. Accretion / (Dilution) in ₹ and in Percentage

Solution (ICMAI Standard):

1. Calculation of Combined EPS

Combined Profit	₹2,000
Combined Number of Shares (200 + 50)	₹250
Combined Post Merger EPS (Profit / No. of Shares)	**₹8**

2. Calculation of Accretion / Dilution

Standalone Pre-merger EPS (1200 / 200)	₹6.00
Accretion / (Dilution) [8 – 6]	₹2.00
Accretion Percentage [2 / 6]	**33.3%**

9.1.5 Earnings Multiples

The multiples based valuation is an application of the market approach of valuation. The market approach is based on the principle of substitution which states that "one will pay no more for an item than the cost of acquiring an equally desirable substitute." Thus, with the market approach value is determined based on prices that have been paid for similar items in the relevant marketplace. Expert judgement is needed for interpretation of what companies are similar and what markets are relevant. The market approach relevant to valuation for mergers and acquisitions includes two primary methods, (a) the M&A transaction and (b) the guideline public company. They result from different kinds of transactions and yield different types of value.

Transaction Multiples Method

The transaction method looks at the prices paid typically by public companies to acquire a controlling interest in a business. The buyers in these transactions are publicly traded companies because closely held businesses usually do not reveal financial information when they make acquisitions. These transactions are often strategic where the buyer is usually acquiring a company in the same or similar industry in which it currently operates to achieve various synergies or other integrative benefits. Thus, the price paid most reflects investment value to that specific buyer rather than fair value which assumes a financial buyer.

Guideline Publicly Traded Multiples

It should be clearly understood that the transaction multiples are very different from the market multiples that are available from the stock markets. Stock market multiples represent the volume from minority shareholders perspective. Whereas the transaction multiples represent transactions from controlling perspective.

Price – Earnings Multiple

The valuation here is based on the following relationship:

$$\text{Price per share} = \text{EPS} \times \text{P/E Ratio}$$

Earnings per Share (EPS) is projected for the company being valued. In the case of unlisted companies, Price to Earnings Ratio (P/E Ratio) of the peer group is considered. Peer group would be other listed companies from the same sector of a similar size.

Where more than one such company exists in the peer group, then a weighted average is used. Suitable adjustments are made to the ratio to reflect specific areas where the company is different from the peer group.

Example 1: If the company's EPS is projected to be ₹6, and peer group P/E Ratio is 12 times, then the shares of the company will be valued at ₹6 × 12 i.e. ₹72 per share. If the company has issued 10 Million shares, then the valuation of the company would be ₹72 × 10 Million i.e., ₹720 Million.

EV-EBITDA Multiple

Earnings are affected by factors such as:

- Financing mix of debt and equity
- Accounting policies regarding depreciation and amortisation
- Tax planning

These factors are not so closely linked to the actual operations of the company. An alternate approach to valuation uses Earnings before Interest, Depreciation, Tax and Amortisation (EBIDTA). It is based on the following relationship:

Value of the company = EBIDTA × EV-EBIDTA Multiple

EBIDTA is projected for the company being valued. As with P/E Ratio, EBIDTA multiple for the peer group can be used, when the company is not listed.

Example 2: If the company's EBIDTA is projected at ₹50 Million, and the peer group EBIDTA multiple is 20 times, then the company will be valued at ₹50 Million × 20 i.e. ₹1,000 Million.

Enterprise Value

This is calculated as the market value of equity and debt of the company, less cash/ bank and the value of investments in the company's portfolio.

If a company's shares are valued at ₹50 per share, and it has issued 10 Million shares, then the market value of the company's shares (also referred to as 'market capitalisation') would be ₹50 × 10 Million i.e. ₹500 Million.

Example 3: The market value of the debt that the company has taken is ₹10 Million, and the company has an investment portfolio worth ₹5 Million. The company also has ₹2 Million in the form of cash.

Enterprise Value can be calculated as ₹500 + ₹10 – ₹5 – ₹2 i.e., **₹503 mn**.

Price to Book Value

The valuation is based on the following relationship:

Price per share = Book Value per share x Price to Book Value Ratio

The book value per share of the company is considered. Price to Book Value Ratio of the peer group is used for unlisted companies.

Example 4: If the book value per share of the company is ₹22, and Price to Book Value ratio of the peer group is 1.5, then each share of the company is valued at ₹22 × 1.5 i.e., **₹33**.

Price to Sales Multiple

This method links valuation to the sales turnover of the company. The relationship used is as follows:

Value = Sales Turnover × Price / Sales Multiple

Example 5: The sales turnover of a company is ₹150 million. The peer group sales turnover is ₹600 million, and peer group market capitalisation is ₹1,800 million. The peer group sales multiple is thus ₹1,800 million / ₹600 million i.e., 3 times. Accordingly, the company will be valued at ₹150 million × 3 i.e., **₹450 million**.

Choosing the Right Comparable Companies

To use earnings multiples properly, we must assess the accounting statements to make sure we are comparing companies on an apples-to-apples basis.

Illustration 5 (ICMAI Study Material): Co. A, Co. B, Co. C – P/E and EV/EBIT

The below information is given about 3 companies.

Particulars	Co. A	Co. B	Co. C
Debt	1,00,000	50,000	-
Equity (Opening Balance)	1,00,000	1,50,000	2,00,000
Enterprise Value	2,00,000	2,00,000	2,00,000
EBIT	30,000	30,000	30,000

Applicable Interest Rate is 9%; Applicable Tax Rate is 25%. Co. A trades at a lower P/E Multiple than its peers Co. B and Co. C. The management of Co. A believes that the lower P/E of the company is not justified. The management team believes the market just doesn't understand its strategy or performance. Assuming book values are representative of Market Values, calculate the P/E and EV/EBIT of each company and assess whether the management is right in their thought process.

Solution (ICMAI Standard):

Particulars	Co. A	Co. B	Co. C
EBIT	30,000	30,000	30,000
Interest	9,000	4,500	-
PBT	21,000	25,500	30,000
Tax @ 25%	5,250	6,375	7,500
PAT	15,750	19,125	22,500
Opening Equity	1,00,000	1,50,000	2,00,000
Add: PAT during the year	15,750	19,125	22,500
CY Equity	**1,15,750**	**1,69,125**	**2,22,500**
P/E [MV of Equity / PAT]	**7.3**	**8.8**	**9.9**
Enterprise Value	2,15,750	2,19,125	2,22,500
EV / EBIT	**7.2**	**7.3**	**7.4**

The management's belief that the markets doesn't understand the reason for lower P/E of Co. A is incorrect. The EV/EBITDA multiple of Co. A is in line with the peers. The reason for the difference is that Co. A has much more debt relative to equity than the other companies. Possibly, if Co. A has the same level of D/E Ratio, the P/E would be higher and in line with peers. Except for very high growth companies, a company with higher debt relative to peers has a lower P/E ratio because more debt translates to higher risk for shareholders and a higher cost of equity. Therefore, each rupee of earnings (and cash flow to shareholders) is worth less to an investor.

Since Price-to-earnings ratio mixes capital structure and nonoperating items with expectations of operating performance, a comparison of P/Es is a less reliable guide to companies' relative value than a comparison of enterprise value (EV) to EBIT.

The Following Principles may Help in Choosing the Right Companies to Compare:

- a) Use the right multiple, usually net enterprise value to EBITA or net enterprise value to NOPLAT. Although the P/E is widely used, it is distorted by capital structure and nonoperating gains and losses.
- b) Use forward estimates of earnings: Multiples using forward earnings estimates typically have much lower variation across peers, leading to a narrower range of uncertainty of value. They also embed future expectations better than multiples based on historical data.
- c) Adjust the multiple for non-operating items: Non-operating items embedded in reported EBITA, as well as balance sheet items like excess cash and pension items, can lead to large distortions of multiples.
- d) Use the right peer group, not a broad industry average: A good peer group must not only operate in the same industry, but also have similar prospects for ROIC and growth
- e) Value multi-business companies as a sum of their parts: Even companies that appear to be in a single industry will often compete in subindustries or product areas with widely varying return on invested capital (ROIC) and growth, leading to substantial variations in multiples.

9.1.6 Discounted Abnormal Earnings or Cash Flows

Valuers must check for operating and normal financial statements while performing financial due diligence and normalise the financial statements before arriving at the valuation. These adjustments are required for both the Target and Acquiring company in case of Stock based mergers and acquisition. Adjustments to a target's financial statements, commonly referred to as normalization adjustments convert the reported accounting information to amounts that show the true economic performance, financial position and cash flow after company.

Differences between amounts shown on the financial statement and the market values most commonly result from one or more of these causes:

- Non-operating income and expenses that are non recurring in nature and may not flow through in future periods. Thus, these should be removed from the Profit & Loss Statement while evaluating value.

- Discretionary expenses to minimise taxes including excess compensation, perquisites, rent or above market payments made to owners or other related parties.
- Adjustment required to change the basis of accounting, including conversion from cash to accrual or from one inventory or depreciation method to another.
- Differences between the market value of assets and the amounts at which they are carried on the companies books.

For smaller companies these normalization adjustments may have a greater impact than for midsize or larger companies. Adjustments can be made to both the profit and loss statement and the balance sheet or one can be adjusted without a corresponding change to the other. For example, nonrecurring gain or loss can be removed from the Profit & Loss Statement without any required adjustment to the balance sheet.

Valuers should assess whether the controlling shareholders of the target company have made discretionary adjustments that might impact the controlling shareholders more. These may include the compensation paid to the promoters, properties of the promoters rented by the firm loans taken from or given to the related parties at rates of interest which are not in line with the market rate of interest.

In case of the balance sheet, the most important adjustments are the ones which require changing the book value of the assets to their market values. Often the contingent liabilities may not be recorded in the balance sheet whereas there may be reasonable possibility of those accruing to the firm. In such cases, the contingent liabilities must also be identified into the balance sheet as liabilities. It is common for companies to not record internally generated intangible such as brand value in the balance sheet. The acquirer must recognise the brand value of the acquired intangibles while preparing the financial statements of the target company.

Valuing the Assets

When the financial statements are prepared using the historical cost accounting a few notes may be relevant.

- **Tangible assets:** It is always wise to have lands and buildings revalued. Items such as plant and machinery, motor vehicles furniture and fixtures that are shown at their book values rather than current cost may require to be revalued. Depreciation rates employed during the period of review must also be reviewed to ensure that the PP&E produce either a value in use for operating assets or the value in exchange if the assets are surplus to the requirements.
- **Investments:** Listed shares and securities should be valued at their market price for the year but unlisted shares must be subject of a secondary valuation using methods similar to those in the main valuation. It is also important to distinguish between investments that are necessary for earnings capacity of the business such as trade investments and investment in subsidiaries, which are long term holdings and those investments that are really spare cash items.
- **Current assets:** If inventory and debtor turnover ratios are rapid there balance sheet values may be taken without extensive revision. However some adjustment to current cost may become apparent when the trading results are reviewed, relating to historical cost methods of stock valuation and provision for bad debts.
- **Intangible assets:** Intangible assets may or may not be recognised in the financial statements. As per accounting regulations internally generated intangible such as brands and trademarks may not be recognised in the financial statements of the target company. However accounting regulations do allow the acquirer to recognise the identifiable intangible assets while preparing the combined financial statements after the acquisition. These intangible assets certainly form the part of the negotiation while fixing the acquisition price for the target. Usually valuers are appointed to identify the intangible assets which may not be recorded in the financial statements of the target company or even to re-evaluate the value of the intangibles that are already recorded in the financial statements.

9.1.7 Acquisitions by Private Equity and Venture Capitalists

Acquisitions are often classified into two types:

1. a) Strategic Acquisitions and
2. b) Financial Acquisitions.

Strategic acquisitions are those where an acquirer intends to run the company themselves. There are significant changes in the way the company operates. The acquirer aims at deriving operational synergies through management integration, product changes, operational changes and more. The target company sees this as an interference in their operations.

Financial Acquisitions are often done by Private Equities, Venture Capitalists and portfolio companies who acquire a company purely for their value and normally do not make significant operational changes. Target companies who have high potential but are short of funds normally welcome such acquisitions.

The best private-equity firms don't just recapitalize companies with debt; they improve the companies' performance through improved governance. A McKinsey study of 60 successful investments by 11 leading private-equity firms found that in almost two-thirds of the transactions, the primary source of new value was improvement in the operating performance of the company, relative to peers, through fruitful interaction between the owners and the management team. The use of financial leverage and

clever timing of investments, often cited as private-equity firms' most important sources of success, were not as important as improved governance. Private-equity firms don't have the time or skills to run their portfolio companies from day to day, but the higher-performing private-equity firms do govern these companies very differently from the way exchange-listed companies are governed. This is a key source of their outperformance. Typically, the private-equity firms introduce a stronger performance culture and make quick management changes when necessary. They encourage managers to abandon any sacred cows, and they give managers leeway to focus on a longer horizon, say five years, rather than the typical one-year horizon for a listed company. Private-equity firms spend most of their time on strategy and performance management, rather than compliance and risk avoidance.

Multiple Choice Questions – 9.1

1. In the context of mergers and acquisitions, what is meant by vertical integration?

A. The company absorbs all its competitors and becomes the sole provider B. The company expands its operations into different stages of production and distribution in the same industry C. The company relies solely on internal production and does not outsource any of its processes D. The company merges or acquires businesses in unrelated industries to spread its risk.

Answer: B. The company expands its operations into different stages of production and distribution in the same industry

2. What type of merger took place between Vodafone India and Idea Cellular?

A. Horizontal merger B. Vertical merger C. Conglomerate merger D. Vortex merger.

Answer: A. Horizontal merger

3. Which of the following is a motive for businesses to take part in mergers and acquisitions?

A. Increasing costs B. Decreasing productivity C. Decreasing market power D. Growth.

Answer: D. Growth.

4. In the context of business valuations, what is synergy?

A. An increase in investment risk B. Excess value derived from the combination of two companies C. Decrease in production costs D. Increase in the market price of a share.

Answer: B. Excess value derived from the combination of two companies

5. If an ice cream manufacturer acquires a dairy farm for access to better milk supplies, this is an example of what kind of integration?

A. Horizontal integration B. Vertical integration C. Backward integration D. Forward integration.

Answer: C. Backward integration

6. What is the formula for calculating Enterprise Value?

A. Market Value of Equity + Debt + Minority Interest + Preference Capital - Cash B. Market Value of Equity - Debt - Preference Capital + Cash C. Market Value of Equity + Debt - Minority Interest + Preference Capital - Cash D. Market Value of Equity + Debt + Preference Capital + Cash

Answer: A. Market Value of Equity + Debt + Minority Interest + Preference Capital - Cash

7. What is the missing item in this formula? Return on Equity (ROE) = _____ × Equity multiplier

A. Asset turnover B. Financial leverage C. Return on Assets D. Net profit margin

Answer: C. Return on Assets

9.2 Acquisition Outcome

The performance record of acquisitions is mixed at best. Research undertaken from a strategic management perspective has sought to establish how well acquisitions have performed from the viewpoint of the acquiring firm. A study by McKinsey & Company reveals that 43 per cent of international acquisitions fail to produce a financial return that meets or exceeds the acquirer's cost of capital; put another way 43 per cent destroy shareholder value for the acquiring firm (Bleeke and Ernst 1993).

9.2.1 Other Potential Acquirers

Financial economists have investigated the impact of M&A on overall wealth generation. These researchers have typically relied on stock market measures of performance. Wealth generation is calculated from the change in the share prices of the bidder and target around the time of the acquisition announcement, appropriately adjusted for the expected change taking account of movements in the overall stock market. If one accepts market efficiency arguments, these 'abnormal returns' represent the market's accurate predictions of the changes in wealth that will result from the acquisition. The results of such studies reveal that, overall, acquisitions create negligible or only very small wealth gains. However, the distribution of any gain between the shareholders of the bidding and target companies is not even. For example, one in-depth study of 429 British acquisitions completed between 1980 and 1990 found that target companies gained approximately 30 per cent in value, while shareholders in bidding companies lost approximately 5 per cent. In order to calculate the total wealth gain, these share price movements must be weighted by the companies' starting point market capitalizations. This revealed that the acquisitions had produced overall wealth gains of only 2 per cent.

The shareholders of a company benefit from a deal if (and only if) the value of their shares increases. The increase may occur immediately, or it may be delayed. Normally the immediate response to the announcement of a merger or acquisition is usually a downward blip in the buyer's stock price but if the deal creates value then as its success is revealed the buyers stock price will appreciate at rate higher than its expected rate of return (the market's risk adjusted for the stock's beta). These cumulative abnormal returns or CAR will continue until the stock reaches a new equilibrium that reflects the value created by the deal. Thereafter, the stock will appreciate at its normal common risk adjusted rate of return subject to noise and new information.

9.2.2 Friendly Mergers

Generally, the acquirer approaches the target's management directly unless it has reason to believe that the target will not welcome the merger. If both companies are open to the idea, the companies enter into merger discussions. Key discussion points at this stage include the amount of consideration that target shareholders will receive, terms of the transaction, and post-merger management structure.

Prior to reaching a formal agreement, both parties conduct due diligence (financial due diligence, legal due diligence, etc.) where accounts and other financial records are examined to ensure the accuracy of representations made by either party during negotiations (e.g., the acquirer might want to confirm that the target's assets are actually worth the amount claimed by the target). Any issues that arise at this stage may have a direct bearing on the price and/or terms of the deal. The target may also conduct due diligence on the acquirer to ensure financial soundness and ability to meet merger payment terms.

Upon completion of due diligence and negotiations, the parties sign a definitive merger agreement, which is a contract that contains terms and conditions, warranties or representations, covenants, termination procedures and remedies, and other miscellaneous clauses.

Typically, merger discussions and negotiations are kept confidential until the definitive merger agreement has been signed. Once it has been signed, the transaction is announced to the public through a joint press release by both companies. Usually, shareholders' approval is required (for target shareholders to approve a stock transaction, or acquirer shareholders to approve the issuance of a substantial amount of shares to finance a stock offering) shareholders are provided with a proxy statement that contains all material facts. Once all required approvals have been obtained (from shareholders, regulatory bodies, etc.), legal advisors file documentation as specified by the regulator (Ministry of Corporate Affairs, SEBI – if any of the companies are listed) and then the transaction is deemed complete. Agreed-upon consideration is paid to target shareholders, and the companies are officially and legally combined.

9.2.3 Hostile Mergers

When the target's management or Board of Directors are not receptive to the idea of a merger, the acquirer may take the deal directly to the target's shareholders through a tender offer or a proxy fight.

In a tender offer:

- The acquirer invites target shareholders individually to submit their shares for a payment.
- The payment can be in the form of cash, shares of the acquirer, other securities, or a combination of cash and securities.

In a proxy fight:

- The acquirer approaches target shareholders to vote for an acquirer-nominated board of directors which, if elected, is then able to replace the target's management, and turn the transaction into a friendly merger.
- Proxy solicitation is approved by regulators and then proxies are mailed directly to target shareholders.

9.2.4 Takeovers

When faced with a hostile tender (takeover) offer, the target's board of directors can:

1. (i) sell the company, either to the bidder or a third party or
2. (ii) try to remain independent.

The determination of the target to resist overtures from the acquirer depends on:

1. (i) the strength of the company's takeover defences,
2. (ii) management's resolve to remain independent, and
3. (iii) the premium above the target's market price offered by the acquirer.

The target may use defensive measures to delay, negotiate a better deal for its shareholders, or try to keep the company independent. Takeover defences can be classified as pre-offer defences and post-offer defences.

- **Poison pills** grant a company the right to issue stock options to existing shareholders enabling them to purchase additional shares of stock at significantly discounted prices. They effectively make it very expensive for the acquirer to take over the target without approval of the target's board of directors.

There are two types of poison pills:

1. (i) A "flip-in" allows existing shareholders (except the acquirer) to buy more shares of the target at a discount.
2. (ii) A "flip-over" allows stockholders to buy the acquirer's shares at a discounted price after the merger.

- **Poison puts** give target company bondholders the right to sell their bonds back to the target at a pre-specified redemption price (typically par value or above) in the event of a takeover. This means that if the acquirer takes over the target, it would need to raise a substantial amount of cash to refinance the target's debt.
- **Share repurchase:** The target may repurchase its shares from shareholders. This can increase the cost of a takeover for the acquirer by increasing the stock's price, or by causing the acquirer to increase its bid to remain competitive with the target's offer for its own shares. If financed by issuing debt, share repurchases can increase the target's leverage ("leveraged recapitalisation"), which makes it less attractive as a takeover target.
- **"Crown jewel" defence:** The target sells off a valuable asset or a division to make the firm less attractive to the would-be acquirer. However, if the sale is initiated after a hostile bid, there is a chance that courts would deem the sale illegal.
- **White knight defence:** The target encourages a third firm (that is more acceptable to target company management) to acquire the target company. The entrance of a white knight may ignite a bidding war for the target, which may result in improved terms being offered to target shareholders. It may also result in the eventual acquirer suffering a winner's curse (overpaying for the company).

9.2.5 Target Management Entrenchment

Managerial entrenchment can be defined as an action, such as investing corporate funds, that is made by a manager in order to boost his or her perceived value as an employee, rather than to benefit the company financially or otherwise.

Managers may sometimes hold little equity and shareholders are too dispersed to take action against non-value maximization behaviour. So it is possible that the acquirer will lay off the target's management after acquisition. Giving ownership to a manager within a company may translate into greater voting power which makes the manager's workplace more secure. Hence, they gain protection against takeover threats and the current managerial market.

Examples of entrenchment strategies

There are a variety of entrenchment practices that managers may employ.

- **Poison pills** – as discussed above, a poison pill gives current shareholders the right to purchase additional shares of the company at extremely attractive prices which causes dilution and effectively increases the cost to the potential acquirer.
- **Restricted Voting rights** – it is common to issue shares of differential voting rights so that control can be retained with some key promoters even if the shares are transferred. In some cases, equity ownership above a certain threshold (e.g. 15%) triggers a loss of voting rights and required board approval. This forces the bidder to negotiate with the board directly.
- **Golden parachutes** are compensation arrangements between the target and its senior management where the managers get lucrative cash payouts if they leave the target company after a merger. These contracts given to key executives and can be used as a type of anti-takeover measure taken by a firm to discourage an unwanted takeover attempt.

9.2.6 Anti-trust and Security Issues

Historically, regulators used market share as a measure of market power to determine whether there were antitrust violations among competitors in an industry. This was done using a simple measure of industry concentration along with market share information. Companies contemplating a merger could determine in advance whether they would be in violation if they were to merge. The approach is transparent and predictable but is deemed too simplistic and rigid.

The Herfindahl-Hirschman Index (HHI) is considered to be a better measure of assessing market concentration. The HHI measure sums the squares of each company's market share (based on sales) in the industry. Not only is it easy to calculate and interpret, but the HHI is also more effective at modelling market concentration.

$$\text{HHI} = \Sigma\ [(\text{Sales of firm i} / \text{Total Sales of the market}) \times 100]^2$$

Students should recall that Sales of the firm / Total Sales = market share. HHIs are calculated based on post-merger market shares.

- An HHI of less than 1,000 suggests that the market is not concentrated.
- An HHI between 1,000 and 1,800 suggests that the market is moderately concentrated.
- An HHI above 1,800 suggests that the market is highly concentrated.

In India, Competition Commission of India regulates the industry concentration to protect consumers' interests.

Illustration 6 (ICMAI Study Material): HHI Calculation – Industry Concentration

The following is the list of key players in an industry along with their market shares.

Companies	A Ltd	B Ltd	C Ltd	D Ltd	E Ltd	F Ltd	G Ltd	H Ltd	Total
Mkt Share	25.0%	20.0%	15.0%	10.0%	10.0%	5.0%	7.5%	7.5%	100.0%

- What would be the HHI for the industry?
- What would be the HHI for the industry of C Ltd and D Ltd merge together? Assuming that the Government will trigger anti-trust issues if the change in HHI is over 100, would there likely be an anti-trust issue?

Solution (ICMAI Standard):

The HHI can be calculated as follows:

Companies	A Ltd	B Ltd	C Ltd	D Ltd	E Ltd	F Ltd	G Ltd	H Ltd	HHI
Mkt Share	25%	20%	15%	10%	10%	7.5%	7.5%	5%	
Squared Mkt Share	625	400	225	100	100	56.25	56.25	25	**1587.5**

Considering the score is between 1000 and 1800, the industry is moderately concentrated.

The HHI can be calculated after the merger of C and D would be as follows:

Companies	A	B	C + D	E	F	G Ltd	H Ltd	HHI
Mkt Share	25%	20%	25%	10%	7.5%	7.5%	5%	
Squared Mkt Share	625	400	625	100	56.25	56.25	25	**1887.5**

Considering the score is exceeding 1800, the industry is likely to be highly concentrated. Also, since the change in HHI is over 100, the regulator may challenge / investigate the merger.

9.2.7 Post Transactions Value incorporating effect of intended synergies

Analysis of M&A Transactions involves identification of economic gains from the transaction. If the combined entity is more than the sum of its parts, the transaction is said to have created synergies. The difference between the combined value and the sum of the parts of individual companies is usually attributed to synergy.

$$\text{Combined Value} = \text{Value of Acquirer} + \text{Standalone value of the target} + \text{Synergy}$$

Since in many cases, the acquirer ends up paying a premium over the standalone fair value of the company, the synergy may not occur unless the premium paid is recovered. Further, there are costs of integration as well. Therefore:

> **Net Gain = Value of synergy - premium paid – Cost of integration**

While assessing synergies, operating improvements are a big source of value creation. Better post-merger integration could lead to abnormal returns even when the acquired company is in unrelated business. Managerial talent is an important instrument in creating value by cutting down costs, improving revenues and improving margins. Many executive compensation is tied to the performance in the post-merger. Providing equity stake in the company induces executives to think and behave like shareholders.

Illustration 7 (ICMAI Study Material): Combined Entity Value and Net Gain

Value of target Co. is ₹500 Million. Value of the acquiring Co. is ₹800 Million. Present value of cost savings if the two companies are merged together is ₹100 million. Acquiring company expects the cost of integration as ₹80 million and the shareholders of Target Co. are expecting a deal premium to be paid of 15 percent over their company's value.

What is the value of Combined entity? Does the merger result in a net gain for the combined entity?

Solution (ICMAI Standard):

Premium Paid = 500 × 0.15 = ₹75 million

Synergy = ₹100 million

Combined Value = Value of Target Co. + Value of Acquiring Co. + Synergy

= 500 + 800 + 100 = **₹1400 million**

Net Gain / Loss = Synergy – Premium Paid – Cost of Integration

= 100 – 75 – 80 = **Loss of ₹55 million**

9.2.8 Valuing Control

The safest way to value a target firm is in steps starting with the status quo valuation of the firm and following up with a value for control. We start our valuation of the target firm by estimating the firm value with existing investment, financing and dividend policies. This valuation, which we term the status quo valuation provides a base from which we can estimate control and synergy premiums.

Many hostile takeovers are justified based on the existence of a market for corporate control. Investors and firms are willing to pay large premiums over the market price to control the management of firms, especially those that they perceive to be poorly run. This section explores the determinants of the value of corporate control and attempts to value it in the context of an acquisition in general the value of control will be much higher for a poorly managed firm that operates at below-optimum capacity than for a well-managed firm. The value of controlling a firm comes from changes made to existing management policy that can increase the firm value. Assets can be acquired or liquidated the financing mix can be changed the dividend policy re-evaluated and the firm restructured to maximise value. The value of the control can be written as:

> **Value of Control = Value of the firm (optimally managed) – Value of the firm (with current management)**

9.2.9 Valuing Synergy

As discussed earlier, synergies may be obtained in various forms in case of mergers and acquisitions. However, some experts believe that synergy may not be valued. One school of thought argues that synergy is too nebulous to be valued and that any systematic attempt to do so requires so many assumptions that it is pointless. If this is true a firm should not be willing to pay large premiums for synergy if it cannot attach a value to get.

As valuers we maintain that synergy can be valued.

Assessment of synergies requires assessment of various questions.

- What form is the synergy expected to take?
- Will it reduce cost as a percentage of sales and increase profit margins?
- Will it increase future growth or length of the growth period?
- When will the synergies start affecting the cash flows post acquisition?

To influence value, synergy has to influence one of the 4 inputs to the valuation process - cash flows from existing assets, higher expected growth rates, a longer growth period or a lower cost of capital. Since value of synergies is the present value of the cash flows created by it, longer it takes for it to show up, the lesser its value. The value of synergy can be estimated similarly as we have assessed the value of control.

- **Step 1:** Value the firms involved in the merger independently by discounting expected cash flows to each firm at the weighted average cost of capital for that firm
- **Step 2:** Estimate the value of the combined firm with no synergy by adding the values obtained for each firm in the first step.
- **Step 3:** Build in the effects of synergy into expected growth rates and cash flows and value the combined firm with synergy.
- **Step 4:** The difference between the value of the combined firm with synergy and the value of the combined firm without synergy provides a value for synergy.

9.2.10 Exit Strategies

Exit strategies involve Mergers and Acquisitions, IPOs, selling stakes to investors, family succession among others.

- **M&A deals:** A merger or acquisition is a strong exit plan option for any company with their business for sale. This is one of the strongest exit strategies for business owners, as they can maintain control over price negotiations and set their own terms. However, M&A processes can be time-consuming and costly, and even fail.
- **Selling the stake to an investor:** Shareholders can sell their stake to their partners or investors so that the business can run even if the shareholders exit the business. The term 'friendly buyer' is often used in this type of exit strategy, as it's likely that you would sell your stake to someone known and trusted. The company can continue to run with minimal disruption to business as usual, keeping revenue streams steady. It's possible that the potential buyer already has a vested interest in the business and is committed to its success in the long term. However, finding a buyer or investor for the company can be difficult. Also, getting the right is difficult. Very often, businesses fail after M&As.
- **Acquihires:** Acquihires is a business exit strategy where a company is bought solely to acquire its talent. This type of acquisition can be very beneficial to skilled employees as they will be well looked after once the business itself is sold.
- **Management and employee buyouts:** In management buyouts, those already working within the business are able to transition into more senior roles to fill the gap in leadership. As the management team is already familiar with your business, they should be well equipped to manage the company.

9.2.11 Tax Implications

Tax implications are some of the most common and influential factors affecting mergers and acquisitions. In fact, Tax is often the primary reason for mergers and acquisitions. If the M&A transaction is structured properly, an organization can save a lot of money through tax benefits.

The Income Tax Act of 1961 includes various provisions that talk about dealing with taxation in different ways of structuring. M&A transactions are carried in various ways.

Definitions

Amalgamation: "Amalgamation", in relation to companies, means the merger of one or more companies with another company or the merger of two or more companies to form one company (the company or companies which so merge being referred to as the amalgamating company or companies and the company with which they merge or which is formed as a result of the merger, as the amalgamated company) in such a manner that—

1. a) all the property and liabilities of the amalgamating company or companies immediately before the amalgamation becomes the property and liabilities of the amalgamated company by virtue of the amalgamation;
2. b) shareholders holding not less than three-fourths in value of the shares in the amalgamating company or companies (other than shares already held therein immediately before the amalgamation by, or by a nominee for, the amalgamated company or its subsidiary) become shareholders of the amalgamated company by virtue of the amalgamation, otherwise than as a result of the acquisition of the property of one company by another company pursuant to the purchase of such property by the other company or as a result of the distribution of such property to the other company after the winding up of the first-mentioned company;

Demerger: "Demerger", in relation to companies, means the transfer, pursuant to a scheme of arrangement under the Companies Act, by a demerged company of its one or more undertakings to any resulting company in such a manner that—

1. a) all the property and liabilities of the undertaking, being transferred by the demerged company, immediately before the demerger, becomes the property and liabilities of the resulting company by virtue of the demerger;
2. b) the property and the liabilities of the undertaking or undertakings being transferred by the demerged company are transferred at values appearing in its books of account immediately before the demerger (except in case where the values

are recorded at different values as per Ind AS).

3. c) the resulting company issues, in consideration of the demerger, its shares to the shareholders of the demerged company on a proportionate basis except where the resulting company itself is a shareholder of the demerged company;
4. d) the shareholders holding not less than three-fourths in value of the shares in the demerged company (other than shares already held therein immediately before the demerger, or by a nominee for, the resulting company or, its subsidiary) become shareholders of the resulting company or companies by virtue of the demerger, otherwise than as a result of the acquisition of the property or assets of the demerged company or any undertaking thereof by the resulting company;
5. e) the transfer of the undertaking is on a going concern basis;
6. f) the demerger is in accordance with the conditions, if any, notified under sub-section (5) of section 72A by the Central Government in this behalf.

Slump Sale: "Slump sale" means the transfer of one or more undertaking, by any means, for a lump sum consideration without values being assigned to the individual assets and liabilities in such sales.

Tax Exemption in case of Merger / Amalgamation

The Income Tax Act, 1961 doesn't define the term merger but only defines an "amalgamation" as defined under Section 2(1B) as "the merger of one or more companies with another company, or the merger of two or more companies to incorporate a new company."

For the provisions of the act, the company which is being merged is called the 'amalgamating company' and the company into which it merges or the resulting company as the outcome of the merger is called the 'amalgamated company'. The company which has been merged ceases its corporate identity from the day the amalgamation is effective. A merger requires approval of the National Company Law Tribunal (NCLT) and it is typically processed through an arrangement as specified under Section 230 to 232 of the Companies Act, 2013.

The Income Tax Act, 1961 provides that:

- in an amalgamation all the assets and liabilities of the amalgamating company immediately preceding the amalgamation must become the assets and liabilities of the amalgamated company as an outcome of the amalgamation.
- At least 3/4th of the shareholders in the amalgamating company shall become shareholders of the amalgamated company as an outcome of the amalgamation.

Hence, only when a merger transaction follows the above mentioned two conditions, it can be termed as an amalgamation for the purposes of The Income Tax Act.

Section 47 (Capital Gains – transactions not regarded as transfer) of the Income Tax Act specifically exempts the following from Capital Gains:

47(iv) any transfer of a capital asset by a company to its subsidiary company, if—

- a) the parent company or its nominees hold the whole of the share capital of the subsidiary company, and
- b) the subsidiary company is an Indian company;

47(v) any transfer of a capital asset by a subsidiary company to the holding company, if—

- a) the whole of the share capital of the subsidiary company is held by the holding company, and
- b) the holding company is an Indian company:

47(vi) any transfer, in a scheme of amalgamation, of a capital asset by the amalgamating company to the amalgamated company if the amalgamated company is an Indian company;

47(via) any transfer, in a scheme of amalgamation, of a capital asset being a share or shares held in an Indian company, by the amalgamating foreign company to the amalgamated foreign company, if—

- a) at least 25 percent of the shareholders of the amalgamating foreign company continue to remain shareholders of the amalgamated foreign company, and
- b) such transfer does not attract tax on capital gains in the country, in which the amalgamating company is incorporated;

47(viaa) any transfer, in a scheme of amalgamation of a banking company with a banking institution sanctioned and brought into force by the Central Government under section 45 (7) of the Banking Regulation Act, 1949 (10 of 1949), of a capital asset by the banking company to the banking institution.

47(viab) any transfer, in a scheme of amalgamation, of a capital asset, being a share of a foreign company, referred to in section 9 (1)(i) explanation 5, which derives, directly or indirectly, its value substantially from the share or shares of an Indian company, held by the amalgamating foreign company to the amalgamated foreign company, if—

- (A) at least 25 percent of the shareholders of the amalgamating foreign company continue to remain shareholders of the amalgamated foreign company; and
- (B) such transfer does not attract tax on capital gains in the country in which the amalgamating company is incorporated;

47(vib) any transfer, in a demerger, of a capital asset by the demerged company to the resulting company, if the resulting company is an Indian company;

47(vic) any transfer in a demerger, of a capital asset, being a share or shares held in an Indian company, by the demerged foreign company to the resulting foreign company, if—

- a) the shareholders holding not less than three-fourths in value of the shares of the demerged foreign company continue to remain shareholders of the resulting foreign company; and
- b) such transfer does not attract tax on capital gains in the country, in which the demerged foreign company is incorporated:

47(vicc) any transfer in a demerger, of a capital asset, being a share of a foreign company, referred to in section 9 (1)(i) explanation 5, which derives, directly or indirectly, its value substantially from the share or shares of an Indian company, held by the demerged foreign company to the resulting foreign company, if—

- a) the shareholders, holding not less than three-fourths in value of the shares of the demerged foreign company, continue to remain shareholders of the resulting foreign company; and
- b) such transfer does not attract tax on capital gains in the country in which the demerged foreign company is incorporated:

47(vid) any transfer or issue of shares by the resulting company, in a scheme of demerger to the shareholders of the demerged company if the transfer or issue is made in consideration of demerger of the undertaking;

47(vii) any transfer by a shareholder, in a scheme of amalgamation, of a capital asset being a share or shares held by him in the amalgamating company, if—

- a) the transfer is made in consideration of the allotment to him of any share or shares in the amalgamated company except where the shareholder itself is the amalgamated company, and
- b) the amalgamated company is an Indian company;

In a situation of a tax neutral demerger, there shall be no capital gains tax on the demerging company on any transfer of capital assets to the resulting company (If an Indian company).

When there is a demerger of a foreign entity into a subsequent foreign entity where the capital assets are transferred, there shall be no tax implication on the capital gains in India if the following are complied with:

- A minimum of 75% of shareholders of the demerging foreign company remain shareholders of the resulting foreign company.
- The country in which the demerging foreign company is incorporated, the said demerger is not chargeable to capital gains tax.

Amortisation of Expenditure in case of Amalgamation or Demerger

Sec 35DD provides that where an assessee, being an Indian company, incurs any expenditure, wholly and exclusively for the purposes of amalgamation or demerger of an undertaking, the assessee shall be allowed a deduction of an amount equal to one-fifth of such expenditure for each of the five successive previous years beginning with the previous year in which the amalgamation or demerger takes place.

Set off and Carry Forward of Losses and Unabsorbed Depreciation

Subject to certain conditions of Sec 72A and 72AA, the accumulated loss and the unabsorbed depreciation of the amalgamating company shall be deemed to be the loss or, allowance for unabsorbed depreciation of the amalgamated company for the previous year in which the amalgamation was effected.

The accumulated loss shall not be set off or carried forward and the unabsorbed depreciation shall not be allowed in the assessment of the amalgamated company unless—

1. a) the amalgamating company—
    - (i) has been engaged in the business, in which the accumulated loss occurred or depreciation remains unabsorbed, for three or more years;
    - (ii) has held continuously as on the date of the amalgamation at least three-fourths of the book value of fixed assets held by it two years prior to the date of amalgamation;
2. b) the amalgamated company—
    - (i) holds continuously for a minimum period of five years from the date of amalgamation at least three-fourths of the book value of fixed assets of the amalgamating company acquired in a scheme of amalgamation;
    - (ii) continues the business of the amalgamating company for a minimum period of five years from the date of amalgamation;
    - (iii) fulfils such other conditions as may be prescribed to ensure the revival of the business of the amalgamating company or to ensure that the amalgamation is for genuine business purpose.

Business losses and unabsorbed depreciation of an amalgamating company may be allowed to be carried forward and set off in the hands of the amalgamated company, subject to the satisfaction of certain conditions. Business losses may be carried forward for eight years pursuant to a merger, subject to certain conditions.

In the case of a demerger, the accumulated losses and unabsorbed depreciation of the demerged company would be allowed to be carried forward and set off in the hands of a resulting company, subject to the satisfaction of certain conditions. Accumulated business losses are permitted to be carried forward for the unexpired period and depreciation can be carried forward indefinitely.

Carry Forward of Tax Losses & Unabsorbed Depreciation

The resulting company is to carry forward the accumulated tax losses and depreciation which is unabsorbed of the undertaking where:

The company which is being transferred has a direct relation to it.

There is no direct relation to it, then it has to be segregated between the demerging company and the resulting company in exactly the same percentage in which the assets have been ascertained by the demerging company and the resulting company.

Cost of assets & depreciation: In the statement of the Demerging company qua the assets transferred, the opening written down value of the assets which are transferred is written down as the same value.

The demerging company is allowed a deduction in the tax treatment in respect of expenses incurred on the demerger transaction equally for 5 years commencing from the year the demerger takes place.

Slump Sale

Gains arising on the transfer of an undertaking for a lump sum consideration, without assigning consideration toward any of the assets individually, is chargeable to tax as per the special provisions as contained under the Act. Capital gains for the purposes of a slump sale are computed as the difference between the sales consideration (less expenditure incurred in relation to the transfer) and the net worth of the undertaking.

Pursuant to amendment vide the Finance Act, 2021 (Finance Act), it has been clarified that a slump exchange is covered within the ambit of taxation. Pursuant to an amendment vide the Finance Act, the sales consideration has now been linked to the Fair Market Value (FMV) of capital assets, as on the date of transfer, and where such sales consideration is lower than the FMV, such that the FMV would be considered as the full value of consideration for the purpose of computing capital gains. This is to be calculated as per Rule 11UAE of Income Tax Rules.

- In a scheme of amalgamation where the amalgamated company is an Indian company, any transfer of a capital asset by an amalgamating company to the said amalgamated company shall be exempted.
- In a scheme of amalgamation where there is a transfer of shares by a shareholder subject to the following 2 conditions getting satisfied:
    - The transfer is made in consideration of the allotment to him of any share or shares in the amalgamated company except where the shareholder itself is the amalgamated company, and
    - The amalgamated company is an Indian company;

The calculation of the acquisition of shares for such shareholders will be done at the cost at which the shares of the amalgamating company had been acquired by the shareholder. The period of the holding shall include the period during which the shares were held by the shareholders of the amalgamating company.

In a scheme of amalgamation, any transfer of a capital asset such as being a share or shares held in an Indian company, by the amalgamating foreign company to the amalgamated foreign company, if:

- A minimum of 25% of the shareholders of the amalgamating foreign company carry on as shareholders of the amalgamated foreign company, and
- In the country where the amalgamating country is incorporated, no tax is levied on capital gains in an amalgamation scheme between 2 foreign companies where as a consequence the transfer results in an indirect transfer of Indian shares along with the conditions as specified above, tax exemption can be availed.

An amalgamation between two or more foreign companies can be exempted from tax in India for the amalgamating foreign company, however, it will definitely result in Indian Capital Tax gains for the shareholders.

Indirect Taxes

As in an Amalgamation/ Merger, there is a transfer of the company on a going-concern basis the Goods & Services Tax is not usually applicable. However, it has been stated under Section 18(3) of the Central Goods & Services Tax Act, 2017 that availability of the input tax credit furnishes that where there is a change in the constitution of a registered person on account of an amalgamation, transfer of unutilized input tax credit in the electronic credit ledger shall be permitted if certain conditions are satisfied.

Stamp Duty

In India, the constitution segregates the power between the Centre and the State Government towards levying stamp duty. Stamp duty is always paid when a Sale Deed or a Deed of Conveyance is executed. The central Government enacts The Indian Stamp Act of, 1899 which may or may not be adopted by the states. Certain states in India have their own respective stamp acts.

Multiple Choice Questions – 9.2

1. In the context of mergers and acquisitions, which formula correctly represents the value of control?

A. Value of Control = Value of the firm optimally managed / Value of the firm with current management B. Value of Control = Value of the firm optimally managed - Value of the firm with current management C. Value of Control = Value of the firm optimally managed × Value of the firm with current management D. Value of Control = Value of the firm optimally managed + Value of the firm with current management.

Answer: B. Value of Control = Value of the firm optimally managed - Value of the firm with current management

2. An acquisition is being considered where the acquirer would pay $200 million for a target company that has a standalone value of $150 million. The acquirer has estimated $60 million in synergies, but expects the cost of integration to be $20 million. What is the Net Gain or Loss?

A. $10 million net loss B. $10 million net gain C. $30 million net loss D. $30 million net gain.

Answer: A. $10 million net loss (Synergy 60 – Premium 50 – Cost 20 = -10)

3. What is the Herfindahl-Hirschman Index (HHI) used for in the context of Mergers and Acquisitions?

A. To measure managerial performance B. To measure changes in stock prices C. To measure market concentration D. To measure financial risks.

Answer: C. To measure market concentration

4. In Valuation, how is the value of synergy calculated?

A. Value of synergy = Combined value - (Value of Acquirer + Standalone value of the target) B. Value of synergy = Combined value / (Value of Acquirer + Standalone value of the target) C. Value of synergy = Combined value × (Value of Acquirer + Standalone value of the target) D. Value of Synergy = Combined value + (Value of Acquirer - Standalone value of the target).

Answer: A. Value of synergy = Combined value - (Value of Acquirer + Standalone value of the target)

5. What is a 'poison pill' strategy in the context of mergers and acquisitions?

A. A strategy used to increase the company's debt to make it less attractive to the acquirer B. A practice that gives existing shareholders the right to purchase additional shares at extremely attractive prices C. A practice where the target company sells off a valuable asset or division to make it less attractive to the acquirer D. A strategy where the target company encourages another firm to acquire it to avoid a hostile takeover

Answer: B. A practice that gives existing shareholders the right to purchase additional shares at extremely attractive prices

6. One of the following is cannot be classified as systematic risk.

A. Interest rate risk B. Political risk C. Credit risk D. Foreign exchange risk

Answer: C. Credit risk

7. Which of the following is associated with defining of product or service features and specifications?

A. Quality Improvement B. Quality Assurance C. Quality Planning D. Quality Control

Answer: C. Quality Planning

9.3 Financial Modelling

Financial modelling is the construction of spreadsheet models that illustrate a company's likely financial results in quantitative terms. Spreadsheets (e.g. MS Excel) are used for creating Financial Models. In other words, "spreadsheet" is the medium and "model" is an end-product.

Most financial statement analysis tasks are undertaken with a forward-looking decision in mind—and much of the time it is useful to summarize the view developed in the analysis with an explicit forecast. Prospective analysis includes two tasks—forecasting and valuation—that together represent approaches to explicitly summarizing the valuer's forward-looking views. The best way to forecast future performance is to do it comprehensively, producing not only profit in lost forecast but also forecast of cash flows and the balance sheet. A comprehensive approach is useful even in cases where one might be interested primarily in the single facet of performance because it guards against unrealistic implicit assumptions.

9.3.1 Attributes of Good Financial Models

- **Realistic:** most models you develop will be directly or indirectly used to make some decisions. The output of the model must therefore be realistic. This might sometimes be time consuming but is still necessary.
- **Error-free:** You must extensively test a model to make sure that it is error free. While some errors are obvious and can be identified since it may not give the desired output. However, some errors may be subtle and maybe harder to predict. Therefore, it is important to do a review of the financial model before the output is reported.
- **Flexible:** In the planning stage you should try to anticipate the different types of questions the model is likely to answer. The more different types of questions a model can answer, the more useful it is.
- **Easy to use:** It is important to ensure that the model is easy to use by any user. While fancy looking dashboards may make the model look attractive it is not necessary.
- **Easily understandable formula:** Many excel models, especially large ones common often include formula that go on for lines. It is advisable to shorten the formula, use short descriptive cell and range names to make formulas readable. Sometimes professionals also use VBA functions to improve the quality and appearance of calculations
- **Minimum hard-coding:** hard coded values that is values embedded in the formulas are difficult to change especially in large models because there is always a danger of missing them in few places. It is advisable that the input cells (sales with manual inputs of numbers or data) and formulated cells should be clearly distinguished in the entire model.
- **Good documentation:** models should have appropriate documentation such as assumptions, inputs outputs model description among others.

9.3.2 Financial Statement Forecasting

The objective of financial statements modelling is to create proforma financial statements in order to make financial projections that can be used to make decisions. Financial statement models are widely used for a variety of purposes including business valuation.

Financial statement modelling involves modelling all the 3 primary financial statements the income statement balance sheet and the cash flow statement. The cash flow statement is usually derived from the other two.

The Key Steps in Developing a Financial Statement Model are:

- expected uses of the model and the required output.
- collect historical data for the company, its industry, and its major competitors
- understand the companies plan and develop a comprehensive set of modelling assumptions
- build the model and debug it
- improve the model based on feedback.

Using Historical Data

Financial statement forecasting models start with at least some historical financial statements of the company. Usually, 3 to 5 years historical financial statements may be useful to produce projections based on historical data. The statement should be generally consistent it is not necessary that every number would be correct to the last rupee. Understanding the footnotes may also be helpful in preparing financial forecasts also, some historical data for the companies industry and its major competitors will also be helpful in creating realistic forecasts and benchmarks. Next getting industry forecasts for market growth price trends expected GDP growth interest rates may be very useful.

Company's Plans

Understanding the company's plans are critical in preparing the financial models. While financial statement forecasts can be made using historical data and basic financial analysis, it may not be useful for anybody if the companies plans are not incorporated into the financial model.. For example, a company may be considering building a new warehouse to expand its sales. This might require investment in not just a warehouse but in additional working capital as well. Search increase in capital expenditure and working capital might lead to increased sales increased cost of goods sold increased expenses higher profits and other balance sheet items as well. Unless you have a good control on these numbers your forecasts will not be useful.

Common-Size Statements

Common size statements are very helpful in creating financial models. In case of a common size statement every item on the profit and loss statement is taken as a percentage of the total revenue. Similarly every item on the balance sheet is taken as a percentage of the total assets. This helps a valuer understand the relationship between different items in the financial statements. The biggest benefit of a common-size analysis is that it can let a valuer identify large or drastic changes in a firm's financials. Rapid increases or decreases will be readily observable, such as a rapid drop in reported profits during one quarter or year. This also helps a valuer compare the performance of different companies irrespective of its size.

Example 6 (ICMAI Study Material): Maruti Suzuki – Common Size Statements

The standalone financial statements of Maruti Suzuki for two years are as follows:

Balance Sheet as at (₹ Cr)

Particulars	Maruti Suzuki Standalone 31-Mar-X2	Maruti Suzuki Standalone 31-Mar-X1
ASSETS		
1. Non Current Assets		
Property, plant and equipment	12,916.20	12,163.10
Capital work in progress	1,252.30	1,006.90
Goodwill		
Other intangible assets	373.00	346.90
Financial assets		
Investments	26,214.70	18,875.40
Loans and advances	0.30	0.40
Other financial assets	23.80	23.10
Non current assets (net)		
Other non current assets	1,603.10	1,678.20
Sub-total	**42,383.40**	**34,094.00**
2. Current Assets		
Inventories	3,262.20	3,132.10
Financial assets		
Investments	2,013.70	1,056.80
Trade receivables	1,199.20	1,322.20
Cash and cash equivalents	13.10	39.10
Loans and advances	2.50	3.10
Other financial assets	95.00	147.80
Current tax assets (net)	485.40	485.40
Other current assets	1,538.80	1,659.50
Sub-total	**8,609.90**	**7,846.00**
Total Assets	**50,993.30**	**41,940.00**

Statement of Profit & Loss for the year ended

Particulars	31-Mar-X3	31-Mar-X2
Income from operations	77,266.20	65,054.60
Other income	2,279.80	1,461.00
Total Income	**79,546.00**	**66,515.60**
Expenses		
Cost of materials consumed	42,629.60	35,483.90
Purchases of products for sale	4,482.10	3,206.60
Changes in inventories of finished goods, work-in-progress, and products for sale	-380.10	6.90
Excise duty	9,231.40	7,516.50
Employee benefits expense	2,331.00	1,978.80
Finance costs	89.40	81.50
Depreciation and amortisation expense	2,602.10	2,820.20
Other expenses	8,722.80	8,037.70
Amount capitalised / Vehicles for own use	-103.60	-60.20
Total Expenses	**69,604.70**	**59,071.90**
Profit/(loss) before exceptional items and tax	9,941.30	7,443.70
Exceptional items		
Profit/(loss) before Tax	**9,941.30**	**7,443.70**
Tax Expense		
Current tax	2,331.70	2,041.40
Deferred tax	271.90	38.00
Total tax expense/(credit)	**2,603.60**	**2,079.40**
Profit/(loss) for the year from continuing operations	**7,337.70**	**5,364.30**
Other comprehensive income/(loss)	221.70	7.00
Total comprehensive income/(loss) for the year	**7,559.40**	**5,371.30**

The following is the common size statement of Tata Motors with Maruti Suzuki for Year X3:

Balance Sheet as at (₹ Cr)	Tata Motors 31-Mar-X2	Common size	Maruti Suzuki 31-Mar-X2	Common size
ASSETS				
Property, plant and equipment	17,364.77	29.66%	12,916.20	25.33%
Capital work in progress	1,870.93	3.20%	1,252.30	2.46%
Goodwill	99.09	0.17%		0.00%
Other intangible assets	2,773.69	4.74%	373.00	0.73%
Intangible assets under development	5,366.03	9.17%		0.00%
Investment in subsidiaries & associates	14,778.87	25.25%		0.00%
Investments	528.37	0.90%	26,214.70	51.41%
Loans and advances	389.61	0.67%	0.30	0.00%
Other financial assets	196.32	0.34%	23.80	0.05%
Other non-current assets	1,856.28	3.17%	1,603.10	3.14%
Sub-total	**45,948.54**	**78.50%**	**42,383.40**	**83.12%**

Identifying Independent and Dependent Variables

There is no one right way to forecast any line item. The method you choose depends on your understanding of the business and what do you think will produce good forecasts. But most often used is the sales driven forecasting. Most financial statement forecasting models use sales growth rate as a key independent variable. To decide which line items can be projected as a percentage of sales, the common size statements are used to project the expenses on the profit and loss statement.

If you look at the common size statements for a company for the past few years you will be able to spot some stable relationships as well as some trends and you can use them at least for the first round of forecasting. You may be able to find some such relationships in other financial indicators as well and use that information to forecast certain line items you should always try to confirm these relationships using industry data and use a combination of industry numbers and company numbers to decide numbers in any forecast sometimes management we have its own target such as target debt to equity ratio dividend growth rate and so on. These assumptions known as policy assumptions should be documented in the list of assumptions.

Some line items do not flow through sales. For example the interest expense is a function of the loan that the company might have borrowed. The depreciation amount is a function of the total amount of fixed assets deployed by the company and their depreciation rates depreciation methods and the age of the fixed assets. Taxes, as we all know is a percentage of profit before tax as specified by the government.

Even if you forecast all the line items reasonably well, balance sheet is not likely to balance. You may use a plug to balance the balance sheet. The items that may be normally used as plug includes cash and marketable securities, short term debt, long term debt equity. In case of substantial funding requirements, the company might need additional funds either in the form of debt or equity and thus it may have to be used as a plug. Alternatively cash and marketable securities are used plug under normal circumstances. In rare circumstances when the company policy specifies the amount of cash to be kept, then additional funds may have to be deployed as investments end shortfall may have to be borrowed and this these may have to be used as a plug. You should be careful that in the balance sheet there should not be more than one plug figure.

Solved Case 1 (ICMAI Study Material): C2D Software Ltd – Financial Modelling

C2D Software Ltd is a software company. The company has shared the following financials with you.

Statement of Profit & Loss

Particulars	31-Mar-X0	31-Mar-X1
Revenue from Operations	48,21,92,172	62,52,80,155
Other income	4,34,921	53,89,037
Total Revenue	**48,26,27,093**	**63,06,69,191**
Employee Benefit Expenses	34,17,59,823	43,86,61,527
Other Operating Expenses	12,84,95,391	17,82,56,640
Operating Expenses	**47,02,55,213**	**61,69,18,166**
EBIDTA	1,23,71,879	1,37,51,025
Less: Depreciation	72,78,205	90,63,847
EBIT	50,93,674	46,87,178
Less: Finance costs	3,24,123	2,12,055
Profit/(Loss) before Tax	47,69,552	44,75,122
Tax	14,30,865	13,42,537
Profit After Tax	**33,38,686**	**31,32,586**

As part of its restructuring exercise, the company is planning a major turnaround. You are hired as a valuer and the company does not have projected financial statements. However, the management has shared the following information with you to assist in preparing the financial statement forecasts following by the valuation.

1. 1. The projected financial statements can be prepared for the next 5 years i.e. till FY 20X6.
2. 2. The revenue growth is expected to be 10 % till FY 2024 and then at 7 % for FY 20X5 and 20X6.
3. 3. Operating expenses as a percentage of revenue is expected to be 37 % while Employee benefit expenses is expected to be 50 % of Revenues. Assume the tax rate to be 30 %.
4. 4. The company expects to collect all its Revenues from customers within 45 days of billing while it expects to pay to its vendors within 70 days.
5. 5. Other Current Assets would be 5 % of Revenues while Other Current Liabilities would be 10 % of Operating Expenses.
6. 6. The company expects to spend ₹20,00,000 annually on Capital Expansion for the next 5 years.
7. 7. The Property, Plant & Equipment is subject to a depreciation rate of 25.89 % on WDV basis.
8. 8. Loans and Advances, and Short term Provisions are not likely to change over the explicit forecast period.
9. 9. Once the financial forecast are prepared, the following information may be relevant for valuation purposes:
    - As on valuation date, the long term Government bond yield is 6 %.
    - Market Return over the long period is 15 %.
    - Estimated Beta based on comparable companies is 1.25.
    - The company does not expect to have any debt in the long run.
    - In the perpetual period, Depreciation is expected to offset Capital expenditure and Change in Working Capital is expected to be 1 % of change in Revenue in the explicit forecast period.
    - The terminal growth in Free Cash Flows is estimated at 4 %, in line with long term inflation of the country.

Solution (ICMAI Standard):

Forecasted Statement of Profit & Loss (₹ in lakhs)

Particulars	FY x1 (Actual)	FY x2	FY x3	FY x4	FY x5	FY x6
Revenue from Operations	6,252.80	6,878.08	7,565.89	8,322.48	8,905.05	9,528.41
Revenue growth		10%	10%	10%	7%	7%
Employee Benefit Expenses	4,386.62	3,439.04	3,782.94	4,161.24	4,452.53	4,764.20
Other Operating Expenses	1,782.57	2,544.89	2,799.38	3,079.32	3,294.87	3,525.51
Operating Expenses	6,169.18	5,983.93	6,582.32	7,240.56	7,747.40	8,289.71
EBIDTA	137.51	894.15	983.57	1,081.92	1,157.66	1,238.69
Less: Depreciation	90.64	103.58	81.94	65.90	54.02	45.21
EBIT	46.87	790.57	901.62	1,016.02	1,103.64	1,193.48
Profit/(Loss) before Tax	44.75	790.57	901.62	1,016.02	1,103.64	1,193.48
Tax [@ 30% on PBT]	13.43	237.17	270.49	304.81	331.09	358.04
Profit After Tax	**31.33**	**553.40**	**631.14**	**711.21**	**772.55**	**835.44**

Calculation of Cost of Equity and Discount Rate

Risk Free Rate of Return	6.00%
Market Return	15.00%
Beta	1.25
Cost of Equity	**17.25%**

Calculation of Present Value of Terminal Value

Particulars	Terminal (₹)
Net profit After Tax [Same as FY x6]	835.44
Plus: Net Non Cash Charges [same as FY x6]	20.00
Less: Investment in Fixed Capital [Same as Depreciation]	20.00
Less: Investment in Non-Cash Working Capital [9,528.41 – 8,905.05] × 1%	6.23
Free Cash Flow to Firm	**829.20**
Terminal Value [FCFF × (1 + g_n) / (WACC – g_n)] [829.20 x (1.04) / (0.1725 - 0.04)]	6,508.46
PV of FCFF including Terminal Value [TV / (1+g)^n] [6,508.46 / $(1.1725)^5$]	2,937.07

Calculation of Free Cash Flows to the Firm and Value per Share (₹ in lakhs)

Particulars	FY x2	FY x3	FY x4	FY x5	FY x6
Net profit After Tax	553.40	631.14	711.21	772.55	835.44
Plus: Net Non Cash Charges	103.58	81.94	65.90	54.02	45.21
Less: Capital Expenditure	-	20.00	20.00	20.00	20.00
Less: Change in NC Working Capital	838.95	381.86	719.29	777.44	829.48
Free Cash Flow to Firm	**-181.97**	**311.22**	**37.83**	**29.13**	**31.17**
PV of FCFF	-155.20	226.38	23.47	15.41	14.07
PV of Cash Flows (explicit period)	**124.13**				
PV of Terminal Value (Note 5)	2,937.07				
Firm Value	**3,061.20**				
Less: Debt	-				
Add: Cash	269.05				
Value of Equity (₹ lakhs)	**3,330.24**				
Value per share (₹)	**3,330.24**				

Solved Case 2 (ICMAI Study Material): Royal Pvt Ltd, Aero Pvt Ltd – Merger with Vincent Pvt Ltd

Royal Pvt Ltd and Aero Pvt Ltd are proposed to be merged with Vincent Pvt Ltd whereby Vincent P Ltd will issue its own shares to the shareholders of the two target companies. The recent summarized financial statements of all the three companies are shared below.

Vincent P Ltd – Profit & Loss Statement

Particulars	31-Mar-22	31-Mar-23
Total Revenue from Operations	1,17,41,057	2,89,59,987
Operating Expenses	42,35,529	1,93,81,027
Profit/(Loss) before Tax	75,05,528	95,78,960
Total Tax	18,76,382	23,94,740
Profit After Tax	**56,29,146**	**71,84,220**

Vincent P Ltd – Balance Sheet

Particulars	31-Mar-22	31-Mar-23
Equity Share Capital (Face Value ₹1)	41,49,800	41,49,800
Other Equity	4,37,82,501	5,09,66,721
Total Equity	4,79,32,301	5,51,16,521
Total Current Liabilities	2,60,512	1,94,212
Total Equity & Liabilities	**4,81,92,813**	**5,53,10,733**
Property, Plant & Equipment	20,51,077	20,51,577
Investments	3,24,90,500	1,76,37,500
Non Current Assets	3,45,41,577	1,96,89,077
Inventories	1,00,00,500	1,50,00,000
Cash & Cash Equivalents	34,93,620	2,04,49,657
Other Current Assets	1,57,116	1,71,999
Total Current Assets	1,36,51,236	3,56,21,656
Total Assets	**4,81,92,813**	**5,53,10,733**

Additional Information:

- The Property, Plant & Equipment includes Land and is carried at Fair Value. The fair value of investments is ₹2,17,46,000.
- The future cash flow projections are not available but the weighted average profits of the last 2 years can be considered maintainable. The capitalization rate applicable to the company is 15 percent.
- Comparable companies trade in the market at 2.28x Price to Book Value multiple. However, a marketability discount may be considered. All the three approaches may carry equal weight.

Royal P Ltd

Particulars	31-Mar-22	31-Mar-23
Total Revenue from Operations	11,00,000	11,10,407
Operating Expenses	4,85,119	4,88,316
Profit/(Loss) before Tax	6,14,881	6,22,091
Total Tax	4,256	5,560
Profit After Tax	**6,10,625**	**6,16,531**

Particulars	31-Mar-22	31-Mar-23
Equity Share Capital (Face Value ₹1)	1,40,000	1,40,000
Other Equity	20,59,643	26,76,174
Total Equity	21,99,643	28,16,174
Total Current Liabilities	36,506	18,666
Total Equity & Liabilities	**22,36,149**	**28,34,840**
Tangible Property	20,50,000	20,50,000
Cash & Cash Equivalents	1,63,308	7,74,449
Other Current Assets	22,841	10,391
Total Current Assets	1,86,149	7,84,840
Total Assets	**22,36,149**	**28,34,840**

Additional Information: The Fair Value of Tangible Property is ₹80,59,000. The future cash flow projections are not available and the past profits is not representative of future performance. Given the size of the company, it may not be comparable to large listed companies in the market.

Aero P Ltd

Particulars	31-Mar-22	31-Mar-23
Total Revenue from Operations	1,00,000	1,08,245
Operating Expenses	83,541	86,370
Profit/(Loss) before Tax	16,459	21,875
Total Tax	4,142	5,507
Profit After Tax	**12,317**	**16,368**

Particulars	31-Mar-22	31-Mar-23
Equity Share Capital (Face Value ₹1)	1,40,000	1,40,000
Other Equity	20,62,126	20,78,494
Total Equity	22,02,126	22,18,494
Total Current Liabilities	36,083	18,499
Total Equity & Liabilities	**22,38,209**	**22,36,993**
Tangible Property	20,50,000	20,50,000
Cash & Cash Equivalents	1,65,475	1,76,683
Other Current Assets	22,734	10,310
Total Current Assets	1,88,209	1,86,993
Total Assets	**22,38,209**	**22,36,993**

Additional Information: Investments include 5,00,000 shares of Vincent P Ltd. The cash flow projections are not available and past profits are not representative of future profits. Also, Market Approach will not be relevant for valuation.

You are required to value the three companies using applicable approaches and arrive at the Share Exchange Ratio. Also, calculate the number of shares to be issued by Vincent to each company shareholders.

Solution (ICMAI Standard):

Valuation of Vincent P Ltd

Valuation under Cost Approach

Book Value of Assets	5,53,10,733
Less: Book Value of Liabilities	1,94,212
Book Value of Equity	5,51,16,521
Less: Book Value of Investments	1,76,37,500
Add: Fair Value of Investments	2,17,46,000
Adjusted Book Value of Equity	**5,92,25,021**
Number of Shares	41,49,800
Adjusted Book Value of Equity (Per Share)	**14.27**

Valuation under Market Approach

Valuation Multiple	2.2800
Book Value of the Company	5,51,16,521
Value of Company	12,56,65,667
Less: Discount for Lack of Marketability	2,51,33,133
Value of Equity (P/BV Multiple)	**10,05,32,534**
Value per share	**24.23**

Valuation under Income Approach

Profit 2023 (Weight 2)	71,84,220
Profit 2022 (Weight 1)	56,29,146
Average Maintainable Profit (weighted average)	**66,65,862**
Capitalisation Rate	15%
Value of Equity (PECV Approach)	**4,44,39,079**

Calculation of Value per share

Particulars	Weights	Fair Value	Fair Value per share
Cost Approach (Adjusted Net Asset Value)	1/3	5,92,25,021	14.27
Income Approach (PECV Method)	1/3	4,44,39,079	10.71
Market Approach (P/BV Ratio)	1/3	10,05,32,534	24.23
Value of Equity (Weighted average)	100%	**6,80,58,738**	**16.40**

Valuation of Royal P Ltd

Valuation under Cost Approach – Calculation of Adjusted Net Asset Value

Book Value of Assets	28,34,840
Book Value of Liabilities	18,666
Book Value of Equity	28,16,174
Less: Book Value of Investments	20,50,000
Add: Fair Value of Investments	80,59,000
Adjusted Book Value of Equity	**88,25,174**
Number of Shares	1,40,000
Adjusted Book Value of Equity (Per Share)	**63.04**

The Market Approach and Income Approach cannot be applied based on available information.

Valuation of Aero P Ltd

Calculation of Adjusted Net Asset Value

Book Value of Assets	22,36,993
Book Value of Liabilities	18,499
Book Value of Equity	22,18,494
Less: Book Value of Investments	20,50,000
Add: Fair Value of Investments (Note 1)	82,00,243
Adjusted Book Value of Equity	**83,68,737**
Number of Shares	1,40,000
Adjusted Book Value of Equity (Per Share)	**59.78**

Note 1: Since Aero holds 500,000 shares of Vincent Ltd and we have already calculated Vincent Ltd valuation above, the Fair Value of investment would be 16.40 × 500,000 = 82,00,243.

Calculation of Share Exchange Ratio

Particulars	Vincent	Royal	Aero
Value per share	16.40	63.04	59.78
Share Exchange Ratio with Transferee	10.00	38.44	36.45
		10: 38	10: 36

Number of shares to be issued to shareholders of Royal:

Existing shares of Royal: 140,000

Share exchange Ratio: 10 : 38

Number of shares to be issued: 140,000 × 38 / 10 = **532,000**

Number of shares to be issued to shareholders of Aero:

Existing shares of Aero: 140,000

Share exchange Ratio: 10 : 36

Number of shares to be issued: 140,000 × 36 / 10 = 504,000

Less: Shares already held by Aero (since Aero will be merged and Vincent cannot its own shares, there will not be anyone to hold the shares and thus these shares will be cancelled) = 500,000

Net Shares to be issued = 4,000

Multiple Choice Questions – 9.3

1. When merger is between two companies that are into the same products or services, it is called a _____

a) horizontal merger b) vertical merger c) Conglomerate merger d) diagonal merger

Answer: a) horizontal merger

2. In a _____, the companies are in different points in the value chain

a) horizontal merger b) vertical merger c) Conglomerate merger d) diagonal merger

Answer: b) vertical merger

3. If the acquirer moves up the value chain towards the ultimate consumer it is called_____

a) vertical merger b) Conglomerate merger c) Forward integration d) Backward integration

Answer: c) Forward integration

4. An ice cream manufacturer acquires restaurants where it can serve ice cream. It is an example of which type of merger?

a) vertical merger b) Conglomerate merger c) Forward integration d) Backward integration

Answer: c) Forward integration

5. If the acquirer moves down the value chain towards raw materials it is called _____

a) Conglomerate merger b) Backward integration c) horizontal merger d) diagonal merger

Answer: b) Backward integration

6. A _____ is one where the merging companies are neither into the same products or services, nor in the same business

a) Conglomerate merger b) vertical merger c) Diagonal merger d) Both a and c

Answer: d) Both a and c

7. In 2018, Walmart acquired 77 percent stake in Flipkart India for USD 16 billion. Is it an example of merger or acquisition?

a) Acquisition b) Merger c) Both d) None of these

Answer: a) Acquisition

8. Acquisitions create value when the cash flows of the combined companies are greater than the sum of their individual values. Is it true?

a) False b) True c) May be d) None of these

Answer: b) True

9. The purchase price of an acquisition will nearly always be _____ than the intrinsic value of the target company

a) Higher b) Lower c) Constant d) None of these

Answer: a) Higher

10. The net present value of the cashflows that will result from improvements made when the companies are combined is known as

a) Intrinsic value b) Market value c) Synergy value d) Purchase value

Answer: c) Synergy value

11. Value gap is the difference between _____and _____

a) Synergy value and purchase price b) Intrinsic value and purchase price c) Market value and purchase price d) Intrinsic value and Synergy value

Answer: b) Intrinsic value and purchase price

12. _____ refers to the excess that an acquirer pays over the market trading value of the target company's shares being acquired.

a) purchase premium b) acquisition premium c) Both d) None of these

Answer: c) Both

13. _____ are those where an acquirer intends to run the company themselves. There are significant changes in the way the company operates.

a) Financial Acquisition b) Strategic acquisitions c) Hostile takeover d) None of these

Answer: b) Strategic acquisitions

14. _____ are often done by Private Equities, Venture Capitalists and portfolio companies who acquire a company purely for their value and normally do not make significant operational changes

a) Financial Acquisition b) Strategic acquisitions c) Hostile takeover d) None of these

Answer: a) Financial Acquisition

15. When the target's management or Board of Directors are not receptive to the idea of a merger, the acquirer may take the deal directly to the target's shareholders through a tender offer or a proxy fight is known as _____

a) Hostile Merger b) Friendly Merger c) Strategic acquisitions d) Financial Acquisition

Answer: a) Hostile Merger

16. In a tender offer:

a) The acquirer invites target shareholders individually to submit their shares for a payment b) The payment can be in the form of cash, shares of the acquirer, other securities, or a combination of cash and securities c) Both a and b d) None of these

Answer: c) Both a and b

17. In a proxy fight:

a) The acquirer approaches target shareholders to vote for an acquirer-nominated board of directors) b) Proxy solicitation is approved by regulators and then proxies are mailed directly to target shareholders c) Both a and b d) None of these

Answer: c) Both a and b

18. _____ grant a company the right to issue stock options to existing shareholders enabling them to purchase additional shares of stock at significantly discounted prices.

a) Poison pills b) Poison puts c) Share repurchase d) None of these

Answer: a) Poison pills

19. _____give target company bondholders the right to sell their bonds back to the target at a pre-specified redemption price in the event of a takeover.

a) Poison pills b) Poison puts c) Share repurchase d) None of these

Answer: b) Poison puts

20. If the combined entity is more than the sum of its parts, the transaction is said to have created _____

a) Combined Value b) Net Worth c) Synergies d) Economic gains

Answer: c) Synergies

21. If the Value of target Co. is ₹500 Million and the value of acquiring company is ₹800 Million. Present value of cost savings if the two companies are merged together is ₹100 million. Acquiring company expects the cost of integration as ₹80 million and the shareholders of Target Co. are expecting a deal premium to be paid of 15 percent over their company's value. what is the value of Combined entity?

a) ₹1400 million b) ₹1345 million c) ₹1445 million d) ₹1540 million

Answer: a) ₹1400 million

22. The merger of one or more companies with another company or the merger of two or more companies to form one company is called _____

a) Demerger b) Acquisition c) Amalgamation d) Slump sale

Answer: c) Amalgamation

23. The transfer of one or more undertaking for a lump sum consideration without values being assigned to the individual assets and liabilities is known as _____

a) Demerger b) Acquisition c) Amalgamation d) Slump sale

Answer: d) Slump sale

24. The Income tax Act, 1961 define "amalgamation" under Section

a) 1(1B) b) 2(1B) c) 3(B) d) 2(2B)

Answer: b) 2(1B)

25. The difference between the current market value of a firm and the capital contributed by investors is

a) Economic Value Added b) Market Value Added c) Enterprise Value Added d) Book value Added

Answer: b) Market Value Added

26. Future retail Ltd and Reliance Ltd go into liquidation and a new company Reliance Retail Ltd is formed. It is a case of:

a) Absorption b) External reconstruction c) Amalgamation d) Take over

Answer: c) Amalgamation

27. Reliance Ltd takes over the business of Future retails. It is a case of:

a) Absorption b) External reconstruction c) Amalgamation d) Take over

Answer: a) Absorption

28. Future retail Ltd is liquidated and a new company Future Enterprises is formed to take over its business. It is a case of:

a) Absorption b) External reconstruction c) Amalgamation d) Take over

Answer: b) External reconstruction

29. Why Amalgamation is known to be in the nature of merger:

a) There is transfer of all assets & liabilities at book values) b) Issue of equity shares discharged the Purchase consideration wholly (except cash for fractional shares) c) Equity shareholders holding 90% equity shares in Transferor Company become shareholders of Transferee Company) d) All of the above

Answer: d) All of the above

30. Net assets minus capital reserve is:

a) Goodwill b) General reserves c) Purchase consideration d) None of the above

Answer: c) Purchase consideration

31. If purchase consideration is more than net assets of the transferor company, then difference will be shown as:

a) Goodwill account b) Capital reserve account c) General reserve account d) None of the above

Answer: a) Goodwill account

32. If purchase consideration is less than net assets of the transferor company, then difference will be shown as:

a) Goodwill account b) Capital reserve account c) General reserve account d) None of the above

Answer: b) Capital reserve account

33. The difference between the purchase consideration and net asset is adjusted in case of merger is adjusted with:

a) Goodwill account b) Capital reserve account c) General reserve account d) None of the above

Answer: c) General reserve account

34. In the books of Transferor Company, shares received from the new company are recorded at:

a) Face value b) Market Price c) Intrinsic value of shares d) None of the above

Answer: b) Market Price

35. Intangible assets are treated as _____ assets.

a) Fictitious assets b) Fixed assets c) Cash and cash equivalents) d) Marketable securities

Answer: b) Fixed assets

36. _____ is a measure of value of which tells whether a company is able to generate returns that exceed the cost of capital employed.

a) Economic Value Added b) Market Value Added c) Enterprise Value Added d) Book value Added

Answer: a) Economic Value Added

37. If a bond of a company is trading at a premium in the market then its yield-to-maturity will be _____ its current yield.

a) more than b) less than c) same as d) no effect on

Answer: b) less than

38. Net operating Profit After Taxes is called _____.

a) Economic Value Added b) Market Value Added c) Enterprise Value Added d) Book value Added

Answer: a) Economic Value Added

39. EVA is _____ related to shareholder's value.

a) directly b) inversely c) not related d) None of the above

Answer: a) directly

40. Which is not a, human-capital related intangible assets?

a) Trained workforce b) Employment agreements c) Union Contracts d) Design patent

Answer: d) Design patent

41. X ltd has ₹100 crores worth of common equity on its balance sheet comprising of 50 lakhs shares. The company's market value Added (MVA) is ₹24 crores. What is company's stock price?

a) 230 b) 238 c) 248 d) 264

Answer: c) 248

42. A firm's current assets and current liabilities are 1600 and 1000 respectively. How much can it borrow on a short-term basis without reducing the current ratio below 1.25?

a) 1000 b) 1200 c) 1400 d) 1600

Answer: c) 1400

43. Identify which of the following is not a financial liability

a) X ltd has 1 lakh ₹10 ordinary shares issued b) X ltd has 1 lakh 8% ₹10 redeemable preference shares issued c) X Ltd has ₹2,00,000 of 6% bonds issued d) Both (A) and (B)

Answer: a) X ltd has 1 lakh ₹10 ordinary shares issued

44. An investment is the risk free when actual returns are always _____ the expected returns.

a) equal to b) less than c) more than d) depends upon circumstances

Answer: a) equal to

45. Which of the followings is not a attribute of good financial models

a) Realistic b) Flexible c) Hard coded values d) Good documentation

Answer: c) Hard coded values

46. When amalgamation is in the nature of merger, the accounting method to be followed is:

a) Equity method b) Purchase method c) Pooling of interests method d) Consolidated method

Answer: c) Pooling of interests method

47. What are the tax consequences of a taxable merger?

a) Selling shareholders can defer any capital gain until they sell their shares in the merged company b) Depreciation tax shield is unchanged by merger c) Selling shareholders must recognize any capital gain d) Depreciable value of assets will remain unchanged

Answer: c) Selling shareholders must recognize any capital gain

📌 Key Takeaways – Module 9

Section	Key Takeaway
9.1	M&A Types (Horizontal, Vertical, Conglomerate); Motives (Growth, Synergy, Market Power, Capabilities, Diversification); Acquisition Pricing (Premium, Value Creation); Premium Analysis (Aruna/Mani Ltd); Comparable Transactions Method (Yasmin/HBR Ltd); Value of Target to Acquirer (Ace Ltd/Base Ltd); Accretion/Dilution Analysis; Earnings Multiples (P/E, EV/EBITDA, P/BV, P/S); Discounted Abnormal Earnings (Normalization Adjustments); Private Equity & VC Acquisitions
9.2	Acquisition Outcome (43% destroy value); Friendly Mergers (Due Diligence, Definitive Merger Agreement); Hostile Mergers (Tender Offer, Proxy Fight); Takeover Defenses (Poison Pills, Poison Puts, Share Repurchase, Crown Jewel, White Knight); Managerial Entrenchment (3 strategies); Anti-trust & Security (HHI); Post-Transaction Value (Synergy, Net Gain); Valuing Control; Valuing Synergy (4 Steps); Exit Strategies; Tax Implications (Amalgamation, Demerger, Slump Sale, Section 47, Set off & Carry Forward)
9.3	Financial Modelling (7 Attributes); Financial Statement Forecasting (5 Key Steps); Using Historical Data; Company's Plans; Common-Size Statements; Independent & Dependent Variables; C2D Software Ltd Case; Royal Pvt Ltd, Aero Pvt Ltd Merger Case

📐 Important Formulas – Module 9

Formula	Description
Acquisition Premium (%) = [(Deal price - Premerger price of Target) / Premerger price of target]	Acquisition Premium
Value Created for Acquirer = (Standalone Value of Target + Value of Performance Improvements) – (Market Value of Target + Acquisition Premium)	Value Creation
Acquirer's Gain = Synergies – Premium = $S – (P_T – V_T)$	Acquirer's Gain
Value of Combined Entity = Pre-Merger Value of Acquirer + Pre-Merger Value of Target + Synergy	Combined Entity Value
Net Gain = Value of synergy - premium paid – Cost of integration	Net Gain
Value of Control = Value of the firm (optimally managed) – Value of the firm (with current management)	Value of Control
HHI = Σ [(Sales of firm i / Total Sales of the market) × 100]^2	Herfindahl-Hirschman Index
Price per share = EPS × P/E Ratio	Earnings Multiple
Value of the company = EBIDTA × EV-EBIDTA Multiple	EV-EBITDA Multiple
Price per share = Book Value per share × Price to Book Value Ratio	P/BV Multiple
Value = Sales Turnover × Price / Sales Multiple	P/S Multiple
Goodwill = Purchase Consideration – Fair Value of Assets acquired	Goodwill (Acquisition)

✅ Revision Checklist – Module 9

- □ Explain Organic vs Inorganic Restructuring
- □ Explain 5 Types of Mergers (Horizontal, Vertical, Conglomerate, Forward, Backward)
- □ Explain 5 Motives for M&A (Growth, Synergy, Market Power, Capabilities, Diversification)
- □ Explain Acquisition Price components
- □ Explain Cash vs Stock offering
- □ Explain Value Creation (Intrinsic Value, Market Value, Purchase Price, Synergy Value, Value Gap)
- □ Solve Illustration 1: Aruna – Mani Ltd (P/E Multiple)
- □ Solve Illustration 2: Yasmin – HBR Ltd (Comparable Transaction Method)
- □ Solve Illustration 3: Ace Ltd – Base Ltd (3 Options)

- □ Solve Illustration 4: Accretion/Dilution Analysis
- □ Explain 5 Earnings Multiples (P/E, EV/EBITDA, EV, P/BV, P/S)
- □ Solve Illustration 5: Co. A, B, C – P/E and EV/EBIT
- □ Explain Normalization Adjustments
- □ Explain Valuing the Assets (Tangible, Investments, Current, Intangible)
- □ Explain Strategic vs Financial Acquisitions
- □ Explain Acquisition Outcome (43% destroy value)
- □ Explain Friendly Mergers (Due Diligence, Merger Agreement)
- □ Explain Hostile Mergers (Tender Offer, Proxy Fight)
- □ Explain Takeover Defences (5 types)
- □ Explain Managerial Entrenchment (3 strategies)
- □ Solve Illustration 6: HHI Calculation
- □ Solve Illustration 7: Combined Entity Value and Net Gain
- □ Explain Valuing Control, Valuing Synergy (4 Steps)
- □ Explain Exit Strategies (4 types)
- □ Explain Tax Implications (Amalgamation, Demerger, Slump Sale, Sec 47, Set off & Carry Forward)
- □ Explain Financial Modelling (7 Attributes)
- □ Solve C2D Software Ltd Financial Modelling
- □ Solve Royal Pvt Ltd, Aero Pvt Ltd Merger Case

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Disclaimer: These revision notes are for educational purposes only. Students are advised to refer to the official ICMAI study material and latest amendments for comprehensive preparation.

🎓 **CONGRATULATIONS! You have completed ALL 9 Modules of CMA Final Paper 20A.**

Section A: Modules 1-4 (Strategic Performance Management) | **Section B:** Modules 5-9 (Business Valuation)