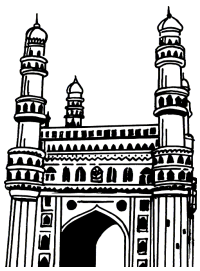
*Rahul's* ✔
*Topper's Voice*

R22
New Syllabus



# JNTU (H)

**Latest Edition**

# MBA

## *II Year IV Semester*

# STRATEGIC FINANCIAL MANAGEMENT

- ☞ **Study Manual**
- ☞ **Internal Assessment**
- ☞ **FAQ's and Important Questions**
- ☞ **Short Questions & Answers**
- ☞ **Exercise Problems**
- ☞ **Choose the correct Answers**
- ☞ **Fill in the blanks**
- ☞ **Solved Model Papers**
- ☞ **Solved Previous Question Papers**

Price ₹ 225-00

**- by -**

**WELL EXPERIENCED LECTURER**

Since 1986

***Rahul Publications***™

**Hyderabad. Cell : 9391018098, 9505799122.**

# JNTU(H) MBA

## *II Year IV Semester*

# STRATEGIC FINANCIAL MANAGEMENT

*Inspite of many efforts taken to present this book without errors, some errors might have crept in. Therefore we do not take any legal responsibility for such errors and omissions. However, if they are brought to our notice, they will be corrected in the next edition.*



***Sole Distributors :*** **Cell : 9391018098, 9505799122**

VASU BOOK CENTRE

**Shop No. 2, Beside Gokul Chat, Koti, Hyderabad.**

**Maternity Hospital Opp. Lane, Narayan Naik Complex, Koti, Hyderabad.**

**Near Andhra Bank, Subway, Sultan Bazar, Koti, Hyderabad -195.**

# STRATEGIC FINANCIAL MANAGEMENT

## STUDY MANUAL


| | |
|---|---|
| **FAQ's and Important Questions** | **V - XII** |
| **Unit - I** | **1 - 18** |
| **Unit - II** | **19 - 60** |
| **Unit - III** | **61 - 126** |
| **Unit - IV** | **127 - 150** |
| **Unit - V** | **151 - 192** |
| **Internal Assessment** | **193 - 198** |


## SOLVED MODEL PAPERS


| | |
|---|---|
| **Model Paper - I** | **199 - 200** |
| **Model Paper - II** | **201 - 203** |
| **Model Paper - III** | **204 - 206** |


## SOLVED PREVIOUS QUESTION PAPERS


| | |
|---|---|
| **April / May - 2019** | **207 - 208** |
| **December - 2019** | **209 - 209** |
| **September - 2020** | **210 - 210** |
| **July / August - 2021** | **211 - 212** |
| **September / October - 2022** | **213 - 214** |
| **March / April - 2023** | **215 - 217** |
| **September - 2023** | **218 - 220** |

# SYLLABUS

## UNIT - I

### FINANCIAL STRATEGY AND PLANNING :

Strategic approach to Financial Management, Definition, Characteristics, Scope and Importance of Strategic Financial Management. Success Factors and Constraints to Strategic Financial Management. Financial Forecasting, Techniques, Financial Planning Process, Decision-making and Problem-solving process. Agency Theory, Agency Costs, Constituents and Criticism of Agency Theory.

## UNIT - II

### INVESTMENT DECISIONS UNDER RISK AND UNCERTAINTY :

Concepts of Risk and Uncertainty. Risk Analysis in Investment Decisions, Risk Adjusted Rate of Return, Certainty Equivalents, Probability Distributions of Cash Flows, Decision Trees, Sensitivity Analysis and Monte Carlo Approach to Simulation, Investment Decisions under Capital Constraints and Capital Rationing. Corporate Cost of Capital - Divisional Cost of Capital, Pure Play Technique, Accounting Beta.

## UNIT - III

### STRATEGIC INVESTMENT DECISIONS :

Real Options, the Timing of Options, Project Abandonment Decisions. IRR - Multiple IRR, Modified IRR, Pure, Simple and Mixed investments. Adjusted NPV and Impact of Inflation on Capital Budgeting Decisions. Discounted Pay back, Post Pay Back, Surplus Life and Surplus Pay Back, Bail Out Pay Back, Return on Investment, Terminal Value, Single Period Constraints, Multi Period Capital Constraint and an Unresolved Problem, NPV Mean Variance analysis, Hertz Simulation and Hillier Approaches.

## UNIT - IV

### STRATEGIC FINANCING DECISIONS :

Capital Structure and Value Creation. Signaling Theory. Tools for developing an Effective Capital Structure. Financial Flexibility and Financial Discipline. Capital Structure Puzzle.

Dividend Policy and Firm Value. Linter's Dividend Model, its Salient features, Dividend Puzzle. Buy Back of Shares and its Characteristics, Modes and Methods of Buy Back of Shares. Reasons, Benefits and Constraints to Buy Back of Shares. Impacts of Share Buybacks. SEBI Regulations. Financial Distress and Restructuring. Characteristics and Causes of Financial Distress. Costs of Financial Distress. Impacts of Financial Distress. Financial Distress Restructuring. The Insolvency and Bankruptcy Code 2016, Corporate Insolvency Resolution Process, Liquidation Process.

## UNIT - V

### MERGERS, ACQUISITIONS AND VALUE BASED MANAGEMENT :

Mergers and Acquisitions, Need, Strategy, Diversification and Mergers and Acquisitions, Value Creation in Mergers and Acquisitions. Theories of Mergers, Types of Mergers, Cost of Mergers, Government guidelines for Takeover, Problems on Mergers and Acquisitions and Cases. Value-based Management: Introduction, Elements and Importance of Value-based Management. Approaches to Value-based Management: Marakon, Alcar, McKinsey, BCG, Economic Value Added, Market Value Added and Cash Value Added.

# Contents


**Topic** **Page No.**

**UNIT - I**

1.1 Strategic Approach to Financial Management ..... 1
1.1.1 Definition ..... 1
1.1.2 Characteristics ..... 2
1.1.3 Scope and Importance of Strategic Financial Management ..... 2
1.2 Success Factors and Constraints to Strategic Financial Management ..... 4
1.3 Financial Forecasting ..... 6
1.3.1 Techniques ..... 6
1.4 Financial Planning ..... 6
1.4.1 Process ..... 9
1.5 Decision-making and Problem-solving Process ..... 10
1.6 Agency Theory ..... 13
1.7 Agency Costs ..... 13
1.8 Constituents and Criticism of Agency Theory ..... 14
- Short Questions Answer ..... 15 - 16
- Choose the Correct Answer ..... 17 - 17
- Fill in the blanks ..... 18 - 18

**UNIT - II**

2.1 Concepts of Risk and Uncertainty ..... 41
2.2 Risk Analysis in Investment Decisions ..... 21
2.3 Risk analysis in investment decisions ..... 28
2.3.1 Risk Adjusted Rate of Return ..... 28
2.3.2 Certainty Equivalents ..... 30
2.3.3 Probability Distributions of Cash Flows ..... 32
2.3.4 Decision Trees ..... 35
2.3.5 Sensitivity Analysis ..... 39
2.4 Monte Carlo Approach to Simulation ..... 43
2.5 Investment Decisions under Capital Constraints and Capital Rationing ..... 47
2.6 Corporate Cost of Capital ..... 49

**Topic** **Page No.**

2.6.1 Divisional Cost of Capital, Pure Play Technique, Accounting Beta ..... 49

- Short Questions Answer ..... 53 - 55
- Exercise Problems ..... 56 - 57
- Choose the Correct Answer ..... 58 - 59
- Fill in the blanks ..... 60 - 60

**UNIT - III**

3.1 Real Options, the Timing of Options ..... 61

3.2 Project Abandonment Decisions ..... 63

3.3 IRR ..... 65

3.4 Multiple IRR ..... 70

3.5 Modified IRR ..... 71

3.6 Pure, Simple and Mixed investments ..... 78

3.7 Adjusted NPV ..... 80

3.8 Impact of Inflation on Capital Budgeting Decisions ..... 83

3.9 Pay Back Period ..... 85

3.9.1 Discounted Pay back, Post Pay Back, Surplus Life and Surplus Pay Back, Bail Out Pay Back ..... 85

3.10 Return on Investment ..... 99

3.11 Terminal Value ..... 102

3.12 Single Period Constraints, Multi-Period Capital Constraint, and An Unresolved Problem ..... 104

3.13 NPV Mean Variance Analysis ..... 108

3.14 Hertz Simulation ..... 108

3.15 Hillier Approaches ..... 112

- Short Questions Answer ..... 119 - 121
- Exercise Problems ..... 122 - 123
- Choose the Correct Answer ..... 124 - 125
- Fill in the blanks ..... 126 - 126

**Topic** **Page No.**

## UNIT - IV


4.1 Capital Structure and Value Creation ..... 127

4.2 Signaling Theory ..... 129

4.3 Tools for Developing an Effective Capital Structure ..... 130

4.4 Financial Flexibility and Financial Discipline ..... 130

4.5 Capital Structure Puzzle ..... 132

4.6 Dividend Policy and Firm Value ..... 132

4.7 Linter's Dividend Model, Its Salient Features ..... 134

4.8 Dividend Puzzle ..... 135

4.9 Buy Back of Shares and its Characteristics ..... 137

4.9.1 Modes and Methods of Buy Back of Shares ..... 137

4.9.2 Reasons, Benefits and Constraints to Buy Back of Shares ..... 138

4.9.3 Impacts of Share Buybacks ..... 138

4.9.4 SEBI Regulations ..... 139

4.10 Financial Distress and Restructuring ..... 139

4.10.1 Characteristics ..... 139

4.10.2 Causes of Financial Distress ..... 140

4.10.3 Costs of Financial Distress ..... 141

4.10.4 Impacts of Financial Distress ..... 141

4.10.5 Financial Distress Restructuring ..... 142

4.11 The Insolvency and Bankruptcy Code 2016 ..... 142

4.12 Corporate Insolvency Resolution Process ..... 144

4.13 Liquidation Process ..... 145

- Short Questions Answer ..... 146 - 147
- Choose the Correct Answer ..... 148 - 149
- Fill in the blanks ..... 150 - 150

**Topic** **Page No.**

## UNIT - V


5.1 Mergers and Acquisitions ..... 151

5.1.1 Need ..... 151

5.2 Mergers and Acquisitions Strategy ..... 153

5.3 Diversification ..... 158

5.4 Theories of Mergers ..... 160

5.5 Types of Mergers ..... 162

5.6 Cost of Mergers ..... 163

5.7 Government Guidelines for Takeover ..... 164

5.8 Problems on Mergers and Acquisitions ..... 166

5.9 Mergers and Acquisition Cases ..... 174

5.10 Value-Based Management ..... 175

5.10.1 Introduction ..... 175

5.10.2 Elements and Importance of Value-based Management ..... 176

5.10.3 Approaches to Value-based Management ..... 176

5.10.3.1 Marakon ..... 176

5.10.3.2 Alcar ..... 177

5.10.3.3 McKinsey ..... 178

5.10.3.4 BCG ..... 179

5.10.3.5 Economic Value Added ..... 179

5.10.4 Market Value Added ..... 184

5.10.5 Cash Value Added ..... 184

- Short Questions Answer ..... 186 - 188
- Exercise Problems ..... 189 - 189
- Choose the Correct Answer ..... 190 - 191
- Fill in the blanks ..... 192 - 192

# Frequently Asked & Important Questions

## UNIT - I

**1. Define Strategic Financial Management. Explain the nature of Strategic Financial Management.**

*Ans :* **(Imp.)**

Refer Unit-I, Page No. 1, Q.No. 1

**2. Explain the Scope and Importance of Strategic Financial Management.**

*Ans :* **(Imp.)**

Refer Unit-I, Page No. 2, Q.No. 3

**3. Discuss the various elements of strategic financial management.**

*Ans :* **(Imp.)**

Refer Unit-I, Page No. 3, Q.No. 4

**4. Explain the Success Factors of Strategic Financial Management.**

*Ans :* **(Imp.)**

Refer Unit-I, Page No. 4, Q.No. 5

**5. Explain the Constraints in Strategic Financial Management.**

*Ans :* **(Imp.)**

Refer Unit-I, Page No. 5, Q.No. 6

**6. Explain the process of Financial Planning.**

*Ans :* **(Imp.)**

Refer Unit-I, Page No. 9, Q.No. 13

**7. Define Agency Theory. Explain different types of Agency Theory.**

*Ans :* **(Imp.)**

Refer Unit-I, Page No. 13, Q.No. 19

## UNIT - II

**1. Define Risk and Uncertainty. How are they different from each other.**

*Ans :* **(April-23, Imp.)**

Refer Unit-II, Page No. 19, Q.No.

**2. Explain briefly about various criteria involved in the process of decision making under risk.**

*Ans :* **(Oct.-22, Imp.)**

Refer Unit-II, Page No. 21, Q.No. 2

**3. Explain briefly about various criteria involved in the process of decision making under Uncertainity.**

*Ans :* **(Imp.)**

Refer Unit-II, Page No. 23, Q.No. 3

**4. Explain briefly about certainty equivalent approach.**

*Ans :* **(Dec.-19, Imp.)**

Refer Unit-II, Page No. 30, Q.No. 6

**5. A project with an initial cash outflow of Rs. 100 Lakhs is expected to have cash flows of Rs. 65 Lakhs, Rs. 60 Lakhs, Rs. 55 Lakhs and Rs. 50 Lakhs over its life at the end of 1st, 2nd, 3rd and 4th year respectively. The cost of capital is 10%. If the certainty equivalents of the cash flows are taken as 80%, 70%, 60% and 50% respectively for 1 to 4 years, is it worthwhile to undertake the project?**

*Sol :* **(Oct.-22, Imp.)**

Refer Unit-II, Page No. 32, Prob. 7

**6. Define decision tree. Explain the steps involved in decision tree approach.**

*Ans :* **(Imp.)**

Refer Unit-II, Page No. 35, Q.No. 8

**7. What is a sensitivity analysis? Explain its impact on project investment decisions.**

*Ans :* **(Sep.-23, May-19, Imp.)**

Refer Unit-II, Page No. 39, Q.No. 9

**8. A project, with an initial investment of Rs. 15 crores gives an annual cash flow of Rs. 5.5 crores per annum for 4 years. The cost of capital for the project is 14%. The annuity factor for 4 years @ 14% is 2.9137 and @ 18% for 4 years is 2.6667. Calculate sensitivity for,**

**(i) Project cost,**

**(ii) Annual cash flow and**

**(iii) Cost of capital. Which of the above three variable is more sensitive?**

Refer Unit-II, Page No. 40, Prob. 13

**9. Briefly discuss the procedure for simulation analysis.**

*Ans :* **(Aug.-21, Imp.)**

Refer Unit-II, Page No. 45, Q.No. 12

**10. How can investment decisions be taken under Capital Constraints.**

*Ans :* **(Sep.-23, Imp.)**

Refer Unit-II, Page No. 48, Q.No.16

**11. A company has an equity beta of 2.00, cost of debt of 7%, D/E ratio of 0.35, and the tax rate of 35%. Risk Free rate 1.25% and Market premium 8%.**

| Name | Equity Beta | Kd | D/E | Tax |
|---|---|---|---|---|
| Competitor | 11.5 | 7.50% | 0.4 | 35% |
| Competitor | 22.5 | 8.00% | 0.3 | 40% |

**Calculate the cost of capital of the company using Pure Play Approach.**

*Sol:* **(Imp.)**

Refer Unit-II, Page No. 50, Prob.17

## UNIT - III

**1. Explain briefly about abandonment decision of a capital budgeting process.**

*Ans :* **(Sep.-23, Oct.-22, Aug.-21, Imp.)**

Refer Unit-III, Page No. 63, Q.No. 3

**2. Explain the concept of Multiple IRR with an example.**

*Ans :* **(Oct.-22, Dec.-19, Imp.)**

Refer Unit-III, Page No. 70, Q.No. 5

**3. Define modified IRR. Explain the procedure for calculating the modified IRR.**

*Ans :* **(Sep.-20, Dec.-19, Imp.)**

Refer Unit-III, Page No. 71, Q.No. 6

**4. Explain the different types of investments.**

*Ans :* **(Dec.-19, May-19, Imp.)**

Refer Unit-III, Page No. 78, Q.No. 8

**5. Differentiate among simple, pure and mixed investments.**

*Ans :* **(Dec.-19, Imp.)**

Refer Unit-III, Page No. 79, Q.No. 9

**6. What is "Adjusted NPV"? What for it is calculated?**

*Ans :* **(Oct.-22, Dec.-19, Imp.)**

Refer Unit-III, Page No. 80, Q.No. 11

**7. The expected cash flows of a project are as follows:**

| Year | Cash flow (`) |
|---|---|
| 0 | 10,00,000 |
| 1 | 2,00,000 |
| 2 | 3,00,000 |
| 3 | 4,00,000 |
| 4 | 5,00,000 |
| 5 | 3,00,000 |

**The cost of capital is 12 percent. Calculate:**

**(a) Benefit cost ratio.**

**(b) MIRR**

**(c) The discounted payback period.**

*Sol :* **(Aug.-21, Imp.)**

Refer Unit-III, Page No. 91, Prob. 15

---

**8. X company is considering two projects M & N, each of which require an initial outlay of Rs.50 lakhs. The expected cash inflows from these projects are:**

| Year | Project M | Project N |
|---|---|---|
| 1 | 12 | 37 |
| 2 | 18 | 24 |
| 3 | 33 | 19 |
| 4 | 36 | 12 |

**a) What is the PBP for each of the project?**

**b) If the two projects are mutually exclusive and the cost of capital is 15%. Which project should the firm invest in?**

**c) If cost of capital is 14%, What is the modified IRR of each project?**

*Sol :* **(Sep.-23, Imp.)**

Refer Unit-III, Page No. 95, Prob. 17

---

**9. The expected cash flows of a project are as follows:**

| Year | Cash flow Rs. |
|---|---|
| 0 | –12,00,000 |
| 1 | 5,00,000 |
| 2 | 4,00,000 |
| 3 | 4,00,000 |
| 4 | 5,00,000 |
| 5 | 3,00,000 |

**The cost of capital is 12 percent. Calculate**

**(a) Calculation of MIRR**

**(b) The discounted payback period.**

*Sol :* **(April-23, Imp.)**

Refer Unit-III, Page No. 97, Prob. 19

---

**10. Explain briefly about Hertz simulation ? Elaborate the process of Hertz simulation.**

*Ans :* **(Sep.-23, Sep.-20, Dec.-19, Imp.)**

Refer Unit-III, Page No. 108, Q.No. 24

**11. How is the standard deviation of NPV defined by Hillier model if the cashflows different years perfectly correlated.**

*Ans :* **(Sep.-23, Oct.-22, Aug.-21, May-19)**

Refer Unit-III, Page No. 112, Q.No. 25

## UNIT - IV

**1. What is Capital Structure? Explain the importance of Capital Structure.**

*Ans :* **(Imp.)**

Refer Unit-IV, Page No. 127, Q.No. 1

**2. Explain the factors determining capital structure.**

*Ans :* **(Imp.)**

Refer Unit-IV, Page No. 127, Q.No. 2

**3. Explain the determinants of dividend policy in a fast growing company. Should there be a dividend freeze?**

*Ans :* **(Imp.)**

Refer Unit-IV, Page No. 133, Q.No. 10

**4. Discuss the salient features of Linter's Dividend Model.**

*Ans :* **(Imp.)**

Refer Unit-IV, Page No. 134, Q.No. 12

**5. What are the assumptions and arguments used by Modigliani and Miller in support of the irrelevance of dividends? Are dividends really irrelevant ? Discuss.**

*Ans :* **(Imp.)**

Refer Unit-IV, Page No. 135, Q.No. 14

**6. Define Buy Back of Shares. Explain the characteristics of Buy Back of Shares.**

*Ans :* **(Imp.)**

Refer Unit-IV, Page No. 137, Q.No. 15

**7. Define Financial Distress. Explain the Characteristics of Financial Distress.**

*Ans :* **(Imp.)**

Refer Unit-IV, Page No. 139, Q.No. 20

**8. What is Insolvency and Bankruptcy Code? State the objectives of IBC.**

*Ans :* **(Imp.)**

Refer Unit-IV, Page No. 142, Q.No. 25

**9. Explain the process of Corporate Insolvency Resolution.**

*Ans :* **(Imp.)**

Refer Unit-IV, Page No. 144, Q.No. 28

## UNIT - V

**1. Define Merger and Acquisitions. Explain the reasons for merger.**

*Ans :* **(Sep.-20, Dec,-19, Imp.)**

Refer Unit-V, Page No. 151, Q.No. 1

**2. Outline the detailed steps involved in analyzing and planning a prospective merger from the stand point of the acquiring firm.**

*Ans :* **(April-23, Imp.)**

Refer Unit-V, Page No. 154, Q.No. 6

**3. Discuss the issues that arises while dealing with mergers.**

*Ans :* **(Imp.)**

Refer Unit-V, Page No. 155, Q.No. 8

**4. Compare and contract between mergers and acquisitions.**

*Ans :* **(Dec.-19, May-19, Imp.)**

Refer Unit-V, Page No. 156, Q.No. 9

**5. Evaluate the payment methods in mergers and acquistions.**

*Ans :* **(Sep.-23, Imp.)**

Refer Unit-V, Page No. 156, Q.No. 10

**6. Explain the advantages and disadvantages of mergers and acquisitions.**

*Ans :* **(Sep.-20, Imp.)**

Refer Unit-V, Page No. 157, Q.No. 11

**7. Explain the various theories of mergers?**

*Ans :* **(Dec.-18, Imp.)**

Refer Unit-V, Page No. 160, Q.No. 16

**8. Describe the different types of Mergers, with suitable examples.**

*Ans :* **(Oct.-22, Sep.-20, Dec.-19, Imp.)**

Refer Unit-V, Page No. 162, Q.No. 17

**9. Critically examine the role of government in avoiding the hostile takeovers**

*Ans :* **(May-19, Imp.)**

Refer Unit-V, Page No. 164, Q.No. 19

**10. Company A plans to acquire Company B. The relevant financial details of the two firms, prior to merger announcement, are given below:**

| Particulars | Company A | Company B |
|---|---|---|
| Market price per share in rupees | 60 | 25 |
| Number of shares | 3,00,000 | 2,00,000 |

**The merger is expected to bring gains which have a present value of Rs.40 lakhs. Company A offers one share in exchange for every two shares of Company B.**

**a) What is the true cost of Company A for acquiring Company B?**

**b) What is the net present value of the merger to Company A?**

**c) What is the net present value of the merger to Company B?**

*Sol :* **(Aug.-21, Imp.)**

Refer Unit-V, Page No. 169, Prob. 4

**11. Given below is the financial data of two companies Company 'A' and Company 'B', Company 'A' is acquiring Company 'B' by exchanging its shares on a one-to-one basis for Company 'B'. The exchange ratio is based on the market prices of the shares of the two companies.**

| Particulars | Company 'A' | Company 'B' |
|---|---|---|
| Earning after taxes (Rs.) | 10,00,000 | 7,00,000 |
| Equity shares outstanding (Number) | 4,00,000 | 2,00,000 |
| Earning per share (Rs) | 2.50 | 3.50 |
| Price earnings ratio (P/E) | 14 | 10 |
| Market price per ratio (Rs) | 35 | 35 |

**You are required to calculate the following after Acquisition/Merger:**

**(i) EPS (Post merger)**

**(ii) Change in EPS for the shareholders of the companies 'A' and 'B'**

**(iii) Market value of the firm, post-merger (Assuming that P/E ratio of the company 'A'; remains unchanged)**

**(iv) Profit accruing to shareholders of both the firms.**

*Sol :* **(Oct.-22, Imp.)**

Refer Unit-V, Page No. 170, Prob. 5

**12. Explain Alcar approaches to value-based management.**

*Ans :* **(Imp.)**

Refer Unit-V, Page No. 177, Q.No. 24

**13. Explain BCG approach to value-based management.**

*Ans :* **(Imp.)**

Refer Unit-V, Page No. 179, Q.No. 26

**14. Define Economic Value Added. Explain various steps for the calculation of Economic Value Added.**

*Ans :* **(Imp.)**

Refer Unit-V, Page No. 179, Q.No. 27

UNIT I

**Financial Strategy and Planning:** Strategic approach to Financial Management, Definition, Characteristics, Scope and Importance of Strategic Financial Management. Success Factors and Constraints to Strategic Financial Management. Financial Forecasting, Techniques, Financial Planning Process, Decision-making and Problem-solving process. Agency Theory, Agency Costs, Constituents and Criticism of Agency Theory.

## 1.1 Strategic Approach to Financial Management

### 1.1.1 Definition

**Q1. Define Strategic Financial Management. Explain the nature of Strategic Financial Management.**

*Ans :* **(Imp.)**

**Introduction**

All organisations require financial management for its successful operations. It contains components for the acquisition, management, allocation and financing of resources for successful growth of an organisation. Every organisation should manage its finances effectively in order to attain its mission and goals. Recently, the fields of strategic management and financial management combined together to evolve a new discipline namely Strategic Financial Management.

**Meaning**

Strategic Financial Management refers to the study of finance with a long term perspective which takes into account the strategic goals of the enterprise. Strategic Financial management is a management approach which makes use of various financial tools and techniques in order to come up with a strategic decision plan.

**Definition**

The Chartered Institute of Management Accountants of UK (CIMA) defines strategic financial management as "the identification of the possible strategies capable of maximizing an organization's net present value, the allocation of scarce capital resources between competing opportunities and the implementation and monitoring of the chosen strategy so as to achieve stated objectives.

Strategy + Finance + Management = Fundamentals of Business

**Nature**

i) It is concerned with the long term management of fund with a strategic perspective

ii) It aims at maximization of profit and wealth of the concern

iii) It is both structured as well as flexible

iv) It promotes growth, profitability and existence of the firm in the long run and maximises shareholder value

v) It is an evolving and continuous process that constantly tries to adopt and revise strategies in order to achieve strategic financial objectives of the firm.

vi) It involves innovative, creative and multidimensional approach for finding solutions to the problems.

vii) It helps to formulate appropriate strategies and facilitates constant monitoring of action plans to match with the long term objectives.

viii) It makes use of analytical financial techniques with qualitative and quantitative judgment on factual information

ix) It is result oriented combining of resources, especially of financial and economic resources

x) Strategic financial management offers a number of solutions while analysing the problems in the organisational context

### 1.1.2 Characteristics

**Q2. Explain the characteristics of Strategic Financial Management.**

*Ans :*

**Characteristics of Strategic Financial Management**

The following are some characteristics of strategic financial management that distinguish it from other types of financial management.

i) It manages to be both organized and adaptable at the same time.

ii) It is concerned with the administration of the fund over the long term, taking a long-term perspective.

iii) When dealing with factual information, it employs analytical financial tools in conjunction with qualitative and quantitative judgement to arrive at a conclusion.

iv) As a result, it contributes to the long-term growth, profitability, and survival of the organization as well as the maximization of shareholder value.

v) It aids in the formulation of appropriate strategies as well as the ongoing monitoring of action plans to ensure that they are in line with long-term objectives and objectives.

vi) It entails approaching problem solving with an inventive, creative, and multifaceted approach in order to identify solutions.

vii) While assessing the challenges in the context of the organization, strategic financial management can identify a number of potential solutions that can be implemented.

viii) This approach is distinguished by the use of result-oriented resource combination, particularly in the case of financial and economic resources.

ix) In order to achieve its strategic financial objectives, the business must adopt and update strategies on a regular basis, which is a developing and ongoing process.

x) The primary goals of the organization are the maximization of profit and wealth for its shareholders.

### 1.1.3 Scope and Importance of Strategic Financial Management

**Q3. Explain the Scope and Importance of Strategic Financial Management.**

**(OR)**

**Discuss the scope of strategic financial management.**

**(OR)**

**Enumerate the importance of strategic financial management.**

*Ans :*

**Scope**

**i) Strategic investment management decisions**

It involves decisions related to the long-term benefits. Capital budgeting techniques are available to analyze risk and return level, using a number of methods.

**ii) Strategic financing management decisions**

It takes into account the amount of funds required in the longrun.in this how much debts and fixed sources of funds arc to be considered.

**iii) Strategic liquidity management decisions**

This decision are important as a firm has to maintain cash reserves for future and contingencies. If the liquidity is not there, then firm may face financial agony.

**iv) Strategic value creation of firm**

It enhances the market status of the firm consistently well performing companies win the trust of existing as well as potential stakeholders or investors. This increases the worth of companies share in capital market.

**v) Strategic profitability management**

A company cannot sustain in future unless and until consisted adequate profits are planned and generated. The source of revenue is pre-decided.

**Importance**

**i) Helps in detecting the requirements of capital in the business**

The first and foremost function of financial management is that it initially estimates the finance needed for the smooth running and functioning of the business. This is one of the primary duties of financial managers. The finance requirements of every business will vary due to the size of the operation, their profit target, and various other objectives and mission.

**ii) Helps in deciding the composition of the capital structure**

Once the capital requirements of the business are calculated, now the next function that needs to completed by the financial manager is deciding what type of capital structure should be there. This basically involves the choices between the short-term and long-term sources of funds and also takes into consideration the cost involved in the raising of this finance.

**iii) Helps in choosing right source of funds**

As there is a different source of raising funds are available in the market. This step simply aims at choosing the most appropriate and accurate one. The common types of fundraising methods are raising funds through issuing shares & debentures, loans from the financial institution, or through the issuance of securities like bonds.

**iv) Allocating and investing in finance raised**

After raising of the funds, they are invested in various means that are revenue-generating and are also in line with the objectives and goals of the business.

**v) Utilization of the surplus amount**

It is concerned with a decision regarding the profit generated by the business and how it should be utilized and there are basically two options available for this profit utilization that are either excess profit should be used for distribution as a dividend or for the retained earnings depending on the future plans of the company.

**f) Managing cash expenses**

This simply means management of the cash so that neither of the expense goes out of the budget. It consists of various expenses where cash payments are to be made like salaries and wages payments, and expenses of water and electricity bills, and also the amount required for the purchase of the raw materials, etc.

**g) Controlling**

It is one of the important function as it is the one which plays a very effective role in the accomplishment of the goals and objectives of the business. It makes sure that whether all the activities are going in accordance with the pre-decided plans and if not accurate control measures are taken.

---

**Q4. Explain the elements of Strategic Financial Management.**

**(OR)**

**Discuss the various elements of strategic financial management.**

*Ans :* **(Imp.)**

A company will select to apply strategic financial management throughout the company. It often involves designing the elements which will increase the financial resources of the company and using them efficiently. The organization needs to be creative since there is no standard approach for strategic management. Every company will have to be creative and devise their strategy. It also devices its elements that reflect their needs and their vision and mission.

However, the following are a few of the common elements of financial management:

**1. Planning**

Define your financial objectives clearly and precisely. Identify the available as well as potential resources which will be helpful in your financial management. Write a specific business plan.

**2. Budgeting**

The company should form a budget that will function with proper financial efficiency and should have minimum waste. Point Out the areas which have the most expenditure and exceed the budget. Ensure that enough liquidity is present to cover the operating payments without using any external sources. Uncover the specific areas in the company which should invest to achieve the goal more efficiently.

**3. Management and assessment of risk**

The financial manager should identify, properly analyze, and take steps to mitigate the uncertainty in the decisions related to investment. You have to revisit all the potential for financial exposure and examine the capital expenditures as well as the workplace policies. Also, the risk metrics, such as standard deviation and value at risk strategies, should be assessed.

**4. Establishment of ongoing procedures**

Collect and analyze the data and make the financial decisions that are consistent with your vision and mission. Variants if any should be tracked and analyzed, which is the difference between actual and budgeted results. Identify the problems and take appropriate actions to rectify them.

Finance function happens in the deep recesses of the "backroom'' but it is the oxygen to an organization's short and long term health. In today's changing world there should be minute details and projections regarding investments made, costs incurred, potential cash flows and profits to implement a strategy to its fullest potential. Hence, Finance as a function is required at every stage to execute a strategy.

## 1.2 Success Factors and Constraints to Strategic Financial Management

**Q5. Explain the Success Factors of Strategic Financial Management.**

*Ans :* **(Imp.)**

Success Factors in Strategic Financial Management:

**1. Financial Expertise**

Successful strategic financial management requires a strong foundation of financial expertise. Finance professionals who understand financial statements, financial ratios, and financial analysis tools are better equipped to make informed decisions. They can identify financial risks, evaluate investment opportunities, and develop strategies that optimize the organization's financial performance.

**2. Strategic Alignment**

Strategic financial management is most effective when it is closely aligned with the organization's strategic objectives. Financial plans and decisions should support the organization's long-term goals and be integrated into the overall strategic planning process. This alignment ensures that financial management decisions are consistent with the organization's mission and vision, leading to better overall performance.

**3. Risk Management**

Effective risk management is a critical success factor in strategic financial management. Organizations must identify potential risks, such as market fluctuations, regulatory changes, or operational issues, and develop strategies to mitigate them. By proactively managing risks, organizations can minimize negative impacts, protect their financial stability, and enhance overall success.

**4. Decision-making**

The quality of decision-making plays a significant role in the success of strategic financial management. Finance professionals must have access to accurate and timely information, analyze data objectively, and consider multiple perspectives before making decisions. By using data-driven decision-making processes, organizations can reduce the risk of biased or flawed decisions, leading to better financial outcomes.

**5. Communication and Collaboration**

Successful strategic financial management requires effective communication and collaboration across different departments and stakeholders. Finance professionals should work closely with operational managers, business unit leaders, and other key stakeholders to understand their needs, align financial objectives with business goals, and ensure that financial decisions are well-aligned and supported. Constraints of Strategic Financial Management:

**6. Limited Resources**

One of the primary constraints of strategic financial management is the limited availability of resources. Organizations often face constraints in terms of financial capital, human resources, and technological capabilities. These limitations can hinder the ability to pursue certain investment opportunities or implement strategies that could significantly benefit the organization.

**7. Uncertainty and Complexity**

The financial landscape is characterized by uncertainty and complexity, with changes in regulations, technological advancements, and market dynamics. Finance professionals face challenges in predicting future trends, assessing risk, and making decisions in an environment where information is constantly evolving. This uncertainty can lead to hesitancy in making strategic financial decisions, potentially constraining the organization's ability to adapt and compete effectively.

**8. Organizational Culture**

The organizational culture can have a significant impact on strategic financial management. A lack of financial awareness or a resistance to financial management practices among non-financial managers can hinder the effectiveness of strategic financial decisions. Additionally, a hierarchical organizational structure or a lack of decision-making authority for finance professionals can restrict their ability to make timely and effective financial decisions.

**9. Regulatory Environment**

The regulatory environment for financial institutions is complex and ever-changing, with numerous regulations and compliance requirements. Compliance with these regulations can be time-consuming and costly, requiring significant resources and attention from finance professionals. The constraints imposed by regulatory requirements can limit the flexibility of strategic financial management, as organizations must navigate a maze of rules and restrictions.

**10. Lack of Skilled Personnel**

The shortage of skilled finance professionals is a significant constraint in strategic financial management. Organizations may face challenges in attracting and retaining talented individuals with the necessary expertise in financial analysis, risk management, and strategic planning. The lack of qualified personnel can hinder the ability to make informed decisions, implement effective financial strategies, and adapt to changing market conditions. Strategic financial management plays a crucial role in the success of organizations by making informed decisions about investments, financing options, and risk management.

**Q6. Explain the Constraints in Strategic Financial Management.**

*Ans :*

**i) Expensive**

Developing a strategy is not an easy task. It cannot be done by operational managers who run the day-to-day operations of a firm. In order to develop a long-term financial strategy and to align it with the overall strategy of the company, managers with different skill sets need to be hired.

**ii) Time Consuming**

The designing of the financial strategy of an organization is not the task that can be performed by a single department. The behaviors and objectives of the entire organization need to be aligned in order for the strategy to be effective. This means that the implementation of strategic finance requires time from line managers, the human resources department, the marketing department, and other such departments within the organization.

Companies where strategic management has been implemented often complain that this philosophy takes away a lot of their time and hence the daily productivity of employees is negatively impacted.

**iii) Less Accuracy**

The entire philosophy of strategic financial management is based on making predictions about events that are far away in the future. Typically, strategic financial management makes decisions based on their perception of how the external environment will be two decades from the current date.

**iv) Conflicting Goals**

The major issue with strategic management is that a lot of the time, short-term goals conflict with long-term goals. In theory, the answer is simple and the organization must focus on the long-term goals of organization. However, in practice, this is easier said than done. Companies often face a lot of pressure from their shareholders to deliver results every quarter.

**v) Impedes Flexibility**

Lastly, strategy is about choosing certain goals. If certain goals are chosen, that also automatically means that certain other goals have been excluded. The exclusion of these goals limits the agility of an organization.

## 1.3 FINANCIAL FORECASTING

### 1.3.1 Techniques

**Q7. Define Financial Forecasting. Explain the importance of Financial Forecasting.**

*Ans :* **(Imp.)**

**Meaning**

Financial forecasting refers to financial projections performed to facilitate any decision-making relevant for determining future business performance. The financial forecasting process includes the analysis of past business performance, current business trends, and other relevant factors.

**Importance**

**i) Annual budget planning**

A budget represents your business' cash flow, financial positions, and future goals and expectations for a set fiscal period. Financial forecasting and planning work in tandem, as forecasting essentially offers an insight into your business' future-these insights help make budgeting accurate.

**ii) Establishing realistic business goals**

Accurate forecasting will help predict whether (and by how much) your business will grow or decline. As such, you can set realistic and achievable goals-and manage your expectations.

**iii) Identifying problem areas**

Financial forecasting can help you identify ongoing problems by analyzing the business' past performance.

**Q8. Explain different types of Financial Forecasting.**

*Ans :* **(Imp.)**

**Types**

Businesses conduct financial forecasting for varying purposes. Consequently, forecasting practices are categorized into four types:

**1. Sales forecasting**

Sales forecasting entails predicting the amounts of products/services you expect to sell within a projected fiscal period. There are two sales forecasting methodologies: top-down forecasting and bottom-up forecasting.

Sales forecasting has many uses and benefits, including budgeting and planning production cycles. It also helps companies manage and allocate resources more efficiently.

**2. Cash flow forecasting**

Cash flow forecasting entails estimating the flow of cash in and out of the company over a set fiscal period. It's based on factors such as income and expenses. It has many uses and benefits, including identifying immediate funding needs and budgeting. However, it is worth noting that cash flow financial forecasting is more accurate over a short term.

**3. Budget forecasting**

As a financial guide for your business' future, a budget creates certain expectations about your company's performance. Budget forecasting aims to determine the ideal outcome of the budget, assuming that everything proceeds as planned. It relies on the budget's data, which relies on financial forecasting data.

**4. Income forecasting**

Income forecasting entails analyzing the company's past revenue performance and current growth rate to estimate future income. It is integral to doing cash flow and balance sheet forecasting. Additionally, the company's investors, suppliers, and other concerned third parties use this data to make crucial decisions. For example, suppliers use it when determining how much to credit the company in supplies.

## 1.4 FINANCIAL PLANNING

**Q9. Define Financial Planning. Explain the objectives of Financial Planning.**

*Ans :* **(Imp.)**

**Meaning**

Financial Planning is the process of estimating the capital required and determining it's competition. It is the process of framing financial policies in relation to procurement, investment and administration of funds of an enterprise.

**Objectives**

**i) Determining capital requirements**

This will depend upon factors like cost of current and fixed assets, promotional expenses and long-range planning. Capital requirements have to be looked with both aspects: short-term and long-term requirements.

**ii) Determining capital structure:** The capital structure is the composition of capital, i.e., the relative kind and proportion of capital required in the business. This includes decisions of debt-equity ratio- both short-term and long- term.

**iii) Framing:** Financial policies with regards to cash control, lending, borrowings, etc.

**iv)** A finance manager ensures that the scarce financial resources are maximally utilized in the best possible manner at least cost in order to get maximum returns on investment.

**Q10. Explain the characteristics of financial planning.**

*Ans :*

A Financial manager should consider the following factors while finalizing a financial plan:

**1. Simplicity**

A financial plan should be so simple that it may be easily understood even by a layman. A complicated financial structure creates complications and confusion.

**2. Based on Clear-cut Objectives**

Financial planning should be done by keeping in view the overall objectives of the company. It should aim to procure funds at the lowest cost so that profitability of the business is improved.

**3. Less Dependence on Outside Sources:**

A long-term financial planning should aim to reduce dependence on outside sources. This can be possible by retaining a part of profits for ploughing back. The generation of own funds is the way of financial operations. In the beginning, outside funds may be a necessity but financial planning should be such that dependence on such funds may be reduced in due course of time.

**4. Flexibility**

The financial plan should not be rigid. It should allow a scope for adjustments as and when new situations emerge. There may be a scope for raising additional funds if fresh 12 opportunities occur. Similarly, idle funds, if any, may be invested in short-term and low-risk bearing securities. Flexibility in a plan will be helpful in coping with the demands of the future.

**5. Solvency and Liquidity:**

Financial planning should ensure solvency and liquidity of the enterprise. Solvency requires that short-term and long-term payments should be made on dates when these are due. This will ensure credit worthiness and goodwill to the concern.

Solvency will be possible when liquidity of assets is maintained. There should be sufficient funds whenever payments are to be made. Proper forecasting of future payments will be helpful in planning liquidity.

**6. Cost**

The cost of raising capital is an important consideration in selecting a financial plan. The selection of various sources should be such that the cost burden should be minimum. As and when possible interest bearing securities should be returned so that this burden is reduced.

**7. Profitability**

A financial plan should adjust various securities in such a way that profitability of the enterprise is not adversely affected. The interest bearing securities and other liabilities should be so adjusted that business is able to improve its profitability.

**8. Varying Risks**

A financial plan should provide for ventures with varying degrees of risks so that it might enable a corporation to achieve substantial earnings from risky adventures.

**9. Planning Foresight**

Foresight is essential for any plan of business operations so that capital requirements may be assessed as accurately as possible.

**10. Practical**

A plan should be such that it should serve a practical purpose. It should be realistic and capable of being put to intensive use. But a proper balance between fixed and working capital should be maintained.

**11. Implementation**

A firm should see to it that plans are actually carried out. The data should be available with the plans at any level in detail and in a certain frequency. This would enable a firm to take a timely and corrective action, whenever necessary.

**Q11. Explain the importance of Financial Planning.**

*Ans :*

Sound financial planning is essential for the success of any business enterprise. It will provide policies and procedures to achieve close coordination between the various functional areas of business. This will lead to the minimization of wastage of resources. Management can follow an integrated approach to the formulation of financial policies, procedures, and programmes only if there is a sound financial plan.

The important benefits of financial planning to a business are discussed below:

i) Financial planning provides policies and procedures for the sound administration of the finance function.

ii) Financial planning results in the preparation of plans for the future. Thus, new projects could be undertaken smoothly.

iii) Adequate funds have to be ensured.

iv) Financial Planning helps in ensuring a reasonable balance between outflow and inflow of funds so that stability is maintained.

v) Financial Planning ensures that the suppliers of funds are easily investing in companies which exercise financial planning.

vi) Financial Planning helps in making growth and expansion programs which help in long-run survival of the company.

vii) Financial planning ensures required funds from various sources for the smooth conduct of business.

viii) Uncertainty about the availability of funds is reduced. It ensures the stability of business operations.

ix) Financial planning attempts to achieve a balance between the inflow and outflow of funds. Adequate liquidity is ensured throughout the year. This will increase the reputation of the company.

x) Cost of financing is kept to the minimum possible and scarce financial resources are used judiciously.

xi) Financial planning serves as the basis of financial control. The management attempts to ensure utilization of funds in tune with the financial plans.

xii) Financial Planning reduces uncertainties with regards to changing market trends which can be faced easily through enough funds, and.

xiii) Financial Planning helps in reducing the uncertainties which can be a hindrance to the growth of the company. This helps in ensuring stability and profitability in concern.

**Q12. Explain the principles governing a financial plan.**

*Ans :*

**Principles Governing a Financial Plan**

Following Principles need to be taken note of by preparing a financial Plan:

**1. Simplicity**

A Financial Plan should envisage simple structure capable of being-managed easily and use minimum types of securities.

**2. Long-term View**

The management should keep in view the long term needs of the orgnisation for obtaining capital rather than easiest way.

**3. Foresight**

Even though, difficult, Technological Improvements, demand forecast, resource availability and other secular changes in future years should be kept in view while. Drafting the financial plan.

**4. Optimum Use**

The business should neither be starved of funds not it should have unnecessary spare funds. It should meet the genuine needs of the company.

**5. Contingencies**

A reserve to meet the contingencies is required. However the Capital should not be kept unnecessarily idle.

**6. Flexibility**

Flexibility helps in making changes or revising the plan according to pressure of circumstances.

**7. Liquidity**

Liquidity is to make available the ready cash whenever required. This will help in avoiding embarrassment to management and loss of goodwill to the organisation.

**8. Economy**

Cost involved in planning and execution of financial requirements should be minimum.

### 1.4.1 Process

**Q13. Explain the process of Financial Planning.**

*Ans :*

The financial planning process provides a roadmap for achieving financial goals. It involves several steps, from assessing the current financial situation to monitoring and adjusting the plan as needed.

**Step in Financial Planning**

1. Establishing Objectives
2. Policy Formulation
3. Forecasting
4. Formulation of Procedures

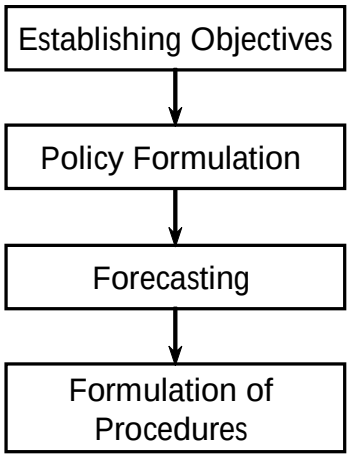



**Fig.: Process of Financial Planning**

According to Ernest W. Walker and William H. Baughn, there are four steps in financial planning:

**1. Establishing Objectives**

The financial objectives of any business enterprise is to employ capital in whatever proportion necessary to increase the productivity of the remaining factors of production over the long run. Although the extent to which capital is employed varies from firm to firm, the objective is identical in all firms. Business enterprises operate in a dynamic society, and in order to take advantages of changing economic conditions, financial planners should establish both short-term and long-run objectives. The long-run goal of any firm is to use capital in the correct proportion.

**2. Policy Formulation**

Financial policies are guides to all actions which deal with procuring, administering and disbursing the funds of business firms. These policies may be classified into several broad categories.

i. Policies governing the amount of capital required for firms to achieve their financial objectives.

ii. Policies which determine the control by the parties who furnish the capital

iii. Policies which act as a guide in the use of debt or equity capital

iv. Policies which guide management in the selection of sources of funds.

v. Policies which govern credit and collection activities of the enterprise.

**3. Forecasting**

A fundamental requisite of financial planning is the collection of 'facts' however, where financial plans concern the future, "facts" are not available. Therefore, financial management is required to forecast the future in order to predict variability of factors influencing the type of policies the enterprise formulates.

**4. Formulation of Procedures**

Financial policies are broad guides which, to be executed property, must be translated into detailed procedures. This helps the financial manger to put planned activities into practice.

**Q14. Discuss the limitations of financial planning.**

*Ans :*

**1. Difficulties in forecasting**

Plans are decisions and decisions require facts about the future. Financial plans are prepared by taking into account the expected situations in the future, which is always uncertain. Since future conditions cannot be forecasted accurately, the adaptability of planning is seriously limited. One way to offset the limitation is to improve forecasting techniques. Another way to overcome this limitation is to revise plans periodically. The development of variable plans, which take changing conditions into consideration, will go a long way in eliminating this limitation.

**2. Difficulty in change**

Another serious difficulty in planning is the reluctance or inability of the management to change a plan once it has been made, for several reasons. Assets may have to be purchased again, raw materials and cost may have to be incurred.

**3. Rapid change**

The growing mechanism of industry is bringing rapid changes in industrial processes. The methods of production, marketing devices, consumer preferences, create new demand every time. The incorporation of new changes require a change in financial plan every time. Once investments are made in fixed assets, then these decisions cannot be reversed. It becomes very difficult to adjust the financial plan for incorporating fast changing solutions. Unless a financial plan helps the adoption of new techniques, its utility becomes limited

**4. Problem of coordination**

Financial functions is the most important of all functions. Other functions also influence a decision about financial plan. While estimating financial means, production policy, personnel requirements, marketing possibilities are all taken into account. Unless there is proper coordination among all the functions, preparing of financial plan becomes difficult. Often there is a lack of coordination among different functions. Even indecision among personnel disturbs the process of financial planning.

## 1.5 Decision-making and Problem-solving Process

**Q15. Define the following terms :**

**(i) Decision-making**

**(ii) Problem-solving**

*Ans :*

To begin, let's clarify what we mean by problem solving and decision-making and how they relate to one another and why it is important to the functioning of a head teacher.

**(i) Decision-making**

Decision-making is a mechanism for making choices at ,each step of the problem solving process. This is the process of identifying and selecting a course of action from two or more courses of action to be taken to solve a problem. It can further be defined as the process through which information, ideas; objectives and knowledge are brought together for action. Decision-making is a patt of problem-solving, and decision-making occurs at every step of the problem-solving process.

**(ii) Problem-solving**

Problem solving is a set of activities designed to analysd a situation systematically and generate, implement, and evaluate solutions. This involkes the seeking of solutions to problems that arise in an institution. The problem solving process leads to formulation of decisions intended to resolve the recognized problems.

**Q16. Explain the process of Decision-making.**

*Ans :* **(Imp.)**

The process of decision making deals with a series of activities which results in the best solution to a problem. The decision making process involves seven steps which are as follows,

**Step 1:** Specifying the objectives

**Step 2:** Identifying and defining the problem

**Step 3:** Generating alternatives

**Step 4:** Evaluation of alternatives

**Step 5:** Selection of the best alternative

**Step 6:** Implementation of the action and

**Step 7:** Evaluating the results.

**Step 1: Specifying the Objectives**

The first step in the decision making process is to specify the objectives or goals of organization. Based on these objectives, the decisions relating to the actions which need to be taken by managers to accomplish the set objectives are taken.

**Step 2: Identifying and Defining the Problem**

The second step of decision making process is the identification of the problem. In this step, the management collects adequate information about the organizational processes and processes the information to diagnose and identify the problem. It is very important for managers to diagnose the real problem in the situation as this helps in resolving the problem easily and taking an effective decision.

**Step 3: Generating Alternatives**

After identifying and defining the actual problem, the manager has to gather appropriate information about the problem. Based on the gathered information, the manager can generate alternatives to solve a problem by analyzing it thoroughly. The information also helps in anticipating the results for each alternative. The manager has to find maximum possible alternatives which are available to resolve the problem. The alternatives should be clear, understandable and specific and should be able to produce a best solution for the problem identified.

**Step 4: Evaluation of Alternatives**

After generating the alternatives, the manager should evaluate them for selecting the best alternative. The possible alternatives can be evaluated by using the following methods,

**(a) Stakeholder Analysis**

In stakeholder analysis, the key aspects involved in the problem are identified and the impact of each alternative on the problem is considered.

**(b) Marginal Analysis**

In marginal analysis, the alternatives are evaluated by comparing the additional revenues generated with respect to the additional costs. The factors other than costs and revenues can also be used for evaluation.

**(c) Cost-benefit Analysis**

Marginal analysis is a traditional method and is cost consuming while cost benefit analysis is a variation of marginal analysis. In this method, the manager compares the costs and the anticipated benefits of each potential course of action. The alternative which involves low cost and high profits can be selected by the manager.

**(d) Quantitative and Qualitative Factors**

Evaluation of alternatives can also be done by considering the qualitative and quantitative factors. Qualitative factors are intangible in nature such as labor relations, risk of technological change etc., whereas quantitative factors are tangible such as the costs and benefits. These factors can be measured in terms of numbers but qualitative factors cannot be expressed in numerical terms.

By rating and comparing the outcomes of these factors, the managers can determine the importance of each alternative in solving the problem.

**Step 5: Selection of the Best Alternative**

In this stage, the actual decision is made by selecting one best course of action from the various alternatives. The managers mostly make use of three approaches for selecting the best alternative. These approaches are as follows,

**(a) Experimentation**

In this approach, the manager selects the best alternative by testing all the proposed alternative courses of action. It is the most expensive technique as it requires huge amount of money for conducting the experiments.

**(b) Experience**

In this approach, the manager selects the best alternative based on his past experience. The degree of success depends on the experience of the manager in selecting the best alternative.

**(c) Research and Analysis**

In this approach, the best alternative is selected by using various models. The important step in this approach is to build a simulation model to find the best solution among the various alternatives for the problem.

**Step 6: Implementation of the Action**

After selecting the best alternative, the action should be implemented by the manager. The implementation of an action needs the active support of the organization and employees at all levels of the organization.

This stage can have an effect on all the above stages. The errors in this stage can occur due to the lack of active participation of all the staff of the organization. This can be avoided by involving the right and capable workers and managers in the decision making.

**Step 7: Evaluation of Results**

After implementation, it is necessary to evaluate the results obtained from the action. If the results are in accordance with the specified objectives, then the decision is a successful decision. The manager should evaluate the results for controlling the performance of the organization and for measuring the performance of the decision. If any negative results occur, then the manager should reassess the decision and repeat the above steps for taking appropriate decision to resolve the problem.

**Q17. Explain various styles of decision making.**

*Ans :*

There are four styles of decision-making based on who makes the decision:

**i) Individual decision making**

In individual decision-making, the leader must make the decision alone, and input from others is limited to collecting relevant information.

**ii) Decision-making through consultation**

In consultation, the leader discusses the issue with one or more people-seeking ideas, opinions, and suggestions-and then makes a decision. The leader considers the input of others, but the final decision may or may not be influenced by it.

**iii) Group decision-making**

In this case, the leader and others work together until they reach a consensus decision. Each group member's opinion and point of view is considered. As a result of participating in the decision making, group members buy into the final decision and commit to supporting its implementation.

**iv) Delegating the decision**

When delegating a decision, the leader sets the parameters, and then allows one or more colleagues to make the final decision. Although the leader does not make the decision, he or she supports it.

**Q18. Enumerate various steps involved in problem solving.**

*Ans :* **(Imp.)**

The process of solving problems can be broken down into several stages

**1. Identify the problem**

Begin by clearly defining the problem or question that needs to be solved. This step is crucial as it sets the foundation for the entire problem-solving process.

**2. Gather information**

Collect all the relevant information and data related to the problem. This may involve conducting research, analyzing existing data, or seeking input from others. The goal is to gather as much information as possible to gain a comprehensive understanding of the problem.

**3. Analyze the information**

Once the necessary information is gathered, analyze it to identify patterns, trends, or any other relevant insights. This step helps in gaining a deeper understanding of the problem and its underlying factors.

**4. Generate possible solutions**

Based on the analysis, brainstorm and generate a list of potential solutions or approaches to address the problem. Encourage creativity and consider different perspectives during this stage.

**5. Evaluate the options**

Assess each potential solution by considering its feasibility, effectiveness, and potential impact. This evaluation process helps in narrowing down the options and selecting the most suitable solution.

**6. Choose a solution**

After careful evaluation, choose the solution that appears to be the most effective and feasible. This decision should be based on a thorough analysis of the available options.

**7. Implement the solution**

Put the chosen solution into action. This may involve creating a plan, allocating resources, and executing the necessary steps to implement the solution.

**8. Monitor and evaluate**

Continuously monitor the progress and evaluate the effectiveness of the implemented solution. This step helps in identifying any potential issues or areas for improvement.

**9. Adjust and refine**

Based on the monitoring and evaluation, make any necessary adjustments or refinements to the solution. This iterative process ensures that the solution remains effective and aligned with the desired outcomes.

**10. Reflect and learn**

Finally, reflect on the problem-solving process and learn from the experience. Identify any lessons learned or insights gained that can be applied to future problem-solving situations.

## 1.6 AGENCY THEORY

**Q19. Define Agency Theory. Explain different types of Agency Theory.**

*Ans :* **(Imp.)**

**Meaning**

Agency theory is a concept used to explain the important relationships between principals and their relative agent. In the most basic sense, the principal is someone who heavily relies on an agent to execute specific financial decisions and transactions that can result in fluctuating outcomes.

**Types**

**1. Shareholders and Company Executives**

As mentioned, the shareholder is represented by the principal. It is because the shareholder invests in an executive's business, in which the executive is responsible for making decisions that affect the shareholder's investment.

If the company executive acts negatively and reduces the worth of the shareholder's stock, it will spark a disadvantageous relationship.

On the other hand, if the company executive were to act ethically resulting in some sort of financial boost in the shareholder's stock, a positive connection will form.

**2. Investor and Fund Manager**

In such a case, the investor is the principal because they are giving a portion of their income to the fund manager to allocate on their behalf.

If the fund manager were to invest in volatile stocks and yield a return less than expected from the investor, a negative relationship begins to form.

Conversely, if the fund manager goes above and beyond and nets a profit outside of the realm of expectation, the investor praises the fund manager and there is a healthy linkage.

**3. Board of Directors and CEO**

Up in the hierarchy, the board of directors is represented by the principal because their financial position and status are decided by the CEO.

If the CEO were to make a wrong financial decision that put the organization at a deficit, the board of directors is more likely to vote against the CEO in the next election.

Oppositely, if the CEO were to introduce a new business sector that provided unprecedented innovation in the market, they would be praised by the board of directors and would likely stay in power for years to come.

The idea of agency theory is represented by the relationships expressed above.

All of the interactions and disagreements faced by both the principal and agent are what make up the entire exploration of the concept.

## 1.7 AGENCY COSTS

**Q20. What is Agency Costs? Explain different types of Agency Costs.**

*Ans :* **(Imp.)**

**Meaning**

Agency costs are costs incurred to handle agency problems. These problems occur due to conflicts between the shareholders (principal) and managers (agents). The agency costs are used to mitigate the conflicts. Usually, there should be no conflicts between principals and agents in a company setting but if shareholders think that managers are utilizing too many funds for their self-interest agency problems may arise.

**Types**

There are two broad categories of agency costs. The first arises when the managers use the company's resources for self-benefits and the second when shareholders spend money to discipline the managers.

There are two sub-types of agency costs associated with an agency problem.

**1. Direct Agency Cost**

The direct agency cost has two types:

- Corporate expenses that benefit the managers at the cost of shareholders' resources.
- The expenditure required to monitor the management team's activities so that the principal's resources stay intact and no agency problems occur in the future.

**2. Indirect Agency Costs**

The agency costs that represent lost opportunities are known as indirect agency costs. For example, the shareholders might think that undertaking a project might add value to the stock but management may think that it will lead to erosion of stock value. In the conflict, shareholders may lose a valuable and important opportunity. This is called indirect agency cost.

## 1.8 Constituents and Criticism of Agency Theory

**Q21. Explain the Constitutents and Criticism of Agency Theory.**

*Ans :*

**Constituents**

Agency theory examines the relationship between a **principal** (who hires someone) and an **agent** (who acts on the principal's behalf). It's particularly relevant in business, where shareholders (principals) entrust executives (agents) to manage the company.

**i) Principal-Agent Problem**

This core idea highlights the potential conflict of interests between principals and agents. Agents might prioritize their own goals (like job security or prestige) over the principal's goals (maximizing profit for shareholders).

**ii) Information Asymmetry**

The principal often has less information than the agent about the agent's actions and decisions. This asymmetry creates challenges in monitoring and ensuring the agent acts in the principal's best interest.

**iii) Alignment Mechanisms**

To address the principal-agent problem, various mechanisms are used to align interests. These include:

a) **Performance-based compensation:** Tying agent rewards to achieving principal goals (e.g., stock options for executives).

b) **Monitoring and bonding:** Principals monitor agent activities (e.g., audits) and require agents to invest their own resources (e.g., security deposits).

c) **Contracting:** Clearly defining expectations and consequences in contracts helps guide agent behavior.

**Criticisms**

**i) Overly Selfish Agents**

Critics argue the theory assumes agents are solely motivated by self-gain, neglecting factors like loyalty, ethics, or professional pride.

**ii) Limited Scope**

The theory might downplay the importance of social context and team dynamics in influencing agent behavior. It primarily focuses on economic incentives.

**iii) Applicability Concerns**

Critics argue the emphasis on shareholder wealth maximization might not translate well to non-profit organizations or situations where social impact is a priority.

**iv) Limited Control for Principals**

In some cases, principals might have limited control over agent actions due to factors like information asymmetry or the complexity of the agent's tasks.

**v) Focus on Short-Term Gains**

The emphasis on maximizing shareholder value might discourage long-term decision-making that benefits the company in the long run.

# Short Questions and Answers

**1. Define Strategic Financial Management.**

*Ans :*

**Introduction**

All organisations require financial management for its successful operations. It contains components for the acquisition, management, allocation and financing of resources for successful growth of an organisation. Every organisation should manage its finances effectively in order to attain its mission and goals. Recently, the fields of strategic management and financial management combined together to evolve a new discipline namely Strategic Financial Management.

**Meaning**

Strategic Financial Management refers to the study of finance with a long term perspective which takes into account the strategic goals of the enterprise. Strategic Financial management is a management approach which makes use of various financial tools and techniques in order to come up with a strategic decision plan.

**2. Nature**

*Ans :*

i) It is concerned with the long term management of fund with a strategic perspective

ii) It aims at maximization of profit and wealth of the concern

iii) It is both structured as well as flexible

iv) It promotes growth, profitability and existence of the firm in the long run and maximises shareholder value

v) It is an evolving and continuous process that constantly tries to adopt and revise strategies in order to achieve strategic financial objectives of the firm.

vi) It involves innovative, creative and multidimensional approach for finding solutions to the problems.

**3. Characteristics of Strategic Financial Management.**

*Ans :*

i) It manages to be both organized and adaptable at the same time.

ii) It is concerned with the administration of the fund over the long term, taking a long-term perspective.

iii) When dealing with factual information, it employs analytical financial tools in conjunction with qualitative and quantitative judgement to arrive at a conclusion.

iv) As a result, it contributes to the long-term growth, profitability, and survival of the organization as well as the maximization of shareholder value.

v) It aids in the formulation of appropriate strategies as well as the ongoing monitoring of action plans to ensure that they are in line with long-term objectives and objectives.

**4. Define Financial Forecasting.**

*Ans :*

Financial forecasting refers to financial projections performed to facilitate any decision-making relevant for determining future business performance. The financial forecasting process includes the analysis of past business performance, current business trends, and other relevant factors.

**5. Importance of Financial Forecasting.**

*Ans :*

**i) Annual budget planning**

A budget represents your business' cash flow, financial positions, and future goals and expectations for a set fiscal period. Financial forecasting and planning work in tandem, as forecasting essentially offers an insight into your business' future-these insights help make budgeting accurate.

**ii) Establishing realistic business goals**

Accurate forecasting will help predict whether (and by how much) your business will grow or decline. As such, you can set realistic and achievable goals-and manage your expectations.

**iii) Identifying problem areas**

Financial forecasting can help you identify ongoing problems by analyzing the business' past performance.

**6. Income forecasting**

*Ans :*

Income forecasting entails analyzing the company's past revenue performance and current growth rate to estimate future income. It is integral to doing cash flow and balance sheet forecasting. Additionally, the company's investors, suppliers, and other concerned third parties use this data to make crucial decisions. For example, suppliers use it when determining how much to credit the company in supplies.

**7. Sales forecasting**

*Ans :*

Sales forecasting entails predicting the amounts of products/services you expect to sell within a projected fiscal period. There are two sales forecasting methodologies: top-down forecasting and bottom-up forecasting.

Sales forecasting has many uses and benefits, including budgeting and planning production cycles. It also helps companies manage and allocate resources more efficiently.

**8. Define Financial Planning.**

*Ans :*

Financial Planning is the process of estimating the capital required and determining it's competition. It is the process of framing financial policies in relation to procurement, investment and administration of funds of an enterprise.

**9. Decision-making**

*Ans :*

Decision-making is a mechanism for making choices at ,each step of the problem solving process. This is the process of identifying and selecting a course of action from two or more courses of action to be taken to solve a problem. It can further be defined as the process through which information, ideas; objectives and knowledge are brought together for action. Decision-making is a patt of problem-solving, and decision-making occurs at every step of the problem-solving process.

**10. Problem-solving**

*Ans :*

Problem solving is a set of activities designed to analysd a situation systematically and generate, implement, and evaluate solutions. This involkes the seeking of solutions to problems that arise in an institution. The problem solving process leads to formulation of decisions intended to resolve the recognized problems.

# Choose the Correct Answers

1. What is the primary goal of financial management? [ b ]
   (a) To minimise the risk (b) To maximise the owner's wealth
   (c) To maximise the return (d) To raise profit
2. From the below-mentioned items which are financial assets? [ d ]
   (a) Machines (b) Bonds
   (c) Stocks (d) B and C
3. The market value of the shares is decided by [ a ]
   (a) The investment market (b) The government
   (c) Shareholders (d) The respective companies
4. Which of the following is concerned with the maximization of a firm's earnings after taxes [ b ]
   (a) Shareholder wealth maximization (b) Profit maximization
   (c) Stakeholder maximization (d) EPS maximization.
5. What is the most appropriate goal of the firm [ a ]
   (a) Shareholder wealth maximization (b) Profit maximization
   (c) Stakeholder maximization (d) EPS maximization
6. The repurchase of stock _____ the earnings per share and _____ the market price of stock. [ a ]
   (a) Increases; Increases (b) Decreases; Decreases
   (c) Increases; Decreases (d) Decreases; Increases
7. Management of all matters related to an organisation's finances is called: [ c ]
   (a) Cash inflows and outflows (b) Allocation of resources
   (c) Financial management (d) Finance
8. Which of the following is not an element of financial management? [ d ]
   (a) Allocation of resources (b) Financial Planning
   (c) Financial Decision-making (d) Financial control.
9. The most important goal of financial management is: [ d ]
   (a) Profit maximisation (b) Matching income and expenditure
   (c) Using business assets effectively (d) Wealth maximisation.
10. To achieve wealth maximization, the finance manager has to take careful decision in respect of: [ d ]
    (a) Investment (b) Financing
    (c) Dividend (d) All the above

# Fill in the Blanks

1. _____ refers to the study of finance with a long term perspective which takes into account the strategic goals of the enterprise.
2. The financial landscape is characterized by _____ and _____.
3. _____ refers to financial projections performed to facilitate any decision-making relevant for determining future business performance.
4. _____ entails estimating the flow of cash in and out of the company over a set fiscal period.
5. _____ is the process of estimating the capital required and determining it's competition.
6. The _____ process provides a roadmap for achieving financial goals.
7. _____ are decisions and decisions require facts about the future.
8. _____ is a set of activities designed to analysd a situation systematically and generate, implement, and evaluate solutions.
9. _____ analysis, the key aspects involved in the problem are identified and the impact of each alternative on the problem is considered.
10. _____ theory is a concept used to explain the important relationships between principals and their relative agent.

**ANSWERS**

1. Strategic Financial Management
2. Uncertainty, Complexity
3. Financial forecasting
4. Cash flow forecasting
5. Financial Planning
6. Financial planning
7. Plans
8. Problem solving
9. Stakeholder
10. Agency

UNIT II

**Investment Decisions under Risk and Uncertainty:** Concepts of Risk and Uncertainty. Risk Analysis in Investment Decisions, Risk Adjusted Rate of Return, Certainty Equivalents, Probability Distributions of Cash Flows, Decision Trees, Sensitivity Analysis and Monte Carlo Approach to Simulation, Investment Decisions under Capital Constraints and Capital Rationing. Corporate Cost of Capital - Divisional Cost of Capital, Pure Play Technique, Accounting Beta.

## 2.1 Concepts of Risk and Uncertainty

**Q1. Define Risk and Uncertainty. How are they different from each other?**

*Ans :* **(April-23, Imp.)**

**i) Meaning of Risk**

Risk means the probability that the actual outcome of an investment may be different from the desired outcome. In other words, risk refers to the variability in returns from a security. Basically, the investors concentrate more on actual outcome which is less than the expected outcome. If the range of potential outcome If the range of potential outcome is wide then the risk will also be high.

Risk emerges from many sources and among them, the three important sources are business risk, interest rate risk and market risk.

Total risk = Unique risk + Market risk

Unique risk is a part of total risk which rises from some specific factors of the firm, such as labour strike, development of new product or entry of new competitor. It is also called as diversifiable risk or unsystematic risk. Market risk is a part of total risk which is related with economy-wide factors such as growth rate of GDP, money supply, inflation rate and interest rate structure. It is also called as systematic risk or non-diversifiable risk.

**ii) Meaning of Uncertainty**

Uncertainty refers to a situation in which there is more than one possible outcome of a business decision and where the probability of each specific outcome is unknown or cannot be estimated accurately.

**Following are the differences between risk and uncertainty:**

| S.No. | Nature | Risk | Uncertainty |
|---|---|---|---|
| **1.** | **Meaning** | Risk is a situation in which probability of outcome is known to decision maker. | Uncertainty is a situation in which probability of outcome is not known to decision maker. |
| **2.** | **Variability** | In case of risk, variability is less compared to uncertainty. | In case of uncertainty, variability is more compared to risk. |
| **3.** | **Measurement** | Risk can be measured as participants have experience in similar events. | Uncertainty cannot be measured as it deals with completely new events. |

| | | | |
|---|---|---|---|
| **4.** | **Probabilities** | In risk, dicision maker can assign probabilities to outcomes of an event. | In uncertainty, decision maker cannot assign probabilities to outcomes of an event. |
| **5.** | **Historical Data** | In risk, decision maker can utilize available historical data. | In uncertainty, decision maker does not have historical data. |

## PROBLEMS

**1. A firm is considering two mutually exclusive projects whose annual net flows have the following distribution:**

| Project-A net cash flow Rs. | Probability of Project A | Project B - net cash flow in Rs. | Probability of Project B |
|---|---|---|---|
| 2,00,000 | 0.1 | 2,10,000 | 0.2 |
| 3,00,000 | 0.6 | 3,30,000 | 0.6 |
| 4,50,000 | 0.3 | 4,50,000 | 0.2 |

**Project A requires an initial investment of Rs. 11,00,000 whereas Project B calls for investing Rs. 10,00,000. Both project would last for 5 years.**

**Calculate the standard deviation for the net cash flows for both projects. Which one is riskier? (April-23, Imp.)**

*Sol :*

**Project - A**

**Calculation of Standard Deviation**

| Net cash inflows Rs. | Deviation from Mean (d) (316667) | Square of deviation ($d^2$) | Probability | Weight Sq. Deviation ($fd^2$) |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 2,00,000 | – 116667 | 13611188889 | 0.1 | 1361118888.9 |
| 3,00,000 | – 16667 | 277,788,889 | 0.6 | 16667333.4 |
| 4,50,000 | 13333 | 17777688889 | 0.3 | 5333306666.7 |
| | | | | 6867098889 |

Standard deviation (S), $= \sqrt{\frac{\Sigma fd^2}{n}}$

$= \sqrt{\frac{6867098889}{1}} = 26205$

**Project - B**

**Calculation of Standard Deviation**

| Net cash inflows Rs. | Deviation from Mean (d) (3,30,000) | Square of deviation ($d^2$) | Probability | Weight Sq. Deviation ($fd^2$) |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 2,10,000 | – 1,20,000 | 14400000000 | 0.2 | 2880000000 |
| 3,30,000 | 0 | 0 | 0.6 | 0 |
| 4,50,000 | 1,20,000 | 14400000000 | 0.2 | 2880000000 |
| | | | | 5760000000 |

Standard deviation (S), $= \sqrt{\frac{\Sigma fd^2}{n}}$

$$= \sqrt{\frac{5760000000}{1}} = 75894.6$$

As the standard deviation of project 'B' is more than project 'A'

Project 'B' is more Risky.

## 2.2 Risk Analysis in Investment Decisions

**Q2. Explain briefly about various criteria involved in the process of decision making under risk.**

**(OR)**

**Explain the techniques for decision making under risk.**

*Ans :* **(Oct.-22, Imp.)**

Following are the techniques which are based on Expected Pay-off Criterion :

**(i)** Expected Monetary Value (EMV)

**(ii)** Expected Opportunity Loss (EOL) / Expected Regret

**(iii)** Expected Value of Perfect Information (EVPI)

**(i) Expected Monetary Value (EMV)**

The weighted average payoff for a given course of action is the Expected Monetary Value (EMV). The total of the payoffs for each course of action multiplied by the probabilities combined with each state of nature. This mathematical description of the EMV is as follows:

$$EMV(S_j) = \sum_{i=1}^{m} P_{ij} P_i$$

where,

m = Number of possible states of nature,

$P_i$ = Probability of occurrence of $i^{th}$ state of nature

$P_{ij}$ = Payoff connected with state of nature $N_i$ and course of action $S_j$

**Steps**

**Step 1:**

Building of the payoff matrix by enlisting all the possible courses of action and states of nature. Enter all the possible combination of course of action and state of nature that are linked with limited payoff values as well as the probabilities of the happening of each state of nature.

**Step 2:**

Calculate the value of EMV for each course of action by multiplying with the conditional payoffs of the combined probabilities which are added to the weighted values for each course of action.

**Step 3:**

Selection of that course of action which yield the optimum EMV.

### (ii) Expected Opportunity Loss (EOL) / Expected Regret

An alternative approach that refers to maximization of Expected Monetary Value (EMV) and minimization of Expected Opportunity Loss (EOL) is also known as expected value of regret. The difference between the highest profit for a state of nature and the actual profit which is obtained for the specific course of action is defined as EOL.

Hence, the amount of payoff that is lost due to the rejection of a course of action, which is having the greatest payoff for the state of nature that has actually appeared, is referred as EOL. That course of action is recommended for which EOL is minimum.

Results obtained by EMV criterion and by EOL, which is an alternative decision criterion for making decision under risk area will always be the same. Hence, only one of the two methods should be applied for reaching a decision. The mathematical description is as follows:

$$EOL\ (N_j) = \sum_{i=1}^{m} 1_{ij} P_i$$

Where, $1_{ij}$ = opportunity loss due to state of nature, $N_i$ and course of action, $S_j$

$P_i$ = probability of occurrence of state of nature, $N_i$

**Steps**

**Step 1:**

Preparation of a conditional profit table depicting that course of action, state of nature as well as associated probabilities.

**Step 2:**

Calculate Conditional Opportunity Loss (COL) value for each state of nature and subtract by each payoff from the maximum payoff of each event.

**Step 3:**

Calculation of EOL for each course of action that is multiplied by the probability of each state of nature with the value of COL and then adding it up.

**Step 4:**

That course of action is selected for which the EOL value is minimum.

### (iii) Expected Value of Perfect Information (EVPI)

The criterion for decision making under risk for each state of nature is combined with its probability of occurrence and some how, the decision maker is able to acquire perfect (complete and accurate) information regarding the occurrence of cixous states of nature. In such a case, only then he will be successful in selecting that course of action yielding the expected payoff for whatever may be the state of nature that actually takes place.

The maximum amount of money which the decision maker has to pay in acquiring additional information about the occurrence of various states of nature prior reaching to a decision is represented by Expected Value of Perfect Information (EVPI). Mathematical description is as follows:

EVPI = Expected profit (or value) with perfect information under certainty - Expected profit without perfect information

Where,

EPPI = Expected profit (or value) with perfect information under certainty

EMV* = Maximum expected monetary value.

**Q3. Explain briefly about various criteria involved in the process of decision making under Uncertainity.**

**(OR)**

**What are the types of investment decisions that can be adopted under uncertainity?**

**(OR)**

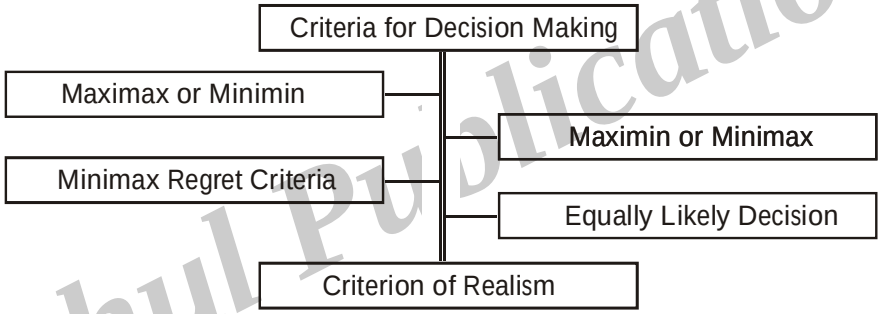
**Describe any two methods used for decision making under uncertainity.**

**(OR)**

**Explain the techniques for decision making under uncertainty.**

*Ans :* **(Imp.)**

There are several rules and techniques to take decisions under uncertainty situation. Important ones are shown in figure below:






**1. Maximum or Minimum (Criterion of Optimism)**

According to this criterion, it is ensured by the decision maker to achieve maximum payoff or minimum cost without missing the opportunity. Thus, he chooses a different course of action represented by the maximum of the maxima or minimum of the minima payoffs. The summary of the working method is as follows:

**(i)** Locating the payoff value (maximum or minimum) that corresponds to each and every course of action.

**(ii)** Selection of an alternative, having the best expected payoff value which maximize the-profit and minimize the loss.

This is called an optimistic decision criterion, due to the selection of an alternative with highest lowest available payoff value by the decision maker.

**2. Maximin or Minimax (Criterion of Pessimism)**

According to this criterion, it is ensured by the decision maker that his earnings are not less than the specified amount. Therefore his selection of alternative is represented by the maximum of the minima payoffs in case of profit, or minimum of the maxima in case of loss.

Summary of the working method is as follows:

**(i)** Locate the payoff values (both minimum in case of loss and maximum in case of profit) that correspond to each alternative.

**(ii)** Select an option having best expected payoff value (maximum for profit and minimum for loss or cost).

According to this criterion, the decision maker being conservative regarding future and he anticipates worst possible outcome (minimum for profit or maximum for cost or loss). Hence, it is known to be pessimistic decision criterion. It is also called Wald's criterion.

### 3. Minimax Regret Criteria (Savage Principle)

This decision criterion was developed by L.J. Savage. According to this criterion he suggested, that due to the decision of the decision maker, he may have the feeling of regret and on the occurrence of event i.e. states of nature. Therefore, he should attempt to lessen the regret prior to the actual selection of a particular alternative.

**The summary of the working method is as follows:**

**(i)** The amount of regret that is equivalent to each alternative for every state of nature is determined.

The regret for $j^{th}$ event that corresponds to the $i^{th}$ alternative is given by the following formula:

$j^{th}$ regret = (maximum payoff - $i^{th}$ payoff) for the $i^{th}$ event.

**(ii)** Maximum regret amount for each alternative is to be determined.

**(iii)** Choosing the alternative that corresponds to the minimum of the aforesaid maximum regrets.

### 4. Equally Likely Decision (Laplace Criterion)

On the assumption, that the occurrence of all states of nature having same probabilities as they have been assigned with equal probability is due to the reason that the probabilities of states of nature are unknown. Since these states of nature are mutually exclusive and collectively exhaustive therefore, each of these must have the probability equal to 1/number of states of nature.

**Following is the summary of the working method:**

**(i)** According to the formula: 1/number of states of nature, assigns equal probability to each state of nature.

**(ii)** Either by the application of the formula or by adding all the payoffs and then dividing them by the number of possible states of nature. Expected (average) payoff for each alternative is to be computed.

(Probability of state of nature j) × (Payoff ($P_{ij}$) implies value for the combination of alternative i and state of nature.

**(iii)** Selection of the best expected payoff value (maximum for profit and minimum for loss/ cost).

Generally the decision maker is being totally unaware regarding various states of nature and their probability of occurrence. Anyhow, this criterion does not have much practical utility.

### 5. Criterion of Realism (Hurwicz Criterion)

Due to the assumption of both the maximax and maximun criterion, the decision maker is neither optimistic nor pessimistic. According to the Hurwicz Criterion, the measure of the decision makers confidence as the decision payoffs are weighted by the coefficient of optimism defined as "$\alpha$", that lies between 0 and 1 ($0 < \alpha < 1$):

**(i)** If the value of $\alpha = 1.0$, the decision maker is totally optimistic;

**(ii)** If the value of $\alpha = 0$, the decision maker is totally pessimistic.

The Coefficient of Pessimism is $(1 - \alpha)$. This is an advantageous approach, as it allows the decision maker in building personal feelings regarding optimism and pessimism relatively.

The formula states:

H (Criterion of realism) = $\alpha$ (Maximum in column) + $(1 - \alpha)$ (Minimum in column)

**The summary of the working method is as follows:**

**(i)** To decide upon the coefficient of optimism, a followed by coefficient of pessimism $(1 - \alpha)$.

**(ii)** After selecting the largest and lowest payoff value for each alternative, multiply it with the values of a and $(1 - \alpha)$ respectively. Calculation of weighted average, H is done by applying the above formula.

**(iii)** Selection of an option having best expected weighted average payoff value.

## PROBLEMS

**2. A newspaper seller has the following probabilities when he/she sells newspapers:**

| Sold Copies | Probability |
|---|---|
| 10 | 0.10 |
| 11 | 0.15 |
| 12 | 0.20 |
| 13 | 0.25 |
| 14 | 0.30 |
| Total | 1.00 |

**The selling price a newspaper is 60 paisa and its cost is 40 paisa. The condition is that seller cannot return the copies of newspaper. Determine how many newspapers, the seller will order?**

*Sol :*

The seller has 10, 11, 12, 13 or 14 numbers of copies for purchases and sales. This means that he/she buys more than 10 and less than 14.

Profit resulting from any combination of supply and demand is shown in following profit table (table (a). Irrespective of demand, the profit will be 200 paisa per day when there is a stock of 10 copies. For example, if seller sells 11 copies while the demand is 14 copies, then the conditional profit will be 220 paisa. If he stocks 12 copies, his profit is 240 paisa when the buyer orders 12, 13 or 14 copies. If he stocks 11 copies and the buyers buy 10 copies, then the profit decreases to 160 paisa (200 paisa profit on selling 10 copies minus 40 paisa of one unsold copy) because one copy of newspaper is unsold. When the seller stocks 12, 13 or 14 copies, then the same rule will be applicable. Thus conditional profit can be given by as follows:

Payoff = 20 × No of Copies Sold – 40 × No of Copies not Sold.

**Table (a) : Conditional Profit Table (Paisa)**

| Possible Demand | | Possible Stock Action | | | | |
|---|---|---|---|---|---|---|
| | | 10 Copies | 11 Copies | 12 Copies | 13 Copies | 14 Copies |
| (No. of Copies) | Probability | | | | | |
| 10 | 0.10 | 200 | 160 | 120 | 80 | 40 |
| 11 | 0.15 | 200 | 220 | 180 | 140 | 100 |
| 12 | 0.20 | 200 | 220 | 240 | 200 | 160 |
| 13 | 0.25 | 200 | 220 | 240 | 260 | 220 |
| 14 | 0.30 | 200 | 220 | 240 | 260 | 280 |

The average value of each alternative can be determined by multiplying the conditional profit by corresponding probability and then adding the resulting values as shown in table (b).

**Table (b) : Conditional Profit Table (Paisa)**

| Possible Demand | Probability | Average Profit from Stocking (Paisa) | | | | |
|---|---|---|---|---|---|---|
| | | 10 Copies | 11 Copies | 12 Copies | 13 Copies | 14 Copies |
| 10 | 0.10 | 20 | 16 | 12 | 8 | 4 |
| 11 | 0.15 | 30 | 33 | 27 | 21 | 15 |
| 12 | 0.20 | 40 | 44 | 48 | 40 | 32 |
| 13 | 0.25 | 50 | 55 | 60 | 65 | 55 |
| 14 | 0.30 | 60 | 66 | 72 | 78 | 84 |
| **Total Average Profit (Paisa)** | | **200** | **214** | **219** | **212** | **190** |

Therefore the seller must order 12 copies in order to earn maximum profit as its daily average profit is 219 paisa. This stock will provide highest profit over a period of time. The next day profit of 219 paisa is not guaranteed. In case he stocks 12 copies per day, then the average profit is 219 paisa per day under given constraints. This is the best choice for him, as others stocks will not provide so much daily profit.

**3. Let consider the following payoff matrix :**

| State of Nature | Probability | Act | | |
|---|---|---|---|---|
| | | Do not Expand (`) | Expand 200 Unit (`) | Expand 400 Units (`) |
| High Demand | 0.4 | 2,500 | 3,500 | 4,900 |
| Medium Demand | 0.4 | 2,500 | 3,500 | 2,500 |
| Low Demand | 0.2 | 2,500 | 1,500 | 1,000 |

**Determine which act must be select using EMV criterion.**

*Sol :*

The various decisions have the following EMV :

| Decision | EMV (`) |
|---|---|
| Do not Expand | 0.4 (2500) + 0.4 (2500) + 0.2 (2500) = 2,500 |
| Expand 200 Units | 0.4 (3500) + 0.4 (3500) + 0.2 (1500) = 3,100 |
| Expand 400 Units | 0.4 (4900) + 0.4 (2500) + 0.2 (1000) = 3,160 |

Since the highest EMV value is 3,160, hence it favours expansion of 400 units.

**4. A seller has the following probabilities when he/she sells newspapers :**

| Copies Sold | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|
| Probability | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 |

**The selling price is 60 paisa and its cost is 40 paisa. The condition is that seller cannot return the copies of newspaper. Using EOL criterion, determine how many newspapers, seller should order ?**

*Sol :*

The conditional profit table is illustrated as shown in table

**Table Conditional Profit Table (Paisa)**

| Possible Demand (No. of Copies) | Probability | Possible Stock Action (Alternative) | | | | |
|---|---|---|---|---|---|---|
| | | 10 Copies | 11 Copies | 12 Copies | 13 Copies | 14 Copies |
| 10 | 0.10 | 200 | 160 | 120 | 80 | 40 |
| 11 | 0.15 | 200 | 220 | 180 | 140 | 100 |
| 12 | 0.20 | 200 | 220 | 240 | 200 | 160 |
| 13 | 0.25 | 200 | 220 | 240 | 260 | 220 |
| 14 | 0.30 | 200 | 220 | 240 | 260 | 280 |

When there is demand of 10 copies then the best alternative is that seller will order 10 copies and this will give a profit of 200 paisa. The conditional opportunity loss for every stock can be obtained by subtracting the respective conditional profits from 200 paisa. Similarly, each value of the rows subtracted from the maximum of that row will provide conditional payoff values for demand of 11, 12, 13 and 14 copies. Therefore, we get the following Conditional Opportunity Loss (COL) table :

**Table Conditional Loss Table (Paisa)**

| Possible Demand (no.of copies) (Event) | Probability | Possible Stock Action (Alternative) | | | | |
|---|---|---|---|---|---|---|
| | | 10 Copies | 11 Copies | 12 Copies | 13 Copies | 14 Copies |
| 10 | 0.10 | 0 | 40 | 80 | 120 | 160 |
| 11 | 0.15 | 20 | 0 | 40 | 80 | 120 |
| 12 | 0.20 | 40 | 20 | 0 | 40 | 80 |
| 13 | 0.25 | 60 | 40 | 20 | 0 | 40 |
| 14 | 0.30 | 80 | 60 | 40 | 20 | 0 |

Expected Opportunity Loss (EOL) can be determined by multiplying the probability of each state of nature with corresponding appropriate loss value and then adding them which provides resulting products. For example, for stocking 11 copies, we have :

Expected Opportunity Loss (EOL)

$$= 0.11 \times 40 + 0.15 \times 0 + 0.20 \times 20 + 0.25 \times 40 + 0.30 \times 60$$

$$= 4 + 0 + 4 + 10 + 18 = 36 \text{ paisa}$$

The EOL for different stocks can be calculated as shown in table :

**Table Expected Loss Table (Paisa)**

| Possible Demand (no.of copies) (Event) | Probability | Possible Stock Action (Alternative) | | | | |
|---|---|---|---|---|---|---|
| | | 10 Copies | 11 Copies | 12 Copies | 13 Copies | 14 Copies |
| 10 | 0.10 | 0 | 4 | 8 | 12 | 16 |
| 11 | 0.15 | 3 | 0 | 6 | 12 | 18 |
| 12 | 0.20 | 8 | 4 | 0 | 8 | 16 |
| 13 | 0.25 | 15 | 10 | 5 | 0 | 10 |
| 14 | 0.30 | 24 | 18 | 12 | 6 | 0 |
| | **EOL (Paisa)** | **50** | **36** | **31** | **38** | **60** |

Since minimum expected opportunity loss will represent the optimum stock action, hence the seller will stock 12 copies per day as the minimum expected loss is 31 paisa.

## 2.3 RISK ANALYSIS IN INVESTMENT DECISIONS

**Q4. Explain how is risk analyzed in investment decisions through different techniques.**

*Ans :*

In investment decisions risk can be analyzed (or) measured based on the following techniques :

**(i) Risk Adjusted Rate of Return**

For answer refer to Unit-II, Q.No. 5

**(ii) Certainty Equivalents**

For answer refer to Unit-II, Q.No. 6

**(iii) Probability Distributions of Cash Flows**

For answer refer to Unit-II, Q.No. 7

**(iv) Decision Trees**

For answer refer to Unit-II, Q.No. 8

**(v) Sensitivity Analysis**

For answer refer to Unit-II, Q.No. 9

### 2.3.1 Risk Adjusted Rate of Return

**Q5. Discuss the concept of risk adjusted discount rate approach.**

**(OR)**

**What is Risk Adjusted Rate of Return?**

**(OR)**

**Explain Risk Adjusted discount method.**

**(OR)**

**Explain the relevance of Risk Adjusted rate of return in investment analysis.**

*Ans :* **(Imp.)**

**Meaning**

Risk Adjusted Discount Rate (RADR) approach is very easy, it is widely used to incorporate risk into capital budgeting decision. The amount of risk which is already involved in a project is included in the discount rate used in calculations of present values.

The projects which involves high risk have high discount rates and projects which are safe have low discount rates. Undoubtedly, the risk-adjusted discount rates display different risk in different types of investments.

In RADR approach, the minimum acceptable required rate of return is the cost of capital (k) or discount rate. In order to maximize the earnings of the shareholders and to increase market value of shares, the project must earn more than the rates earned in the economy for specified risk. A well accepted project is that in which required rate of return increases with increase in risk, increase in discount rate with increase in risk of the project. The discount rate which incorporate time and risk preference of investors is known as risk-adjusted discount rate.

Risk-adjusted discount = Risk free rate + Risk premium

$$k = k_f + k_r$$

In order to evaluate NPV under the RAD method following equation is used.

$$NPV = \sum_{t=1}^{h} \frac{CFAT}{(1+k_r)^t} - C_0$$

Where,

CFAT– Expected cash flow after tax in year t.

$C_0$ – Cash Outflows

$k_r$ – Risk – adjusted rate

t – Time

When RADR approach is used with NPV, the project is accepted only if the value of NPV is positive. When IRR is used as decision criterion, IRR is compared with the risk-adjusted required rate of return. The project is accepted when *r* exceeds the risk adjusted rate.

**Advantages**

1. This technique is very simple and easy to evaluate and understand.
2. It is a consistent method because it is clear that a risky project involves higher expectations.

**Disadvantages**

1. It is difficult to find risk element, hence, it is taken randomly.
2. The cash flows must be adjusted in risky situation not the discount rate.
3. The assumption of constant increase in risk over the time is not suitable in all situations.

**PROBLEM**

**5. Rahul Company Ltd. considers the purchase of a new investment. For which two alternatives investments are available (X and Y) each costing Rs. 1,00,000. Cash inflows are as follows,**

**Cash Inflows**

| Year | Investment 'X' (Rs.) | Investment 'Y' (Rs.) |
|---|---|---|
| 1 | 50,000 | 45,000 |
| 2 | 45,000 | 25,000 |
| 3 | 35,000 | 20,000 |
| 4 | 25,000 | 40,000 |

**The company has a target return on capital of 12%. Risk premium rates are 4% and 10% respectively for investments X and Y. Suggest which investment should be preferred.**

*Sol :*

The profitability of the two investment are made depending upon net present values cash inflows adjusted for risk premium rates as follows.

| | Investment 'X' | | | Investment 'y' | | |
|---|---|---|---|---|---|---|
| Year | Discount Factor @ 12% + 4% = 16% | Cash Inflow (`) | Present Value (`) | Discount Factor @ 12% + 10% = 22% | Cash Inflows (`) | Present Value (`) |
| 1 | 0.862 | 50,000 | 43,100 | 0.820 | 45,000 | 36,9000 |
| 2 | 0.743 | 45,000 | 33,435 | 0.672 | 25,000 | 16,800 |
| 3 | 0.641 | 35,000 | 22,435 | 0.551 | 20,000 | 11,020 |
| 4 | 0.552 | 25,000 | 13,800 | 0.451 | 40,000 | 18,040 |
| | | | ` 1,12,770 | | | ` 82,760 |

| | |
|---|---|
| NPV = 'X' = | 1,12,770 |
| (–) cashout flow | 1,00,000 |
| | – 12,770 |
| 'Y' = | 82,760 |
| (–) cashout flow | 1,00,000 |
| | – 17,240 |

As investment 'X' gives higher net present value over investment 'X'. Hence, investment 'X' is to be preferred.

### 2.3.2 Certainty Equivalents

**Q6. Explain briefly about certainty equivalent approach ?**

**(OR)**

**What is certainty equivalent approach ?**

**(OR)**

**What is certainty equivalent coefficient?**

*Ans :* **(Dec.-19, Imp.)**

CEA overcomes, some of the limitations of RADR approach. It in corporates risk of a project by adjusting the expected cash flows, instead of adjusting discount rate. This eliminates the problem of calculating RADR, by assigning arbitrary premium for a given level of risk.

**Steps:**

**Step :1** Determination of Risk Adjustment Factor [Certainty equivalent coefficient]

It represents the relationship between riskless (certain) cash flows and risky (uncertain) cash flow:

**Symbolically:**

$$\text{Certainty Equivalent Coefficient} = \frac{\text{Riskless CFs}}{\text{Risky CFs}}$$

Certainty equivalent coefficient assumes a value between 0 and 1, and varies inversely with risk. A higher CE coefficient will be used if lower risks is forecasted and vice-versa.

**Step:2** Determination of Present Value

As we have seen in Step 1 certainty equivalent coefficient helps to convert expected value of uncertainty cash flows into certain cash flows. Then the next step is to calculate present values, with use of risk free rate (may be assumed). Here there is no addition of risk premium, because, uncertain cash flows are converted into equivalent cash flow.

Here either NPV technique or IRR technique can be applied.

**Decision Rule:**

Accept: If NPV of certainty equivalent cash flow > 0

Reject: If NPV of certainty equivalent cash flow < 0

Consider: If NPV of certainty equivalent cash flow = 0

**If IRR Technique is used:**

Accept: If IRR > Risk free rate

Reject: If IRR < Risk free rate

Consider: If IRR = Risk free rate

**Advantages**

**(i)** It is simple to calculate and easy to understand,

**(ii)** It is superior to RADR, since it does not assume that the risk increases with the time increase,

**Disadvantages**

Despite it being easy to understand and having conceptual soundness, it has the following weaknesses:

**(i)** It is difficult to consider increasing risk capacity,

**(ii)** It is inconvenient and difficult to specify a services CE coefficients.

## PROBLEMS

**6. The Delta corporation is considering an investment in one of the two mutually exclusive proposals: project A which involves an initial outlay of 1,50,000. The certainty equivalent approach is employed in evaluating risky investments. The current yield on treasury bills is 0.05 and the company uses as the riskless rate.**

**The expected values of net cash flows with their respectively certainty-equivalents are :**

| | Project A | | Project B | |
|---|---|---|---|---|
| Year | Cash flows (` Thousands) | Certainty-equivalent | Cash flows (` Thousands) | Certainty-equivalent |
| 1 | 90 | 0.8 | 90 | 0.9 |
| 2 | 100 | 0.7 | 90 | 0.8 |
| 3 | 110 | 0.5 | 100 | 0.6 |

**(a)** Which project should be acceptable to the company?

**(b)** Which project is riskier ? How do you know?

**(c)** If the company was to use the risk-adjusted discount rate method, which project would analyzed with higher rate ?

*Sol :* **(May-19, Imp.)**

**(a) Calculation of NPV of Project A**

| Year | CFAT (` in 000's) | Certainty - Equivalent (CE) | Adjusted CFAT (CFAT × CE) (` in 000's) | PV factor (at 0.05) | Total PV |
|---|---|---|---|---|---|
| 1 | 90 | 0.8 | 72 | 0.952 | 68,544 |
| 2 | 100 | 0.7 | 70 | 0.907 | 63,490 |
| 3 | 110 | 0.5 | 55 | 0.864 | 47,520 |
| | | | | Total PV | 1,79,554 |
| | | | | **Less** : Initial Outlay | 1,70,000 |
| | | | | NPV | **9,554** |

**Calculation of NPV of Project B**

| Year | CFAT (` in 000's) | Certainty - Equivalent (CE) | Adjusted CFAT (CFAT × CE) (` in 000's) | PV factor (at 0.05) | Total PV |
|---|---|---|---|---|---|
| 1 | 90 | 0.9 | 81 | 0.952 | 77,112 |
| 2 | 90 | 0.8 | 72 | 0.907 | 65,304 |
| 3 | 100 | 0.6 | 60 | 0.864 | 51,840 |
| | | | | Total PV | 1,94,256 |
| | | | | **Less** : Initial Outlay | 1,50,000 |
| | | | | NPV | **44,256** |

The NPV of Project B is higher than Project A. Thus the firm should accept Project B.

**(b)** Project A is riskier because its certainty-equivalent connected with expected CFAT is less.

**(c)** If the company was to use the risk adjusted discount rate method, then its should analyze the Project A with high discount rate because the Project A is more risky.

**7. A project with an initial cash outflow of Rs. 100 Lakhs is expected to have cash flows of Rs. 65 Lakhs, Rs. 60 Lakhs, Rs. 55 Lakhs and Rs. 50 Lakhs over its life at the end of 1st, 2nd, 3rd and 4th year respectively. The cost of capital is 10%. If the certainty equivalents of the cash flows are taken as 80%, 70%, 60% and 50% respectively for 1 to 4 years, is it worthwhile to undertake the project?**

*Sol :* **(Oct.-22, Imp.)**

Calculation of certainty equivalent of cash flows.

I year - $65,00,000 \times \frac{80}{100} = 52,00,000$

II year - $60,00,000 \times \frac{70}{100} = 42,00,000$

III year - $55,00,000 \times \frac{60}{100} = 33,00,000$

IV year - $50,00,000 \times \frac{50}{100} = 25,00,000$

| Year | Cash in flow | pv factor @ 10% | PVCF |
|---|---|---|---|
| 1 | 52,00,000 | 0.909 | 47,26,800 |
| 2 | 42,00,000 | 0.826 | 34,69,200 |
| 3 | 33,00,000 | 0.751 | 24,78,300 |
| 4 | 25,00,000 | 0.683 | 17,07,500 |
| | | | 1,23,81,800 |

NPV = Cash in flow – Cash out flow

= 12381800 – 10000000

= 2381800

NPV is positive so project is selected.



### 2.3.3 Probability Distributions of Cash Flows

**Q7. Explain briefly about probability distribution of cashflows ?**

*Ans :*

The concept of probability for incorporating risk is already explained in evaluation process of capital budgeting proposals. The probability attribution approach used in evaluating risk in capital budgeting relies upon the performance of cash flows. Risk involved in capital budgeting can be determined by using a parameter of standard deviation.

The cash flows may be either independent or dependent cash flows.

**1. Independent Cash Flows**

The cash flows which are not affected by the previous years cash flows are known as independent cash flows. For example, cash flows in year 2 are not affected by the cash flows of first year. The dependent cash flows are completely opposite of independent cash flows.

The expected values of the probability distribution of NPV for any project can be mathematically expressed as,

$$NPV = \sum_{t=1}^{n} \frac{\overline{CF_t}}{(1+k_t)^t} - C_0$$

Where,

$\overline{CF_t}$ - Expected value of net cash flow

*i* - Risk free rate of interest

The standard deviation of the probability distribution of net present values are equal to,

$$\sigma\,(NPV) = \sqrt{\sum_{t=1}^{n} \frac{\sigma_t^2}{(1+i)^{2t}}}$$

Where,

$\sigma_t$ = Standard deviation of probability distribution of NPV for period *t.*

$$\sigma_t = \sqrt{\sum_{j=1}^{n} (\overline{CF}_{jt} - \overline{CF}_t)^2 \cdot P_{jt}}$$

**Normal Probability Distribution**

In order to evaluate the component of risk in capital budgeting, normal probability distribution can be used. With the help of normal probability distribution, decision maker can have a clear perspective of expected values of NPV. The value of probability of NPV $\leq 0$, then risk is very low and if value of probability of NPV $> 0$ there is considerable risk. Hence, normal probability distribution is very useful technique to analyze the risk involved in a project.

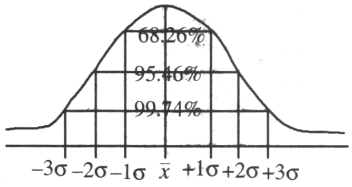



**Fig.: Normal Curve**

The complete area of normal probability distribution is equal to 1 (0.5 on each side). The distribution curve ranges between minus infinity to plus infinity.

**2. Dependent Cash Flows**

Most of the investment projects involves dependent cash flows. If the degree of correlation is high between cash flows, the standard deviation will also be large. But the expected values of NPV remains constant, irrespective of behaviour of cash flows.

**(i) Perfect Correlation**

Perfect correlation exists when standard deviation of cash flows in one period represents the same standard deviation of expected cash flow in the next period.

In case of perfect correlation, the standard deviation of cash flows can be expressed as,

$$\sigma = \sum_{t=1}^{n} \frac{\sigma_t}{(1+k_j)^t}$$

### (ii) Moderate Correlation

In moderate correlation, cash flows are neither perfectly correlated nor independent. The moderate cash flows can be controlled by using the concepts of decision tree and conditional probabilities.

The standard deviation of the projects when the cash flows are moderately correlated.

$$\sigma = \sqrt{\sum_{t=1}^{n} (NPV_j - ENPV)^2 P_j}$$

Where,

$NPV_j$ – Net present value for series *j* of net cash flows

*ENPV* – Expected value of net present value

$P_j$ – Probability of occurrence of the series.

**PROBLEM**

**8. Two mutually exclusive investment proposals are considered. The following table gives the information.**

| Cost / Cash in flow | Project P Rs. 5000 | | Project Q Rs. 5000 | |
|---|---|---|---|---|
| Year | Rs. | Probability | Rs. | Probability |
| 1 | 3,000 | 0.3 | 6,000 | 0.3 |
| 2 | 5,000 | 0.5 | 7,000 | 0.5 |
| 3 | 7,000 | 0.3 | 4,000 | 0.3 |
| 4 | 10,000 | 0.2 | 5,000 | 0.2 |

**Cost of capital is 12% (Assumed). Suggest the selection of the project.**

*Sol :*

**Calculation of Net Present Values of the two Projects (P and Q)**

| Year | Project P | | | | Project Q | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | P.V Factor @ 12 % (1) | Cash Inflow (2) | Probability (3) | Monetary Value 2 × 3 = (4) | Present Value 1 × 2 × 3 = (5) | Cash Inflows (6) | Probability (7) | Monetary Value 6 × 7 = (8) | Present Value 1 × 6 × 7 = (9) |
| 1 | 0.893 | 3,000 | 0.3 | 900 | 804 | 6,000 | 0.3 | 1,800 | 1607.4 |
| 2 | 0.797 | 5,000 | 0.5 | 2,500 | 1992.5 | 7,000 | 0.5 | 3,500 | 2789.5 |
| 3 | 0.721 | 7,000 | 0.3 | 2,100 | 1495.2 | 4,000 | 0.3 | 1,200 | 854.4 |
| 4 | 0.635 | 10,000 | 0.2 | 2,000 | 1270 | 5,000 | 0.2 | 1,000 | 635 |
| | | | Total present value | | 5562 | | Total present of value | | 5886.3 |

**Project 'P'**

| | | |
|---|---|---|
| = Total present value | = | 5,562 |
| (–) Cost of investment | = | 5,000 |
| | | 562 |

**Project 'Q'**

| | | |
|---|---|---|
| Total present value | = | 5,886.3 |
| (–) Cost of investment | = | 5,000 |
| | | 886.3 |

**Conclusion**

From the NPV table, it indicates that project 'Q' NPV is comparatively more over project 'P' after taking into consideration, the probabilities of cash inflows. Therefore, project 'Q' is more profitable.

### 2.3.4 Decision Trees

**Q8. Define decision tree. Explain the steps involved in decision tree approach.**

**(OR)**

**Explain the merits and demerits of decision tree approach.**

*Ans :* **(Imp.)**

**Meaning**

A decision tree is a branching diagram which is similar to a probability tree. It represents problems in a series of decisions to be made under conditions of uncertainty. Any one of the decisions may be dependent on the outcome of preceding or the outcomes of a trial.

A decision tree is a diagrammatic representation of the relationships among decisions states of nature and payoffs (or outcomes). The first step is to draw a diagram which shows the structure of the problem. Decision trees are constructed from left to right. The branches represent the possible alternative decisions which could be made and the various possible outcomes which might arise. It is helpful to distinguish between the two types of branch.

**Steps**

**Step 1**

Determine the number of decisions to be taken and the alternative strategies available for each decision in a sequential manner.

**Step 2**

Determine the outcome (or event) which may occur from each alternative strategy (course of action).

**Step 3**

Construct a tree diagram representing the order in which decisions are taken and outcomes are occurring. The decision tree diagram begins from left side and move towards right side.

**Step 4**

Determine the probabilities of occurrences of each state of nature.

**Step 5**

Determine the pay off values for each pair (or combination) of state of nature and course of action.

**Step 6**

Calculate expected pay off value for each course of action starting from right side of the decision tree.

**Step 7**

Select the course of action (or alternative strategy) with the best expected pay off value.

**Step 8**

Work backwards from last decision point to first decision point and at each decision point repeat the steps from step 4 to step 7.

**Merits**

Following are the merits or the situations under which decision trees are suitable,

1. This approach is very useful in sequential investments where decisions are dependent on each other.
2. The graphical representation of decision tree approach helps the decision maker in identifying alternatives clearly.
3. It clearly explains assumptions and calculations, so that it can be questioned and revised.

**Demerits**

Following are the demerits or the situations under which decision trees are not suitable,

**1.** If decision-maker includes more alternatives and variables it becomes very difficult.

**2.** When interdependent alternatives are used, decision tree becomes too complicated to solve the problem.

**3.** If the proposal is divided into more stages then diagram becomes large in size and consumes lot of time for calculations, sometimes it becomes almost impossible to solve the problem:

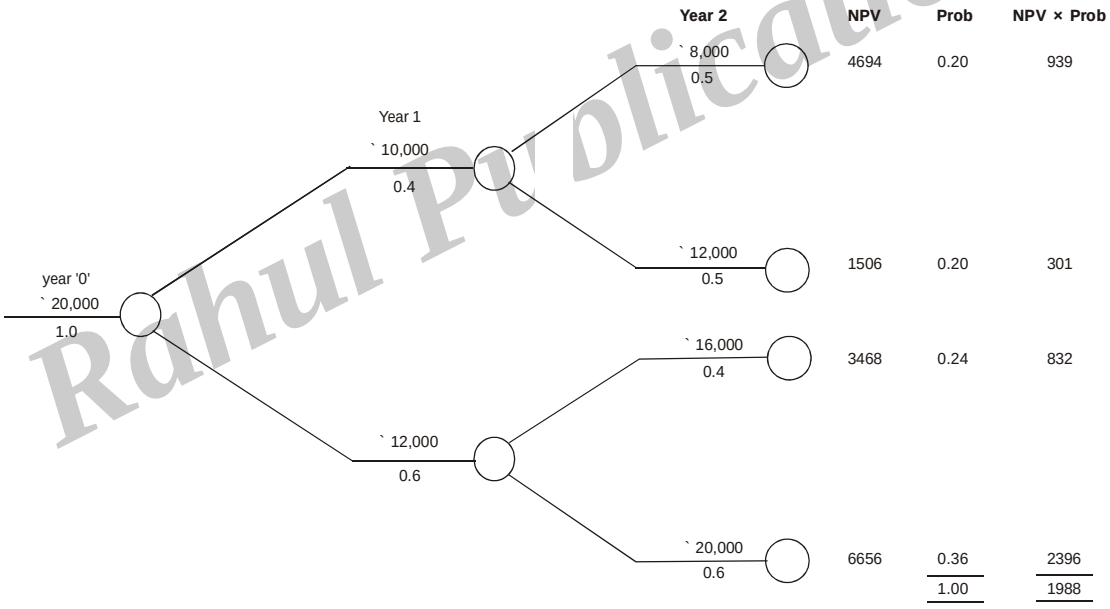
## PROBLEMS

**9. A company is considering new equipment. The net cash flows of the equipment have been estimated as given below. The equipment's life is estimated to be two years.**

| | Year 1 | Probability | Year 2 | Probability |
|---|---|---|---|---|
| NCF | 10,000 | 0.4 | 8,000 | 0.5 |
| | | | 12,000 | 0.5 |
| NCF | 12,000 | 0.6 | 16,000 | 0.4 |
| | | | 20,000 | 0.6 |

**The cost of equipment is ` 20,000 and the company's cost of capital is 12 per cent. Use the decision tree approach to recommend whether the equipment should be bought or not.**

*Sol :*




The tree diagram shows four possible outcomes which are indicated by branch or path. The NPV's are computed by taking into consideration discount factor @ 12% (given).

**1.** (10000 x 0.893 + 8000 x 0.797) - (20000) = - 4694.

**2.** (10000 x 0.893 + 12000 x 0.797) - (20000) = - 1506.

**3.** (12000 x 0.893 + 16000 x 0.797) - (20000) = 3468.

**4.** (12000 x 0.893 + 20000 x 0.797) - (20000) = 6656.

As the NPV is positive it is advisable to bought the equipment.

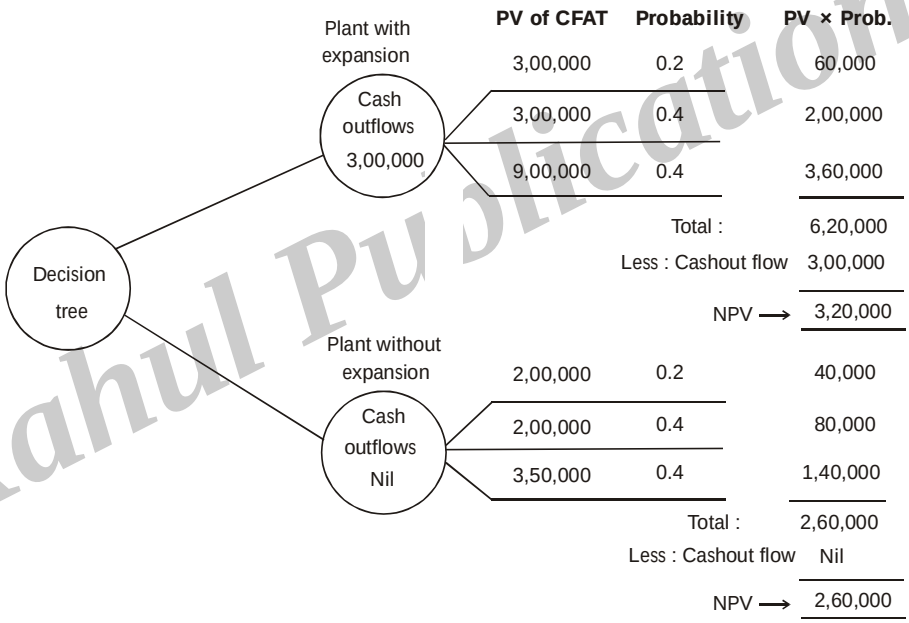
**10. A company has the following estimates of the present values of the future cash flows after taxes associated with the investment proposal, concerned with expanding the plant capacity. It intends to use a decision approach to get a clear picture of the possible outcomes of this investment. The plant expansion a expected to cost ` 3,00,000. The respective PVS of future CDAT and probabilities are as follows,**

| With expansion (`) | Without expansion (`) | Probabilities |
|---|---|---|
| 3,00,000 | ` 2,00,000 | 0.2 |
| 5,00,000 | 2,00,000 | 0.4 |
| 9,00,000 | 3,50,000 | 0.4 |

**Advise the company regarding the financial feasibility of the project.**

*Sol:*

The decision tree corresponding to given data is shown below,




From the above calculation, NPV is expected to be ` 3,20,000 with plant expansion and ` 2,60,000 without plant expansion.

Therefore, it is recommended that the company should expand the capacity of the plant.

**11. An automobile company has come up with an electric car. The firm is ready for pilot production and test marketing. This will cost ` 200 crore and take six months. Management believes that there is 70 percent chance that the pilot production and test marketing will be successful. In case of success, the company can build a plant costing ` 1500 crores. The plant will generate an annual cash inflow of ` 300 crore for 20 years if the demand is high or an annual cash inflow of ` 200 crore if the demand is low. High demand has a probability of 0.6; low demand has a probability of 0.4. Suggest the optimal course of action using decision tree analysis.**

*Sol:* **(Aug.-21, Imp.)**

**Note:** Assume discount rate as 10%. Since its not given in the problem.

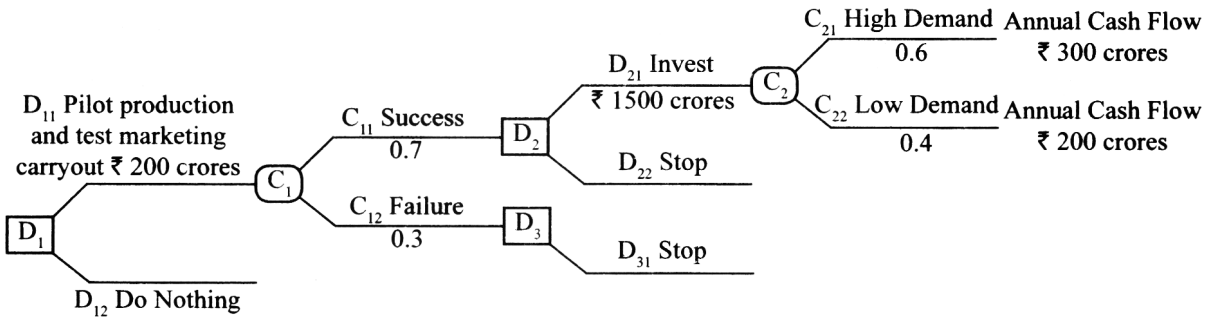



**Fig.: Decision Tree**

Determining of Optimal Course of Action

**Decision**

| Node | Options | Probability | Expected Monetary Value |
|---|---|---|---|
| $C_2$ | Plant will generate if demand is, | | |
| | $C_{21}$ High | 0.6 | 0.6 (300 × 8.51 (20,10%)) = ` 1531.8 |
| | $C_{22}$ Low | 0.4 | 0.4 (200 × 8.51 (20,10%)) = ` 680.8 |
| | | | Total EMV = 1531.8 + 689.8 = ` 2212.6 |
| $D_2$ | $D_{21}$ : Invest ` 1500 crores | - | 2212.6–1500 = ` 712.6 |
| | $D_{22}$ : Stop (No Investment) | - | 0 |
| | Select $D_{21}$ since its EMV is greater than $D_{22}$ | | |
| | $C_{11}$ : Success of pilot production and test marketing | 0.7 | 0.7 (712.6) = ` 498.82 |
| | $C_{12}$ : Failure of pilot production and test marketing | 0.3 | 0.3 (0) = 0 |
| | | | Total = 498.82 + 0 = 498.82 |
| $D_1$ | $D_{11}$ : Pilot production and test marketing carryout at a cost of ` 200 crores | - | 498.82 = ` 298.82 |
| | D12 : Do nothing | - | 0 |



**12. Venkat Inte'1 Company provides the following estimates of the present values of the future expected cash flows after taxes associated with investment proposal relating to the plant expansion.**

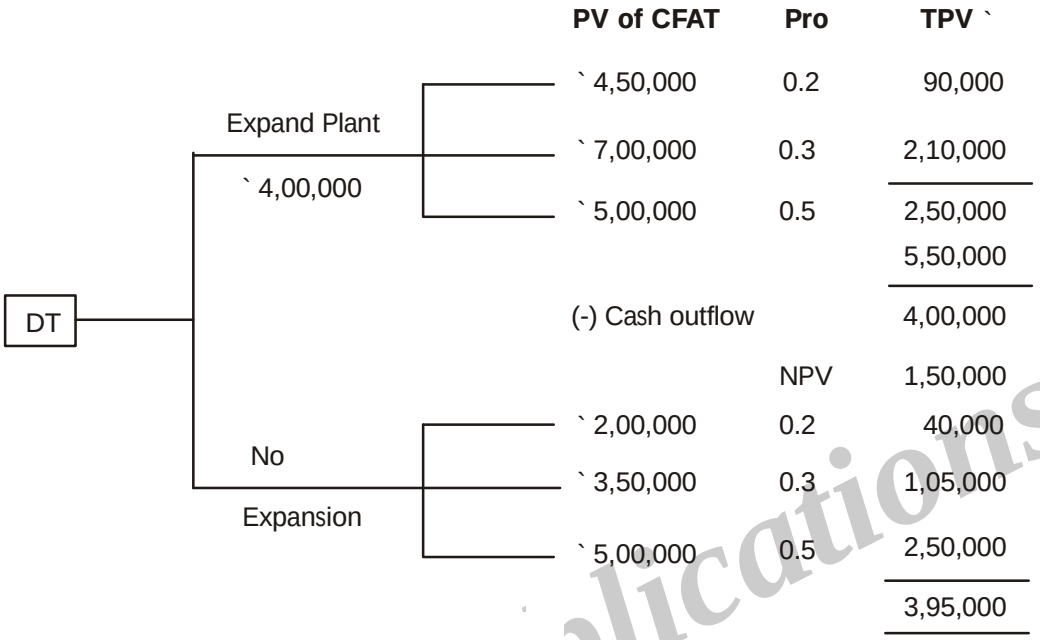
| CFAT (`) | | |
|---|---|---|
| **With Expansion** | **Without expansion** | **Probability** |
| **4,50,000** | **2,00,000** | **0.2** |
| **7,00,000** | **3,50,000** | **0.3** |
| **5,00,000** | **5,00,000** | **0.5** |

**The plant expansion costs ` 4,00,000. You are required to advise the Venkat Inte' 1 Company regarding the financial feasibility on the investment with the use of decision tree approach.**

*Sol:*

In the above illustration, PV of CFs are available.

Calculation of NPV (`)




**Decision :** Proposed expansion is feasible, since, the NPV is positive i.e., ` 1,50,000

### 2.3.5 Sensitivity Analysis

**Q9. Explain briefly about sensitivity analysis.**

**(OR)**

**What is a sensitivity analysis? Explain its impact on project investment decisions.**

**(OR)**

**Interpret Sensitivity analysis method of investment analysis with an example.**

*Ans :* **(Sep.-23, May-19, Imp.)**

**Meaning**

Sensitivity analysis can help to mitigate the impact of influences, depending upon the severity of damage occurring out of risks. To control the influence the sensitivities are analyzed. Sensitivity analysis is made along with uncertainty and probability analysis, to determine the extent of action to be taken. The higher the sensitivity of influences on event, higher the risk and the damage.

Sensitivity analysis is the study of the key assumptions or calculations on which a management decision is based in order to predict alternative outcomes of that decision if different assumptions are adopted. Sensitivity analysis is a modelling procedure used in forecasting whereby changes are made in the estimates of the variables to establish whether any will critically affect the outcome of the forecast.

It is a study to determine the responsiveness of the conclusions of an analysis to changes or errors in parameter values used in the analysis, seeks to test the responsiveness of outcomes from decision models to different input values and constraints as a basis for appraising the relative risk of alternative courses of action. It is

possible to use sensitivity analysis for helping to determine the value of information in addition to its role in strategic decision making. Sensitivity analysis seeks to determine the range of variations in the coefficients over which the solution will remain optimal.

Sensitivity analysis is used in determination of risk factor in capital budgeting decisions. It aids in identifying the most sensitive factor, that may cause the error in estimation. Sensitivity analysis tells about the responsiveness of each factor on the project's NPV or IRR.

**Merits**

Sensitivity analysis is very famous method for evaluating risk. It involves following merits,

**1.** It represents how sensitive a project is to fluctuations in values of fundamental variables.

**2.** This method show how critical values like NPV may be controlled if any changes in some factor occurs.

**3.** The sensitivity analysis is very attractive as it express the issues same as project evaluator.

**Demerits**

The demerits of sensitivity analysis are,

**1.** It explains the impact of changes in some variable on NPV but does not explain the probability of these changes.

**2.** In sensitivity analysis only one variable is modified at a time whereas in practice many variables have to be considered at the same time.

**3.** The analysis is subjective in nature where in decision of one person is different from the other (one may accept while the other may reject a proposal).



## PROBLEMS

**13. A project, with an initial investment of Rs. 15 crores gives an annual cash flow of Rs. 5.5 crores per annum for 4 years. The cost of capital for the project is 14%. The annuity factor for 4 years @ 14% is 2.9137 and @ 18% for 4 years is 2.6667. Calculate sensitivity for,**

**(i) Project cost,**

**(ii) Annual cash flow and**

**(iii) Cost of capital. Which of the above three variable is more sensitive?**

*Sol :* **(Oct.-22, Imp.)**

Annual cash in flow (`) (5.5 × 2.9137) = 16.02535

(–) Project cost = 15 crores

1.02535

(i) Sensitivity for project cost $= \frac{\text{Increased in project cost}}{\text{Project cost}}$

$= \frac{1.02535}{15} \times 100 = 6.83$

(ii) Sensitivity for annual cash flow = $\frac{\text{Decreases in CIF}}{\text{Cash in flow}}$

$$= \frac{1.02535}{16.02535} \times 100 = 6.39\%$$

(iii) Cost of capital (NN) = $\frac{\text{Increase in } K_O}{K_O} = \frac{18-14}{14}$

$$= \frac{4}{14} \times 100 = 28.57\%$$

**Working**

$CIF \times AF - COF = 0$

$AF = \frac{COF}{CIF} = \frac{15}{5.5} = 2.72.$

Cost of capital is 18.

**14. Premier Industries Ltd. has prepared the following budgeted profitability statement for the current year operations:**

| Particulars | | (Rs.) |
|---|---|---|
| **Sales** | **(2500 units × Rs. 4)** | **10,000** |
| **Variable cost :** | | |
| **Materials** | **4,000** | |
| **Labour** | **3,000** | **7,000** |
| **Contribution** | | **3,000** |
| **Less : Fixed cost** | | **2,000** |
| **Profit** | | **1,000** |

**Make a sensitivity analysis based on the above data.**

*Sol :*

The changes in the sales revenue and costs on profit can be analyzed with the help of sensitivity analysis as follows:

**(a)** If selling price is reduced by more than 10% budgeted, the company would incur loss.

**(b)** If the sales are reduced by more than 10% of the budgeted sales of 2500 units, the company would incur loss.

**(c)** If labour costs increase by more than 33.33% above the budgeted, the company would make a loss.

**(d)** If material cost increases by 25% or more of the budgeted cost, the company would make a loss.

**(e)** If the fixed costs increase by more than 50% of budgeted fixed cost, the company would incur loss.

If we observe the sensitivity of the above data, sales units and selling price per units is more sensitive than other items of cost. Hence this area remain careful consideration.

**15. X Ltd. is considering a project with the following cashflow:**

| Year | Purchase of plant | Running cost | Savings |
|---|---|---|---|
| 0 | 70,000 | – | |
| 1 | - | 20,000 | 60,000 |
| 2 | - | 25,000 | 70,000 |

**The cost of capital is 8%. Mea sure the sensitivity of the project to changes in the level of running cost, savings and plant cost. Which factor is the most sensitive ?**

**The present values of Re. 1 at 8% for year 1 and year 2 are respectively 0.9259 and 0.8573.**

*Sol :*

| Particulars | | Amount | Amount |
|---|---|---|---|
| P V of Savings | | | |
| Year 1 | (60,000 × 0.9259) | | 55,554 |
| Year 2 | (70,000 × 0.8573) | | 60,011 |
| | | | 1,15,565 |
| Less : P.V. of Running Cost | | | |
| Year 1 | (20,000×0.9259) | 18,518 | |
| Year 2 | (25,000×0.8573) | 21,432 | 39,950 |
| Net savings | | | 75,615 |
| Less: Purchase cost of plant | | | 70,000 |
| Net present value | | | 5,615 |



**i) Sensitivity for Plant Cost**

If the purchase cost of plant increases by Rs. 5,615, the NPV of the project will become zero. Therefore, the sensitivity for plant cost is :

$$= \frac{5,615}{70,000} \times 100$$

= 8.02%

**ii) Sensitivity for Running Cost**

If the present value of running cost increases by Rs. 5,615, the NPV of the project will become zero. Therefore, the sensitivity for running cost is :

$$\frac{5,615}{39,950} \times 100$$

= 14.06%

**iii) Sensitivity for Savings**

If the savings decrease by Rs. 5,615, the NPV becomes zero. Therefore, the sensitivity for savings is: 5,615

$$\frac{5,615}{1.15.565} \times 100 = 4.86\%$$

Analysis - Savings is most sensitive.

**16. An investment of $40,000 today is expected to give rise to annual contribution of $25,000. This is based on selling one product, with a sales volume of 10,000 units, selling price of $12.50 and variable costs per unit of $10. Annual fixed cost of $10,000 will be incurred for the next four years; the discount rate is 10%.**

**a) Calculate the NPV of this investment.**

**b) Calculate the sensitivity of your calculation to the following:**

**i) Initial Investment.**

**ii) Selling price per unit.**

**iii) Sales volume.**

**iv) Fixed costs.**

**v) Discount rate.**

*Sol :* **(Sep.-23, Imp.)**

An investment of $ 40,000 today is expected to give rise to annual contribution

**Calculate of NPV's**

| (a) | Year | C.F. | Discount @ 10% | PV of F.C.V. |
|---|---|---|---|---|
| | 1 - 4 | $ 25,000 | 3.169865 | $ 79247 |
| | | | (-) Initial Investment | ($ 40000) |
| | | | Net present value | $ 39247 |
| (b) | i) Initial Investment | | → $ 40000 | |
| | ii) Selling price per unit | | → $ 12.50 | |
| | Variable cost per unit | | → $ 10 | |
| | iii) Sales volume | | → 10000 | |
| | iv) Fixed cost | | → $ 10000 | |
| | v) Discount rate | | → 10% | |

## 2.4 MONTE CARLO APPROACH TO SIMULATION

**Q10. What is simulation ? Explain the nature of simulation.**

*Ans :*

**Meaning**

In real life, many problem occur which cannot be defined by a mathematical representation because of their stochastic nature, complexity in problem formulation or conflicts in idea that describe the exact nature of the problem.

Simulating the model means experimenting the model by trying alternate actions and then comparing the consequences of these actions. This provide answers to many questions arising during the experimentation. This technique is used in almost all fields limited by our imagination and the ability to translate these imagination in to computer directives or in a mathematical model.

**Definitions**

**(i)** **According to Donald. G.Malcolm** A simulated model may be defined as one which depicts the working of a large scale system of men, machines, materials and information operating over a period of time in a simulated environment of the actual real world conditions.

**(ii)** **According to Shannon** Simulation is the process of designing a model of real system and conducting experiments with this model for the purpose of understanding the behaviour (within the limits imposed by a criterion or set of criteria) for the operation of the system.

**Nature**

**(i)** Simulation is a statistical technique to simulate or imitate the given real world situations.

**(ii)** If the model and the relationship study of its elements are simple then even the basic mathematical techniques like algebra, probability, calculus etc., can be used to obtain the desired information. This is called analytical solution.

**(iii)** As, the real world models are highly complex, its very much difficult for anyone to evaluate them through analytical methods.

**(iv)** Broadly speaking, it is a technique which conducts experiments on the models that have been constructed based on real life situations.

**Q11. What are the various types of Simulation ?**

*Ans :*

The various types of simulation are discussed below.

**1. Continuous Models**

Such model consist of system whose behaviour is a function of time i.e., behaviour of the system changes with respect to time. In this models, various difference differential equations are used to describe the interface between the different system elements.

**2. Discrete Models**

In contract to the above model, here changes occurs only at specific points (usually referred to as discrete points) during a particular period of time.

This model is extensively used in waiting lines, where it helps in calculating average waiting line and length of queue changes in such activities are noticed on the arrival or departure of any customer.

**3. Analog simulation (Environmental Simulation)**

In this type of simulation the reality is represented in physical form.

**Example :** The game of snake and ladder is used to simulate the morality of the players, if he/she is moving up by using ladder, it indicates the goodness where as if he/she comes down by being swallowed up by the snake, shows their temptation indicating badness.

**4. Computer Simulation (System Simulation)**

Complicated managerial decision making problems cannot be resolved by using analog simulation and it may be uneconomical to carry out the actual experimentation with the system.

In this type, the problem is solved by using high speed electronic computers wherein a mathematical model is generated for a complex system based on this model a computer programme is developed, which helps in attaining the solution accurately.

**5. Deterministic and Probabilistic Simulation**

When the process under consideration is complicated and involves multiple stages with high degree of iterations then they can be resolved by using deterministic simulation. Deterministic simulation adopts fixed procedures for the determination of outcomes and performance. Probabilistic simulation is used when one or more of given variables are independent.

**6. Time Dependent and Independent Simulation**

In time dependent simulation, determining the time when the event is likely to happen is necessary.

**For example:** In order to ensure the smooth functioning of manufacturing activities, lead time for the required raw material should be determined.

In time independent simulation, it is not necessary to have the knowledge of when the event would likely to happen.

**For example:** If an item is processed four times a day it is not necessary to know exactly at what particular time it will be processed, but is needs to be processed at any point of time during a whole day.

**7. Visual Interactive Simulation**

When any real life situation has to be simulated then it must be done in the form of a computer algorithm by constructing a model which is an exact replica of real life situation. This type of simulation uses computer graphics to represent the simulation results that have been obtained due to the variations in the value of inputs.

**8. Business Games**

This simulation consists of many participants who are playing their respective roles and are simulating the real competition.

Like in real life, here also individuals or team compete with their competitors so as to attain their goals.

**9. Corporate and Financial Simulations**

It is used in corporate planning particularly in the financial planning of corporates.

When the financial risk is to be analyzed then several activities like production, marketing, finance etc., are integrated into a single model i.e., either deterministic or probabilistic model.

**Q12. Briefly discuss the procedure for simulation analysis.**

*Ans :* **(Aug.-21, Imp.)**

The various steps involved in simulation analysis/ process are as follows,

**1. Identify the Problem**

The simulation process solves only those problems whose assumptions for analytical problems are not satisfied or there is no appropriate model of the system under consideration. For example, the arrival/ service pattern the queuing system does not meet the criteria required to solve the problem by queuing theory.

**2. Identify the Decision Variables and Decide the Objective**

After identifying the problem, the next step is to identify the decision variables, define the problem and list the objectives to be achieved from solution of the model. This not only facilitates the development of the model but also provides the basis for the evaluation of the simulation results. For example, in inventory situation, the demand, lead time and safety stock are considered as decision variables.

**3. Construction of an Appropriate Model**

The third step in simulation process is the development of a suitable simulation model. For the development of the model, a clear understanding of the relationship among the system elements is required. This model may be a physical, mathematical, mental conception or a combination of all. In general, many models involve physical scaled down model of an aeroplane or ship made up of wood or other material. As the physical models are expensive, the mathematical model showing the relationship between the system elements are preferred.

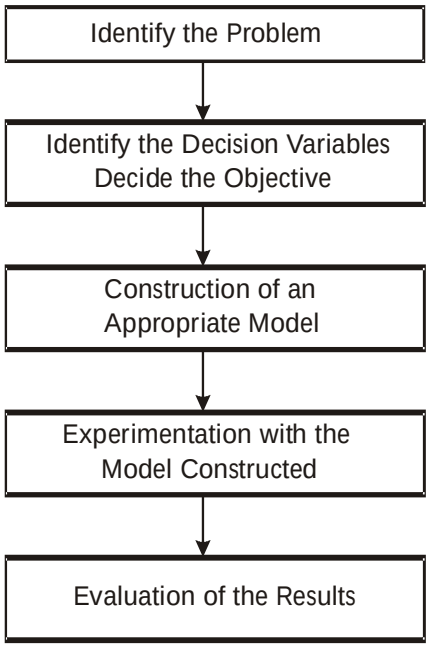



**Fig.: Process of simulation analysis**

**4. Experimentation with the Model Constructed**

This step involves comparing the model with the actual system under consideration as the model should represent the exact system in consideration. This step runs the model developed for study. If the conditions are deterministic and constant, a single run is enough and if the conditions are stochastic in nature, then number of runs will be required to get the correct picture of the model performance.

**5. Evaluation of the Results**

The last step in simulation process is examining the results of the problem as well as their reliability and accuracy. These interpretations depend on the extent to which the model portray the reality. If the simulation is complete, then select the best course of action or else make necessary changes in the decision variables and repeat the process from step 3. The closer the model is related to real system, the lesser will be the need for adjusting the results.

**Q13. Explain in brief Monte Carlo approach to simulation.**

*Ans :* **(Sep.-20, Imp.)**

**Meaning**

Monte-Carlo Simulation technique involves conducting continuous experiments on the model with known probability distribution in order to draw random samples using random numbers. If the system cannot be described by a probability distribution, then an empirical probability distribution can be constructed. In general, the problem is solved by simulating the data with random number generators. The basic steps involved in simulation by Monte-Carlo technique are as follows,

1. The probability distribution is set up for the variables to be analyzed.
2. For each random variable, cumulative probability distribution is build up.
3. Generating random numbers and then assigning set of random numbers to each random variable.
4. Conducting experiment using random sampling.
5. Experiments are conducted and repeated until the required number of simulation runs has been generated.
6. A course of action is then designed and implemented.

**Generation of Random Numbers**

A random number is a number obtained from sequential numbers whose probability is same as compared to the list of sequential numbers. When random numbers are generated from some deterministic process then they are called as "Pseudo-random numbers".

Monte-Carlo simulation is widely used in generating random numbers. It is one of the most important aspect of simulation model. It is used to ascertain random observations from the probability distribution. Random numbers must be assigned in equal proportions in accordance with their probability distribution. Random numbers can be generated through computer random tables or manually.

The devices used for ascertaining random numbers are roulette wheels, dice rolling, card shuffling etc. Mostly, for generating random numbers computer program are used which lies between 0 and 1. If random numbers are generated in conjunction with the cumulative probability distribution of a random variable then they should be in multiples of 0 but not of 1.

The random numbers which have been selected from a table must not depend on the starting point of a table and can be randomly started with any row or column without deviating from the pattern. If random numbers are selected from more than one concerned variable than different list of numbers for each variables are considered.

**Mid-square Method of Generating Pseudo-random Numbers**

This method is most commonly used for generating sequences of pseudo-random numbers. This method have the following steps,

**Step 1**

Select any four digit integer to start the simulation process. The first random number can be obtained in the following manner.

**Step 2**

Selected four digit integer (say 2345) and then it must be squared.

**Step 3**

The resulting number is (5499025). The resultant number should contain 8 digits. If the resultant numbers have less than 8 digits, then insert zero at the beginning of the number (as 05499025).

**Step 4**

From the resultant number select middle four digits (4990) which may become the random number for the new process. In this procedure, pseudo-random numbers are generated.

Everytime, the entire process needs to be repeated for getting the pseudo-random numbers.

## 2.5 INVESTMENT DECISIONS UNDER CAPITAL CONSTRAINTS AND CAPITAL RATIONING

**Q14. What is Capital Rationing? Explain different types of Capital Rationing.**

*Ans :*

**Meaning**

Capital rationing refers to those investment decisions which a firm has to take under the constraint of availability of fund. Capital rationing implies a situation where the firm is forced by the external or self-imposed factors to acquire essential amount of capital so that it can invest in all investment projects with positive NPV. Under capital rationing, management must not only ascertain the profitable investment opportunities but it must identify the combination of the profitable projects which can generate highest NPV within the funds available. The capital budgeting decisions taken by the firm when there are limited funds are known as capital rationing decisions.

**Types**

Capital rationing is caused by external or internal forces which are levied by the management. It is of two types,

1. External capital rationing
2. Internal capital rationing.

**1. External Capital Rationing**

External capital rationing has emerged due to deficiency in capital markets which are result of shortage in market information or fixed attitude that restricts free flow of capital.

**2. Internal Capital Rationing**

Internal capital rationing is developed due to restriction set up by the management. Management implement different restrictions like not to acquire additional funds through debt, fix an arbitrary limit to amount of funds to be invested, etc. At times, it is impossible to evaluate capital rationing internally.

**Q15. Explain the methods of Capital Rationing.**

*Ans :* **(Dec.-19, Imp.)**

Capital rationing can be carried out with the help of two different approaches or methods i.e Ranking method and Mathematical Programming method.

**1. Ranking Method**

In ranking method, ranks are allotted to available projects depending on selected criterion such as NPV, IRR, PI, BCR, etc. First rank is assigned to the project with highest value according to chosen criterion and second rank is assigned to project with next highest value and so on.

After ranking is given to projects, they are selected from rank 1 project to the lowest rank project until the available capital budget is finished.

Ranking method is very simple method of capital rationing. But it has two drawbacks, i.e project indivisibility and investment criterion.

**2. Mathematical Programming Method**

If number of good projects increases for investment then number of feasible combinations of projects also increases. It will lead to problem of finding optimum combination of projects which can match available funds for investment. It becomes more complicated with increasing number of years in planning horizon. Choosing the optimum combination of projects becomes time consuming in some situations. In this type of situations, mathematical programming models are used which provides a methodology resulting in optimum combination of projects. The mathematical programming models useful in capital rationing are as follows,

**(a) Linear Programming Model**

Linear programming is a famous mathematical programming technique to get solution for problem of optimum utilization of limited resources. It has three elements i.e., Decision variables, objective function and constraints.

**(b) Integer Linear Programming Model**

The integer linear programming model is same as linear programming model with only one difference. The linear programming allow any value between "0" and "1" for fraction of investment on projects whereas integer linear programming model allow only two values either

"0" or "1". It implies a project can be either accepted or rejected, if available funds are insufficient to meet capital outlay. There are many software packages prevailing in market for managing integer linear programming models which are useful in solving capital rationing problems.

**Q16. How can investment decisions be taken under Capital Constraints.**

**(OR)**

**Discuss the investment decisions under capital constraints.**

*Ans :* **(Sep.-23, Imp.)**

The following figure depicts the steps involved in investment decision under capital constraint or capital budgeting process,

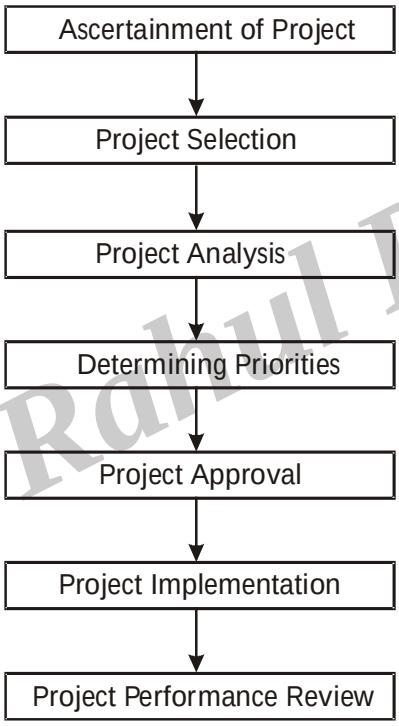



**Fig. : Process of Capital Budgeting/Investment Decision**

**1. Ascertainment of Project**

Identifying the project for investment is the first step in capital budgeting. Various projects are ascertained by department officer for analysis and the suitable project is selected according to corporate strategies and submitted to the capital expenditure planning committee.

**2. Project Selection**

Different projects are checked thoroughly by capital expenditure planning committee and selection is based on the corporate strategy.

**3. Project Analysis**

In this step, profitability of different projects is analyzed. It may be classified into independent project, dependent project and mutually exclusive project. The methods by which profitability of project can be ascertained are Pay Back Period (PBP), Rate of Return (ROR), Net Present Value (NPV), Internal Rate of Return (IRR) etc.

**4. Determining Priorities**

Giving priorities helps the firm or an individual to work smoothly. By analyzing the project, one can know the profitability, urgency and risk involved and can accordingly select the project. Ranking different projects is necessary for the firm.

**5. Project Approval**

After meeting all the requirements stated in the above step the project is approved and included in capital expenditure budget. Then, the amount from which fixed assets are purchased in budget period is estimated.

**6. Project Implementation**

Implementing the project is an important aspect for capital expenditure committee as they have to consider the profitability of the project with time and cost limit. To overcome delays in work network techniques such as PERT and CPM are useful for managing the project.

**7. Project Performance Review**

The final step is to check whether all the above steps are running smoothly or not and if any problem occurred, it can be rectified with corrective actions. The project expenditure needs to be compared with post completion expense of the investment process, the actual return generating from investment, everything needs to be properly viewed. Finally, the performance can be known.

**Q17. What are the constraints while making investments in the new projects? Explain.**

*Ans :* **(May-19, Imp.)**

Investment in new project is effected by following constraints,

**1. Liquidity**

Investment plan must consider the liquidity constraint as investor may need some money to meet unexpected cash requirements in future. Some investments should be made in liquid assets so that they can be easily converted into cash without affecting portfolio value.

**2. Time Horizon**

Time horizon constraint is related to time periods for which returns are expected to meet future needs. Investor's time horizon is closely linked with liquidity needs and ability to handle risk. When investor has long investment horizons he/she requires less liquidity and can manage greater portfolio risk. Whereas, investor with shorter time horizons consider more liquidity and less risky investments.

**3. Legal and Regulatory**

There are various laws to regulate investment process and financial markets. Investment strategies of individuals and institutions are constrained by legal and regulatory factors. These constraints make specifications in asset classes in which investments are not permitted.

**4. Tax Concerns**

Tax constraint is based on when and how different types of returns are taxed. Policy statement must be drafted by considering tax environment. Capital gains and investment income are liable for differential tax treatments. Investment planning becomes difficult due to taxes and becomes more complicated if international investments become part of the portfolio.

## 2.6 CORPORATE COST OF CAPITAL

### 2.6.1 Divisional Cost of Capital, Pure Play Technique, Accounting Beta

**Q18. What is Corporate Cost of Capital? Explain briefly about various techniques of corporate cost of capital?**

*Ans :*

When businesses evaluate investment opportunities, understanding the cost of capital is crucial because it represents the return rate that investors expect from their investments in the company. This concept becomes more nuanced when applied to different parts of a company, such as divisions, or when using specific methods to estimate the cost of capital.

**Corporate Cost of Capital**

The corporate cost of capital (CCC) is essentially the weighted average cost of capital (WACC) for the entire corporation. It reflects the average rate of return the company must earn on its existing assets to maintain its current value and satisfy its creditors and investors. The CCC combines the cost of equity, the cost of debt, and the cost of any other capital component, weighted by their proportion in the company's capital structure. It's used for evaluating new projects that have a similar risk profile to the company's current operations.

**Techniques**

**1. Divisional cost of capital**

Companies often operate in multiple lines of business, each with its own risk profile and financial characteristics. The divisional cost of capital is the cost of capital for a specific division within a company, adjusted for the unique risks and financial structure of that division. It's particularly useful for large, diversified companies, where different divisions may face significantly different levels of risk. Calculating the divisional cost of capital allows for more accurate project evaluation and investment decision-making within each division.

**2. Pure Play Technique**

The pure play technique is a method used to estimate the cost of capital for a project or division by identifying a publicly traded company (or companies) engaged solely in the line of business similar to the project or division being evaluated. By using the beta (a measure of volatility or systematic risk compared to the market) of these "pure play" companies, a company can adjust for its own capital structure to estimate the project or division's cost of equity. This approach is particularly useful when a company's division or project has a different risk profile from the company as a whole or when no direct historical data is available.

**3. Accounting beta**

Beta is used in the CAPM formula to estimate risk, and the formula would require a public company's own stock beta. For private companies, a beta is estimated based on the average beta among a group of similar public companies. Analysts may refine this beta by calculating it on an after-tax basis. The assumption is that a private firm's beta will become the same as the industry average beta.

**PROBLEMS**

**17. A company has an equity beta of 2.00, cost of debt of 7%, D/E ratio of 0.35, and the tax rate of 35%. Risk Free rate 1.25% and Market premium 8%.**

| Name | Equity Beta | Kd | D/E | Tax |
|---|---|---|---|---|
| Competitor | 11.5 | 7.50% | 0.4 | 35% |
| Competitor | 22.5 | 8.00% | 0.3 | 40% |

**Calculate the cost of capital of the company using Pure Play Approach.**

*Sol:* **(Imp.)**

Unlevered beta = Levered beta / [1 + (1 - t) x D/E]

For competitor 1,

Unlevered Beta = 1.5 / [1 + (1 - 0.35) × 0.4]

= 1.1905

For competitor 2,

Unlevered Beta = 2.5 / [1 + (1 – 0.4) x 0.3]

= 2.1186

Average Unlevered Beta = (1.905 + 2.1186) / 2

= 1.6546

Relevered Beta = Unlevered Beta x [1 + (1 – t) x D/E]

= 1.6546 x [1 + (1 - 0.35) x 0.35]

= 2.031

Cost of Equity = Risk Free Rate + Beta x Market Risk Premium

= 1.25 + 2.031 x 8

= 17.50%

Cost of Capital = Weight of Debt x Cost of Debt x (1 - Tax Rate) + Weight of Equity x Cost of Equity Weight of Debt = D/E / [1 + D/E]

= 0.35 / 1.35 = 0.2593

Weight of Equity = 1 – 0.2593 = 0.7407

Cost of Capital = 0.2593 x 7% x (1 - 0.35) + 0.7407 x 17.5

= 14.14%

**18. Company is going to open a new division. The division will be financed with $1 million in debt and $3 million in equity. The tax rate is 15% for all firms. The risk-free rate is 1% and market portfolio return is 7%. The yield on the division's debt is 4%. The information on the relevant pure play companies is given below:**

| Pure Play Firm | Beta | Debt/Equity |
|---|---|---|
| A | 1.5 | 0.6 |
| B | 0.8 | 0.2 |

**What is the project beta of the pure play firm A?**

**What is the project beta of the pure play firm B?**

**What is the average of the project betas of the pure play firms?**

**What is the new division's beta?**

**What is the cost of equity of the new division?**

*Sol:*

**a) Unlevered beta for firm A :**

Unlevered Beta = Beta / (1 + (1 – tax rate) × Debt /Equity)

**Explanation :**

We have

Beta = 1.5

tax rate = 15%

Debt /Equity = 0.6

Substituting the values , we get :

$$\text{Unlevered Beta for A} = \frac{1.5}{1+(1-0.15)\times 0.6}$$

On calculating , we get :

Unlevered Beta for $A \approx 0.9933775$

Unlevered Beta for $A \approx 0.99$ (rounded to 2 decimal places)

**b) Unlevered beta for firm B :**

**Explanation :**

We have :

Beta = 0.8

tax rate = 15%

Debt / Equity = 0.2

Substituting the values, we get :

$$\text{Unlevered Beta for B} = \frac{0.8}{1+(1-0.15)\times 0.2}$$

On calculating, we get :

Unlevered Beta for $B \approx 0.6837607$

Unlevered Beta for $B \approx 0.68$ (rounded to 2 decimal places)

Average Unlevered Beta = (Unlevered Beta A + Unlevered Beta B)/2

**Explanation:**

We have :

Unlevered Beta for A $\approx$ 0.9933775

Unlevered Beta for B $\approx$ 0.6837607

Substituting the values, we get :

$$\text{Average Unlevered Beta} = \frac{0.9933775 + 0.6837607}{2}$$

On calculating, we get :

Average Unlevered Beta $\approx$ 0.8385691

Average Unlevered Beta $\approx$ 0.8386 (rounded to 4 decimal places)

**(c) Calculate the new division's beta :**

Project Beta = Average Unlevered Beta × [1 + (1 – tax rate) (Debt E)

**Explanation:**

We have :

Average Unlevered Beta $\approx$ 0. 8385691

tax rate = 15%

Debt /Equity = 1/3

Substituting the values, we get :

$$\text{Project Beta} = 0.8385691 \times \left[1 + (1\text{-}0.15) \times \left(\frac{1}{3}\right)\right]$$

On calculating, we get:

Project Beta $\approx$ 0.8385691 × (1.2833333)

Project Beta $\approx$ 1.0761637

**(d) Calculate the cost of equity for the new division :**

Cost of Equity = Risk – Free Rate + Beta × (Market Portfolio Return -

Cost of Equity = 1% + 1.0761637 × (7% – 1%)

Cost of Equity = 1% + 1.0761637 × (6%)

On calculating, we get :

Cost of Equity $\approx$ 0.074569822 or 7.4569822%

Cost of Equity $\approx$ 7.4570% (rounded to 4 decimal places)

# Short Questions and Answers

**1. Define Risk.**

*Ans :*

Risk means the probability that the actual outcome of an investment may be different from the desired outcome. In other words, risk refers to the variability in returns from a security.

Basically, the investors concentrate more on actual outcome which is less than the expected outcome. If the range of potential outcome If the range of potential outcome is wide then the risk will also be high.

Risk emerges from many sources and among them, the three important sources are business risk, interest rate risk and market risk.

Total risk = Unique risk + Market risk

**2. Define Uncertainty**

*Ans :*

Uncertainty refers to a situation in which there is more than one possible outcome of a business decision and where the probability of each specific outcome is unknown or cannot be estimated accurately.

**3. Define Expected Monetary Value**

*Ans :*

The weighted average payoff for a given course of action is the Expected Monetary Value (EMV). The total of the payoffs for each course of action multiplied by the probabilities combined with each state of nature.

**4. Define Expected Value of Perfect Information**

*Ans :*

The criterion for decision making under risk for each state of nature is combined with its probability of occurrence and some how, the decision maker is able to acquire perfect (complete and accurate) information regarding the occurrence of cixous states of nature.

In such a case, only then he will be successful in selecting that course of action yielding the expected payoff for whatever may be the state of nature that actually takes place.

The maximum amount of money which the decision maker has to pay in acquiring additional information about the occurrence of various states of nature prior reaching to a decision is represented by Expected Value of Perfect Information (EVPI).

**5. Define Risk Adjusted Rate of Return**

*Ans :*

Risk Adjusted Discount Rate (RADR) approach is very easy, it is widely used to incorporate risk into capital budgeting decision. The amount of risk which is already involved in a project is included in the discount rate used in calculations of present values.

The projects which involves high risk have high discount rates and projects which are safe have low discount rates. Undoubtedly, the risk-adjusted discount rates display different risk in different types of investments.

**6. Define Probability distribution of cashflows**

*Ans :*

The concept of probability for incorporating risk is already explained in evaluation process of capital budgeting proposals. The probability attribution approach used in evaluating risk in capital budgeting relies upon the performance of cash flows. Risk involved in capital budgeting can be determined by using a parameter of standard deviation.

**7. Define decision tree**

*Ans :*

A decision tree is a branching diagram which is similar to a probability tree. It represents problems in a series of decisions to be made under conditions of uncertainty. Any one of the decisions may be dependent on the outcome of preceding or the outcomes of a trial.

A decision tree is a diagrammatic representation of the relationships among decisions states of nature and payoffs (or outcomes). The first step is to draw a diagram which shows the structure of the problem. Decision trees are constructed from left to right.

**8. Define Sensitivity analysis.**

*Ans :*

Sensitivity analysis can help to mitigate the impact of influences, depending upon the severity of damage occurring out of risks. To control the influence the sensitivities are analyzed. Sensitivity analysis is made along with uncertainty and probability analysis, to determine the extent of action to be taken. The higher the sensitivity of influences on event, higher the risk and the damage.

Sensitivity analysis is the study of the key assumptions or calculations on which a management decision is based in order to predict alternative outcomes of that decision if different assumptions are adopted.

Sensitivity analysis is a modelling procedure used in forecasting whereby changes are made in the estimates of the variables to establish whether any will critically affect the outcome of the forecast.

**9. Define Simulation.**

*Ans :*

In real life, many problem occur which cannot be defined by a mathematical representation because of their stochastic nature, complexity in problem formulation or conflicts in idea that describe the exact nature of the problem.

Simulating the model means experimenting the model by trying alternate actions and then comparing the consequences of these actions.

This provide answers to many questions arising during the experimentation. This technique is used in almost all fields limited by our imagination and the ability to translate these imagination in to computer directives or in a mathematical model.

**10. Types of Simulation**

*Ans :*

The various types of simulation are discussed below.

**(i) Continuous Models**

Such model consist of system whose behaviour is a function of time i.e., behaviour of the system changes with respect to time. In this models, various difference differential equations are used to describe the interface between the different system elements.

**(ii) Discrete Models**

In contract to the above model, here changes occurs only at specific points (usually referred to as discrete points) during a particular period of time.

This model is extensively used in waiting lines, where it helps in calculating average waiting line and length of queue changes in such activities are noticed on the arrival or departure of any customer.

**(iii) Analog simulation (Environmental Simulation)**

In this type of simulation the reality is represented in physical form.

**Example :** The game of snake and ladder is used to simulate the morality of the players, if he/she is moving up by using ladder, it indicates the goodness where as if he/she comes down by being swallowed up by the snake, shows their temptation indicating badness.

**(iv) Computer Simulation (System Simulation)**

Complicated managerial decision making problems cannot be resolved by using analog simulation and it may be uneconomical to carry out the actual experimentation with the system.

In this type, the problem is solved by using high speed electronic computers wherein a mathematical model is generated for a complex system based on this model a computer programme is developed, which helps in attaining the solution accurately.

**11. What is Capital Rationing**

*Ans :*

Capital rationing refers to those investment decisions which a firm has to take under the constraint of availability of fund. Capital rationing implies a situation where the firm is forced by the external or self-imposed factors to acquire essential amount of capital so that it can invest in all investment projects with positive NPV.

Under capital rationing, management must not only ascertain the profitable investment opportunities but it must identify the combination of the profitable projects which can generate highest NPV within the funds available.

The capital budgeting decisions taken by the firm when there are limited funds are known as capital rationing decisions.

**12. What is Corporate Cost of Capital**

*Ans :*

The corporate cost of capital (CCC) is essentially the weighted average cost of capital (WACC) for the entire corporation. It reflects the average rate of return the company must earn on its existing assets to maintain its current value and satisfy its creditors and investors.

The CCC combines the cost of equity, the cost of debt, and the cost of any other capital component, weighted by their proportion in the company's capital structure. It's used for evaluating new projects that have a similar risk profile to the company's current operations.

**13. When must capital be rationed? How should investment opportunities be selected?**

*Ans :*

Some risk factors that you should consider while creating an investment portfolio includes market fluctuations, time horizon, personal risk tolerance, inflation risk, liquidity risk, etc. It will help you weigh good investment options aligned with your needs and choose the right long term and short term investments.

# Exercise Problems

1. X company is considering two projects M and N, each of which require an initial of ` 50 lakhs. The expected cahs inflows from these projects are,

| Year | Project M | Project N |
|---|---|---|
| 1 | 12 | 37 |
| 2 | 18 | 24 |
| 3 | 33 | 19 |
| 4 | 36 | 12 |

If cost of capital is 14%. What is the modified IRR of each project ?

**[Ans : Modified IRR = Project M = 23.08%, Project N = 24.37%]**

2. Grow more Fertilizers Limited is considering a capital project requiring an outlay of ` 15 million. It is expected to generate a net cash inflow of ` 3.75 million for 6 years. The opportunity cost of capital is 18 percent. Grow more Fertilizers can raise a term loan of ` 10 million for the project. The term loan will carry an interest rate of 16 percent and would be repayable in 5 equal annual installments, the first installment falling due at the end of the second year. The balance amount required for the project can be raised by issuing equity. The issue cot is expected to be 8 percent. The tax rate for the company is 50 percent.

(i) What is the base case NPV?

(ii) What is the adjusted net present value?

**[ Base Case NPV = (18,82,500) and ANPV = (1,40,248)].**

3. A company owns a lease on a certain property. It may sell the lease for ` 75,000 or may drill the said property for oil. Various possible drilling results are as under along with the probabilities of happening and rupee consequences.

| Possible Results | Probability | Rupee Consequences |
|---|---|---|
| Dry well | 0.10 | –1,00,000 |
| Gas well only | 0.40 | 45,000 |
| Oil and gas combination | 0.30 | 98,000 |
| Oil well | 0.20 | 1,99,000 |

Draw a decision tree for the above problem and determine whether the company should drill or sell.

**[Ans : The company should drill the said property for oil (expected rupee consequences = ` 77,200]**

4. Mr. Ramesh is interested in developing and marketing a new drug. The cost of extensive research to develop the drug would be ` 1,00,000. The manager of the research programme said that there is 60% chance that the drug will be developed successfully. The market potential is assessed as follows with the present value of profits.

| Market Conditions | Probability | Present Value of Profits (in `) |
|---|---|---|
| Large market potential | 0.1 | 5,50,000 |
| Moderate market potential | 0.5 | 2,40,000 |
| Low market potential | 0.4 | 80,000 |

The present value figures do not include the cost of research. While Mr. Ramesh considering this proposal, another similar proposal came up which also had required the investment of ` 1,00,000. The present value of profits for the second proposal was ` 1,20,000. The return on the investment in the second proposal is almost certain.

(a) Draw a decision tree for Mr. Ramesh indicating all choices and events.

(b) What decision Mr. Ramesh should take regarding the investment of ` 1,00,000?

**[Ans: Mr. Ramesh should develop the new drug (expected present value of the net profit = ` 1,24,200]**

# Choose the Correct Answers

1. Risk arises from various sources such as _____. [ d ]
   (a) Market Risk (b) Competition Risk
   (c) International Risk (d) All of the above

2. Expected cash flows are calculated as _____. [ b ]
   (a) Sum of likely cash flow of the project
   (b) Sum of likely cash flow of project multiplied by probability of cash flow
   (c) Sum of likely cash flow of project divided by probability of cash flow
   (d) None of the above

3. Variance Measures _____. [ a ]
   (a) How far each number in the set is from the mean
   (b) The mean of a given data set
   (c) Return on Investment
   (d) Level of risk borne for every percent of expected return

4. Certainty Equivalent _____. [ d ]
   (a) Is a guaranteed return from an Investment after adjusting for risk
   (b) Is the return that is expected over the lifetime of a project
   (c) Is equivalent to Net Present Value
   (d) Is an important component in Decision Tree Analysis

5. The firm expects an NPV of Rs 10,000 if the economy is exceptionally strong (30% probability), an NPV of Rs 4,000 if the economy is normal (40% probability), and an NPV of Rs 2,000 if the economy is exceptionally weak (30% probability). Expected Net present value is _____. [ d ]
   (a) ` 5,200 (b) ` 6,000
   (c) ` 5,000 (d) ` 6,200

6. Risk Premium _____. [ b ]
   (a) is the extra rate of return expected by the Investors as a reward for bearing extra risk
   (b) is equivalent to the rate of Government Securities
   (c) is the return provided to equity shareholders
   (d) is over and above expected rate of return

7. Calculation of Coefficient of Variance depends on _____. [ b ]
   (a) Standard Deviation (b) Expected Return
   (c) Expected cash flow (d) All of the above

8. Scenario Analysis is considered under scenarios such as _____. [ d ]

(a) Worst Case Scenario (b) Base Case Scenario

(c) Best Case Scenario (d) All of the above

9. Sensitivity analysis is useful in decision making because _____. [ b ]

(a) It shows the probabilities associated with each outcome

(b) It tells the user how much critical each input is for the Output value

(c) It allows to calculate the probable results under different scenarios

(d) The results of Sensitivity Analysis are reliable

10. When the risk is high, the certainty equivalent coefficient is _____. [ b ]

(a) Higher (b) Lower

(c ) No impact (d) None of the above

# Fill in the blanks

1. Cash inflows comprises _____ cash flows and _____ cash flows.
2. Cash flows of any project having conventional CF pattern, involves _____ basic elements.
3. _____ and _____ charges should be added to the cash outflows.
4. _____ and _____ value should be added to the last year's CFAT.
5. The variations in the actual returns arising from a project is known as _____.
6. Optimistic cash flow is one of the assumptions of _____ analysis.
7. _____ and _____ are the two important measures of risk.
8. _____ Standard deviation is divided by mean to get _____.
9. In the absence of _____ real rate (Rr), would be equal to the nominal rate (Rn).
10. _____ is the formula for converting cost of capital into a nominal rate when inflation rate is 'i'.

**ANSWERS**

1. Operating, Terminal
2. Three
3. NWC, Installation
4. NWC, Scrap
5. Risk
6. Sensitivity
7. Standard deviation, CV
8. CV
9. Inflation
10. (1 + Rn) = (1 + Rr) (1 + i)]

UNIT III

**Strategic Investment Decisions**: Real Options, the Timing of Options, Project Abandonment Decisions. IRR - Multiple IRR, Modified IRR, Pure, Simple and Mixed investments. Adjusted NPV and Impact of Inflation on Capital Budgeting Decisions. Discounted Pay back, Post Pay Back, Surplus Life and Surplus Pay Back, Bail Out Pay Back, Return on Investment, Terminal Value, Single Period Constraints, Multi Period Capital Constraint and an Unresolved Problem, NPV Mean Variance analysis, Hertz Simulation and Hillier Approaches.

## 3.1 REAL OPTIONS, THE TIMING OF OPTIONS

**Q1. Explain the concept of Real Options, the Timing of Options.**

*Ans :*

### 1. Real Options

A real option is an economically valuable right to make or else abandon some choice that is available to the managers of a company, often concerning business projects or investment opportunities. It is referred to as "real" because it typically references projects involving a tangible asset (such as machinery, land, and buildings, as well as inventory), instead of a financial instrument.

Real options differ thus from financial options contracts since they involve real (i.e. physical) "underlying" assets and are not exchangeable as securities.

**Choices that Fall Under Real Options**

The choices that corporate managers face that typically fall under real options analysis are under three categories of project management.

**i)** The first group are options relating to the size of a project. Depending on the ROV analysis, options may exist to expand, contract, or expand and contract the project over time, given various contingencies.

**ii)** The second group relates to the lifetime of a project - to initiate one, delay starting one, abandon an existing one, or plan the sequencing of the project's steps.

**iii)** The third group of real options involves the project's operations: The process flexibility, product mix, and operating scale, among others.

### 2. Timing of Option

Timing option allows company to delay making an investment.

The flexibility over timing consists of the opportunity to invest immediately, delay investment for one period, or not invest at all. The timing option provides an opportunity to invest when circumstances are most favourable.

**i)** Timing option can significantly increase a project's value. With uncertain interest rates, the investment-timing option, which is the ability to postpone rather than immediately implement or reject a capital budgeting project.

**ii)** With the assumption that investment costs are distributed independently over time, the optimal investment policy consists of a sequence of target costs, below which investment takes place and above which it does not.

**iii)** When no timing option is present, there is no reduction in optimal target cost. The timing option reduces optimal cost targets.

**Q2. Summarize the concept of Capital Budgeting.**

*Ans :* **(Sep.-23, Imp.)**

**Meaning**

Capital budget may be defined as "the firm's decision to invest its current funds most efficiently in the lzzong-term assets in anticipation of an expected flow of benefits over a series of years.

Therefore, it involves a current outlay or series of outlay of cash resources in return for an anticipated flow of future benefits.

Capital budgeting is the process of identifying, analysing and selecting investment projects whose returns (cash flows) are expected to extend beyond one year.

From the above definition, we may identify the basic features of capital budgeting viz., potentially large anticipated benefits, relatively a high degree risk, and a relatively long-time period between the initial outlay and anticipated return.

Firm's investment decisions would generally include expansion, acquisition, modernization, replacement of fixed assets.

**Importance**

Capital budgeting decisions are important due to the following reasons:

**1. Growth**

Fixed assets are earning assets, since they have decisive influence on the rate of return and direction of the firm's growth. A wrong decision can affect other projects, which are already running under profits. In other words, unwanted or unprofitable investments will result in heavy operating costs.

**2. More Risky**

Investment in long-term assets increases average profit but it may lead to fluctuations in its earnings, then the firm will become more risky. Hence, investment decision decides the future of the business concern.

**3. Huge investments**

Long-term assets involve more initial cash outflows, which make the firm imperative to plan its investment programmes very carefully and make an advance arrangement of funds either from internal sources or external sources or from both sources.

**4. Irreversibility**

Long-term assets investments decisions are not easily reversible without much financial loss to the firm; due to the difficulty in finding a market for such used capital items. Hence, the firm will incur more loss in that type of capital assets.

**5. Effect on other Projects**

Whenever there is investment in long-term assets under expansion programme, its cash flows affect the projects under consideration, if it is not economically independent. The effect may be an increase in the profits or a decrease in profits. So, while taking investment in long-term assets decision, the maker has to check the impact of the proposed project on other projects, if the effect is in terms of increase in profits then the financial manager has to accept the project and vice-versa.

**6. Difficult Decision**

Capital budgeting decision is very difficult due to:

**(a)** The decision depends on the expected future cash inflows,

**(b)** The uncertainty of the future and more risk.

## 3.2 PROJECT ABANDONMENT DECISIONS

**Q3. Explain briefly about abandonment decision of a capital budgeting process ?**

**(OR)**

**What are the situations where projects are abandoned?**

**(OR)**

**What are the factors to be analyzed in reaching a decision for abandonment of business operation?**

**(OR)**

**Abandonment of a project at right time is also a good strategy? Illustrate the circumstances, under which abandonment of a project is prudent?**

**(OR)**

**Describe the project abandonment decisions.**

*Ans :* **(Sep.-23, Oct.-22, Aug.-21, Imp.)**

Management of investment is a dynamic process which cannot be maintained consistently during the whole life of the project, i.e., there exists number of changes during the life of the project. These changes may lead to changes in the attractiveness of the project in terms of cash flows, profit, relevance. Thus, it is necessary to periodically review the project during the life of the project to update the capital budgeting decisions such as continuation of the project or terminate the project or divestment of the project.

A firm can make use of the techniques of new project analysis for the review of existing project performance in order to supplement the capital budgeting decisions. But the existing project some how differ from the new project in the following ways,

**i)** The cash outflows of a new project results in relevant cash flows whereas for existing project the returns considers the sunk costs which are irrelevant.

**ii)** The cash flows of a new project are uncertain whereas for existing project they are precise.

**iii)** The discount rate of existing project should differ from that of new project i.e., an appropriate discount rate need to be determined after estimating the incremental cash flows of existing project based on which one can take the decision whether to continue or abandon the project.

Assume the life of existing project 'X' is 7 years and it has been in use for past 3 years.

| | | |
|---|---|---|
| Initial analysis of project X (Estimated cash flows) | $C_0$ $C_1$ $C_2$ $C_3$ | $C_4$ $C_5$ $C_6$ $C_7$ |
| Post analysis | $A_0$ $A_1$ $A_2$ $A_3$ Actual cash flows | $NC_4$ $NC_5$ $NC_6$ $NC_7$ Future cash flows |

**The information that is necessary to take capital budgeting decisions regarding existing project include,**

**i)** Present value of estimated cash flows in initial stages,

$$PVCF = \sum_{n=1}^{B} \frac{NC_n}{(1+r)^n} \text{ or } \sum_{n=1}^{B} NC_n \left[(1+r)^{-n} \text{ or } (PV @ r\%, n)\right]$$

B = Balance life of project

r = Appropriate discount rate.

**ii) Salvage Value of Project**

The expected amount that can be realized by terminating the project is called salvage value.

**iii) Divestment Value (DV)**

The price of the project offered by the third party to buy the project from the existing owner. The following relation helps the manager to take appropriate decisions.

**a)** If PVCF > SV > DV, then the project can be continued

**b)** If PVCF > DV > SV, then continue the project

**c)** If DV > SV > PVCF, then divest the project

**d)** If DV > PVCF > SV, then divest the project

**e)** If SV > DV > PVCF then terminate the project

**f)** If SV > PVCF > DV, then terminate the project.

## PROBLEMS

**1. XYZ Ltd., had set up a project 4 years ago. The project has a remaining life of 6 years. The cash flow forecast for the balance life is as follows,**

| Year | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Cash flow forecast (millions) | 30 | 35 | 45 | 50 | 30 | 25 |

**The salvage value of the project if terminated immediately is Rs.120 million. A third party has offered to buy the project for Rs.175 million. The discount rate is 12%, what should XYZ do ?**

*Sol :*

Given that

Salvage value = Rs.120 million

Divestment value = Rs.175 million

Discount rate = 12%

**Calculation of PVCF of the Cash flows @ 12%**

| Year | Forecasted | PV@12% | PVCF cash flows |
|---|---|---|---|
| 1 | 30 | 0.893 | 26.790 |
| 2 | 35 | 0.797 | 27.895 |
| 3 | 45 | 0.712 | 32.040 |
| 4 | 50 | 0.636 | 31.8 |
| 5 | 30 | 0.567 | 17.01 |
| 6 | 25 | 0.507 | 12.675 |
| | **Total** | **PVCF** | **148.21** |

∴ PVCF at the end of $6^{th}$ year = 148.21 million

Salvage Value (SV) at the end of $6^{th}$ year = 120 million

Divestment Value (DV) at the end of $6^{th}$ year = 175 million

Since DV > PVCF > SV, the XYZ ltd., needs to divest the project to the third party.

**2. PQR company has started a project 5 years ago which has a remaining life of 5 years. The forecasted cash flows (in millions) for the balance life is as follows:**

| Year | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Forecasted cash flows | 70 | 60 | 76 | 50 | 45 |

**The salvage value at the end of 5th year is Rs.200 million. A third party has offered to buy the project for Rs.210 million. The discount rate is 10%, what should PQR company do ?**

*Sol :*

Given that,

Salvage value = Rs.200 million

Disinvestment value = Rs.210 million

Discount rate = 10%

**Calculation of PVCF@ 10% of the cash flows**

| Year | Forecasted cash flows | PV@10% | PVCF |
|---|---|---|---|
| 1 | 70 | 0.909 | 63.63 |
| 2 | 60 | 0.826 | 49.56 |
| 3 | 76 | 0.751 | 57.076 |
| 4 | 50 | 0.683 | 34.15 |
| 5 | 45 | 0.621 | 27.945 |
| | **Total** | **PVCF** | **232.361** |

PVCF at the end of 5lh year = 232.61 million

Salvage value at the end of 5th year = 200 million

Divestment value at the end of 5lh year = 210 million

Since PVCF > DV > SV, the company has been recommended to continue the project.

## 3.3 IRR

**Q4. Define IRR ? Explain the merits and demerits of IRR.**

*Ans :*

**Meaning**

The internal rate of return is also one of the capital budgeting technique that identifies the time value of money. This method is also known as yield method, discounted rate of return and trial and error yield method. It is that rate of return which equates the present value of cash inflows to the present value of cash outflows. The hit and trial method is used in internal rate of return method to discount the cash flows of the project as discount rate is not known. The internal rate of return is calculated with the help of the following formula.

$$C = \frac{A_1}{(1+r)^1} + \frac{A_2}{(1+r)^2} + \frac{A_3}{(1+r)^3} + ..... + \frac{A_n}{(1+r)^n}$$

Where,

C – Initial outlay at time zero

r – Rate of discount of internal rate of return

A, $A_2$, .. A – Future net cash flows at different periods

n – Number of years.

**Steps**

The internal rate of return method involves following steps,

**1.** Calculate the future cash inflows before depreciation but after tax.

**2.** Calculate fake payback period by dividing the initial investment by average cash flows.

$$\text{Fake payback period} = \frac{\text{Initial investment}}{\text{Average cash flows}}$$

**3.** Identify the discounting factor from present value annuity table and calculate NPV with that percentage.

**4.** If NPV is positive take a higher rate and if NPV is negative take a lower rate and once again calculate NPV.

**5.** After getting one positive NPV and one negative NPV, use interpolation to calculate actual IRR. Actual IRR can be calculated by using the following formula,

$$\text{Lower rate} + \frac{\text{Present value at lower rate -Cash outflow}}{\text{PV at lower rate-PV at higher rate}} \times \text{Difference in the discount rates}$$

A particular project is accepted when IRR is more than cost of capital and if IRR of the project is less than cost of capital it is rejected.

**Merits**

**1.** Like the NPV method, it considers the time value of money.

**2.** It takes into account all the cash proceeds during the life of the projects.

**3.** The percentage figure calculated in this method is more meaningful to the management than the NPV as it satisfies them in terms of return of capital.

**4.** The percentage figure generally allows a sound, uniform ranking of projects.

**5.** This method is consistent with the firm's objective of maximizing owner's welfare.

**Demerits**

**1.** It is not easy to understand and calculate the IRR as it involves complicated and tedious computational problems.

**2.** This method assumes that the net cash inflows are immediately reinvested so as to yield a rate equal to IRR, whereas in NPV method, it is assumed that cash inflows are reinvested at the firm's cost of capital.

**3.** The result shown by the NPV and the IRR method may be different if the projects are different in the following respects:

**(a)** Expected life of the project; and

**(b)** Cash outlays.

**4.** There may be some investment project on which no real value of IRR can be computed, e.g. social projects.

**5.** It may not give a unique answer in all situations. Such a situation arises when all set cash outflows do not follow all the net cash outflows for a project.

**6.** The use of multiple rates might create confusion.

**7.** It is rather difficult to assess the estimated life of the project, since the machine life can be highly increased, if appropriate preventive maintenance is implemented.

## PROBLEMS

**3. A project cost ` 96,000 and is expected to generate cash inflows of ` 48,000, ` 12,000 and ` 36,000 at the end of each year for next 3 years. Calculate project's IRR.**

*Sol :*

**Calculation of Internal Rate of Return**

| Year | Cash Flows (`) | P.V Factor @ 10% | Present values (`) | P.V Factor @5% | PVCF | PV Factor @1% | PVCF |
|---|---|---|---|---|---|---|---|
| 1 | 48,000 | 0.909 | 43,632 | 0.952 | 45,696 | 0.990 | 47,520 |
| 2 | 12,000 | 0.826 | 9,912 | 0.907 | 10,884 | 0.980 | 11,760 |
| 3 | 36,000 | 0.751 | 27,036 | 0.864 | 31,104 | 0.970 | 34,920 |
| | | Present Values | 80,580 | | 87,684 | | 94,200 |
| | | **Less:** Project cost | 96,000 | | 96,000 | | 96,000 |
| | | **Net present value** | **– 15,420** | | **– 8,316** | | **– 1,800** |

From the above calculation of IRR it is concluded that, IRR for the given project cash flows cannot be calculated. Because for IRR calculation one positive net present value and one negative net present value is required. However, even at 1% PV factor no positive value is obtained.

Therefore, calculation cannot be proceed further.

**4. A company proposes to undertake one of two mutually exclusive projects namely, AXE and BXE. The initial capital outlay and annual cash inflows are as under:**

| | | AXE | BXE |
|---|---|---|---|
| **Initial capital outlay** | | **` 22,50,000** | **` 30,00,000** |
| **Salvage value at the end of the life** | | **0** | **0** |
| **Economic life (years)** | | **4** | **7** |
| **After tax annual cash inflows** | **Year 1** | **` 6,00,000** | **` 5,00,000** |
| | **2** | **12,50,000** | **7,50,000** |
| | **3** | **10,00,000** | **7,50,000** |
| | **4** | **7,50,000** | **12,00,000** |
| | **5** | **-** | **12,50,000** |
| | **6** | **-** | **10,00,000** |
| | **7** | **-** | **8,00,000** |

**The company's cost of capital is 16%.**

**Calculate for each project IRR and suggest.**

*Sol :*

**Calculation of Internal Rate of Return (IRR) of AXE Project**

| Year | Cash Flows (`) | P.V. Factor @16% | Present Value (`) | P.V. Factor @22% | Present Value (`) |
|---|---|---|---|---|---|
| 1 | 6,00,000 | 0.862 | 5,17,200 | 0.820 | 4,92,000 |
| 2 | 12,50,000 | 0.743 | 9,28,750 | 0.672 | 8,40,000 |
| 3 | 10,00,000 | 0.641 | 6,41,000 | 0.551 | 5,51,000 |
| 4 | 7,50,000 | 0.552 | 4,14,000 | 0.451 | 3,38,250 |
| Total Present Values | | | 25,00,950 | | 22,21,250 |
| **Less:** Initial Capital Outlay | | | 22,50,000 | | 22,50,000 |
| **Net Present Value (NPV)** | | | **2,50,950** | | **– 28,750** |

$$IRR = LR + \frac{\text{Positive NPV at LR 16\%}}{\text{P.V at LR 16\% – P.V at HR 22\%}} \times (HR - LR)$$

$$= 16 + \frac{2,50,950}{25,00,950 - 22,21,250} \times (22 - 16) = 16 + \frac{2,50,950}{2,79,700} \times 6$$

$$= 16 + 0.90 \times 6 = 16 + 5.4$$

$$= 21.40\%$$

**Calculation of Internal Rate of Return (IRR) of BXE Project**

| Year | Cash Flows (`) | P.V. Factor @ 16% | Present Value (`) | P.V. Factor @21% | Present Value (`) |
|---|---|---|---|---|---|
| 1 | 5,00,000 | 0.862 | 4,31,000 | 0.826 | 4,13,000 |
| 2 | 7,50,000 | 0.743 | 5,57,250 | 0.683 | 5,12,250 |
| 3 | 7,50,000 | 0.641 | 4,80,750 | 0.564 | 4,23,000 |
| 4 | 12,00,000 | 0.552 | 6,62,400 | 0.467 | 5,60,400 |
| 5 | 12,50,000 | 0.476 | 5,95,000 | 0.386 | 4,82,500 |
| 6 | 10,00,000 | 0.410 | 4,10,000 | 0.319 | 3,19,000 |
| 7 | 8,00,000 | 0.354 | 2,83,200 | 0.263 | 2,10,400 |
| | Total Present Values | | 34,19,600 | | 29,20,550 |
| | **Less:** Initial Capital Outlay | | 30,00,000 | | 30,00,000 |
| | **Net Present Value (NPV)** | | **4,19,600** | | **–79,450** |

$$IRR = LR + \frac{\text{Positive NPV at LR 16\%}}{\text{P.V at LR 16\% – P.V at HR 21\%}} \times (HR - LR)$$

$$= 16 + \frac{4,19,000}{34,19,600 - 29,20,550} \times (21 - 16)$$

$$= 16 + \frac{4,19,600}{4,99,050} \times 5$$

$$= 16 + 0.84 \times 5$$

$$= 16 + 4.2$$

$$= 20.20\%$$

**Conclusion**

The Internal Rate of Return (IRR) of AXE project is 21.40% and BXE project is 20.20%. AXE project is slightly profitable than BXE project. Therefore, it is suggested to adopt AXE project.

**5. A company is considering an investment proposal to install new milling controls at a cost /df ? 50,000. The facility has a life expectancy of 5 years and no salvage value. The tax rate is 35 percent. Assume the firm uses straight line depreciation and the same is allowed for tax purpose. The estimated cash Flows Before Depreciation and Tax (CFBT) from the investment proposal are as follows,**

| Year | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| CFBT (`) | 10,000 | 10,692 | 12,769 | 13,462 | 20,385 |

**Calculate the IRR of the investment proposal.**

*Sol:*

**Calculation of Cash Flows**

| Year (1) | EBDIT (2) | Depreciation (3) | EBIT= (2 – 3) (4) | Tax @ 35% ((4) × 0.35) (5) | EAT (`) ((4) – (5) (6)) | Cash Flows (EAT + Dep.) ((6) + (3)) (7) |
|---|---|---|---|---|---|---|
| 1 | 10,000 | 10,000 | 0 | 0 | 0 | 10,000 |
| 2 | 10,692 | 10,000 | 692 | 242 | 450 | 10,450 |
| 3 | 12,769 | 10,000 | 2,769 | 969 | 1,800 | 11,800 |
| 4 | 13,462 | 10,000 | 3,462 | 1,212 | 2,250 | 12,250 |
| 5 | 20,385 | 10,000 | 10,385 | 3,635 | 6,750 | 16,750 |

**Calculation of Internal Rate of Return**

| Year (`) | CFAT 6% | P.V Factor @ Values (`) | Present @ 7% | P.V Factor Values (`) | Present |
|---|---|---|---|---|---|
| 1. | 10,000 | 0.943 | 9,430 | 0.935 | 9,350 |
| 2. | 10,450 | 0.890 | 9,300 | 0.873 | 9,123 |
| 3. | 11,800 | 0.840 | 9,912 | 0.816 | 9,629 |
| 4. | 12,250 | 0.792 | 9,702 | 0.763 | 9,347 |
| 5. | 16,750 | 0,747 | 12,512 | 0.713 | 11,942 |
| Total Present Values | | | 50,856 | | 49,391 |
| **Less:** Initial cost of investment | | | 50,000 | | 50,000 |
| **Net Present Value** | | | 856 | | **– 609** |

$$IRR = LR + \frac{\text{Positive NPV at LR 6\%}}{\text{PV at LR 6\%} - \text{PV at HR 7\%}} \times (HR - LR)$$

$$= 6 + \frac{856}{50,856 - 49,391} \times (7 - 6)$$

$$= 6 + \frac{856}{1.465} \times 1$$

$$= 6 + 0.58$$

$$= 6.58.$$

$\therefore$ IRR of project is 6.58

**Working Notes**

$$\text{Depreciation} = \frac{\text{Cost} - \text{Scrap Value}}{\text{Life of the Project}}$$

$$= \frac{50,000 - 0}{5} = 10,000$$

## 3.4 MULTIPLE IRR

**Q5. Explain the concept of Multiple IRR with an example.**

**(OR)**

**Discuss the multiple IRR.**

*Ans :* **(Oct.-22, Dec.-19, Imp.)**

There is another instance in which the IRR approach may not be reliable - when projects have non normal cash flows. A project has normal cash flows if it has one or more cash outflows (costs) followed by a series of cash inflows. Notice that normal cash flows have only one change in sign - they begin as negative cash flows, change to positive cash flows, and then remain positive.

Non-normal cash flows occur when there is more than one change in sign. For example, a project may begin with negative cash flows, switch to positive cash flows, and then switch back to negative cash flows. This cash flow stream has two sign changes – negative to positive and then positive to negative – so it is a Non-normal cash flow. Projects with normal cash flows can actually have two or more IRRs, or multiple IRRs.

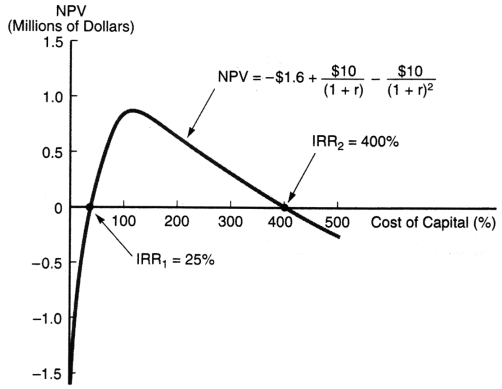
To see this, consider the equation that one solves to find a project's IRR:

$$\sum_{t=0}^{N} \frac{CF_t}{(1 + IRR)^t} = NPV = 0$$

Notice that the above Equation is a polynomial of degree N, so it may have as many as N different roots, or solutions. All except one of the roots are imaginary numbers when investments have normal cash flows (one or more cash outflows followed by cash inflows), so in the normal case, only one value of IRR appears. However, the possibility of multiple real roots, hence multiple IRRs, arises when the project has non normal cash flows (negative net cash flows occur during some year after the project has been placed in operation).

**Example**

Suppose a firm is considering the expenditure of $1.6 million to develop a strip mine (Project M). The mine will produce a cash flow of $10 million at the end of Year 1. Then, at the end of Year 2, $10 million must be expended to restore the land to its original condition. Therefore, the project's expected net cash flows are as follows (in millions of dollars):




**Expected Net Cash Flow**

| Year 0 | End of Year 1 | End of Year 2 |
|---|---|---|
| – $ 1.6 | + $10 | – $10 |

These values can be substituted into above equation to derive the IRR for the investment:

$$NPV = \frac{-\$1.6 \text{ million}}{(1+IRR)^0} + \frac{\$10 \text{ million}}{(1+IRR)^1} + \frac{-\$10 \text{ million}}{(1+IRR)^2} = 0$$

When solved, we find that NPV = 0 when IRR = 25% and also when IRR = 400%. Therefore, the IRR of the investment is both 25% and 400%. This relationship is depicted graphically in Figure. Note that no dilemma would arise if the NPV method were used. If Project M's cost of capital were 10%, then its NPV would be - $0.77 million, and the project should be rejected. If r were between 25 and 400%, the NPV would be positive.

## 3.5 MODIFIED IRR

**Q6. Define modified IRR. Explain the procedure for calculating the modified IRR.**

**(OR)**

**Discuss the modified IRR.**

**(OR)**

**How is modified IRR calculated?**

**(OR)**

**Write a short notes on Modified IRR?**

*Ans :* **(Sep.-20, Dec.-19, Imp.)**

**Meaning**

In terms of concept net present value is the most preferable choice than IRR but in practice most of the firms are interested to use (IRR) internal rate of return instead of NPV for evaluating capital budgeting decisions. However, the regular IRR have some limitations. Thus, percentage measure called modified IRR needs to be introduced which can modify the regular IRR to increase its efficiency in evaluating profitability of a firm and capital budgeting decisions.

Modified IRR is defined as the compound average annual rate based on the rate of reinvestment that differs with the regular IRR.

**Steps**

The procedure for calculating MIRR consists of three steps,

**i)** Calculation of (PV of costs) present value of the costs of a project discounted at cost of capital.

$$PVC = \sum_{t=0}^{n} \frac{(\text{Cash outflows})_t}{(1+r)^t}$$

**ii)** Calculation of terminal value of cash inflows i.e., the future value of cash inflows that are compounded at cost of capital.

$$TV = \sum_{t=1,n}^{n} \text{cash inflows}_t [1+r]^{n-1}$$

Where, r = Cost of capital.

**iii)** Calculation of MIRR using the following formula,

$$PVC = \frac{TV}{(1+r^*)^n}$$

Where, r* = Modified IRR (or)

$$(1+r^*) = \frac{TV}{PVC}$$

$$\Rightarrow 1+r^* = \left[\frac{TV}{PVC}\right]^{\frac{1}{n}}$$

$$\Rightarrow 1+r^* = \left[\frac{TV}{PVC}\right]^{\frac{1}{n}}$$



**Benefits**

MIRR yields several benefits to a finance manager than regular IRR.

**i)** According to MIRR, the project cash flows are to be reinvested at cost of capital whereas the IRR principle states that the project's cash flows are to be reinvested at their own IRR's. In general, a firm can gain high returns by reinvesting the cash flows at cost of capital.

**ii)** MIRR serves the best indicator of the real profitability of the firm.

**iii)** It avoids the existence of multiple IRRS in a project.

In case of mutually exclusive projects both NPV and MIRR results will be same. If the NPV of a project 'A' is higher than NPV of the project 'B'. (Where A and B are mutually exclusive projects) i.e., $NPV_A > NPV_B$ then the $MIRR_A > MIRR,,$. There does not exist any issues between NPV and MIRR as that in case of NPV and regular IRR. If both projects are same except in the life of the projects then also MIRR results will be same with that of NPV provided MIRR calculated using the terminal year of the project with longer duration. However, there exists conflicts

between NPV and MRR in case of projects with different sizes. For instance, a capital budgeting decision in case of two projects of which ne is large project (L) and other one is small, mutually exclusive project (S) is based on the following conditions,

**i)** $NPV_L > NPV_S$ and

**ii)** $MIRR_S > MIRR_L$

Though the MIRR serves best in representing the true profitability of the firms than the regular IRR most of the firms are adopting NPV as it depicts the contribution of each project to the firm's value.

## PROBLEMS

**6. Company is considering two mutually exclusive projects A and B, whose costs and cash flows are shown below.**

| Year | A | B |
|---|---|---|
| 0 | (1,000) | (1,000) |
| 1 | 100 | 1,000 |
| 2 | 300 | 100 |
| 3 | 400 | 50 |
| 4 | 700 | 50 |

**Calculate,**

**(a) MIRR at a rate of 12%**

**(b) Calculate NPV for both projects whose cost of capital is 12% which project is accepted.**

*Sol :*

**(a) MIRR at a rate of 12%**

**Project - A**

**i) Calculation of PVC**

$$PVC = \sum_{t=0}^{n} \frac{\text{cash outflows}}{(1+r)^t}$$

$$= \frac{1,000}{(1+0.12)^0}$$

$$= 1,000$$

**ii) Calculation of Terminal Value**

$$TV = \sum_{t=1..n}^{n} \text{Cash inflows}\,(1+r)^{n-1}$$

$$= 100\,(1.12)^{4-1} + 300\,(1.12)^{4-2} + 400\,(1.12)^{4-3} + 700\,(1.12)^{4-4}$$

$$= 140.5 + 376.32 + 448 + 700$$

$$= 1664.82$$

**iii) Calculation of MIRR (r*)**

$$(1 + r^*)^4 = \frac{TV}{PVC}$$

$$(1 + r^*)^4 = \frac{TV}{PVC}$$

$$= \frac{1664.82}{1000} \Rightarrow 1.665$$

$$r^* = (1.665)^{1/4} - 1$$

$$= 1.136 - 1$$

$$r^* = 0.136 \text{ or } 13.6\%$$

$\therefore$ MIRR of project X = 13.6%

**Project B**

**i) Calculation of PVC**

$$PVC = \frac{1,000}{(1+0.12)^0} \qquad (\because t = 0)$$

$$= 1,000$$

**ii) Calculation of TV**

$$TV = 1000\,(1.12)^{4-1} + 100\,(1.12)^{4-2} + 50(1.12)^{4-3} + 50(1.12)^{4-4}$$

$$r^* = 1405 + 125.44 + 56 + 50$$

$$= 1636.44$$

**iii) Calculation of MIRR (r*)**

$$(1+r^*)^4 = \frac{TV}{PVC}$$

$$= \frac{1636.44}{1000} = 1.636$$

$$1+r^* = (1.636)^{1/4}$$

$$r^* = 1.1310 - 1$$

$$= 0.1310 \text{ or } 13.10\%$$

$\therefore$ MIRR of project Y = 13.10%

**(b) NPV @ 12%**

**Project A**

| Year | Cash in flow | Discounting factor | Present value of cash flows |
|---|---|---|---|
| 1 | 100 | 0.893 | 89.3 |
| 2 | 300 | 0.797 | 239.1 |
| 3 | 400 | 0.7117 | 284.68 |
| 4 | 700 | 0.6355 | 444.85 |
| Total PV of cash flows | | | 1057.93 |
| (–) Cash outflows | | | 1000 |
| Net present value | | | 57.93 |

**Project B**

| Year | Cash in flow | Discounting factor | Present value of cash flows |
|---|---|---|---|
| 1 | 1000 | 0.893 | 893 |
| 2 | 100 | 0.797 | 79.7 |
| 3 | 50 | 0.7117 | 35.6 |
| 4 | 50 | 0.6355 | 31.8 |
| Total PV of cash flows | | | 1040.1 |
| (–) Cash outflows | | | 1000 |
| Net present value | | | 40.1 |

| Parameters | Project A | Project B |
|---|---|---|
| (i) Modified IRR (r*) | 13.6% | 13.10% |
| (ii) NPV | 57.93 | 40.1 |

Based on both MIRR and NPV, the project X is recommended as project 'X' has higher NPV and MIRR than project 'Y'.

**7. Cummings products company is considering two mutually exclusive investment. The project expected net cash flows are as follows,**

| Year | A | B |
|---|---|---|
| **0** | **(300)** | **(405)** |
| **1** | **(387)** | **134** |
| **2** | **(193)** | **134** |
| **3** | **000)** | **134** |
| **4** | **600** | **134** |
| **5** | **600** | **134** |
| **6** | **850** | **134** |
| **7** | **(180)** | **0** |

**(a) Construct NPV profiles for A and B projects discounted at 10%.**

**(b) What is each projects MIRR at a cost of capital 10%?**

*Sol :*

**(a) NPV @ 10%**

Given cash outflows = 300

Cost of capital = 10%

**Project A**

| Year | Cash inflows | PV@10% | PVCF |
|---|---|---|---|
| 1 | – 387 | 0.909 | – 351.783 |
| 2 | – 193 | 0.826 | – 159.418 |
| 3 | – 100 | 0.751 | – 75.1 |
| 4 | 600 | 0.683 | 409.8 |
| 5 | 600 | 0.621 | 372.6 |
| 6 | 850 | 0.564 | 479.4 |
| 7 | – 180 | 0.513 | – 92.34 |
| | Total PV of cash inflows | | 583.16 |
| | (–) Cash outflows | | 300 |
| | Net present value | | 283.16 |

**Project B**

| Year | Annual cash inflows | PV@10% | PVCF |
|---|---|---|---|
| 1 – 6 | 134 | 7.716 | 1033.94 |
| 7 | 0 | 9.487 | 0 |
| | | Total PV cash inflows | 1033.94 |
| | | (–) Cash outflows | 405.00 |
| | | Net present value | 628.94 |

**(b) MIRR : Project A**

**(i) Calculation of PVC**

$$PVC = \sum_{t=1..n}^{n} \frac{\text{Cash outflows}_t}{(1+r)^t}$$

$$PVC = \frac{300}{(1.10)^0} + \frac{387}{(1.10)^1} + \frac{193}{(1.10)^2} + \frac{100}{(1.10)^3} + \frac{180}{(1.10)^7}$$

$$= 300 + 351.82 + 159.50 + 75.131 + 92.37$$

$$= 978.821$$

**(ii) Calculation of TV**

$$TV = \sum_{t=1,\,2.n}^{n} \text{cash inflows} \times (1 + r)^{n-1}$$

$$= 600\,(1.10)^{7-4} + 600(1.10)^{7-5} + 850(1.10)^{7-6}$$

$$= 798.6 + 726 + 935$$

$$= 2460$$

**(iii) Calculation of MIRR**

$$(1 + r^*)^7 = \frac{TV}{PVC}$$

$$= \frac{2,460}{978.821}$$

$$= 2.513$$

$$r^* = (2.513)^{1/7} - 1 = 1.141 - 1$$

$$r^* = 0.141 \text{ or } 14.1\%$$

**Project B**

**(i) Calculation of PVC**

$$PVC = \sum_{t=0}^{n} \frac{\text{cash outflows}_t}{(1+r)^t}$$

$$= \frac{405}{(1.10)^0}$$

$$= 405$$

**(ii) Calculation of TV**

$$TV = \sum_{t=0}^{n} \text{cash inf lows}\,[1+r]^{n-1}$$

$$= 134\,(1.10)^{7-1} + 134\,(1.10)^{7-2} + 134\,(1.10)^{7-3} + 134\,(1.10)^{7-4}$$
$$+ 134\,(1.10)^{7-5} + 134\,(1.10)^{7-6} + 0\,(1.10)^{7-7}$$

$$= 237.4 + 215.8 + 196.2 + 178.35 + 162.14 + 147.4 + 0$$

$$= 1137.29$$

**(iii) Calculation of MIRR**

$$(1 + r^*)^7 = \frac{TV}{PVC} = \frac{1137.29}{405}$$

$$(1 + r^*) = (2.808)^{1/7} = 1.16$$

$$r^* = 1.16 - 1 = 0.16 \text{ or } 16\%.$$

**Q7. Compare and contrast between IRR, MIRR and multiple IRR.**

*Ans :* **(Imp.)**

| Sl.No. | Nature | IRR | Modified IRR | Multiple IRR |
|---|---|---|---|---|
| 1 | **Definition** | IRR is the discount rate at which the net present value of a project will be zero. | MIRR is a compound average annual rate. | A project with multiple IRR consists of more than one IRR. It is a problem of IRR. |
| 2. | **Basis for Calculation** | It is based on the discount rate. | MIRR is based on compound rate. | It is also based on discount rate. |
| 3. | **Effect on Capital Budgeting Decisions** | IRR does not serve best indicator of the firm's profitability | MIRR serves a better indicator of real profitability of firm. | It misleads the capital budgeting decisions of a manager. |
| 4. | **Similarity with NPV in Results** | In case of mutually exclusive projects IRR results differ with that of NPV. | For mutual exclusive projects both NPV and MIRR yields similar results. | Multiple IRR is entirely differ with NPV results. Thus, NPV is better suggested than multiple IRR. |
| 5. | **Basis for Reinvestment** | In IRR reinvestment of returns occur at the project's IRR. | In MIRR reinvestments occur at the cost of capital which can yield high returns that reinvesting at IRR. | There is no such case of reinvestment. |
| 6. | **Ability to Resolve Multiple IRRs** | It fails to eliminate the problem of multiple IRRs. | Multiple IRR problem can be better solved by MIRR. | – |

## 3.6 PURE, SIMPLE AND MIXED INVESTMENTS

**Q8. Explain the different types of investments.**

**(OR)**

**Define Pure, Simple and Mixed Investments.**

*Ans :* **(Dec.-19, May-19, Imp.)**

The investments are generally categorized into three groups,

a) Simple investment

b) Pure investment

c) Mixed investment.

**a) Simple Investment**

An investment is said to be simple if it has only one sign change or consists of initial capital outflows followed by cash inflows. The series of cashflows for a simple investment is (–, +, +). Simple investments are always pure investments. In simple investments, the rate of return should maintain the NPV as '0', i.e., present value of cash outflows should be equal to present value of cash inflows at that rate at 1%.

PV of cash outflows – PV of cash inflows = NPV (0)

**b) Pure Investment**

An investment is said to be pure investments if it is either simple or non-simple, conventional or non-conventional and does not borrow the returns of the project. Pure investments are said to have unique rate of returns. In pure investment, the project balances during the whole life of a project should be less than or equal to zero i.e., -ve project balanced otherwise i.e., if the project balances are +ve it will represents that firm has borrowed the returns of the project.

**c) Mixed investment**

An investment is said to be mixed if it is non simple and non conventional investments. In mixed investment the project balances of a project are positive i.e., PB > 0. The IRR at these project balances cannot be considered as a true IRR. In the mixed investments the following aspects need to be considered while determining the project balances.

**i)** The initial investment of money in a project will yield an interest rate of $i^*$.

**ii)** The external investment such as cash borrowings from the projects also yield same interest of $i^*$. The borrowings from the project returns are required to reinvest in the project either at a rate of return ($i^*$) or at an external rate which is less than i in order to gain the same rate of returns.

**Calculation of True IRR for Mixed Investment**

In case of mixed investments the true IRR can be determined using the following procedure :

**i)** Assume that the cash borrowings from the project are again reinvested in the firm.

**ii)** Use present value method to invest the investments at MARR.

**iii)** True IRR can be calculated as a function of MARR by considering the project balances of the last year equal to zero i.e., $PB\ (i, \text{MARR})_D = 0$.

**iv)** The true IRR then determined is referred to as Return on Invested Capital (RoIC).



**Q9. Differentiate among simple, pure and mixed investments.**

*Ans :* **(Dec.-19, Imp.)**

| Sl. No. | Nature | Simple Investment | Pure Investment | Mixed Investment |
|---|---|---|---|---|
| 1. | **Net investment Test** | A project which passes net investment test becomes simple investment. | A project which passes net investment test becomes pure investment. | A project which fails net investment test becomes mixed investment. |
| 2. | **Borrowing** | In simple investment, firm never borrows money from the project. | In pure investment, firm never borrows money from the project. | In mixed investment, firm borrows money from project in investment period. |
| 3. | **Relationship** | Simple investment is always a pure investment. | Pure investment is always a simple investment. | Mixed investment is a non simple investment. |

## 3.7 ADJUSTED NPV

**Q10. Define NPV. Explain the merits and demerits of NPV.**

*Ans :*

**Meaning**

NPV can be defined as preset value of benefits minus preset value of costs. It is the process of calculating present values of cash inflows using cost of capital as an appropriate rate of discount and subtract present value of cash outflows from the present value of cash inflow and find the net present value, which may be positive or negative. It is also known as discounted benefit cost ratio method. Positive net present value occurs when the present value of cash inflow is higher than the present value of cash outflows and vice-versa.

**Steps involved in computation of NPV**

**i)** Forecasting of cash inflows of the investment project based on realistic assumptions,

**ii)** Computation of cost of capital, which is used as a discounting factor for conversion of future cash inflows into present values,

**iii)** Calculation of PV cash flows using cost of capital as discounting rate,

**iv)** Finding out NPV by subtracting PV of cash outflows from PV of cash inflows.

**Decision Rule**

Acceptance or reject rule of the project decides based on the NPV.

**Accept:** NPV > Zero

**Reject:** NPV < Zero

**Merits**

The Merits of NPV are:

**i)** It takes into account the time value of money.

**ii)** It uses all cash inflows occurring over the entire life period of the project, including scrap value of the old project.

**iii)** It is particularly useful for the selection of mutually exclusive projects.

**iv)** It takes into consideration the changing discount rate.

**v)** It is consistent with the objective of maximisation of shareholders' wealth.

**Demerits**

NPV is the most acceptable method when compared with the traditional methods. However, it has certain Limitations.

**i)** It is difficult to understand when compared with PBP and ARR.

**ii)** Calculation of required rate or discounting factor or cost of capital (based on different methods) is difficult, which involves a lengthy and time consuming process.

**iii)** In case of projects involving different cash outlays NPV method may not give dependable results.

**iv)** It does not give satisfactory results when comparing two projects with different life periods. Generally, a project having a shorter economic life would be preferable, other things being equal.

**Q11. Explain briefly about Adjusted Net Present Value.**

**(OR)**

**What is risk Adjusted NPV?**

**(OR)**

**What is "Adjusted NPV"? What for it is calculated?**

*Ans :* **(Oct.-22, Dec.-19, Imp.)**

**Meaning**

The net present value that is adjusted with the NPV of financial side effects such as issue costs, tax shields of debt, subsidies, incentives etc., is referred to as adjusted NPV.

The adjusted cost of capital forms the base for the evolution of adjusted NPV. The main aim of adjusting the base NPV is to eliminate the adverse financing effects on the project. Adjusted NPV is based on base NPV which is further adjusted with the NPV of financing side effects.

Adjusted NPV = Base NPV ± NPV of financing side effects.

**Calculation of a NPV**

The procedure for calculating adjusted NPV include two stages,

**i)** Calculation of base case NPV and then evaluating the project to determine whether it is completely funded by the equity of the firm.

$$\text{Base NPV} = -\text{Initial investment} + \sum_{t=1,\ldots,n}^{n} \text{cash inflows (PV@ } r_t\%, t)$$

If the answer for the evaluation is yes then proceed to next stage.

**ii)** Adjusting the base NPV with the adverse impact on the financing of the project.

Adjusted NPV = Base NPV ± PV of side effects of financing

Most commonly the factors considered for adjustments are issue costs and tax shields on debt.

**i)** Issue cost can be calculated using the following formula,

$$\text{Issue costs} = \frac{\text{Equity capital}}{\text{1-Percent allocated for issue costs absorption}} - \text{Equity capital}$$

**ii)** PV of tax shields on debt finance can be calculated as,

| Year | Particulars | Amt |
|---|---|---|
| (i) | Outstanding debt at the beginning of year | xxx |
| (ii) | Interest @ x% on outstanding debt | xxx |
| (iii) | Tax shield @ t% on interest | xxx |
| (iv) | PV factor @ x% | xxx |
| (v) | PV of tax shield (iii) × (iv) @ x% | xxx |

**Evaluation Criteria**

If the project has a positive APV then the project is said to be a worthwhile one. If it is negative it is better for the firm to reject that project.

**Q12. Explain the merits and demerits of Adjusted NPV.**

*Ans :*

**Merits**

**i)** By calculating Adjusted NPV, a firm can track the impact of financing side effects on the project and the basis for Adjusted NPV for which it involves a series of computations. Based on this Adjusted NPV, a firm can redesign the project plan.

**ii)** If the Adjusted NPV is negative for a project then the firm can take certain measures to reduce the impact of side effects such as reducing the issue costs or increasing the subsidies etc.

**iii)** Adjusted NPV helps a firm in identifying the projects with highly profitable capital structure and have special incentives, subsidies etc.

**iv)** Adjusted NPV is more suitable for infrastructure projects which have a significant impact of financing side effects and LBO (Leveraged Buyouts) which is a take over and possess complete temporary debts in capital structure. WACC can also be used to evaluate and LBO.

**v)** Adjusted NPV helps in reducing the debt structure of the projects.

**Demerits**

Though Adjusted NPV is more beneficial to firms it also has certain demerits,

**i)** Adjusted NPV is a complex process as it consists of a series of adjustments.

**ii)** Adjusted NPV is not widely used in practice as it need advanced techniques to evaluate the impact of the financing side effects on the project.

**Q13. How does adjusted NPV vary from NPV?**

*Ans :* **(April-23)**

The adjusted present value is the net present value (NPV) of a project or company if financed solely by equity plus the present value (PV) of any financing benefits, which are the additional effects of debt. By taking into account financing benefits, APV includes tax shields such as those provided by deductible interest.

Adjusted Present Value = Unlevered Firm Value + NE

Where

NE = Net effect of debt

The net effect of debt includes tax benefits that are created when the interest on a company's debt is tax-deductible. This benefit is calculated as the interest expense times the tax rate, and it only applies to one year of interest and tax. The present value of the interest tax shield is therefore calculated as: (tax rate * debt load * interest rate) / interest rate.



**8. A plastic manufacturer has under consideration the proposal of production of high quality plastic glasses. The necessary equipment to manufacture the glasses would cost ` 1 lakh and would last 5 years. The tax relevant rate of depreciation is 25 per cent on written down value. There is no other asset in this block. The expected salvage value is ` 10,000. The glasses can be sold at ` 4 each. Regardless of the level of production, the manufacturer will incur cash cost of ` 25,000 each year if the project is undertaken. The overhead costs allocated to this new line would be ` 5,000. The variable costs are estimated at ` 2 per glass. The manufacturer estimates it will sell about 75,000 glasses per year; the tax rate is 35 per cent. Should the proposed equipment be purchased? Assume 20 per cent cost of capital and additional working requirement, ` 50,000.**

*Sol :*

**Calculation of Cash Outflow**

| Particulars | Amount (`) |
|---|---|
| Cost of Production equipment | 1,00,000 |
| Additional working capital requirement | 50,000 |
| **Total** | **1,50,000** |

**Calculation of CFAT and NPV**

| Particulars | Years | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Sales revenue (75,000 x 4) | 3,00,000 | 3,00,000 | 3,00,000 | 3,00,000 | 3,00,000 |
| **Less:** Costs | | | | | |
| Variable cost (75,000 x 2) | 1,50,000 | 1,50,000 | 1,50,000 | 1,50,000 | 1,50,000 |
| Additional fixed cost | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 |
| Depreciation (D) | 25,000 | 18,750 | 14,063 | 10,547 | - |
| Earnings before taxes | 1,00,000 | 1,06,250 | 1,10,937 | 1,14,453 | 1,25,000 |
| **Less:** Taxes @ 35% | 35,000 | 37,188 | 38,828 | 40,059 | 43,750 |
| Earnings after taxes (EAT) | 65,000 | 69,062 | 72,109 | 74,394 | 81,250 |
| CFAT (EAT + D) | 90,000 | 87,812 | 86,172 | 84,941 | 81,250 |
| **Add:** Recovery of working capital (WC) | | | | | 50,000 |
| **Add:** Salvage value (sv) | | | | | 10,000 |
| **Add:** Tax benefit on short term capital loss | | | | | 7,574 |
| | | | | | 1,48,824 |
| Multiply by PV factor @20% | 0.833 | 0.694 | 0.579 | 0.482 | 0.402 |
| PV (CFAT × PV factor) | 74,970 | 60,942 | 49,894 | 40,942 | 59,827 |
| Total PV | | | | | 2,86,575 |
| **Less:** Cash outflows | | | | | 1,50,000 |
| **NPV** | | | | | **1,36,575** |



**Comment**

The proposed equipment should be purchased by the firm.

**Note**

i) The block includes only one asset, depreciation is not charged at the end of the year because the asset has been sold in the year.

ii) `7,574 = ` 1,00,000 – ` 68,359 (accumulated depreciation) – `10,000 (SV) × 0.35.

## 3.8 Impact of Inflation on Capital Budgeting Decisions

**Q14. Discuss the effect of Inflation on Capital Budgeting Decisions.**

**(OR)**

**Explain the Impact of Inflation on Capital Budgeting Decisions.**

**(OR)**

**What is the impact of Inflation on Capital Budgeting Decisions?**

**(OR)**

**How can inflation influence on Capital Budgeting Decisions?**

**(OR)**

**How would you account for inflation premium in capital budgeting decisions?**

*Ans :* **(April-23, Sep-20, Aug.-21, Imp.)**

Inflation as a significant effect on capital budgeting decisions of a firm,

**i) Impact of Inflation on Cash Flows**

It effects the decision of the analysts under the rate which is either nominal or real. Nominal cash flows consider the inflation effect whereas real cash flows are calculated after deducting the effect of inflation.

**ii) Impact of Inflation on Discount Rates**

The nominal discount rate should be used for discounting the nominal cash flows. Similarly, the real rate should be used for discounting the real cash flows otherwise there exists a bias in investing long-term projects. The real and nominal rates are related as follows,

$$1 + M = (1 + r)(1 + 0) \quad \ldots (1)$$

Where,

M – Nominal rate of return

r – Real rate of return

i = Inflation rate

Nominal rate can be calculated from equation (1) as,

$$M = (1 + r)(1 + 0 - i) \quad \ldots (2)$$

Real rate can be calculated from equation (1) as,

$$r = \frac{(1+M)}{(1+i)} - 1$$

**iii) Impact of Inflation on Depreciation Deductions**

The value of depreciation on tax savings can be decreased by the effect of inflation. If an actual inflation is higher than expected inflation rates then there will be a substantial decrease in the firm's expected profitability. As the increase in inflation leads to an increase in the real taxes by reducing the value of depreciation on real tax savings.

The inflation effects on depreciation deductions of historical costs.

The allowance for depreciation reduces the effect of tax on income to some extent. NPV will get reduced if there is an increase in income as it is included under tax bracket.

During inflation there will be a decrease in the investment as these allowances are based on historical costs. The value of depreciation allowances will be reduced if the tax write-off is further deferred.

$$\text{Effective tax write-off} = \frac{\sum^{PV} \text{of depreciation deductions at different inflation rates}}{\text{cost of assets}}$$

Effective tax rate write-off reduces with the increase in inflation rates which represents that they are in line with the life of assets.

Generally, lower inflation rate enhances the capital investment. However according to nominal approach there exists no change/increase in value of allowances for depreciation with the inflation rates.

**iv) Impact of Inflation on Bond Holders Value**

Inflation also affects the bond holders value of reducing their fixed payments. The price paid by bond holders include the expected inflation rates. If actual inflation > expected then there will be a substantial decrease in the value of fixed payments to bond holders, which leads to an increase in the profitability of the firm.

**v) Impact of Inflation on Output of Firm**

Inflation effects the sales or output of a firm which leads to substantial effect on the after tax cash flows of a firm.

**vi) Impact of Inflation on Firm's Relations with Stakeholders**

Increase in inflation rates also adversely affects the relations of a firm with their stakeholders such as customers, suppliers, employees etc.

## 3.9 PAY BACK PERIOD

### 3.9.1 Discounted Pay back, Post Pay Back, Surplus Life and Surplus Pay Back, Bail Out Pay Back

**Q15. Define Pay Back Period. Explain merits and demerits of Pay Back Period.**

*Ans :*

**Meaning**

Payback period method is a traditional method of capital budgeting. It is simple and widely used quantitative method of investment evaluation. Payback period is also termed as payout or pay off period method. With the help of payback period method firm can evaluate the number of years to recoup the initial investment from cash flow after tax. The formula to calculate payback period is,

$$\text{Payback period} = \frac{\text{Initial Investment}}{\text{Annual Cash flows}}$$

**Accept/Reject Criterion of Payback Period**

Payback period is used as a measuring tool to accept or reject investment proposal. A proposal whose actual payback period is more than what has been predetermined by the management has to be rejected. In case of comparison between two projects, a project with less payback period is preferred to a project with high payback period. Payback period can also be used as a method of ranking in case of mutually exclusive projects. The projects can be arranged in an ascending order according to the lengths of the payback periods.

**Merits**

The merits of payback period are as follows,

**1.** This is a method which is simple to understand and equally simple to calculate.

**2.** This method prefers investment in short term periods. Therefore, it reduces the possibility of loss on account of obsolescence.

**3.** This method requires less time and labour and it is economical when compared to other techniques of capital budgeting.

**4.** This method makes it clear that no profits arises till the payback period is over. This inference is very useful for new companies in deciding when they should start paying dividends.

**Demerits of Pay Back Period (PBP) Method**

The demerits of payback period are as follows,

**1.** The payback period method does not take into account the time value of money. A rupee today is definitely worth more than a rupee after a year. This basic fact is ignored by this method.

**2.** The payback period method ignores the returns that are generated by a project after its payback period.

**Q16. Write a short note on :**

**(i) Discounted Pay back**

**(ii) Post Pay Back**

**(iii) Payback Reciporcal Method**

**(iv) Bail Out Pay Back**

*Ans :* **(Sep-23, Sep-20, May-19)**

**i) Discounted Payback Period (DPP)**

In Discounted Payback Period method, the present values of all cash outflows and inflows are computed at an appropriate discount rate. Generally, the present values of all inflows are cumulated in order of time. The time period at which Cumulated Present Value of Cash Inflows is equal to Value of Cash Outflows is referred as "Discounted Payback Period".

**ii) Post Payback Period (PPP)**

This method is also known as surplus life over pay back period method. As per this method, the project yielding highest post pay back period are selected. This method is suitable for those projects which do not differ significantly in terms of their size. The expected cash inflows are even during the life of the project.

**iii) Payback Reciprocal Method (PRM)**

Payback reciprocal method is a good approximation of the rate of return under some conditions.

This method is used when the following conditions are fulfilled,

**(a)** Equivalent Cash inflows are yearly generated.

**(b)** The project under consideration must be twice of the pay back period.

This method is sometimes used to find out the internal rate of return. The formula for calculating pay back reciprocal is as follows,

$$\text{Payback Reciprocal} = \frac{\text{Annual Cash Inflows}}{\text{Total Investment}}$$

**iv) Bail-Out Payback Period (BPP)**

Bail-out payback method is one of the improved methods of payback method. The bail-out payback system takes into consideration the salvage value of a capital investment. This method gives due weightage to the salvage value of the projects because of its existence in capital expenditure decisions where risk is a key factor. The salvage value of the asset during the life of the project is determined and each year's saving is accumulated in a cumulative form. Each year's cumulative total of savings increases every year due to the salvage value. When cumulative savings plus salvage value becomes equal to the total cost of investment then such period is called as bail-out payback period.

## PROBLEMS

**9. The expected cashflows of a project are as follows**

| Year | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Cashflow | -100,000 | 20,000 | 30,000 | 40,000 | 50,000 | 30,000 |

**The cost of capital is 12%. Calculate discounted payback period.**

*Sol :*

**Discounted Payback Period**

| Years | Inflows Rs. | PV Factor @12% | PV of CFAT | Cumulative PV of CFAT |
|---|---|---|---|---|
| 1 | 20,000 | 0.893 | 17,860 | 17,860 |
| 2 | 30,000 | 0.797 | 23,910 | 41,770 |
| 3 | 40,000 | 0.712 | 28,480 | 70,250 |
| 4 | 50,000 | 0.636 | 31,800 | 1,02,050 |
| 5 | 30,000 | 0.567 | 17,010 | 1,19,060 |

The above table shows that in the first 3 years Rs. 70,250 is recovered and rest of the amount in 4th year. This means, payback period is between 3 and 4 years. By using interpolation the exact period can be arrived at,

$$\text{Discounted payback period} = 3 \text{ years} + \frac{29.750}{31,800}$$

$$= 3 \text{ years} + 0.9 = 3.9 \text{ years}$$

**Working Notes**

3rd year value = Cash outflow – Cumulative CFAT

= 100,000 – 70,250

= 29,750

**10. Calculate discounted payback period from the information given below,**

**Cost of project 5,00,000**
**Life of the project 4 years**
**Annual cash inflow 2,50,000**
**Cut-off rate 18%**

*Sol :*

**Calculation of Discounted Payback Period**

| Years | Inflow Rs. | PV at 18% | PV of CFAT Rs. | Cumulative PV of CFAT Rs. |
|---|---|---|---|---|
| 1 | 2,50,000 | 0.847 | 2,11,750 | 2,11,750 |
| 2 | 2,50,000 | 0.718 | 1,79,500 | 3,91,250 |
| 3 | 2,50,000 | 0.609 | 1,52,250 | 5,43,500 |
| 4 | 2,50,000 | 0.516 | 1,29,000 | 6,72,500 |

From the above table, cumulative present value of cash inflows at the end of 2nd year is Rs. 3,91,250 and Rs. 5,43,500 at the end of 3rd year. Hence, discounted payback period falls in between 2 and 3 years.

$$\text{Discounted payback period} = 2 \text{ year} + \frac{5,00,000 - 3,91,250}{1,52,250}$$

$$= 2 \text{ years} + \frac{1,08,750}{1,52,250}$$

$$= 2 \text{ year} + 0.7 = 2.7 \text{ year (approx).}$$

**11. Calculate discounted pay-back period from the information given below :**

| | |
|---|---|
| **Cost of project** | **Rs. 6,00,000** |
| **Life of the project** | **5 years** |
| **Cut off rate 10%** | **Rs. 2,00,000** |

*Sol :*

**Calculation of Present Value of Cash Inflows**

| Years | Inflows Rs. | PV at 10 Discount Factor | Present Value of CFAT | Cumulative Present Value of CFAT |
|---|---|---|---|---|
| 1 | 2,00,000 | 0.909 | 1,81,800 | 1,81,800 |
| 2 | 2,00,000 | 0.826 | 1,65,200 | 3,47,000 |
| 3 | 2,00,000 | 0.751 | 1,50,200 | 4,97,200 |
| 4 | 2,00,000 | 0.683 | 1,36,600 | 6,33,800 |
| 5 | 2,00,000 | 0.621 | 1,24,200 | 7,58,000 |

Cumulative present value of cash inflows at the end of the third year is Rs. 4,97,200 and it is Rs. 6,33,800 at the end of fourth year. Hence, discounted pay-back period falls in between 3 and 4 years. To be exact,

$$\text{Discounted pay-back period} = 3 \text{ yeas} + \frac{1,02,800}{1,36,600}$$

$$= 3 + 0.75$$

$$= 3.7 \text{ years approx.}$$

**12. A company is considering three projects X, Y and Z. Following are the particulars in respect of these :**

| Particulars | X | Y | z |
|---|---|---|---|
| Cost (`) | 3,00,000 | 3,75,000 | 3,40,000 |
| Expected Life (In Years) | 12 | 12 | 12 |
| Scrap Value (In `) | 20,000 | 30,000 | 25,000 |
| Annual Savings | 42,000 | 60,000 | 50,000 |

**Suggest the best of these projects :**

**i) Using payback period**

**ii) Post-payback period and**

**iii) Index of post-payback period profit Ignore income tax.**

*Sol :*

| Particulars | Project 'X' | Project 'Y' | Project 'Z' |
|---|---|---|---|
| Cost of investment (N1) | ` 3,00,000 | ` 3,75,000 | ` 3,40,000 |
| Operating savings or cash Inflows (`) | 42,000 | 60,000 | 50,000 |
| Payback period | $\frac{3,00,000}{42,000}$ = 7.14 years | $\frac{3,75,000}{60,000}$ = 6.25 years | $\frac{3,40,000}{50,000}$ = 6.8 years |
| Ranking | III | I | II |
| Expected life in years | 12 | 12 | 12 |
| Surplus life in years | (12-7.14 = 4.86 years) | (12-6.25 = 5.75 years) | (12-6.8 = 5.2 years) |
| Post-payback (operating savings × surplus life in years) | 42,000 × 4.86 = 2,04,120 | 60,000 × 5.75 = 3,45,000 | 50,000 × 5.2 = 2,60,000 |
| Ranking | II | I | III |
| Index of post-payback profit | $\frac{2,04,120}{3,00,000} \times 100$ = 68.04% | $\frac{3,45,000}{3,75,000} \times 100$ = 92% | $\frac{2,60,000}{3,40,000} \times 100$ = 76.47% |
| Ranking | II | I | III |

**Interpretation**

From the table, it can be suggested that project 'y' is acceptable because of high ranking when compared to project and project *'y'*. Thus, project *'y'* maximizes the return for the company. Hence, project 'y' is selected over other projects.

**13. For each of the following projects. Compute,**

**i) Payback period**

**ii) Post-payback profitability and**

**iii) Post-payback profitability index.**

| | | |
|---|---|---|
| **A)** | **Initial outlay** | **Rs. 60,000** |
| | **Annual cash inflow (after tax but before depreciation)** | **Rs. 12,000** |
| | **Estimated life** | **8 years** |
| **B)** | **Initial outlay** | **Rs. 60,000** |
| | **Annual cash inflow (After tax but before depreciation)** | |
| | **First three years** | **Rs. 18,000** |
| | **Next five years** | **Rs. 6,000** |
| | **Estimated life** | **8 years** |
| | **Salvage** | **Rs. 9000** |

*Sol :*

**A) i) Payback Period**

$$= \frac{\text{Investment}}{\text{Annual cash inflow}} = \frac{60,000}{12,000} = 5 \text{ years}$$

**ii) Post-payback Profitability**

= Annual cash inflow (Estimated life – Payback period)

= 12,000 (8 – 5)

= 12,000 × 3 = Rs. 36,000

**iii) Post back Profitability index**

$$= \frac{\text{Post payback profitability}}{\text{Net investment}} \times 100 = \frac{36,000}{60,000} \times 100 = 60\%$$

**B) i) Payback Period**

For unequal cashflow, the payback period is calculated as follows:

| Cash Inflows | Rs. |
|---|---|
| 1st year's cash inflow | 18,000 |
| 2nd year's cash inflow | 18,000 |
| 3rd year's cash inflow | 18,000 |
| 4th year's cash inflow | 6,000 |
| | Rs. 60,000 |

Therefore, the payback period is 4 years.

**ii) Post-payback Profitability**

= Annual cash inflow × Remaining life after payback period

= Rs. 6000 × 4 = Rs. 24,000

**iii) Post-payback Profitability Index**

$$= \frac{24,000}{60,000} \times 100 = 0.4 \times 100 = 40\%.$$

**14. Determine bail-out payback with the help of following information in respect of an investment decision regarding acquisition of following two mutually exclusive projects. If initial cost of investment, cash inflows and salvage values is as follows,**

| Description | Investment at Year-0 (in Rs.) | Year-1 | Year-2 | Year-3 | Year-4 | Year-5 |
|---|---|---|---|---|---|---|
| Project-A | 20000 | 5000 | 6000 | 4000 | 3000 | 2500 |
| Salvage value of A | – – | 6000 | 4000 | 3000 | 2000 | 1000 |
| Project-B | 25000 | 7000 | 4000 | 5000 | 3000 | 2500 |
| Salvage value of B | – – | 6000 | 4000 | 3000 | 2000 | 100 |

*Sol :*

**Bail-out Payback Method for Project 'A'**

| Years (1) | Cash inflows (2) | Salvage value (3) | Cumulative value (4=2+3) |
|---|---|---|---|
| 1. | 5,000 | 6,000 | 11,000 |
| 2. | 6,000 | 4,000 | 10,000 |
| 3. | 4,000 | 3,000 | 7,000 |
| 4. | 3,000 | 2,000 | 5,000 |
| 5. | 2,500 | 1,000 | 3,500 |

The cumulative value at the end of 2nd year is Rs. 21,000 (11,000 + 10,000) and it is more than the original investment i.e., Rs. 20,000 (year-0 investment). Hence, the bail-out payback time is 2 years. After the completion of bail-out payback period, the capital investment becomes totally scrapped.

The bail-out payback for project-B is as follows,

Bail-out Payback Method for Project 'B'

| Years (1) | Cash inflows (2) | Salvage value (3) | Cumulative value (4=2+3) |
|---|---|---|---|
| 1. | 7,000 | 6,000 | 13,000 |
| 2. | 4,000 | 4,000 | 8,000 |
| 3. | 5,000 | 3,000 | 8,000 |
| 4. | 3,000 | 2,000 | 5,000 |
| 5. | 2,500 | 1,000 | 3,500 |

The cumulative value at the end of 3rd year is Rs. 29,000 (13,000 + 8,000 + 8,000) and it is more than the original investment i.e., Rs. 25,000 (year-0 investment). Hence, in project 'B' the bail-out payback time is 3 years. After the completion of bail-out payback period, the capital investment becomes totally scrapped.

**Conclusion**

Project 'A' has 2 year bail-out payback time.

Project 'B' has 3 year bail-out payback time.

Thus project 'A' is preferred due to low bail-out payback time when compared to project 'B.

**15. The expected cash flows of a project are as follows:**

| Year | Cash flow (`) |
|---|---|
| 0 | 10,00,000 |
| 1 | 2,00,000 |
| 2 | 3,00,000 |
| 3 | 4,00,000 |
| 4 | 5,00,000 |
| 5 | 3,00,000 |

**The cost of capital is 12 percent. Calculate:**

**(a) Benefit cost ratio.**

**(b) MIRR**

**(c) The discounted payback period.**

*Sol :* **(Aug.-21)**

| Year (1) | Cash Inflow (`) (2) | PV Factor @12% (3) | PVCF (4) = (2) × (3) | Cumulative CFAT (5) |
|---|---|---|---|---|
| 1 | 2,00,000 | 0.893 | 1,78,600 | 1,78,600 |
| 2 | 3,00,000 | 0.797 | 2,39,100 | 4,17,700 |
| 3 | 4,00,000 | 0.712 | 2,84,800 | 7,02,500 |
| 4 | 5,00,000 | 0.636 | 3,18,000 | 10,20,500 |
| 5 | 3,00,000 | 0.567 | 1,70,100 | 11,90,600 |

Total Present Value of Cash Inflow = 11,90,600

**(a) Calculation of Benefit Cost Ratio (Profitability Index)**

$$= \frac{\text{Present Value of Cash Inflows}}{\text{Initial Cash Outlay}}$$

$$= \frac{11,90,600}{10,00,000} = 1.19$$

**(b) Calculation of MIRR (Modified Internal Rate of Return)**

$$MIRR = \left[\frac{TV}{PVC}\right]^{t/n} - 1$$

**Calculation of PVC (Present Value of Costs)**

$$PVCF = \sum_{t=0}^{n} \frac{(\text{Cash Outflows})}{(1+r)^r} = \frac{10,00,000}{(1+0.12)^0}$$

= ` 10,00,000

**Calculation of TV (Terminal Value)**

$$TV = \sum_{t=1...n}^{n} \text{Cash Inflows}, (1 + r)^{n-1}$$

$$= 2,00,000\ (1.12)^{5-1} + 3,00,000\ (1.12)^{5-2} + 4,00,000\ (1.12)^{5-3} + 5,00,000\ (1.12)^{5-4} + 3,00,000\ (1.12)^{5-5}$$

$$= 2,00,000\ (1.5735) + 3,00,000\ (1.4049) + 4,00,000\ (1.2544) + 5,00,000\ (1.12) + 3,00,000\ (1)$$

= 3,14,700 + 4,21,470 + 5,01,760 + 5,60,000 + 3,00,000 = ` 20,97,930

**Calculation of MIRR (r*)**

$$(1+r^*)^5 = \frac{TV}{PVC}$$

$$(1+r^*)^5 = \frac{20,97,930}{10,00,000}$$

$$(1+r^*)^5 = 2.0979$$

$$r^* = (2.0979)^{1-5} - 1$$

$$= 1.1597 - 1$$

$$= 0.1597$$

or

$$= 0.1597 \times 100 = 15.97\%$$

$\therefore$ MIRR of project = 15.97%.

**(c) Calculation of Discounted Payback Period**

The above table shows that in the 3rd year only `17,02,500 is recovered and remaining (10,00,000 – 7,02,500) ` 2,97,500 in 4th year. This mean payback lies between 3rd and 4th year. By using interpolation the exact period can be arrived.

$$\text{Discounted Payback Period} = 3 \text{ years} + \frac{\text{Initial Cost} - \text{Cumulative CFAT of } 3^{rd} \text{ Year}}{4^{th} \text{ Year PVCF}}$$

$$= 3 \text{ years} + \frac{10,00,000 - 7,02,500}{3,18,000}$$

$$= 3 \text{ years} + \frac{2,97,500}{3,18,000}$$

$$= 3 \text{ years} + 0.94$$

$$= 3.94 \text{ years.}$$



**16. A company is considering two projects Project M and project N, each of which requires an initial outlay of Rs. 50 crores. The expected cash inflows from these projects in crores of Rupees are:**

| Year | Project M | Project N |
|---|---|---|
| 1 | 11 | 38 |
| 2 | 19 | 22 |
| 3 | 32 | 18 |
| 4 | 37 | 10 |

**(a) What is the discounted payback period for each of the projects if the cost of capital is 12 percent?**

**(b) What is post-payback profitability index for each of the projects?**

*Sol :* **(Aug.-21)**

**Calculation of Discounted Payback Period for Project M**

| Year (1) | Cash Inflow (`) (crores) (2) | PV Factor @12% (3) | PVCF (4) = (2) × (3) | Cumulative CFAT (5) |
|---|---|---|---|---|
| 1 | 11 | 0.893 | 9.823 | 9.823 |
| 2 | 19 | 0.797 | 15.143 | 24.966 |
| 3 | 32 | 0.712 | 22.784 | 47.750 |
| 4 | 37 | 0.636 | 23.532 | 71.282 |

The above table shows that in the first three years only ` 47.75 crores is recovered and remaining (50 – 47.75) ` 2.25 crores in 4th year. This means payback period lies between 3rd and 4th year. By using interpolation the exact period can be arrived.

$$\text{Discounted Payback Period for Project M} = \frac{\text{Initial Cost} - \text{Cumulative CFAT}}{4^{th}\text{ Year PVCF}}$$

$$= 3 \text{ years} + \frac{50 - 47.75}{23.532}$$

$$= 3 \text{ years} + \frac{2.25}{23.532}$$

$$= 3 \text{ years} + 0.096$$

$$= 3.096 \text{ years.}$$

**Calculation of Discounted Payback Period for Project N**

| Year (1) | Cash Inflow (`) (crores) (2) | PV Factor @12% (3) | PVCF (4) = (2) × (3) | Cumulative CFAT (5) |
|---|---|---|---|---|
| 1 | 38 | 0.893 | 33.934 | 33.934 |
| 2 | 22 | 0.797 | 17.534 | 51.468 |
| 3 | 18 | 0.712 | 12.816 | 64.284 |
| 4 | 10 | 0.636 | 6.36 | 70.644 |

The above table shows that in the first years only ` 33.934 crores is recovered and remaining (50 –33.934) ` 16.066 crores in 2nd year. This means payback period lies between 1st and 2nd year. By using interpolation the exact period can be arrived.

$$\text{Discounted Payback Period for Project N} = 1 \text{ year} + \frac{\text{Inital Cost} - \text{Cumulative CFAT of } 1^{st}\text{ Year}}{2^{nd}\text{ Year PVCF}}$$

$$= 1 \text{ year} + \frac{50 - 33.934}{17.534}$$

$$= 1 \text{ Year} + \frac{16.066}{17.534}$$

$$= 1 \text{ year} + 0.92$$

$$= 1.92 \text{ years}$$

**(b) Post-Payback Profitability Index**

**Project M**

$$\text{Post-Payback Profitability Index} = \frac{\text{Post Payback Profits}}{\text{Initial Investment}} \times 100$$

Post-Payback Profitability (for uneven cash inflows) = [Total Cash Inflows + Scrap Value] – Investment

Total Cash Inflows = 11 + 19 +32+ 37 = ` 99 crores

∴ Post Payback Profitability = (99 + 0) – 50 [ ∴ Investment = ` 50 crores]

= ` 49 crores

$$\text{Post Payback Profitability Index for Project M} = \frac{49}{50} \times 100 = 98\%.$$

**Project N**

Post-Payback Profitability (for uneven cash inflows) = [Total Cash Inflows + Scrap Value] - Investment

Total Cash Inflows = 38 + 22 + 18 + 10 = ` 88 crores

∴ Post Payback Profitability = (88 + 0) – 50 = ` 38 crores

$$\text{Post Payback Profitability Index for Project N} = \frac{38}{50} \times 100 = 76\%.$$

**17. X company is considering two projects M & N, each of which require an initial outlay of Rs.50 lakhs. The expected cash inflows from these projects are:**

| Year | Project M | Project N |
|---|---|---|
| 1 | 12 | 37 |
| 2 | 18 | 24 |
| 3 | 33 | 19 |
| 4 | 36 | 12 |

**a) What is the PBP for each of the project?**

**b) If the two projects are mutually exclusive and the cost of capital is 15%. Which project should the firm invest in?**

**c) If cost of capital is 14%, What is the modified IRR of each project?**

*Sol :* **(Sep.-23, Imp.)**

**Calculation of Discounted Payback Period for Project M**

| Year (1) | Cash Inflow (`) (2) | PV Factor @15% (3) | PVCF (4) = (2) × (3) | Cumulative CFAT (5) |
|---|---|---|---|---|
| 1 | 12 | 0.869 | 10.428 | 10.428 |
| 2 | 18 | 0.756 | 13.608 | 24.036 |
| 3 | 33 | 0.658 | 21.714 | 45.75 |
| 4 | 36 | 0.572 | 20.592 | 66.342 |

The above table shows that in the first three years only ` 45.75 lakhs is recovered and remaining (50 – 45.75) ` 4.25 Lakhs in 4th year. This means payback period lies between 3rd and 4th year. By using interpolation the exact period can be arrived.

$$\text{Discounted Payback Period for Project M} = \frac{\text{Initial Cost} - \text{Cumulative CFAT}}{4^{th}\ \text{Year PVCF}}$$

$$= 3 \text{ years} + \frac{50 - 47.75}{20.592} = 3 \text{ years} + \frac{4.25}{20.592}$$

$$= 3 \text{ years} + 0.206 = 3.206 \text{ Years.}$$

**Calculation of Discounted Payback Per for Project N**

| Year (1) | Cash Inflow (`) (crores) (2) | PV Factor @12% (3) | PVCF (4) = (2) × (3) | Cumulative CFAT (5) |
|---|---|---|---|---|
| 1 | 37 | 0.869 | 32.153 | 32.153 |
| 2 | 24 | 0.756 | 18.144 | 50.297 |
| 3 | 19 | 0.658 | 12.502 | 62.799 |
| 4 | 12 | 0.572 | 6.86 | 69.699 |

The above table shows that in the first years only ` 32.153 lakhs is recovered and remaining (50 –32.153) ` 17.847 lakhs in 2nd year. This means payback period lies between 1st and 2nd year. By using interpolation the exact period can be arrived.

$$\text{Discounted Payback Period for Project N} = 1 \text{ year} + \frac{\text{Inital Cost} - \text{Cumulative CFAT of } 1^{st}\ \text{Year}}{2^{nd}\ \text{Year PVCF}}$$

$$= 1 \text{ year} + \frac{50 - 32.153}{18.144} = 1 \text{ Year} + \frac{17.847}{18.144}$$

$$= 1 \text{ year} + 0.98$$

$$= 1.98 \text{ years}$$

∴ The firm should invest in 'N' project.

**18. A company invested Rs. 20 lakhs in a project. The expected cash flow are Rs. 5 lakhs per annum. The salvage value at the end of 1st, 2nd, 3rd, 4th and 5th years are Rupees 12 lakhs, 10 lakhs, 8 lakhs, 6 lakhs and zero respectively. Calculate the Payback period and the bailed payback period.**

*Sol :* **(Oct.-22)**

$$\text{Payback period} = \frac{\text{Investment}}{\text{Annual cash flows}} = \frac{20,00,000}{5,00,000} = 4 \text{ years}$$

Bailout payback period

| Year | Cash inflow | Salvage value | Value |
|---|---|---|---|
| 1 | 5,00,000 | 12,00,000 | 17,00,000 |
| 2 | 5,00,0000 | 10,00,000 | 15,00,000 |
| 3 | 5,00,000 | 8,00,000 | 13,00,000 |
| 4 | 5,00,000 | 6,00,000 | 11,00,000 |
| 5 | 5,00,000 | 0 | 5,00,000 |

The cumulative value at the end of 2nd year is 32,00,000 and it is more than original investment (20,00,000). Hence it is accepted and bailout payout period is 2 years.

**19. The expected cash flows of a project are as follows:**

| Year | Cash flow Rs. |
|---|---|
| 0 | –12,00,000 |
| 1 | 5,00,000 |
| 2 | 4,00,000 |
| 3 | 4,00,000 |
| 4 | 5,00,000 |
| 5 | 3,00,000 |

**The cost of capital is 12 percent. Calculate**

**(a) Calculation of MIRR**

**(b) The discounted payback period.**

*Sol :* **(April-23)**

MIRR at a rate of 12%

**(a) Calculation of MIRR.**

**i) Calculation of PVC.**

$$PVC = \sum_{t=0}^{n} \frac{\text{Cash outflows}}{(1+r)^t}$$

$$= \frac{12,00,000}{(1+0.12)^0} = 12,00,000$$

**ii) Calculation of Terminal value**

$$TV = \sum_{t=1,n}^{n} \text{Cash inflow } (1+r)^{n-1}$$

$$= 5,00,000\,(1.12)^{5-1} + 4,00,000\,(1.12)^{5-2} + 4,00,000\,(1.12)^{5-3} + 500000(1.12)^{5-4} + 300000\,(1.12)^{5-5}$$

$$= 500000\,(1.12)^4 + 400000\,(1.12)^3 + 400000\,(1.12)^2 + 500000\,(1.12)^1 + 300000\,(1.12)$$

$$= 786759.68 + 561971.2 + 501760 + 5,60,000 + 3,36,000$$

$$= 2746490.88$$

**iii) Calculation of MIRR (r*)**

$$(1 + r^*)^5 = \frac{TV}{PVC}$$

$$= \frac{2746490.88}{12,00,000} = 2.2887424$$

$$r^* = (2746491)^{1/5} - 1$$

$$= 19.39 - 1 = 18.39\%$$

**(b) The Discounted Payback Period**

**Discounted payback period**

| Year | Cash inflows | Pv factor @ 12% | PVCf | Cumulative pcvf |
|---|---|---|---|---|
| 1 | 5,00,000 | 0.893 | 4,46,500 | 4,46,500 |
| 2. | 4,00,000 | 0.797 | 3,18,800 | 7,65,300 |
| 3. | 4,00,000 | 0.712 | 2,84,800 | 10,50,100 |
| 4. | 5,00,000 | 0.636 | 3,18,000 | 13,68,100 |
| 5 | 3,00,000 | 0.567 | 1,70,000 | 15,38,200 |

The above table shows that in the first 3 years 10,50,100 is recovered and rest off the amount in 4th year. This means payback is between 3 and 4 years.

$$\text{Discounted payback period} = 3 \text{ years} + \frac{149900}{318000}$$

$$= 3 + 0.47$$

$$= 3.47 \text{ years}$$

**20. A company is considering two projects P and project Q, each of which requires an initial outlay of Rs. 40 crores. The expected cash inflows from these projects in crores of Rupees are:**

| Year | Project P | Project Q |
|---|---|---|
| 1 | 11 | 34 |
| 2 | 19 | 20 |
| 3 | 30 | 18 |
| 4 | 32 | 10 |

**What is the discounted payback period for each of the projects if the cost of capital is 10 percent?**

*Sol :* **(April-23)**

Calculation of Discounted payback period.

**Project P**

**Discounted Payback Period**

| Year | Cash inflows | PV factor @ 10% | PVCF | Cumulative PVCF |
|---|---|---|---|---|
| 1 | 11 | 0.909 | 9.999 | 9.999 |
| 2 | 19 | 0.826 | 15.694 | 25.693 |
| 3 | 30 | 0.751 | 22.53 | 48.223 |
| 4 | 32 | 0.683 | 21.856 | 70.079 |

The above table shows that in the first 2 years 25.693 is recovered and the rest off the amount in 3rd year. This means payback is between 2 and 3 years.

$$\text{Discounted payback period} = 2 + \frac{14.307}{22.53}$$

$$= 2.63 \text{ years.}$$

**Project Q**

**Discounted Payback Period**

| Year | Cash inflows | PV factor @ 10% | PVCF | Cumulative PVCF |
|---|---|---|---|---|
| 1 | 34 | 0.909 | 30.906 | 30.906 |
| 2 | 20 | 0.826 | 16.52 | 47.426 |
| 3 | 18 | 0.751 | 13.518 | 60.944 |
| 4 | 10 | 0.683 | 6.83 | 67.774 |

The above the table shows that in the 1st year 30.906 is recovered and rest off the amount in 2nd year. This means payback is between 1st and 2nd years.

$$\text{Discounted payback period} = 1 + \frac{9.094}{16.52}$$

$$= 1 + 0.550$$

$$= 1.55 \text{ years}$$

## 3.10 RETURN ON INVESTMENT

**Q17. Explain the term accounting rate of return with its merits and demerits.**

**(OR)**

**Discuss the importance of return on investment in project appraisal.**

*Ans :*

Return on investment is also known as accounting (or) average rate of return.

Accounting Rate of Return (ARR) is a traditional method of capital budget evaluation and it is also known as average rate of return method. According to this method the capital investment proposals are judged on the basis of accounting information rather than cash flows.

Accounting rate of return can be calculated as,

**i)** $$\text{ARR} = \frac{\text{Annual average Net Earnings}}{\text{Original investment}} \times 100$$

**ii)** $$\text{ARR} = \frac{\text{Annul average net earnings}}{\text{Average investment}} \times 100$$

The term average annual net earnings is the average of the earnings after depreciation and tax over the whole of the economic life of the project. The amount of average investment is calculated as:

$$\text{Average investment} = \frac{\text{Original investment}}{2}$$

$$\text{Average investment} = \frac{\text{Original investment} - \text{Scrap value}}{2}$$

(OR)

$$\text{Average investment} = \left(\frac{\text{Original investment} - \text{Scrap value}}{2}\right) + \text{Net working capital} + \text{Salvage value}$$

It is assumed that depreciation is charged on straight line basis method. So, average investment is 50% of original cost less scrap value.

**Merits**

**i)** Accounting rate of return can be easily understood and implemented.

**ii)** It provides a better view of profitability as it uses entire profits of the project in evaluating rate of return.

**iii)** As it requires accounting data, it can be easily obtained from financial data.

**Demerits**

**i)** ARR also ignores the time value of money like payback period.

**iii)** ARR focuses on accounting profits rather than cash flows which are more significant.

**iii)** The firm cannot depend on this method to maximize the market value of shares.

**iv)** This method is not suitable for investment proposal in which investment are made in installments.

## PROBLEMS

**21. Project cost ` 28,000 and has a scrap value of ` 5000 after ` 5 years. The net profit before depreciation and taxes for the five years period are expected to be ` 4,000, ` 6000, ` 7000, ` 9000, ` 12000. Calculate the ARR assuming 35% rate of tax and depreciation on straight line method.**

*Sol :* **(Dec.-19)**

**Determination of EAT and ARR**

| Year | EBDIT | Depreciation | EBIT | Taxes @35% | EAT |
|---|---|---|---|---|---|
| 1 | 4,000 | 4,600 | -600 | -210 | -390 |
| 2 | 6,000 | 4,600 | 1,400 | 490 | 910 |
| 3 | 7,000 | 4,600 | 2,400 | 840 | 1560 |
| 4 | 9,000 | 4,600 | 4,400 | 1,540 | 2,860 |
| 5 | 12,000 | 4,600 | 7,400 | 2,590 | 4810 |
| Total EAT | | | | | 9,750 |
| Average EAT = [Total EAT + 5] = $\frac{9750}{5}$ = | | | | | 1,950 |

$$\text{Averagge Investment} = \frac{28,000}{2} = 14,000$$

$$\text{ARR} = \frac{\text{Average EAT}}{\text{Average Investment}} \times 100 = \frac{1,950}{14,000} \times 100$$

$$= 13.93\%$$

**Working Notes**

Calculation of Depreciation on Straight Line Method:

$$\text{Depreciation} = \frac{\text{Cost} - \text{Salvage value}}{\text{Life}} = \frac{28,000 - 5,000}{5}$$

$$= \frac{23,000}{5} = 4,600$$

**22. A chemical company is considering investment in a project that costs ? 5,00,000. The life of the project is 5 years and estimated salvage value is zero. Tax rate is 55%. The company uses straight line depreciation and proposed project has estimated earnings before depreciation and before tax as follows:**

| Year | Earnings before depreciation and tax (`) |
|---|---|
| 1 | **1,00,000** |
| 2 | **1,00,000** |
| 3 | **1,50,000** |
| 4 | **1,50,000** |
| 5 | **2,50,000** |

**Determine the following:**

**(i) Payback period and**

**(ii) Average rate of return.**

*Sol.:*

**Calculation of Cash Flows**

| Year | Earnings Before Depreciation and Tax ( `) | Depreciation (`) | EBT (`) | Tax @ 55% (`) | EAT (`) | Cash Flows [EAT + + Depreciation] (`) | Cumulative Cash inflows (`) |
|---|---|---|---|---|---|---|---|
| 1 | 1,00,000 | 1,00,000 | - | - | - | 1,00,000 | 1,00,000 |
| 2 | 1,00,000 | 1,00,000 | - | - | - | 1,00,000 | 2,00,000 |
| 3 | 1,50,000 | 1,00,000 | 50,000 | 27,500 | 22,500 | 1,22,500 | 3,22,500 |
| 4 | 1,50,000 | 1,00,000 | 50,000 | 27,500 | 22,500 | 1,22,500 | 4,45,000 |
| 5 | 2,50,000 | 1,00,000 | 1,50,000 | 82,500 | 67,500 | 1,67,500 | 6,12,500 |
| **Total** | **7,50,000** | **5,00,000** | **2,50,000** | **1,37,500** | **1,12,500** | **6,12,500** | |

**(i) Pay-back Period**

The cumulative cash inflows are ` 4,45,000 in 4th year and ` 6,12,500 in 5th year, Hence, pay back period is between 4th and 5th year.

$$\therefore \quad \text{Pay back Period} = 4 \text{ years} + \left(\frac{5,00,000 - 4,45,000}{1,67,500}\right)$$

$$= 4 \text{ years} + \frac{55,000}{1,67,500} = 4 \text{ years} + 0.33 = 4.33 \text{ years.}$$

**(ii) Average Rate of Return**

$$\text{ARR} = \frac{\text{Average Annual Profits}}{\text{Original Investment}} \times 100$$

$$\text{Average Annual Profits} = \frac{\text{Total profits after Tax}}{\text{No. of years}} = \frac{\text{Total profits after Tax}}{\text{No. of years}} = \frac{1,12,500}{5} = 22,500$$

$$\text{ARR} = \frac{22,500}{5,00,000} \times 100 = 4.5\%$$

**Working Notes**

$$\text{Depreciation} = \frac{\text{Cost} - \text{Scrap Value}}{\text{Life}} = \frac{5,00,000}{5} = 1,00,000$$

## 3.11 TERMINAL VALUE

**Q18. Define Terminal Value Method.**

**(OR)**

**Discuss the importance of Terminal Value in project selection.**

*Ans :* **(Imp.)**

The terminal value method is an advanced technique of evaluating investment proposals. In this method future cash flow are reinvested in some other project at a specified rate of return this continues till the end of the project. Unlike net present value method, the net cash flows and outlays are compounded and forward. If the present value of sum of compounded reinvested cash inflows is more than present value of the outlays the project is accepted. The project with higher present value of the total of the compounded cash flows is preferred in mutually exclusive projects.

The terminal value method also ascertain the terminal rate of return which is also known as modified internal rate of return to control the drawback of the internal rate of return method.

### PROBLEMS

**23. A project involves initial investment of Rs. 25,000 life of the project is 4 years and cash inflows are Rs. 12,000 p.a for 4 years cost of capital is 12%. The expected rate at which cash inflows will be reinvested at the end of the year.**

| Year | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Percentage | 5% | 5% | 10% | 10% |

**You are required to analyses the feasibility of the project using terminal value method.**

*Sol :*

**Calculation of Compounded Value of Cash Inflows**

| Year | Cash in flows | Rate of interest | Years of investment | Compounding factor | Compound value |
|---|---|---|---|---|---|
| 1. | 12,000 | 5% | 3 | 1.158 | 13,896 |
| 2. | 12,000 | 5% | 2 | 1.102 | 13,236 |
| 3. | 12,000 | 10% | 1 | 1.100 | 13,200 |
| 4. | 12,000 | 10% | 0 | 1.000 | 12,000 |
| | | | | | **52,332** |

$$PV = \frac{\text{Compound value of cash inflow}}{(1+K)^4} = \frac{52,332}{(1+0.12)^4}$$

= 52,332 × 0.636 = Rs. 33,283.

As the present value of the compounded reinvested cash inflows Rs. 33,283 is greater than the original cash outlay of Rs. 25.000 (terminal value is positive i.e., Rs. 8,283) project is accepted.

**24. The following information relates to a project :**

**Initial Outlay** **Rs. 20,000**

**Life of the project** **4 years**

**Cash inflows** **Rs. 10,000 p.a. for 4 years**

**Cost of capital (K)** **12%**

**Expected interest (hurdle) rates at which cash inflows will be reinvested:**

| End of the year | Percent |
|---|---|
| **1** | **7%** |
| **2** | **7%** |
| **3** | **9%** |
| **4** | **9%** |

*Sol :*

You are required to analyse the feasibility of the project using terminal value method.

| Year | Cash Inflows (Rs.) | Rate of Interest (%) | Years for Investment (No.) | Compounding Factor (C.F.) | Compounded Value (Rs.) |
|---|---|---|---|---|---|
| 1 | 10,000 | 7% | 3 | 1.225 | 12,250 |
| 2 | 10,000 | 7% | 2 | 1.145 | 11,450 |
| 3 | 10,000 | 9% | 1 | 1.090 | 10,900 |
| 4 | 10,000 | 9% | 0 | 1.000 | 10,000 |
| | | | | Total | 44,600 |

Present value of the total of the compounded reinvested cash inflows

$$PV = \frac{\text{Compounded Value of Cash Inflows}}{(1+k)^4} = \frac{44,600}{(1+0.12)^4}$$

= 44,600 × 0.636 (Using Present Value Tables) = Rs. 28,366

As the present value of the compounded reinvested cash inflows Rs. 28,366 is greater than the original cash outlay of Rs. 20,000 (or terminal value is positive, i.e., Rs. 8,366), the project can be accepted.

**25. Evaluate the following proposal using Terminal value method**

**(i) Original outlay Rs. 8,00,000, (ii) Life of the project 3 years, (iii) Cash inflows: Rs. 4,00,000 p.a. for three years, (iv) Cost of capital 10% Expected interest rates at which the cash flow will be re-invested.**

| Year end | % |
|---|---|
| 1 | 8 |
| 2 | 8 |
| 3 | 8 |

*Sol :* **(April-23)**

**Calculation of terminal value method**

| Year | Cash flow | Rate of Interest | Year for Investment | Compounding Factor | Compounded Value |
|---|---|---|---|---|---|
| 1 | 4,00,000 | 8% | 2 | 1.166 | 4,66,400 |
| 2 | 4,00,000 | 8% | 1 | 1.080 | 4,32,000 |
| 3 | 4,00,000 | 8% | 0 | 1.000 | 4,00,000 |
| | | | | | 12,98,400 |

$$Pv = \frac{\text{Compound value of cash inflow}}{(1+k)^3} = \frac{12,98,400}{(1+0.10)^3}$$

= 12,98,400 × 0.751 = 975098.4

## 3.12 Single Period Constraints, Multi-Period Capital Constraint, and An Unresolved Problem

**Q19. Explain the concept of single period constraints.**

**(OR)**

**Discuss on single period constraints.**

*Ans :*

Most of the firms are using profitability index technique for evaluating the projects in order to take capital budgeting decisions regarding that project. Profitability index is relevant for the simple and divisible projects with single period capital constraints rather than the mutually exclusive projects with capital constraints in more than one period. Profitability index represents the ability of the project in generating value of the funds invested in that project.

$$\text{Profitability index} = \frac{\text{NPV}}{\text{Initial investment}}$$

A profitability index value higher than 1 depicts that the project will yield positive and profitable NPV, whereas the projects with PI less than 1 will yield only negative NPV and loss to the firm. The primary objective of firm in using PI is to select the set of projects which can yield high profits and value to the shareholders.

## PROBLEMS

**26. A firm has a set of projects P, Q, R, S and T whose cashflows are as follows,**

| | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| P | -200 | 40 | 80 | 120 | 160 |
| Q | -300 | 100 | 200 | 100 | 280 |
| R | -120 | -40 | 80 | 80 | - |
| S | -200 | 120 | 120 | 200 | 80 |
| T | -100 | -140 | 80 | 120 | 60 |

**Under non rationing situation, the selection of project is based on NPV of the projects. The NPV of the projects can be determined by discounting the cashflows at a rate of 10%.**

*Sol :*

| Year | P | PV@10% | $PVCF_P$ | Q | $PVCF_Q$ | R | $PVCF_R$ | S | $PVCF_S$ | T | PVCF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 40 | 0.909 | 36.36 | 100 | 90.9 | -40 | -36.36 | 120 | 109.08 | 140 | 127.26 |
| 2. | 80 | 0.826 | 66.08 | 200 | 165.2 | 80 | 66.08 | 120 | 99.12 | 80 | 66.08 |
| 3. | 120 | 0.751 | 90.12 | 100 | 75.1 | 80 | 60.08 | 200 | 150.2 | 120 | 90.12 |
| 4. | 160 | 0.683 | 109.28 | 280 | 191.24 | — | — | 80 | 54.64 | 60 | 40.98 |
| Total PVCF | | | 301.84 | | 522.44 | | 89.8 | | 413.04 | | 324.44 |
| (–) cash out flows | | | –200 | | –300 | | –120 | | –200 | | –100 |
| | | | 101.84 | | 222.44 | | –30.2 | | 213.04 | | 224.44 |
| NPV | | | IV | | II | | V | | III | | I |

Project R has been rejected as the NPV is negative.

Assume if a capital rationing arise at '0' year such as the available capital is only 600. With the capital restrictions the firm cannot complete all the 4 projects P, Q, S and T. The firm needs to determine the appropriate project based on the profitability index. The following table represents the ranking of the projects based on PI.

| Project | PV of Cashflow /Outlay | PI | Rank |
|---|---|---|---|
| P | $\frac{101.84}{200}$ | 0.509 | IV |
| Q | $\frac{222.44}{300}$ | 0.741 | III |
| R | $\frac{-30.2}{120}$ | –0.251 | V |
| S | $\frac{213.04}{200}$ | 1.0652 | II |
| T | $\frac{224.44}{100}$ | 2.24 | I |

The order of the projects based on the decreasing order of ranks and their investments requirements.

| Project | Rank | Year '0' |
|---|---|---|
| T | 1 | 100 |
| S | 2 | 200 |
| Q | 3 | 300 |
| P | 4 | 200 |
| R | – | 120 |

The firm can accept the three projects T, S and Q by utilizing the capital resources available.

Total NPV = 224.44 + 213.04 + 222.44 = 659.92

Firm should first invest the available funds in T, S and Q which will yield a total NPV of 659.92 at a single period capital expenditure constraint. This increases the wealth of shareholder by 659.92. As there is a restriction on the availability of capital sources, the wealth of shareholders has been decreased by Rs. 101.84.

**Q20. Explain briefly about multi period capital constraints an unresolved problem.**

**(OR)**

**Discuss on multi period capital constraints.**

**(OR)**

**Write a note on multi period capital constraints.**

*Ans :*

The investment decision-making for multi-period constraint is usually considered as complex and not completely resolved under capital rationing because of differing assumptions which consists of both explicitly and implicitly and also because of failure to isolate the problem from general capital market theory. Therefore, to avoid such problems, companies should follow strategies which are helpful in the long-run.

Under multi-period capital rationing, profitability index is not used to rank projects especially when projects are divisible and the firm is subject to capital rationing for a multi-period. The profitability index is used for ranking projects only for a single period constraints. In multi-period capital rationing linear programming is used to determine the combination of projects which maximises NPV subject to the capital constraints in each period.



**Q21. Compare single period and multi period capital constraint.**

*Ans :* **(May-19)**

| S.No. | Single Period Constraint | Multi-Period Capital Constraint |
|---|---|---|
| 1. | Single period constraint takes place when there is a shortage of funds for only one period. | Multi-period constraint takes place when there is a shortage of funds for more than one period |
| 2. | It deals with divisible, indivisible and mutually exclusive projects. | It deals with linear programming and dual values |
| 3. | Profitable index is used in single period constraint. | Profitable index is not used in multi-period constraint. |
| 4. | Single period easy compared to multi-period constraint. | Multi-period is usually considered as complex compared to single period constraint |

## PROBLEMS

**27. A company has determined the following probabilities for net cash flows for three years generated by a project.**

| Year 1 | | Year 2 | | Year 3 | |
|---|---|---|---|---|---|
| Cash Flows (Rs) | Probability | Cash Flow (Rs) | Probability | Cash Flow (Rs) | Probability |
| 2,000 | 0.2 | 2,000 | 0.4 | 2,000 | 0.1 |
| 3,000 | 0.3 | 3,000 | 0.2 | 3,000 | 0.5 |
| 4,000 | 0.4 | 4,000 | 0.1 | 4,000 | 0.2 |
| 5,000 | 0.1 | 5,000 | 0.3 | 5,000 | 0.2 |

**Calculate the expected net cash flows of multi-period. Also calculate the present value of the expected cash flow using 12% discount rate.**

*Sol :*

The present value of the expected value of cash flows at 12% discount rate are as follows,

$$1^{st} \text{ year} = \frac{1}{1.12} = 0.893$$

$$2^{nd} \text{ year} = \frac{0.893}{1.12} = 0.797$$

$$3^{rd} \text{ year} = \frac{0.797}{1.12} = 0.712$$

ENCF = Expected Net Cash Flows

$$PV(ENCF) = \frac{ENCF_1}{(1+k)^1} + \frac{ENCF_2}{(1+k)^2} + \frac{ENCF_3}{(1+k)^3}$$

**Year-1**

$ENCF_1$ = (2000 × 0.2) + (3000 × 0.3) + (4000 × 0.4) + (5000 × 0.1)
= 400 + 900 + 1600 + 500 = Rs. 3400

**Year-2**

$ENCF_2$ = (2000 × 0.4) + (3000 × 0.2) + (4000 × 0.1) + (5000 × 0.3)
= 800 + 600 + 400 + 1500 = Rs. 3300

**Year-3**

$ENCF_3$ = (2000 × 0.1) + (3000 × 0.5) + (4000 × 0.2) + (5000 × 0.2)
= 200 + 1500 + 800 + 1000 = Rs. 3,500

$$PV(ENCF) = \frac{3400}{(1+0.12)^1} + \frac{3300}{(1+0.12)^2} + \frac{3500}{(1+0.12)^3}$$

$$= \frac{3400}{(1+12)^1} + \frac{3300}{(1+12)^2} + \frac{3500}{(1+12)^3}$$

= 3400 × 0.893 + 3300 × 0.797 + 3500 × 0.712

= 3036.2 + 2630.1 + 2492 = Rs. 8158.3.

## 3.13 NPV Mean Variance Analysis

**Q22. Define NPV. Explain the merits and demerits of NPV.**

*Ans :*

For answer refer to Unit-III, Q.No. 10

**Q23. Explain briefly about Mean Variance Analysis.**

*Ans :*

In 1952, Markowitz introduced mean variance analysis which is essential for both finance researchers and practitioners. This theory enables to solve the problems relating to optional portfolio selection.

Mean variance analysis is the process of weighing risk which is referred as variance against expected return. It helps the investors in making decisions relating to financial instruments in which they invest depending on level of risk and rewards. It also enable the investors to determine maximum reward at given level of risk or minimum risk at given level of return.

Mean variance analysis constitutes a part of modem portfolio theory which believes that if investors possess complete information then they will make rational decisions relating to investments. Mean variance analysis involves two important parts i.e., variance and expected return. Variance refers to spreading of returns of a specific security on daily or weekly basis. The expected return is a probability which express the estimated return of investment in the security. If two securities have same expected return but variance is less for one security then security with less variance must be selected. In the same way, if securities have same variance but different return then security with higher return must be selected. In modem portfolio theory, an investor will be choosing different securities to make investments in different levels of variance and expected return.

## 3.14 Hertz Simulation

**Q24. Explain briefly about Hertz simulation ? Elaborate the process of Hertz simulation.**

**(OR)**

**Explain the model of Hertz Simulation.**

**(OR)**

**Briefly discuss the Hertz Simulation.**

**(OR)**

**What is Hertz Simulation? Explain its importance.**

**(OR)**

**Write a brief note on Hertz Simulation as the tool of critical appraisal techniques in the investment decisions.**

**(OR)**

**Examine the utility of Hertz's simulation model, in assessing risky project proposals for investment decisions.**

*Ans :* **(Sep.-23, Sep.-20, Dec.-19, Imp.)**

Hertz introduced the use of simulation model for evaluating the risks associated with investments by determining the expected rate of return and standard deviation of investment. The procedure of Hertz simulation model consists of,

**Step 1**

Hertz identified the important factors that are uncertain and has a significant effect on the investment. He developed the probability distribution for each factor based on the historical data assessment of the outcomes or knowledge of the decision makers of the firm. The factors include,

**a)** **Market Analysis:** The following factors should be considered while analysing the market,

i) Market size

ii) Selling price

iii) Growth rate

iv) Market share.

**b)** **Investment Cost Analysis:** The factors that should be considered for this are,

i) Investment required

ii) Residual value of investment.

**c)** **Operational and Fixed Costs:** The firm needs to analyse the following factors under this category,

i) Operational costs

ii) Fixed costs

iii) Useful life of facilities.

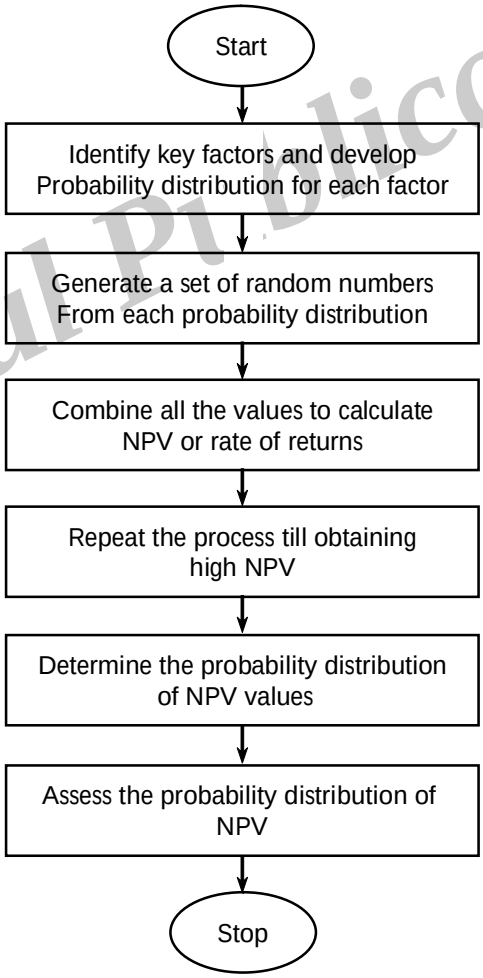



**Fig.: Steps in Hertz Simulation Model**

**Step 2**

Select a value for each factor randomly or develop a set of random numbers of the distributed values of the factors in order to calculate rate of return for each factor. Simulate these values in order to determine the rate of return or NPV.

**Step 3**

The process needs to be repeated for number of times to determine the risks associated with the investment.

It is necessary to restrict the variations in the factors affecting the market while determining the expected return from the simulated set of random numbers. Simulation of the random numbers can also be done using computers which yields favourable and adequate results.

For every time, a set of values of each of nine factors need to be simulated to calculate the respective returns for each factor. After conducting adequate trials of simulation, a firm can plot the results on a graph to determine the rate of return and the frequency distribution which helps in determining the probability of favourable returns of investment under various degrees of risk. The list of the profitable investments with less risks can be determined by comparing the frequency distribution of the rates of return on investment. Simulation models are also used for budgeting or profit planning. These models help in reducing the effect of wide variability in different factors that affects the firm's profitability.



## PROBLEMS

**28. ABC company wants to assess the different projects on 3 factors such as demand in units, profits (price cost) per unit and investment required for the project. These factors are independent of each other. The probability distributions of the 3 factors are as follows,**

| Annual Demand | | Profit (Rs.) | | Investment | |
|---|---|---|---|---|---|
| Units ('000) | Probability | Units | Probability | Rs. | Probability |
| 40 | 0.05 | 6.00 | 0.20 | 3000 | 0.25 |
| 45 | 0.20 | 10.00 | 0.10 | 4000 | 0.50 |
| 50 | 0.10 | 14.00 | 0.20 | 5000 | 0.25 |
| 55 | 0.30 | 18.00 | 0.40 | | |
| 60 | 0.10 | 20.00 | 0.10 | | |
| 65 | 0.20 | | | | |
| 70 | 0.05 | | | | |

**Using simulation process for 10 times compute the return on investment for each trials based on the 3 factors. Suggest the appropriate return and project.**

*Sol :*

i) Calculate the cumulative probability tables for each factor based on which random numbers can be assigned to the factors.

**Random Numbers for Annual Demand**

| Annual Demand | Probability | Cumulative Probability | Random Numbers |
|---|---|---|---|
| 40 | 0.05 | 0.05 | 00-04 |
| 45 | 0.20 | 0.25 | 05 - 24 |
| 50 | 0.10 | 0.35 | 25 - 34 |
| 55 | 0.30 | 0.65 | 35 - 64 |
| 60 | 0.10 | 0.75 | 65 - 74 |
| 65 | 0.20 | 0.95 | 75 - 94 |
| 70 | 0.05 | 1.00 | 95-99 |

**Random Numbers for Profit**

| Profit | Probability | Cumulative Probability | Random Numbers |
|---|---|---|---|
| 6 | 0.20 | 0.20 | 00 - 19 |
| 10 | 0.10 | 0.30 | 20-29 |
| 14 | 0.20 | 0.50 | 30-49 |
| 18 | 0.40 | 0.90 | 50-89 |
| 20 | 0.10 | 1.00 | 90-99 |



**Random Numbers for Investment**

| Investment required | Probability | Cumulative Probability | Random Numbers |
|---|---|---|---|
| 3000 | 0.25 | 0.25 | 00-24 |
| 4000 | 0.50 | 0.75 | 25 - 74 |
| 5000 | 0.25 | 1.00 | 75 - 99 |

ii) The simulation worksheet consists of 10 trials by selecting random numbers from the above sets. The return for every project can be calculated using the following formula.

$$R\% = \frac{\text{Profit} \times \text{Demand}}{\text{Investment}} \times 100$$

| Trial | Random | Simulated | Random | Simulated | Random | Simulated | Simulated |
|---|---|---|---|---|---|---|---|
| 1 | 14 | 45 | 10 | 6 | 5 | 3,000 | $\frac{45\times6}{3,000}\times100=9\%$ |
| 2 | 30 | 50 | 40 | 14 | 24 | 4,000 | $\frac{50\times14}{4,000}\times100=17.5\%$ |
| 3 | 40 | 55 | 25 | 10 | 16 | 3,000 | $\frac{55\times10}{3,000}\times100=18.33\%$ |
| 4 | 50 | 55 | 36 | 14 | 47 | 4,000 | $\frac{55\times14}{4,000}\times100=19.25\%$ |
| 5 | 20 | 45 | 99 | 20 | 86 | 5,000 | $\frac{45\times20}{5,000}\times100=18\%$ |
| 6 | 45 | 55 | 58 | 18 | 94 | 5,000 | $\frac{55\times18}{5,000}\times100=19.8\%$ |
| 7 | 28 | 50 | 47 | 14 | 35 | 4,000 | $\frac{50\times14}{4,000}\times100=17.5$ |
| 8 | 90 | 65 | 75 | 18 | 48 | 4,000 | $\frac{65\times18}{4,000}\times100=29.25\%$ |
| 9 | 80 | 65 | 86 | 18 | 19 | 3,000 | $\frac{65\times18}{3,000}\times100=39\%$ |
| 10 | 72 | 60 | 64 | 18 | 78 | 5,000 | $\frac{60\times18}{5,000}\times100=21.6\%$ |



of all the returns in the above table, the returns are highest (39%) at trial 9. It represents that the demand of 65,000 units yields a profit of 18/- per unit and require an investment of Rs. 30,00,000.

## 3.15 Hillier Approaches

**Q25. Briefly discuss the Hillier approaches.**

**(OR)**

**Discuss the Hillier Approach in analysis and appraisal of project.**

**(OR)**

**How is the standard deviation of NPV defined by Hillier model if the cashflows different years perfectly correlated.**

**(OR)**

**Write a brief note on Hillier Approaches as the tool of critical appraisal techniques in the investment decisions.**

**(OR)**

**Explain the concept NPV mean variance analysis.**

*Ans :* **(Sep.-23, Oct.-22, Aug.-21, May-19)**

**Meaning**

According to Hiller, expected NPV and standard deviation of NPV can be determined using analytical derivation. Hiller explained |c(NPV)] standard deviation of NPV in three different cases,

i) Independent cash flows

ii) Perfect correlated cash flows

iii) Mixed condition.

Hiller's approach is limited only to positive correlation of cash flows as it is not possible for perfect negative correlation of cash flows in case of multiple periods.

**i) Independent Cash Flows**

If the cash flows are independent there does not exist any relation between the cash flows. In this case, it is very difficult to determine the variance of NPV as there will be an increase in the possible outcomes with the increase in the degree of independence among the cash flows. If a project has a life of 3 years and 5 cash flows in each year as the cash flows are independent the possible outcomes will be 5 × 5 × 5 = 125.

The probability of each combination can be determined by the product of the probabilities of the cash flows of those combinations. The expected values and variance of NPV can be determined based on the present value of the cash flows.

$$\sigma\,(NPV) = \left[\sum_{t=0}^{n} \frac{\sigma_t^2}{(1+i)^{2t}}\right]^{1/2}$$

$$= \sigma_0^2 + \frac{\sigma_1^2}{(1+i)^2} + \frac{\sigma_2^2}{(1+i)^{2\times 2}} + \frac{\sigma_3^2}{(1+i)^6} + .... + \frac{\sigma_n^2}{(1+i)^{2t}}$$

$$\overline{NPV} \text{ or } E(NPV) = \sum_{t=1}^{n} \frac{C_t}{(1+i)^t} - I$$

$$\bar{C}_t \text{ for a year} = \frac{c_1 + c_2 + c_3 + ....c_n}{n}$$

Where,

$\overline{NPV}$ = Expected NPV

s (NPV) = Standard deviation

I = Initial of NPV investment

$\sigma_t$ = Standard deviation of cash flow for year 't'.

### ii) Perfectly Correlated Cash Flows

If the cash flows are perfectly correlated there exists a definite relationship between the cash flows. If there is a deviation in the cash flows of one year due to some factors i.e., $c_i$ then there will be a similar effect of these factors on the cash flows of $j^{th}$ year i.e., $c_j$. The expected value and standard deviation of NPV cart be calculated using the following formula,

$$E(NPV) = \sum_{t=1}^{n} \frac{\bar{C}_t}{(1+i)^t} - I$$

$$s(NPV) = \sum_{t=1}^{n} \frac{\sigma_t}{(1+i)^t}$$

### iii) Mixed Condition

In some cases the cash flows are partly independent and partly correlated with others. For instance, the acceptability of a product by the target market customers may be unsatisfactory, satisfactory or excellent. The acceptability of the product in the present year determine the forecasts for next year is the cash flows in this aspect are dependent. Whereas, the effect of economic conditions on the sales in one year may not determine the effect of economic conditions in the next year i.e., independent nature.

In this case one should generate all combinations and need to compute the joint probabilities for each. Determine the PV of cash flows and then calculate mean and standard deviation based on PVCF. In mixed case, the cash flows are categorized into two parts,

$c_j$ = Independent cash flows

$c^*_i$ = Dependent cash flows.

The variance can be calculated as,

$$V(NPV) = s^2 = \left[\sum_{t=0}^{n} \frac{v(c_t)}{(1+i)^{2t}}\right] + \left[\sum_{t=0}^{n} \frac{\sqrt{vc_t^*}}{(1+i)^t}\right]^2$$

$$s = \sqrt{V(NPV)}$$

Risk associated with the project can be determined based on the standard deviation and NPV as standard deviation is a measure of project risk and serves a base for evaluation of risk of only one project but not for comparative analysis of projects. In that case of comparative analysis of risk it is necessary to calculate coefficient of variance for each.

$$\text{Coefficient of variance} = \frac{\sigma}{E(NPV)} \times 100$$

If the coefficient of variance is high it represents that the project is associated with high degree of risk.

## PROBLEMS

**29. From the following information, ascertain which project is more risky on the basis of standard deviation.**

| Project A | | Project B | |
|---|---|---|---|
| **Cash Inflow Rs.** | **Probability** | **Cash Inflow Rs.** | **Probability** |
| **2,000** | **0.2** | **2,000** | **0.1** |
| **4,000** | **0.3** | **4,000** | **0.4** |
| **6,000** | **0.3** | **6,000** | **0.4** |
| **8,000** | **0.2** | **8,000** | **0.1** |

*Sol :*

**Calculation of Standard Deviation**

**Project A**

| Cash Inflows Rs. | Deviation from Mean (d) [5,000] | Square of Deviation ($d^2$) | Probability | Weighted Sq. Deviation ($fd^2$) |
|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** |
| 2,000 | –3,000 | 90,00,000 | 0.2 | 18,00,000 |
| 4,000 | –1,000 | 10,00,000 | 0.3 | 3,00,000 |
| 6,000 | +1,000 | 10,00,000 | 0.3 | 3,00,000 |
| 8,000 | +3,000 | 90,00,000 | 0.2 | 18,00,000 |
| | | | n = 1 | $\Sigma(fd^2)$ = 42,00,000 |

Standard Deviation (s), $= \sqrt{\frac{\Sigma fd^2}{n}} = \sqrt{\frac{42,00,000}{1}} = 2,050$

**Project B**

| Cash Inflows Rs. | Deviation from Mean (d) [5,000] | Square of Deviation ($d^2$) | Probability | Weighted Sq. Deviation ($fd^2$) |
|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** |
| 2,000 | –3,000 | 90,00,000 | 0.1 | 9,00,000 |
| 4,000 | –1,000 | 10,00,000 | 0.4 | 4,00,000 |
| 6,000 | +1,000 | 10,00,000 | 0.4 | 4,00,000 |
| 8,000 | +3,000 | 90,00,000 | 0.1 | 9,00,000 |
| | | | n = 1 | $\Sigma df^2$ = 26,00,000 |

Standard Deviation (s), $= \sqrt{\frac{\Sigma fd^2}{n}} = \sqrt{\frac{26,00,000}{1}} = 1,612$

**30. A company is considering two mutually exclusive projects X and Y Project X costs Rs. 30,000 and Project Y Rs. 36,000. You have been given below the net present value probability distribution for each project :**

| Project X | | Project Y | |
|---|---|---|---|
| NPV Estimate Rs. | Probability | NPV Estimate Rs. | Probability |
| 3,000 | 0.1 | 3,000 | 0.2 |
| 6,000 | 0.4 | 6,000 | 0.3 |
| 12,000 | 0.4 | 12,000 | 0.3 |
| 15,000 | 0.1 | 15,000 | 0.2 |

**(i) Compute the expected net present value of projects X and Y.**

**(ii) Compute the risk attached to each project i.e., standard deviation of each probability distribution.**

**(iii) Which project do you consider more risky and why ?**

**(iv) Compute the profitability index of each project.**

*Sol :*

**(i) Computation of Expected Net Present Value of Projects X and Y**

| Project 'X' | | | Project 'Y' | | |
|---|---|---|---|---|---|
| NPV Estimate (Rs.) | Probability | Expected NPV (Rs.) | NPV Estimate (Rs.) | Probability (Rs.) | Expected NPV |
| 3,000 | 0.1 | 300 | 3,000 | 0.2 | 600 |
| 6,000 | 0.4 | 2,400 | 6,000 | 0.3 | 1,800 |
| 12,000 | 0.4 | 4,800 | 12,000 | 0.3 | 3,000 |
| 15,000 | 0.1 | 1,500 | 15,000 | 0.2 | 3,000 |
| | | 9,000 | | | 9,000 |

**(ii) Computation of Standard Deviation of Projects X and Y**

**Project X**

| NPV Estimate (Cash Inflows Rs.) | Deviation from Mean (d) [9,000] | Square of Deviations $(d)^2$ | Probability (f) | Weighted Square Deviation $(fd)^2$ |
|---|---|---|---|---|
| 3,000 | –6,000 | 3,60,00,000 | 0.1 | 36,00,000 |
| 6,000 | –3,000 | 90,00,000 | 0.4 | 36,00,000 |
| 12,000 | +3,000 | 90,00,000 | 0.4 | 36,00,000 |
| 15,000 | +6,000 | 3,60,000 | 0.1 | 36,00,000 |
| | | | n = 1 | $\Sigma fd^2$ = 1,44,00,000 |

Standard Deviation (s), $= \sqrt{\frac{\Sigma fd^2}{n}} = \sqrt{\frac{1,44,00,000}{1}} = 3,795$

**Project 'Y'**

| NPV Estimate (Rs.) | Deviation from Mean (d) [9,000] | Square of Deviations $(d)^2$ | Probability (f) | Weighted Square Deviation $(fd)^2$ |
|---|---|---|---|---|
| 3,000 | –6,000 | 3,60,00,000 | 0.2 | 72,00,000 |
| 6,000 | –3,000 | 90,00,000 | 0.3 | 27,00,000 |
| 12,000 | +3,000 | 90,00,000 | 0.3 | 27,00,000 |
| 15,000 | +6,000 | 3,60,00,000 | 0.2 | 72,00,000 |
| | | | n = 1 | $\Sigma fd^2$ = 1,98,00,000 |

$$\text{Standard Deviation (s)} = \sqrt{\frac{\Sigma fd^2}{n}} = \sqrt{\frac{1,98,00,000}{1}} = 4,450$$

(iii) As the standard deviation of project Y is more than that of Project X, Project Y is more risky.

(iv) Computation of profitability index :

Expected NPV = Total of present value cash inflows – Project Cost

Present Value of Cash Inflows = Expected NPV + Project Cost

Project X = 9,000 + 30,000 [Expected NPV is calculated in (i) above] = Rs. 39,000

Project Y = 9,000 + 36,000 = Rs. 45,000

$$\text{Profitability Index ; Project X} = \frac{39,000}{30,000} = 1.3$$

$$\text{Profitability Index ; Project Y} = \frac{45,000}{36,000} = 1.25$$

**31. The Rajeev Company is considering to make investment in a proposal which requires an outlay of Rs.1,20,000. The project has a life of three years over which the following cash inflows are likely to be generated.**

| Year 1 | | Year 2 | | Year 3 | |
|---|---|---|---|---|---|
| **Cash Flow** | **Probability** | **Cash Flow** | **Probability** | **Cash Flow** | **Probability** |
| **30,000** | **0.2** | **30,000** | **0.1** | **40,000** | **0.3** |
| **40,000** | **0.4** | **50,000** | **0.4** | **60,000** | **0.3** |
| **50,000** | **0.3** | **80,000** | **0.4** | **80,000** | **0.2** |
| **60,000** | **0.1** | **90,000** | **0.1** | **1,00,000** | **0.2** |

**The management feels that the expected cash flows in the various periods may be considered to base its decision about acceptance or rejection of the project. If the discount rate is 10%, should the proposal be accepted?**

*Sol :*

We shall obtain the expected cash inflow for each of the years. This is calculated as follows:

Calculation of Expected Cash Flows

| Year | Cash Flow $C_{ti}$ | Probability $P_{ti}$ | Expected Value | Expected Cash Flow $C = S\ C_{ti}\ P_{ti}$ |
|---|---|---|---|---|
| 1 | 30,000 | 0.2 | 6,000 | |
| | 40,000 | 0.4 | 16,000 | |
| | 50,000 | 0.3 | 15,000 | |
| | 60,000 | 0.1 | 6,000 | 43,000 |
| 2 | 30,000 | 0.1 | 3,000 | |
| | 50,000 | 0.4 | 20,000 | |
| | 80,000 | 0.4 | 32,000 | |
| | 90,000 | 0.1 | 9,000 | 64,000 |
| 3. | 40,000 | 0.3 | 12,000 | |
| | 60,000 | 0.3 | 18,000 | |
| | 80,000 | 0.2 | 16,000 | |
| | 1,00,000 | 0.2 | 20,000 | 66,000 |

Now the expected NPV can be calculated as :

| Year | Expected Cash Flow | PV Factor @ 10% | Present Value |
|---|---|---|---|
| 0 | –120000 | 1.0000 | –120000 |
| 1 | 43000 | 0.9091 | 39091.3 |
| 2 | 64000 | 0.8264 | 52889.6 |
| 3 | 66000 | 0.7513 | 46585.8 |
| | | Expected NPV | 21566.8 |

Since the expected NPV of the proposal is greater than zero, it is an acceptable one.

# Short Questions and Answers

**1. Real Options**

*Ans :*

A real option is an economically valuable right to make or else abandon some choice that is available to the managers of a company, often concerning business projects or investment opportunities. It is referred to as "real" because it typically references projects involving a tangible asset (such as machinery, land, and buildings, as well as inventory), instead of a financial instrument.

Real options differ thus from financial options contracts since they involve real (i.e. physical) "underlying" assets and are not exchangeable as securities.

**2. Timing of Option**

*Ans :*

Timing option allows company to delay making an investment.

The flexibility over timing consists of the opportunity to invest immediately, delay investment for one period, or not invest at all. The timing option provides an opportunity to invest when circumstances are most favourable.

**i)** Timing option can significantly increase a project's value. With uncertain interest rates, the investment-timing option, which is the ability to postpone rather than immediately implement or reject a capital budgeting project.

**ii)** With the assumption that investment costs are distributed independently over time, the optimal investment policy consists of a sequence of target costs, below which investment takes place and above which it does not.

**3. Capital Budgeting**

*Ans :*

Capital budget may be defined as "the firm's decision to invest its current funds most efficiently in rnfedong-term assets in anticipation of an expected flow of benefits over a series of years.

Therefore, it involves a current outlay or series of outlay of cash resources in return for an anticipated flow of future benefits.

Capital budgeting is the process of identifying, analysing and selecting investment projects whose returns (cash flows) are expected to extend beyond one year.

From the above definition, we may identify the basic features of capital budgeting viz., potentially large anticipated benefits, relatively a high degree risk, and a relatively long-time period between the initial outlay and anticipated return.

Firm's investment decisions would generally include expansion, acquisition, modernisation, replacement of fixed assets.

**4. Define IRR ?**

*Ans :*

The internal rate of return is also one of the capital budgeting technique that identifies the time value of money. This method is also known as yield method, discounted rate of return and trial and error yield method. It is that rate of return which equates the present value of cash inflows to the present value of cash outflows. The hit and trial method is used in internal rate of return method to discount the cash flows of the project as discount rate is not known.

**5. Multiple IRR**

*Ans :*

There is another instance in which the IRR approach may not be reliable - when projects have non normal cash flows. A project has normal cash flows if it has one or more cash outflows (costs) followed by a series of cash inflows. Notice that normal cash flows have only one change in sign - they begin as negative cash flows, change to positive cash flows, and then remain positive.

**6. Modified IRR**

*Ans :*

In terms of concept net present value is the most preferable choice than IRR but in practice most of the firms are interested to use (IRR) internal rate of return instead of NPV for evaluating capital budgeting decisions. However, the regular IRR have some limitations. Thus, percentage measure called modified IRR needs to be introduced which can modify the regular IRR to increase its efficiency in evaluating profitability of a firm and capital budgeting decisions.

**7. Simple Investment**

*Ans :*

An investment is said to be simple if it has only one sign change or consists of initial capital outflows followed by cash inflows. The series of cashflows for a simple investment is (–, +, +). Simple investments are always pure investments. In simple investments, the rate of return should maintain the NPV as '0', i.e., present value of cash outflows should be equal to present value of cash inflows at that rate at 1%.

**8. Mixed investment**

*Ans :*

An investment is said to be mixed if it is non simple and non conventional investments. In mixed investment the project balances of a project are positive i.e., PB > 0. The IRR at these project balances cannot be considered as a true IRR. In the mixed investments the following aspects need to be considered while determining the project balances.

i) The initial investment of money in a project will yield an interest rate of $i^*$.

ii) The external investment such as cash borrowings from the projects also yield same interest of $i^*$. The borrowings from the project returns are required to reinvest in the project either at a rate of return ($i^*$) or at an external rate which is less than in order to gain the same rate of returns.

**9. Pure Investment**

*Ans :*

An investment is said to be pure investments if it is either simple or non-simple, conventional or non-conventional and does not borrow the returns of the project. Pure investments are said to have unique rate of returns. In pure investment, the project balances during the whole life of a project should be less than or equal to zero i.e., -ve project balanced otherwise i.e., if the project balances are +ve it will represents that firm has borrowed the returns of the project.

**10. Adjusted NPV?**

*Ans :*

The net present value that is adjusted with the NPV of financial side effects such as issue costs, tax shields of debt, subsidies, incentives etc., is referred to as adjusted NPV.

The adjusted cost of capital forms the base for the evolution of adjusted NPV. The main aim of adjusting the base NPV is to eliminate the adverse financing effects on the project. Adjusted NPV is based on base NPV which is further adjusted with the NPV of financing side effects.

Adjusted NPV = Base NPV ± NPV of financing side effects.

**11. Define Pay Back Period.**

*Ans :*

Payback period method is a traditional method of capital budgeting. It is simple and widely used quantitative method of investment evaluation. Payback period is also termed as payout or pay off period method. With the help of payback period method firm can evaluate the number of years to recoup the initial investment from cash flow after tax. The formula to calculate payback period is,

$$\text{Payback period} = \frac{\text{Initial Investment}}{\text{Annual Cash flows}}$$

**12. Discounted Pay back**

*Ans :*

In Discounted Payback Period method, the present values of all cash outflows and inflows are computed at an appropriate discount rate. Generally, the present values of all inflows are cumulated in order of time. The time period at which Cumulated Present Value of Cash Inflows is equal to Value of Cash Outflows is referred as "Discounted Payback Period".

**13. Payback Reciprocal Method (PRM)**

*Ans :*

Payback reciprocal method is a good approximation of the rate of return under some conditions.

This method is used when the following conditions are fulfilled,

(a) Equivalent Cash inflows are yearly generated.

(b) The project under consideration must be twice of the pay back period.

This method is sometimes used to find out the internal rate of return. The formula for calculating pay back reciprocal is as follows,

$$\text{Payback Reciprocal} = \frac{\text{Annual Cash Inflows}}{\text{Total Investment}}$$

**14. Bail-Out Payback Period (BPP)**

*Ans :*

Bail-out payback method is one of the improved methods of payback method. The bail-out payback system takes into consideration the salvage value of a capital investment. This method gives due weightage to the salvage value of the projects because of its existence in capital expenditure decisions where risk is a key factor. The salvage value of the asset during the life of the project is determined and each year's saving is accumulated in a cumulative form. Each year's cumulative total of savings increases every year due to the salvage value. When cumulative savings plus salvage value becomes equal to the total cost of investment then such period is called as bail-out payback period.

**15. Define Terminal Value Method.**

*Ans :*

The terminal value method is an advanced technique of evaluating investment proposals. In this method future cash flow are reinvested in some other project at a specified rate of return this continues till the end of the project. Unlike net present value method, the net cash flows and outlays are compounded and forward. If the present value of sum of compounded reinvested cash inflows is more than present value of the outlays the project is accepted. The project with higher present value of the total of the compounded cash flows is preferred in mutually exclusive projects.

The terminal value method also ascertain the terminal rate of return which is also known as modified internal rate of return to control the drawback of the internal rate of return method.

**16. Multi period capital constraints.**

*Ans :*

The investment decision-making for multi-period constraint is usually considered as complex and not completely resolved under capital rationing because of differing assumptions which consists of both explicitly and implicitly and also because of failure to isolate the problem from general capital market theory. Therefore, to avoid such problems, companies should follow strategies which are helpful in the long-run.

Under multi-period capital rationing, profitability index is not used to rank projects especially when projects are divisible and the firm is subject to capital rationing for a multi-period. The profitability index is used for ranking projects only for a single period constraints. In multi-period capital rationing linear programming is used to determine the combination of projects which maximises NPV subject to the capital constraints in each period.

# Exercise Problems

1. Prom the following information of two projects, you are required to state which project is more risky. Why?

| Situations | Project P | Project Q |
|---|---|---|
| Worst | 18,300 | Nil |
| Most likely | 24,300 | 24,300 |
| Best | 30,300 | 48,300 |

Each project involves an initial cash outflow of ` 1,30,000. The project's required rate of return is 12 per cent. Projects life period is 10 years. The present value of an annuity of ` 1 for 10 years at 12 percent is 5.650.

**[Ans: Project Q is more risk, since in this project possibility of suffering from loss is more. If the situation is worst, it will not provide any profit].**

2. ABC Company is considering projects, whose initial investment is `1,00,000. The economic life of the projects is 3 years. Under the three states of economy, its actual cash flows and associated probabilities are as follows:

| State of Economy | Year 1 | | Year 2 | | Year 3 | |
|---|---|---|---|---|---|---|
| | CFAT(`) | Pro. | CFAT (`) | Pro. | CFAT (`) | Pro. |
| Bad | 40,000 | 020 | 40,000 | 04 | 40,000 | 020 |
| Normal | 80,000 | 0.60 | 80,000 | 0.50 | 80,000 | 0.30 |
| Good | 1,20,000 | 0.20 | 1,20,000 | 0.10 | 1,20,000 | 0.50 |

Calculate:

(a) EMV

(b) PV of project if required rate of return is 10 per cent

(c) NPV of 10 per cent.

**[Ans: (a) `2,40,000 (b) ` 1,97,980 (c) 97,980]**

3. A company is considering investing in a new project; whose CFAT are as follows:

| Year | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| CFAT(Rs.) | 11,000 | 6,000 | 2,000 | 1,000 | 5,000 |

Risk free interest rate is 6 per cent, and decision-makers are interested to add 4 per cent as risk premium for investing on a new project.

Calculate:

(i) NPV;

(ii) PI using RADR approach.

**[Ans: (i) ` 272(H) 1.02]**

4. Good Luck Company is considering two mutually exclusive projects. The expected CFAT and the associated CE coefficient for those are as follows:

| | Year | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Project | CFAT (`) | 15,000 | 16,000 | 17,000 | 17,500 | 14,000 |
| A | CEL | 0.9 | 08 | 07 | 06 | 0.4 |
| Project | CFAT (`) | 20,000 | 15,000 | 11,000 | 15,000 | |
| B | CEC | 0.9 | 08 | 07 | 0.6 | 0.4 |

Calculate NPV and suggest which project is feasible. The cash of project is ` 45,000 calls and cash of capital is 12 per cent.

**[Ans: Project B is feasible since its NPV is higher than the other NPV: Project A ` 2902.6; ` 40946.91]**

# Choose the Correct Answers

1. Which of the following is the term that describes the amount of time taken for a capital budgeting project to recover its initial investment? [ c ]

   (a) Investment period (b) Redemption period

   (c) Payback period (d) Maturity period

2. Which of the following can be a criterion for the acceptance of a project? [ d ]

   (a) The Profitability Index should be greater than unity

   (b) The Internal Rate of Return should be greater than the cost of capital

   (c) The Net Present Value should be greater than zero

   (d) All of the above

3. Which of the following is true for a project with a shorter payback period? [ a ]

   (a) The project will have a lesser risk (b) The project will have less Net Present Value

   (c) The project will have more Net Present Value (d) The project will have a greater risk

4. Capital planning is the interaction – [ c ]

   (a) Embraced to investigate how to make accessible extra money to the business.

   (b) By which the firm chooses how much cash flow to put resources into business

   (c) By which the firm concludes which long-haul ventures to make.

   (d) This helps make an ace financial plan for the association.

5. The choice to acknowledge or dismiss a capital planning project relies upon – [ c ]

   (a) An investigation of the incomes produced by the venture

   (b) Cost of capital puts resources into business/project.

   (c) Both (a) and (b)

   (d) Neither (a) nor (b)

6. The Internal Rate of Return (IRR) standard for project acknowledgment, under hypothetically boundless assets, is: [ b ]

   Acknowledge all undertakings which have:

   (a) IRR equivalent to the expense of capital

   (b) IRR more noteworthy than the expense of capital

   (c) IRR is not exactly the expense of capital

   (d) None of the above mentioned.

7. Which of the accompanying addresses how much time it takes for a capital budgeting undertaking to recuperate its underlying expense? [ b ]

   (a) Maturity period (b) Payback period

   (c) Redemption period (d) Investment period

8. Integrating floatation costs into the examination of a task will: [ d ]

(a) Have no impact on the current worth of the venture.

(b) Increase the NPV of the venture.

(c) Increase the task's pace of return.

(d) Increase the underlying money outpouring of the task.

9. While picking among totally unrelated ventures, the task with – [ b ]

(a) Lower cost of capital will be chosen

(b) Quickest restitution is liked

(c) Higher NPV gets chosen

(d) Longest restitution is liked

10. The choices that are worried about the distribution of assets to the transient venture recommendations are known as: [ a ]

(a) Working capital choices (b) Capital planning

(c) Capital venture (d) None of these

# Fill in the Blanks

1. A _____ option is an economically valuable right to make or else abandon some choice that is available to the managers of a company.
2. _____ option allows company to delay making an investment.
3. IRR is also known as _____
4. _____ can be defined as preset value of benefits minus preset value of costs.
5. _____ method is a traditional method of capital budgeting.
6. _____ method is one of the improved methods of payback method.
7. The _____ method is an advanced technique of evaluating investment proposals.
8. _____ constraint takes place when there is a shortage of funds for only one period.
9. _____ constraint lakes place when there is a shortage of funds for more then one period.
10. _____ analysis is the process of weighing risk which is referred as variance against expected return.

**ANSWER**

1. Real
2. Timing
3. Yield method
4. NPV
5. Payback period
6. Bail-out payback
7. Terminal value
8. Single period
9. Multi Period
10. Mean variance

UNIT IV

**Strategic Financing Decisions:** Capital Structure and Value Creation. Signaling Theory. Tools for developing an Effective Capital Structure. Financial Flexibility and Financial Discipline. Capital Structure Puzzle.

Dividend Policy and Firm Value. Linter's Dividend Model, its Salient features, Dividend Puzzle. Buy Back of Shares and its Characteristics, Modes and Methods of Buy Back of Shares. Reasons, Benefits and Constraints to Buy Back of Shares. Impacts of Share Buybacks. SEBI Regulations. Financial Distress and Restructuring. Characteristics and Causes of Financial Distress. Costs of Financial Distress. Impacts of Financial Distress. Financial Distress Restructuring. The Insolvency and Bankruptcy Code 2016, Corporate Insolvency Resolution Process, Liquidation Process.

## 4.1 Capital Structure and Value Creation

**Q1. What is Capital Structure? Explain the importance of Capital Structure.**

*Ans :* **(Imp.)**

**Meaning**

The most crucial component of starting a business is capital. It acts as the foundation of the company. Debt and Equity are the two primary types of capital sources for a business.

Capital structure is defined as the combination of equity and debt that is put into use by a company in order to finance the overall operations of the company and for its growth.

**Importance**

Capital structure is vital for a firm as it determines the overall stability of a firm.

(i) A firm having a sound capital structure has a higher chance of increasing the market price of the shares and securities that it possesses. It will lead to a higher valuation in the market.

(ii) A good capital structure ensures that the available funds are used effectively. It prevents over or under capitalisation.

(iii) It helps the company in increasing its profits in the form of higher returns to stakeholders.

(iv) A proper capital structure helps in maximising shareholder's capital while minimising the overall cost of the capital.

(v) A good capital structure provides firms with the flexibility of increasing or decreasing the debt capital as per the situation.

**Q2. Explain the factors determining capital structure.**

*Ans :* **(Imp.)**

The following factors influence the capital structure decisions:

**1. Risk of Cash Insolvency**

Risk of cash insolvency arises due to failure to pay fixed interest liabilities. Generally, the higher proportion of debt in capital structure compels the company to pay higher rate of interest on debt irrespective of the fact that the fund is available or not.

The non-payment of interest charges and principal amount in time call for liquidation of the company.

**2. Risk in Variation of Earnings**

The higher the debt content in the capital structure of a company, the higher will be the risk of variation in the expected earnings available to equity shareholders.

If return on investment on total capital employed (i.e., shareholders' fund plus long-term debt) exceeds the interest rate, the shareholders get a higher return.

On the other hand, if interest rate exceeds return on investment, the shareholders may not get any return at all.

**3. Cost of Capital**

Cost of capital means cost of raising the capital from different sources of funds. It is the price paid for using the capital.

A business enterprise should generate enough revenue to meet its cost of capital and finance its future growth. The finance manager should consider the cost of each source of fund while designing the capital structure of a company.

**4. Control**

The consideration of retaining control of the business is an important factor in capital structure decisions. If the existing equity shareholders do not like to dilute the control, they may prefer debt capital to equity capital, as former has no voting rights.

**5. Trading on Equity**

The use of fixed interest bearing securities along with owner's equity as sources of finance is known as trading on equity. It is an arrangement by which the company aims at increasing the return on equity shares by the use of fixed interest bearing securities (i.e., debenture, preference shares etc.).

**6. Government Policies**

Capital structure is influenced by Government policies, rules and regulations of SEBI and lending policies of financial institutions which change the financial pattern of the company totally. Monetary and fiscal policies of the Government will also affect the capital structure decisions.

**7. Size of the Company**

Availability of funds is greatly influenced by the size of company. A small company finds it difficult to raise debt capital. The terms of debentures and long-term loans are less favourable to such enterprises. Small companies have to depend more on the equity shares and retained earnings.

On the other hand, large companies issue various types of securities despite the fact that they pay less interest because investors consider large companies less risky.

**8. Needs of the Investors**

While deciding capital structure the financial conditions and psychology of different types of investors will have to be kept in mind. For example, a poor or middle class investor may only be able to invest in equity or preference shares which are usually of small denominations, only a financially sound investor can afford to invest in debentures of higher denominations.

A cautious investor who wants his capital to grow will prefer equity shares.

**9. Flexibility**

The capital structures of a company should be such that it can raise funds as and when required. Flexibility provides room for expansion, both in terms of lower impact on cost and with no significant rise in risk profile.

**10. Period of Finance**

The period for which finance is needed also influences the capital structure. When funds are needed for long-term (say 10 years), it should be raised by issuing debentures or preference shares. Funds should be raised by the issue of equity shares when it is needed permanently.

**11. Nature of Business**

It has great influence in the capital structure of the business, companies having stable and certain earnings prefer debentures or preference shares and companies having no assured income depends on internal resources.

**12. Legal Requirements**

The finance manager should comply with the legal provisions while designing the capital structure of a company.

---

**Q3. Explain the need of capital structure.**

*Ans :*

**1. Increase in Value of the Firm**

A sound capital structure of a company helps to increase the market price of shares and securities which, in turn, lead to increase in the value of the firm.

**2. Utilisation of Available Funds**

A good capital structure enables a business enterprise to utilise the available funds fully. A properly designed capital structure ensures the determination of the financial requirements of the firm and raise the funds in such proportions from various sources for their best possible utilisation.

**3. Maximisation of Return**

A sound capital structure enables management to increase the profits of a company in the form of higher return to the equity shareholders i.e., increase in earnings per share.

This can be done by the mechanism of trading on equity i.e., it refers to increase in the proportion of debt capital in the capital structure which is the cheapest source of capital.

If the rate of return on capital employed (i.e., shareholders' fund + longterm borrowings) exceeds the fixed rate of interest paid to debt-holders, the company is said to be trading on equity.

**4. Minimisation of Cost of Capital**

A sound capital structure of any business enterprise maximises shareholders' wealth through minimisation of the overall cost of capital. This can also be done by incorporating long-term debt capital in the capital structure as the cost of debt capital is lower than the cost of equity or preference share capital since the interest on debt is tax deductible.

**5. Solvency or Liquidity Position**

A sound capital structure never allows a business enterprise to go for too much raising of debt capital because, at the time of poor earning, the solvency is disturbed for compulsory payment of interest to .the debt supplier.

**6. Flexibility**

A sound capital structure provides a room for expansion or reduction of debt capital so that, according to changing conditions, adjustment of capital can be made.

**7. Undisturbed Controlling**

A good capital structure does not allow the equity shareholders control on business to be diluted.

## 4.2 SIGNALING THEORY

**Q4. Discuss about Signaling Theory.**

**(OR)**

**Explain briefly about Signaling Theory.**

*Ans :*

(i) The signalling theory emanates from information asymmetries between firm management and shareholders. If managers believe that their firms are undervalued, they will issue debt first and then issue equity as a last resort. Conversely, if management believes that their firm is overvalued, they will issue equity first.

(ii) The signalling theory was first coined by Ross who posits that if managers have inside information, their choice of capital structure will signal information to the market.

(iii) Leverage may well be influenced by the theoretical premise that increases in debt are a positive sign that managers are confident about future earnings. Debt contracts are a commitment by managers to make future interest payments.

(iv) Failure to repay debt could lead to bankruptcy. This signals confidence to the market that the firm will have sufficient cash flows to service debt.

(v) The shareholders of a firm are the residual claimants to the firm s cash flows. This is because promised interest payments are an obligation and have priority over dividends. As a consequence, share prices are more sensitive to financial structure announcements than bond prices.

(vi) If managers are optimistic about their firm's future prospects, the firm's share price will appear more undervalued than bond prices.

(vii) Smith empirically tests the signaling theory, and finds an average reduction of three percent in the share price of firms that announced new equity offerings.

(viii) By contrast, there was a negligible decline in the share prices following debt issue announcements. In addition, increases in debt were associated with an increase in share price returns of about 14 percent for debt for equity substitutions.

**Implication**

1. The implication of the signaling theory is that corporate managers will attempt to time equity issues based on the market's assessment of their shares. it report a strong relationship between firm financing decisions and historical market values of equity.

2. In essence, the capital structure of a firm is the cumulative result of corporate managers past attempts to time the market.

## 4.3 Tools for Developing an Effective Capital Structure

**Q5. Discuss the Tools for Developing an Effective Capital Structure.**

*Ans :*

Two basic tools evaluate the capital

1. EBIT EPS Analysis Structure
2. Financial Leverage

### 1. EBIT - EPS Analysis Structure

Earnings per share (EPS) to the changes in earnings before interest and tax (EBIT) under different financial plans/ capital structures. It is known as EBIT - EPS analysis. Use of fixed cost sources of finance in capital structure of a firm is known as financial leverages or trading on equity.

The benefits are more when a firm uses debt as a source of finance, due to cheap and the interest is tax deductible source.

Use of debt can be used to maximise shareholders' wealth only when a firm has high level of operating profit (EBIT). EBIT - EPS analysis is one way to study the relation between earnings per share (EPS) and various possible levels of operating profit (EBIT), under various financial plans.

### 2. Financial Leverage

Firms may need long-term funds for long-term activities like expansion, diversification, modernisation, etc. Finance manager's job is to raise the required funds with different composition of sources.

The required funds may be raised by two sources: equity and debt. Use of various sources to compose capital is known as capital structure. The use of fixed charges, sources of funds such as debt and preference share capital along with the equity share capital in capital structure is described as financial leverage.

According to Lawrence, financial leverage is the ability of the firm to use fixed financial charges to magnify the effects of changes in EBIT on the firm's earnings per share. In other words, financial leverage may be defined as the payment of fixed rate of interest for the use of fixed interest bearing securities to magnify the rate of return as equity shares.

It is also known as "trading as equity". Hence, financial leverage results from the presence of fixed financial charges in the income statement. Financial leverage associates with financing activities.

The fixed charges do not vary with the firm's EBIT. They must be paid regardless of the amount of EBIT available to the firm. It indicates the effect on EBIT created by the use of fixed charge securities in the capital structure of a firm.

Financial leverage is computed by the following formula:

Financial Leverage

$$= \frac{\text{Financial Leverage - EBIT (Operating Profit)}}{\text{EBIT (Taxable Income)}}$$

Degree of Financial Leverage (DFL)

$$= \frac{\text{Percentage change in EPS}}{\text{Percentage change in EBIT}}$$

Financial leverage may be positive or negative, favourable leverage occurs when the firm earns more on the assets purchased with the funds, than the cost of their use and vice-versa. Higher the degree of financial leverage leads to high financial risk.

The financial risk refers to the risk of the firm not being able to cover its fixed financial costs. Hence, financial manager should take into consideration the level of EBIT and fixed charges while preparing the firm's financial plan.

## 4.4 Financial Flexibility and Financial Discipline

**Q6. What is Financial Flexibility? How can a company measure financial flexibility?**

*Ans :*

**Meaning**

Financial flexibility is refers to as the ability of an organization to access and restructure it's financing needs at a low cost. It can also referred to as the ability of an

organization in managing it's unanticipated financial needs effectively. It is the ability to adapt to the Changing environment due to unforeseen events.

**Tools**

**1. Liquidity Ratios**

These metrics gauge a company's ability to meet its short-term obligations. The two most common liquidity ratios are the current ratio (current assets divided by current liabilities) and the quick ratio (current assets minus inventory, divided by current liabilities). A higher ratio indicates better liquidity and flexibility.

**2. Debt Ratios**

These metrics assess a company's leverage and debt management. Key measures include the debt-to-equity ratio and the interest coverage ratio. Lower debt ratios and higher interest coverage ratios suggest greater financial flexibility.

**3. Cash Flow Analysis**

A company's capacity to generate cash flow is a critical aspect of financial flexibility. Analyzing operating cash flow and free cash flow helps to determine whether a company generates sufficient cash to cover expenses, service debt, and reinvest in the business.

**4. Working Capital Management**

Efficient management of working capital, including accounts receivable, inventory, and accounts payable, can free up cash for other purposes, thereby enhancing financial flexibility.

**5. Reserve Funds**

Maintaining a cash reserve or having access to credit lines can provide a financial safety net during unexpected challenges.

**6. Quality of Assets**

The composition of a company's assets can also affect its financial flexibility. High-quality, liquid assets, such as marketable securities, are more valuable in times of crisis than illiquid assets.

**7. Scenario Analysis**

Conducting stress tests and scenario analyses can help determine how a company's financials would perform under adverse conditions, offering insights into its flexibility.

**8. Management's Strategy and Decision-Making**

Qualitative factors, such as the management team's ability to adapt to changing circumstances and make sound financial decisions, play a significant role in financial flexibility.

**9. Market Conditions**

Economic and industry-specific conditions can influence a company's financial flexibility. Factors like market volatility, interest rates, and the competitive landscape should be taken into account.

---

**Q7. Define financial discipline. Explain the importance of financial discipline.**

*Ans :*

**Meaning**

Financial discipline is a consistent practice of spending, saving, and investing wisely to ensure effective management of financial resources and accumulate wealth in the long run. It centers on adhering to a budget, preventing debt, and achieving financial stability.

**Importance**

**1. Financial Goal Achievement**

A disciplined approach is essential for achieving financial objectives, whether it involves paying for higher education, owning a home, or planning retirement.

**2. Promotes Savings and Investments**

Financial discipline promotes regular savings and consistent investments, contributing to long-term financial security and potential wealth accumulation.

**3. Helps in Budgeting**

It aids in budgeting, ensuring the efficient allocation of funds to meet both immediate needs and long-term personal or business goals.

**4. Aids Future Planning**

Financial discipline allows for effective future planning, be it for retirement, entrepreneurial ventures, or other significant life events.

**5. Ensures Debt Management**

It plays a crucial role in managing debt, helping individuals avoid unnecessary financial burdens, and facilitating systematic debt repayment.

**6. Improves Credit Score**

By adhering to financial discipline, individuals can improve their credit scores through timely payments and responsible financial practices.

**7. Accumulates Wealth**

Implementation of effective financial management strategies in the long run ensures the accumulation of wealth in the form of savings and investments.

**8. Prepares for Crisis**

It prepares individuals and businesses for unexpected expenses or emergencies, reducing the impact on overall financial stability.

**9. Reduces Stress**

Such proactive financial behavior lowers stress and anxiety levels otherwise driven by cash crunch.

## 4.5 Capital Structure Puzzle

**Q8. Explain briefly about Capital Structure Puzzle.**

*Ans :*

(i) The capital structure puzzle refers to the observation that the leverage ratio of firms does not seem to change much over time, even with changes in the financial market and cost of debt capital.

(ii) This puzzle has been a topic of interest for many researchers and has been explained through various theories such as the presence of information asymmetry, agency costs, and transaction costs.

(iii) The authors found that firms with higher tax benefits tend to have a higher debt-to-equity ratio. This result supports the agency cost theory, as tax benefits can act as an incentive for managers to take on more debt financing, as the interest paid on debt is tax deductible.

(iv) The authors found that firms with strong corporate governance tend to have a lower debt-to-equity ratio, as the presence of an independent board of directors and effective monitoring mechanisms reduce the agency costs associated with debt financing.

(v) A third related study is by Fama and French (2017), who investigated the capital structure of firms in the US. The authors found that the debt-to-equity ratio of firms is positively correlated with firm size and profitability, and negatively correlated with firm growth and market-to-book ratios.

(vi) These findings suggest that the capital structure puzzle can be partially explained by firm characteristics, such as size, profitability, growth, and market-to-book ratios.

## 4.6 Dividend Policy and Firm Value

**Q9. Define Dividend. Explain the importance of Dividend.**

*Ans :*

**Meaning**

Dividend is denotes as that portion of profits which is allocated to the shareholders of the company. It may be defined as the return that a shareholder gets from the company, out of its profits on his shareholdings.

**Definition**

**According to the Institute of Chartered Accountants of India,** dividend is "a distribution to shareholder out of profits or reserves available for this purpose".

**Importance**

(i) The dividend is prepared to identify the amount of profits that is distributed to shareholders as dividend and the amount to be retained in the firm. Dividend policy decision is one of the most critical decisions of financial management.

(ii) Retained earnings are important because they enhance the growth of the firm, whereas dividends are essential for shareholders because they increase their current earnings.

(iii) Dividend policy of a firm influence long-term financing as well as wealth of shareholders. Hence, firm must make an appropriate dividend decision so that a reasonable amount of dividend is distributed and a sufficient amount is retained with the firm for its expansion and existence.

(iv) There is an inverse relationship between dividends and retained earnings. When firm distributes large amount of profits as dividends then there will be less amount of retained earnings and vice versa.

There are two types of theories in dividend policy,

**1. Theory of irrelevance**

Which believes that dividend decision does not have any impact on shareholder's wealth and the valuation of the firm.

**2. Theory of relevance**

Which believes that dividend decision substantially has an impact on shareholder's wealth and valuation of firm.

**Q10. Explain the Factors Determining Dividend Policy.**

**(OR)**

**Following are the Factors Determining Dividend Policy.**

**(OR)**

**Explain the determinants of dividend policy in a fast growing company. Should there be a dividend freeze?**

*Ans :* **(Imp.)**

**1. Legal Restrictions**

In deciding on the dividend, the directors take the legal requirements too into consideration. In order to protect the interests of creditors an outsiders, the companies Act 1956 prescribes certain guidelines in respect of the distribution and payment of dividend.

Moreover, a company is required to provide for depreciation on its fixed and tangible assets before declaring dividend on shares.

It proposes that Dividend should not be distributed out of capita, in any case. Likewise, contractual obligation should also be fulfilled, for example, payment of dividend on preference shares in priority over ordinary dividend.

**2. Size of the Earnings**

Practically and truly speaking, the upper ceiling on dividend is dictated by the earnings of the business. If the amount and the nature of earnings are relatively stable a firm is better able to predict what its future earnings will be and is, therefore, more likely to pay-out a higher percentage of profits.

A rational dividend policy should take into account both the amount and nature of earnings from year to year.

**3. Investment Opportunities and Share holder's Preferences**

Management should adopt a dividend policy which strikes a balance between the shareholder's preference for dividends and financing investment opportunities with retained profits. Having a large number of profitable projects in hand, a company should give preference to the retention of earnings over the payment of dividends.

**4. Liquidity Position**

Because the payment of dividends involves outflow of cash from the business, the dividend policy must take into account the liquidity position of the firm.

Even if a firm has had a good record of earnings, it may not be able to pay cash dividends due to its liquidity position. Even a very profitable business has a pressing need for funds. Hence a firm may elect not to pay cash dividends.

**5. Management's Attitude towards Control**

As a matter of policy, some companies expand only to the extent of their internal earnings. This is justified on the ground that raising funds by selling additional shares would dilute the control of the company. Selling debentures will increase the risks of fluctuating earnings to the detriment of the present members of the company.

The management's attitude towards control would reduce the dividend pay-out and increase reliance on internal financing.

**6. State of Capital Market and Access to it**

The corporate management may be tempted to follow a liberal policy if the fund position in the capital market of the country is comfortable and the firm can take recourse to it due to its good earnings position.

If the capital market funds position is comfortable but the firm has no access to it due to high cost of capital it would compel the company to rely on retained earnings and follow a conservative dividend policy.

**7. Contractual Restrictions**

Sometimes a firm's ability to pay cash dividends is restricted by certain specific conditions in loan agreements.

When the finances are raised from external sources, creditors may impose various restrictions to immunize themselves for possible insolvency of the firm.

While formulating the dividends policy, the financial manager must keep in mind various contractual requirements. The creditors may withdraw their money from the firm if these requirements are violated.

**8. Profit Rate and Stability of Earnings**

A firm with a large rate of return on its investment will have larger profits. It can pay more dividends to its shareholders as compared to a firm with lesser return.

Again, if the earnings are relatively stable and do not fluctuate from time to time, a firm can predict its future earnings and pay a higher rate of dividend than a firm with fluctuating earnings. An unstable firm cannot determine what will be its actual future earnings.

Therefore, to meet adverse future conditions, it is likely to plough back more profits.

**9. Inflation**

It increases the replacement cost of assets which are being depreciated every year at the book value. Funds generated from providing depreciation may be insufficient to meet the rising cost of assets which might become obsolete and have to be replaced in future.

Therefore the management should reduce the rate of dividend during a period of inflation to maintain the earning power of the firm.

**Q11. Explain various forms of dividend.**

*Ans :*

**1. Cash Dividend**

Generally, many companies pay dividends in the form of cash. But payment of dividend in the form of cash requires enough cash in its bank or in hand. In other words, there should not be any shortage of cash for payment of dividends.

**2. Scrip Dividend**

In this form of dividends, the equity shareholders are issued transferable promissory notes for a shorter maturity period that may or may not be interest bearings.

**3. Bond Dividend**

Both scrip dividend and bond dividend are same, but they differ in terms of maturity. Bond dividends carries longer maturity whereas scrip dividend carries shorter maturity. Effect of both forms of dividends on the company is the same. Bond dividend bears interest.

**4. Property Dividend**

The name itself suggests that payment of dividend takes place in the form of property. This form of dividends takes place only when a firm has assets that are no longer necessary in the operation of business and shareholders are ready to accept dividend in the form of assets. This form of dividend payment is not popular in India.

**5. Stock Dividend (Bonus Shares)**

Stock dividend is the payment of additional shares of common stocks to the ordinary shareholders.

## 4.7 LINTER'S DIVIDEND MODEL, ITS SALIENT FEATURES

**Q12. Explain briefly about Linter's Dividend Model.**

**(OR)**

**Discuss the salient features of Linter's Dividend Model.**

*Ans :* **(Imp.)**

**Meaning**

Lintner's Model was proposed by professor John Lintner from Harvard Business school after he interviewed 28 large firms. His study proposed an organisation's current dividend on its current annual earnings and previous year's dividends. In his proposal,

Lintner assumes that every organisation has set dividend policies, and he also assumes that the organisation wants to maintain a constant dividend rate. Lintner observed that most organisations set target dividends to earnings ratios using the present net value, and the earnings increases are not sustainable; thus, changes in the dividend will occur when there is a sustainable increase in the earnings

The dividend is defined as dividing annual organisational earnings among the shareholders. The common dividends distributed include cash, stock and

property. In a cooperative organisation, a dividend policy is highly sensitive and complicated. Lintner's Dividend Model was developed to explain the behaviour of dividend policy.

The model addresses two main determinants of dividend payout: recent earnings and previous dividends. According to the model, if an organisation follows its target payout ratio, the dividend will change whenever the earnings changes. The dividend payout is the current net income after tax and the lagged dividend (last year's dividend).

Lintner's Dividend Model uses the following formula –

$$D_t = a + b_1P_t + b_2D_{t-1} + u_t$$

Where

$D_t$ represents the total equity dividend. t represents time.

$D_{t-1}$ is the sum of the equity dividend in a span of t–1.

$P_t$ is the current net earnings after tax.

This represents an organisational capability to pay the dividend to the stakeholders.

$U_t$ is the error term.

**Features**

(i) Lintner's Model assumes that the capital market is perfect in that all investors are rational, information is freely available, and securities are infinitely divisible. According to the model, every investor can influence the market prices of securities, and there is no floatation cost. The tax rates applicable to capital gains and dividends are not different.

(ii) The assumptions of Lintner's Model are unrealistic and unattainable in reality. The approach used in the calculation of the dividend payout is questionable on account of the capital market's imperfections and the resolution of uncertainty.

## 4.8 DIVIDEND PUZZLE

**Q13. Explain the concept of Dividend Puzzle.**

*Ans :*

The dividend puzzle is a concept in finance in which companies that pay dividends are rewarded by investors with higher valuations, even though, according to many economists, it should not matter to investors whether a firm pays dividends or not.

The reasoning goes that dividends, from the investor's point of view, should have no effect on the process of valuing equity because the investor already owns the firm and, thus, he/she should be indifferent to either getting the dividends or having them re-invested in the firm.

Another reason for economists to be puzzled is that equity holders pay a higher tax rate on dividend payouts compared to capital gains from the firm repurchasing shares as an alternative payout policy.

The puzzle evolved from the Modigliani–Miller theorems of 1959 and 1961.

The reasons for the dividend puzzle have been attributed to a wide range of factors, including uncertainties, psychological/behavioral economics issues, tax-related matters, and asymmetric information.

**Q14. Explain briefly about Modigliani-Miller approach.**

**(OR)**

**What are the assumptions and arguments used by Modigliani and Miller in support of the irrelevance of dividends? Are dividends really irrelevant ? Discuss.**

*Ans :* **(Imp.)**

**Meaning**

This theory states that dividend decision will not have any impact either on shareholder's wealth or share prices, as it is not related to valuation of the firm.

According to this theory, investors don't separate their dividends and capital gains. The main aim of investors is to yield more and more return in their investment.

In case, the company has profitable investment opportunities, it will retain the earnings to finance them, otherwise distribute them.

**The Modigilani - Miller Approach**

The Modigliani-Miller theorem forms the basis for modern thinking on capital structure. The basic theorem states that, in the absence of taxes, bankruptcy costs, and asymmetric information, and in an efficient market,

the value of a firm is unaffected by how that firm is financed. It does not matter if the firm's capital is raised by issuing stock or selling debt. It does not matter what the firm's dividend policy is. Therefore, the Modigliani-Miller theorem is also often called the capital structure irrelevance principle.

They opine "under conditions of perfect capital markets, rational investors, absence of tax discrimination between dividend income and capital appreciation, given the firm's investment policy its dividend policy may have no influence on the market price of the shares."

They argued that whatever increase in shareholders wealth results form dividend payment, will be exactly offset by the effect of raising additional capital. For instance if a company having investment opportunities can distribute all its earnings among the shareholders. Then it will raise the capital required from outside.

This will result in increasing the number of shares, resulting in fall in the future earning per share. So, whatever a shareholder has gained a result of increased dividends may be neutralized completely on account of fall in the value of shares due to decline in the expected earnings per share.

**Assumptions**

M.M. hypothesis is based on the following assumptions :

1. Capital markets are perfect. The conditions are
   (a) Investors behave rationally,
   (b) Information is freely available to them
   (c) There are no floatation and transaction costs.
2. There are either no taxes or there are no differences in the tax rates applicable to capital gains and dividends.
3. The firm has a fixed investment policy.
4. Risk or uncertainty does exist. Investors are able to forecast future prices and dividends with certainty.

**Determination of market price of the share:**

According to M.M. hypothesis, the market value of a share in the beginning of the period is equal to the present value of dividends paid at the end of the period plus the market price of the share at the end of the period. It is shown in the following equation :

$$P_0 = \frac{D_1 + P_1}{(1 + k_e)}$$

Where,

$P_0$ = Present market price of a share

$k_e$ = cost of equity capital

$D_1$ = Dividend to be received at the end of period one

$P_1$ = Market price of a share at the end of period one

**Computation of number of new shares to be issued**

According to M.M. hypothesis, the investment plan of a company can be financed either by retained earnings or by issue of new shares or both. The number of new shares to be issued can be determined by the following formula :

$$m \times P_1 = I_1 - (X - nD_1)$$

Where,

m = number of new shares to be issued

$P_1$ = price at which new issue is to be made

$I_1$ = amount of investment required

X = net profit during the period

$nD_1$ = Total dividends paid during the period

**Criticisms**

1. M.M. hypothesis assumes that taxes do not exist, it is far from reality,. In practical life not only the shareholders has to pay tax but there are different rates of tax for capital gains and dividends. Capital gains are subject to a lower rate of tax as compared to dividends.
2. Floatation costs: A firm has always to pay floatation costs in term of under writing fee and brokers commission whenever it wants to raise funds from outside. As a result of external financing is costlier than internal financing.
3. Shareholders prefer current income than future income. M.M states that both are equal.
4. Dividends have informational content, it is not considered by M.M.

## 4.9 Buy Back of Shares and its Characteristics

**Q15. Define Buy Back of Shares. Explain the characteristics of Buy Back of Shares.**

*Ans :* **(Imp.)**

**Meaning**

Share or stock buyback is the practice where companies decide to purchase their own share from their existing shareholders either through a tender offer or through an open market. In such a situation, the price of concerning shares is higher than the prevailing market price.

When companies decide to opt for the open market mechanism to repurchase shares, they can do so through the secondary market. On the other hand, those who choose the tender offer can avail the same by submitting or tendering a portion of their shares within a given period. Alternatively, it can be looked at as a means to reward existing shareholders other than offering timely dividends.

However, company owners may have several reasons for repurchasing their stocks. Individuals should make a point to find out the underlying causes to make the most of such decisions and also to benefit from them accordingly.

**Characteristics**

1. Companies issue shares to raise equity capital and expand their venture, but often such a practice does not prove to be of much use. Similarly, keeping excess money at the bank is more like a truncated cash flow offering liquidity over the ideal requirement.

   Hence, instead of piling on cash reserves, companies with robust financial standing tend to make the best possible use of the cash available through a stock buyback.

2. It often when the number of shareholders of a company exceeds the manageable limit, it becomes challenging for the entity to reach a decision unanimously. Additionally, it may result in a power struggle within the company and among the shareholders with voting rights.

   To avoid or aggravate such situations, company board members often resort to share buybacks and plan to consolidate their hold over the company by increasing their voting rights.

3. When a company decides to buy back its shares, it may also indicate that the company considers its shares to be undervalued. Besides serving as a remedy for the situation, it also helps to project a positive picture of the company's prospects and its current valuation.

   Other than these, stock buybacks may be prompted to improve companies' overall valuation or to reward their existing shareholders.

### 4.9.1 Modes and Methods of Buy Back of Shares

**Q16. Explain the various methods of Buy Back of Shares.**

*Ans :*

The following are the main methods of buyback of shares and other specified securities:

**1. Tender Method**

Under this method the company fixes a price at which it wishes to buy-back a specified number of shares from its shareholders.

If the number of shares offered for buy-back at the stated price is more than the number of shares to be bought-back, then the shares are bought-back from each shareholder proportionately.

**2. Open Market Purchases**

Under this method, buy-back is done in the following two ways:

**(a) Open Market through Stock Exchange**

Under this method the company buys-back shares through the stock exchange at the prevailing market price till it purchases the pre-determined number of shares it had originally decided to buy-back and the market price does not exceed the pre-determined maximum price for buy-back.

SEBI guidelines provide that in case of buyback of shares through the stock market route, the purchases shall not be made from the promoters or persons in control of the company and the buyback of shares shall be made only on stock exchange with electronic trading facility.

**(b) Open Market through Book-building process**

In this method, a company makes an offer to buy-back a specified number of shares to the shareholders at a specified price range, say ` 40 to ` 45 per share. The shareholders are invited to make a bid quoting a price within the price range and the number of shares offered for buy-back.

After receiving the bids the company selects the offered price from the lowest price onwards at which the cumulative number of shares offered equals or exceeds the maximum number of shares the company proposes to buy-back.

The company fixes the buy-back price within the range of minimum offer price and the "highest price accepted" which shall be paid to all the shareholders whose shares are accepted for buy-back.

SEBI guidelines do not permit the buy-back through negotiated deals, spot transactions and private placement.

### 4.9.2 Reasons, Benefits and Constraints to Buy Back of Shares

**Q17. Explain the Benefits and Constraints to Buy Back of Shares.**

*Ans :*

**Benefits**

The following are the benefits of buyback of shares:

(i) To increase promoters holding as the shares which are bought back are cancelled.

(ii) To increase earnings per share if there is no dilution in company's earnings as the buyback of shares reduces the outstanding number of shares.

(iii) To support the share price on the stock exchanges when the share price, in the opinion of the company management, is less than its worth, especially in the depressed market.

(iv) To discourage others to make hostile bid to take over the company as the buy back will increase the promoters holding.

(v) To pay surplus cash to the shareholders when the company does not need it for the business.

(vi) To reward the shareholders by buyback of shares at substantially higher price than market price.

**Constraints**

The following are the constraints of buyback of shares:

(i) It may be used as a tool for insider trading.

(ii) It increases promoters holding and thus decreases the public shareholding in case of listed companies, especially when the public shareholding is less.

### 4.9.3 Impacts of Share Buybacks

**Q18. Explain the Impacts of Share Buybacks.**

*Ans :*

The following pointers highlight what are buybacks impacts that are faced by a company's different financial aspects.

**(i) Effect on Earnings Per Share (EPS)**

Repurchasing a company's shares lays a direct impact on its EPS by increasing the ratio significantly. It mainly happens because the net income tends to remain the same, while the total number of outstanding shares reduces post repurchasing.

**(ii) Effect on Financial Statement**

The money spent to repurchase company stocks would be recorded in the business's earnings report and can also be found in the statement of cash flow under the head 'financial activities as well as the statement of retained earnings.

Besides influencing the income statement of a company, the impact of share buybacks can be noticed in other financial statements as well.

For instance, in the Balance Sheet, the record of a company's cash holding would reduce and in turn, would lower its total assets.

Simultaneously, the amount of share-holder's equity would also undergo a reduction. Notably, such a reduction would help improve performance metrics like Return on Equity (ROE) and Return on Asset (ROA).

**(iii) Effect on the Company's Portfolio**

Usually, companies who have faith in their prospects indulge in the practice of repurchasing their company shares. Such a display of confidence is received positively by potential investors and existing shareholders and helps earn their trust significantly.

In turn, it helps the company to enhance its market reputation and facilitates an increase in its share value naturally. All of this directly helps improve the venture's portfolio significantly.

**(iv) Effect on Increasing Shareholder Value**

Business owners who opt for share repurchase are more likely to enhance their EPS significantly, and that too much faster than operational improvements.

Investors scouting for profitable investment options tend to acknowledge companies with steady EPS as a better income-generating avenue with enhanced growth potential.

### 4.9.4 SEBI Regulations

**Q19. Explain the SEBI Regulations of Buy Back of Shares.**

*Ans :*

**1. Authorization by Articles of Association**

Companies Act, 2013 provides that the buyback of securities must be authorized by the AOA of the company. If no such provision exists in AOA, AOA must be altered to authorize the buyback of securities.

**2. Approval of Buyback**

The Buyback of securities must be approved by the Board of Directors if the buyback is up to 10% of the Paid up capital and free reserve. Approval must be obtained from the shareholders of the company if the buyback is up to 25% of the Paid up Capital and free reserves.

**3. Maximum Limit**

The maximum limit for the buyback of securities shall be between twenty-five percent or less of the aggregate of paid-up capital and free reserves of the company.

**4. Declaration of Solvency**

When a company proposes to buy back its own shares, it shall before the buyback, file with Registrar and SEBI a declaration of solvency signed by at least two directors of the company

**5. Debt-Equity Ratio**

The debt-equity ratio after the buyback must be 2:1 (Debt/ (Equity Capital + Preference Capital + Reserves).

6. Only fully paid-up shares can be bought back by the companies.

7. The buy-back must be completed within 12 months of passing the Resolution.

8. According to the Companies Act, 2013 the shares bought back must be extinguished/destroyed within 7 days of completion of buy-back.

9. If the Buyback is being done out of Free Reserves of the company, then an amount equal to the Nominal Value of the shares bought back must be to be transferred to the Capital Redemption Reserve Account (CRR account). [vi]

## 4.10 FINANCIAL DISTRESS AND RESTRUCTURING

### 4.10.1 Characteristics

**Q20. Define Financial Distress. Explain the Characteristics of Financial Distress.**

*Ans :* **(Imp.)**

**Meaning**

Financial distress is a condition in which a company or individual cannot generate sufficient revenues or income, making it unable to meet or pay its financial obligations.

This is generally due to high fixed costs, a large degree of illiquid assets, or revenues sensitive to economic downturns. For individuals, financial distress can arise from poor budgeting, overspending, too high of a debt load, lawsuit, or loss of employment.

**Characteristics**

**1. Diminished or Stagnant Earnings**

A long period of declining sales or lack of sales growth may indicate financial difficulties. It is often due to increased competition, changing market conditions, or ineffective business strategies.

**2. Increased Expenses**

Financial problems can arise when expenses consistently outpace sales growth. Examples include rising costs such as labor costs, raw material costs, rent, utility bills, and interest payments on debt.

**3. Heavy Debt**

Excessive borrowing and debt can strain your finances, especially if you pay high interest rates or face difficulty meeting your debts. Unsustainable levels of debt contribute to long-term financial distress. 4. Insufficient cash flow:

Inadequate cash flow affects a company's spending, debt and ability to maintain liquidity. Persistent liquidity bottlenecks indicate a financial crisis.

**5. Lower Profitability**

Declining profit margins or recurring losses, such as persistent declines in profitability, indicate a deterioration in financial conditions. These conditions indicate that the company's operations are not generating enough revenue to support themselves.

**6. Difficult Access to Finance**

Difficulties in obtaining external funding, such as bank loans or investment funds, indicate financial difficulties. This difficulty is due to declining confidence from lenders and investors.

**7. Negative Market Sentiment**

Poor market perception, reflected in falling stock prices, downgraded credit ratings and lack of investor confidence, exacerbates financial hardships. Negative sentiment limits access to capital, raises borrowing costs and hinders growth opportunities.

**8. Legal and Regulatory Issues**

Legal or regulatory issues, such as lawsuits, fines, and compliance issues, can create financial hardships. Resolving these issues can be costly and can lead to reputational damage.

**9. Industry-specific Factors**

In certain industries, unique factors can cause financial difficulties. Exemplifications of this include changing consumer preferences, technological advances and nonsupervisory changes that have a significant impact on sectors similar as retail, energy and telecommunications.

**10. Lack of Strategic Adaptability**

Failure to adapt to market trends, consumer demands and technological advances leads to financial hardship. Rigid business models and outdated strategies hamper competitiveness and long-term growth.

### 4.10.2 Causes of Financial Distress

**Q21. Explain the causes of Financial Distress.**

*Ans :* **(Imp.)**

**1. Lost or Reduced Income**

Anyone can suffer a sudden drop in income at any time. You may be unexpectedly fired or laid off from a job, or the company that you work for may go out of business, leaving you suddenly unemployed.

A severe economic crisis or other circumstance may compel you to take a substantial pay cut to remain employed. Whatever the cause, if you don't have savings to dip into, you may quickly find yourself struggling just to pay your most basic expenses, such as housing, utilities, and food.

**2. Unexpected Expenses**

Large unexpected expenses, such as high medical bills or an expensive car repair, are another common cause of financial difficulties.

**3. Divorce**

Divorce is one of the most frequent and severe causes of financial distress. In fact, divorce is such a financial strain often on both parties that, according to studies, the rate of bankruptcy filings for single mothers in the United States is 300% higher than the national average.

**4. Failure to Adequately Manage your Finances**

Even people with high incomes can end up in financial distress if they fail to manage their money well. Expenses can creep upward, such as credit card bills, and suddenly a person finds themselves struggling financially. It's important to always budget your money carefully.

### 4.10.3 Costs of Financial Distress

**Q22. Explain the Costs of Financial Distress.**

*Ans :*

**1. Legal and Administrative Costs**

Companies in financial distress often need to incur significant legal fees to navigate complex bankruptcy proceedings, restructurings, and negotiations with creditors. Administrative costs associated with managing the insolvency process can also be substantial.

**2. Loss of Reputation**

Financial distress can damage a company's reputation with customers, suppliers, and investors. This loss of trust and credibility can have long-lasting implications for the company's ability to attract new business and secure funding in the future.

**3. Employee Morale and Retention**

Uncertainty about the future of a company in financial distress can lead to low employee morale and high turnover rates. The costs associated with recruiting and training new employees can add to the financial burden of the company.

**4. Loss of Value**

Companies in financial distress often experience a decline in the value of their assets, such as inventory, real estate, and intellectual property. This can result in significant losses for shareholders and creditors.

**5. Reduced Access to Capital**

Financially distressed companies may find it difficult to secure additional financing or lines of credit, as lenders are likely to view them as high-risk borrowers. This can limit the company's ability to invest in growth opportunities and weather future financial challenges.

**6. Customer and Supplier Relationships**

Financial distress can strain relationships with customers and suppliers, leading to delayed payments, canceled contracts, and reduced orders. This can have a ripple effect on the company's cash flow and ability to maintain operations.

**7. Decreased Market Share**

A company in financial distress may struggle to compete effectively in its industry, leading to a loss of market share to more financially stable competitors. This can further erode the company's revenue and profitability.

### 4.10.4 Impacts of Financial Distress

**Q23. Explain the Impacts of Financial Distress.**

*Ans :*

**1. Diminished or Stagnant Earnings**

A long period of declining sales or lack of sales growth may indicate financial difficulties. It is often due to increased competition, changing market conditions, or ineffective business strategies.

**2. Increased Expenses**

Financial problems can arise when expenses consistently outpace sales growth. Examples include rising costs such as labor costs, raw material costs, rent, utility bills, and interest payments on debt.

**3. Heavy Debt**

Excessive borrowing and debt can strain your finances, especially if you pay high interest rates or face difficulty meeting your debts. Unsustainable levels of debt contribute to long-term financial distress.

**4. Insufficient Cash flow**

Inadequate cash flow affects a company's spending, debt and ability to maintain liquidity. Persistent liquidity bottlenecks indicate a financial crisis.

**5. Lower Profitability**

Declining profit margins or recurring losses, such as persistent declines in profitability, indicate a deterioration in financial conditions. These conditions indicate that the company's operations are not generating enough revenue to support themselves.

**6. Difficult Access to Finance**

Difficulties in obtaining external funding, such as bank loans or investment funds, indicate financial difficulties. This difficulty is due to declining confidence from lenders and investors.

**7. Negative Market Sentiment**

Poor market perception, reflected in falling stock prices, downgraded credit ratings and lack of investor confidence, exacerbates financial hardships. Negative sentiment limits access to capital, raises borrowing costs and hinders growth opportunities.

**8. Legal and Regulatory Issues**

Legal or regulatory issues, such as lawsuits, fines, and compliance issues, can create financial hardships. Resolving these issues can be costly and can lead to reputational damage. 9. Industry-specific factors:

In certain industries, unique factors can cause financial difficulties. Exemplifications of this include changing consumer preferences, technological advances and nonsupervisory changes that have a significant impact on sectors similar as retail, energy and telecommunications.

**9. Lack of Strategic Adaptability**

Failure to adapt to market trends, consumer demands and technological advances leads to financial hardship. Rigid business models and outdated strategies hamper competitiveness and long-term growth.

### 4.10.5 Financial Distress Restructuring

**Q24. Define Financial Distress Restructuring. Explain the benefits and causes of Financial Distress Restructuring.**

*Ans :*

**Meaning**

A condition where a company or individual struggles to meet their financial obligations due to insufficient cash flow or income. This can lead to difficulty paying bills, repaying loans, or maintaining operations.

**Benefits**

1. **Avoids bankruptcy:** Restructuring can help companies stay afloat and avoid a forced liquidation of assets.
2. **Improves financial health:** By reducing debt and increasing cash flow, restructuring strengthens the company's financial position.
3. **Enhances competitiveness:** By streamlining operations and cutting unnecessary costs, restructuring can improve efficiency and profitability.

**Causes of Financial Distress Leading to Restructuring:**

1. **Poor Management:** Ineffective leadership, strategic mistakes, or operational inefficiencies can significantly impact financial performance.
2. **Economic Downturn:** A weak economy can lead to decreased demand for products or services, impacting revenue and profitability..
3. **Industry Disruption:** Technological advancements or changes in consumer preferences can render a company's products or services obsolete, leading to financial stress.
4. **Excessive Debt:** Taking on too much debt can become burdensome, especially with rising interest rates, limiting a company's ability to meet its financial obligations.

## 4.11 The Insolvency and Bankruptcy Code 2016

**Q25. What is Insolvency and Bankruptcy Code? State the objectives of IBC.**

*Ans :* **(Imp.)**

**Meaning**

The legal status of an entity or a person where the debt owed to the creditors cannot be repaid is known as Bankruptcy. A court order imposes bankruptcy in most of the jurisdictions. It is mostly initiated by the debtor. It is important to note that bankruptcy is not synonymous with insolvency.

It is not the only legal status that could be applicable to an insolvent individual or an entity. In countries like the UK, bankruptcy is exclusive to individuals. Liquidation, administration and other such insolvency proceedings are applicable to entities and companies.

The Insolvency and Bankruptcy Code, 2016 (IBC) is the bankruptcy law of India which seeks to consolidate the existing framework by creating a single law for insolvency and bankruptcy.

**Objectives**

(i) To consolidate and amend all existing insolvency laws in India.

(ii) To simplify and expedite the Insolvency and Bankruptcy Proceedings in India.

(iii) To protect the interest of creditors including stakeholders in a company.

(iv) To revive the company in a time-bound manner.

(v) To promote entrepreneurship.

(vi) To get the necessary relief to the creditors and consequently increase the credit supply in the economy.

(vii) To work out a new and timely recovery procedure to be adopted by the banks, financial institutions or individuals.

(viii) To set up an Insolvency and Bankruptcy Board of India.

(ix) Maximization of the value of assets of corporate persons.

**Q26. Explain them provisions of IBC 2016.**

*Ans :*

The IBC, 2016 is the bankruptcy law of India that consolidates and amends the existing laws relating to insolvency and bankruptcy of corporate persons, partnership firms, and individuals.

(i) Insolvency is a state where the liabilities of an individual or an organization exceeds its asset and that entity is unable to raise enough cash to meet its obligations or debts as they become due for payment.

(ii) Bankruptcy is when a person or company is legally declared incapable of paying their due and payable bills.

- The IBC aims to provide a time-bound and creditor-driven process for insolvency resolution and to improve the credit culture and business environment in the country.
- IBC resolves claims involving insolvent companies. This was intended to tackle the bad loan problems that were affecting the banking system.

**Regulating Authority**

(i) The Insolvency and Bankruptcy Board of India (IBBI) was established under the Insolvency and Bankruptcy Code, 2016.

(ii) It is a statutory body, responsible for making and implementing rules and regulations for insolvency and bankruptcy resolution of corporate persons, partnership firms, and individuals in India.

(iii) The IBBI has 10 members, representing the Ministry of Finance, the Ministry of Corporate Affairs, and the Reserve Bank of India.

**Adjudicating Authority**

(i) National Company Law Tribunal (NCLT) has jurisdiction over companies, other limited liability entities.

(ii) Debt Recovery Tribunal (DRT) has jurisdiction over individuals and partnership firms other than Limited Liability Partnerships.

**Amendments in the IBC**

(i) The IBC has undergone significant amendments in the past 12 months to address emerging challenges and enhance its effectiveness.

- These amendments include the approval for the sale of assets or resolution plans on a segregated basis, an increase in the number of NCLT benches to 16, and extended timelines for filing claims.
- Sector-specific amendments, provisions for the audit of corporate debtors, and modifications in Form G2 have been introduced to address unique challenges.

**Achievements**

(i) Since its inception in 2016, IBC has resolved Rs. 3.16 lakh crore of debt stuck in 808 cases in seven years, according to CRISIL.

(ii) It has resolved a significant amount of stressed assets with better recovery rates compared to previous mechanisms like the Debt Recovery Tribunal, the Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest Act, 2002 and Lok Adalat.

(iii) IBC has achieved higher recovery rates, with creditors realizing 32% of admitted claims on average and 169% of the liquidation value.

- In contrast, other mechanisms had recovery rates ranging from 5-20%.

(iv) IBC's deterrent effect is evident as borrowers, fearing the loss of companies, have proactively settled over Rs. 9 lakh crore in debt before cases entered the insolvency process.

- This highlights a significant behavioral change among borrowers, showcasing the efficacy of the Insolvency and Bankruptcy Code in encouraging timely settlements.

**Q27. Describe the various issues of IBC 2016.**

*Ans :*

**(i) Missing the Deadline**

IBC mandates that an insolvent asset must be resolved in 270 days. Out of the 12 big accounts initially referred to IBC, five cases are pending for more than 600 days due to continuous litigation by some party or the other. Among the most prominent examples of this chequered journey for the IBC is the Essar Steel insolvency. It has been more than 600 days since the Rs 50,000-crore account entered the IBC.

**(ii) Lack of Benches and Judges**

India has 14 NCLTs, and two are yet to start functioning. The government had a couple of years back announced to set up 24 bankruptcy courts.

The NCLT judge roster shows 27 members have been sharing the workload against the target of appointing 60 judicial and technical members. Delhi and Kolkata are sharing the workloads of Jaipur, Chandigarh, Guwahati and Cuttack benches.

Recently the government highlighted that it has been taking steps to increase the capacity of National Company Law Tribunal (NCLT) and increased its benches from 10 to 15. Also, 26 new members have been added taking the total strength to 52.

**(iii) Haircuts**

It is the extent of write off that banks undertake as part of a resolution plan to get the company back on track. So far financial creditors have got 43 per cent of their claims and 188 per cent of the liquidation value. Steps should be taken so that haircuts are reduced.

- All these factors are raising concerns that IBC will meet the same fate as DRT and SARFAESI and banks will eventually lose confidence in IBC
- The recent Supreme Court order setting aside RBI's decision to send all power companies to the NCLT has also set a wrong precedent.

## 4.12 Corporate Insolvency Resolution Process

**Q28. Explain the process of Corporate Insolvency Resolution.**

*Ans :* **(Imp.)**

1. A financial creditor (himself or jointly with other financial creditors), an operational creditor or the corporate debtor (through Corporate applicant i.e. corporate debtor itself; or an authorised member, partner of corporate debtor; or a person who has control and supervision over the financial affairs of the corporate debtor) may initiate corporate insolvency resolution process in case a default is committed by corporate debtor.
2. An application can be made before the National Company Law Tribunal (NCLT) for initiating the resolution process. Operational creditor needs to give demand notice of 10 days to corporate debtor before approaching the NCLT.
3. Corporate insolvency process shall be completed within 180 days of admission of application by NCLT. Upon admission of application by NCLT, Creditors' claims will be frozen for 180 days, during which time NCLT will hear proposals for revival and decide on the future course of action.

   And thereupon, no coercive proceedings can be launched against the corporate debtor in any other forum or under any other law, until approval of resolution plan or until initiation of liquidation process.
4. NCLT appoints an interim Insolvency Professional (IP) upon confirmation by the Insolvency and Bankruptcy Board (hereinafter, "the Board") within 14 days of acceptance of application.

   Interim IP holds office for 30 days only. Interim IP takes control of the debtor's assets and company's operations, collect financial information of the debtor from information utilities.

5. NCLT causes public announcement to be made of the initiation of corporate insolvency process and calls for submission of claims by any other creditors.

6. After receiving claims pursuant to public announcement, interim IP constitutes the creditors' committee. All financial creditors shall be part of creditors' committee and if any financial creditor is related party of corporate debtor, then such financial creditor will not have any right of representation, participation or voting.

   Operational creditors should be part of Creditors' Committee (without voting right) if their aggregate dues are not less than 10% of the debt.

7. Creditors' committee shall meet first within seven days of its constitution and decide by 75% of votes either to replace or confirm interim IP as Resolution Professional.

   Thereupon, Resolution Professional is appointed by the NCLT upon confirmation by the Board. The creditors' committee, with a majority of 75% votes, can change Resolution Professional any time.

8. The creditors' committee has to then take decisions regarding insolvency resolution by a 75% majority voting.

9. If three-fourths of the financial creditors consider the case complex and require extension of time beyond 180 days, the NCLT can grant a one-time extension of up to 90 days.

10. Resolution Professional to conduct entire corporate insolvency resolution process and manage the corporate debtor during the period.

11. Resolution Professional shall prepare information memorandum for the purpose of enabling resolution applicant to prepare resolution plan.

    A resolution applicant means any person who submits resolution plan to the resolution professional. And upon receipt of resolution plans, Resolution Professional shall place it before the creditors' committee for its approval.

12. Once a resolution is passed, the creditors' committee has to decide on the restructuring process that could either be a revised repayment plan for the company, or liquidation of the assets of the company.

    If no decision is made during the resolution process, the debtor's assets will be liquidated to repay the debt.

13. The resolution plan will be sent to NCLT for final approval, and implemented once approved.

## 4.13 LIQUIDATION PROCESS

**Q29. Define Liquidation. Explain the process of Liquidation.**

*Ans :*

**Meaning**

Liquidation is the shutdown of a business or business segment. The business sells off assets to pay off creditors and other liabilities. After settling all the claims, the residual funds get distributed among the owners, shareholders, and investors.

**Process**

1. The directors decide to voluntarily liquidate a business due to inadequate cash flow. Dissolution becomes the only option for paying off the creditors. Alternatively, the court can order the compulsory dissolution of a business.

2. The company or the court appoints an insolvency professional (IP) as the official liquidator to take charge of the process.

3. At this stage, the owners lose their powers and rights, the liquidator takes over.

4. The insolvency professional dissolves the assets after assessing.

5. Next, the liquidator determines all the payables and debts of the company.

6. Finally, the authorized liquidator distributes the funds among claiming parties based on the standard order of priority order.

7. The company ceases to exist and is taken off the registrar of companies (ROC).

# Short Question and Answers

**1. What is Capital Structure?**

*Ans :*

The most crucial component of starting a business is capital. It acts as the foundation of the company. Debt and Equity are the two primary types of capital sources for a business.

Capital structure is defined as the combination of equity and debt that is put into use by a company in order to finance the overall operations of the company and for its growth.

**2. What is EBIT EPS Analysis**

*Ans :*

Earnings per share (EPS) to the changes in earnings before interest and tax (EBIT) under differeSoEfmancial plans/ capital structures. It is known as EBIT - EPS analysis. Use of fixed cost sources of finance in capital structure of a firm is known as financial leverages or trading on equity.

The benefits are more when a firm uses debt as a source of finance, due to cheap and the interest is tax deductible source.

**3. What is Financial Flexibility?**

*Ans :*

Financial flexibility is refers to as the ability of an organization to access and restructure it's financing needs at a low cost. It can also referred to as the ability of an organization in managing it's unanticipated financial needs effectively. It is the ability to adapt to the Changing environment due to unforeseen events.

**4. Define financial discipline.**

*Ans :*

Financial discipline is a consistent practice of spending, saving, and investing wisely to ensure effective management of financial resources and accumulate wealth in the long run. It centers on adhering to a budget, preventing debt, and achieving financial stability.

**5. Define Dividend.**

*Ans :*

**According to the Institute of Chartered Accountants of India,** dividend is "a distribution to shareholder out of profits or reserves available for this purpose".

**6. State the forms of dividend.**

*Ans :*

**(i) Cash Dividend**

Generally, many companies pay dividends in the form of cash. But payment of dividend in the form of cash requires enough cash in its bank or in hand. In other words, there should not be any shortage of cash for payment of dividends.

**(ii) Scrip Dividend**

In this form of dividends, the equity shareholders are issued transferable promissory notes for a shorter maturity period that may or may not be interest bearings.

**(iii) Bond Dividend**

Both scrip dividend and bond dividend are same, but they differ in terms of maturity. Bond dividends carries longer maturity whereas scrip dividend carries shorter maturity. Effect of both forms of dividends on the company is the same. Bond dividend bears interest.

**(iv) Property Dividend**

The name itself suggests that payment of dividend takes place in the form of property. This form of dividends takes place only when a firm has assets that are no longer necessary in the operation of business and shareholders are ready to accept dividend in the form of assets. This form of dividend payment is not popular in India.

**(v) Stock Dividend (Bonus Shares)**

Stock dividend is the payment of additional shares of common stocks to the ordinary shareholders.

**7. Define Linter's Dividend Model.**

*Ans :*

Lintner's Model was proposed by professor John Lintner from Harvard Business school after he interviewed 28 large firms. His study proposed an organisation's current dividend on its current annual earnings and previous year's dividends. In his proposal,

Lintner assumes that every organisation has set dividend policies, and he also assumes that the organisation wants to maintain a constant dividend rate. Lintner observed that most organisations set target dividends to earnings ratios using the present net value, and the earnings increases are not sustainable; thus, changes in the dividend will occur when there is a sustainable increase in the earnings

**8. Define Dividend Puzzle**

*Ans :*

The dividend puzzle is a concept in finance in which companies that pay dividends are rewarded by investors with higher valuations, even though, according to many economists, it should not matter to investors whether a firm pays dividends or not.

The reasoning goes that dividends, from the investor's point of view, should have no effect on the process of valuing equity because the investor already owns the firm and, thus, he/she should be indifferent to either getting the dividends or having them re-invested in the firm.

**9. Define Buy Back of Shares.**

*Ans :*

Share or stock buyback is the practice where companies decide to purchase their own share from their existing shareholders either through a tender offer or through an open market. In such a situation, the price of concerning shares is higher than the prevailing market price.

When companies decide to opt for the open market mechanism to repurchase shares, they can do so through the secondary market. On the other hand, those who choose the tender offer can avail the same by submitting or tendering a portion of their shares within a given period. Alternatively, it can be looked at as a means to reward existing shareholders other than offering timely dividends.

**10. Define Financial Distress.**

*Ans :*

Financial distress is a condition in which a company or individual cannot generate sufficient revenues or income, making it unable to meet or pay its financial obligations.

This is generally due to high fixed costs, a large degree of illiquid assets, or revenues sensitive to economic downturns. For individuals, financial distress can arise from poor budgeting, overspending, too high of a debt load, lawsuit, or loss of employment.

# Choose the Correct Answers

1. What is Capital Structure? [ c ]
   (a) A balance between the assets and liabilities of the firm
   (b) A balance between the revenue and expenditure of the firm
   (c) A distribution of equity and debt that structures the finances of the company.
   (d) All of the above

2. What are the components of capital structure? [ b ]
   (a) Debts and Equity (b) Debts, Preferred stock and Equity
   (c) Debts, revenue and equity (d) All of the above

3. The official term for 'setting rates' is [ c ]
   (a) Price determination (b) Selling Price
   (c) Utility Ratemaking (d) None of the above

4. Which of these is a theory of capital structure? [ d ]
   (a) Net Income (b) Modigliani-Miller Theorem
   (c) Net Operating Income (d) All of the Above

5. The Modigliani-Miller theorem is disregarded by economists because [ b ]
   (a) It is outdated (b) It is unrealistic and euphoric
   (c) It has been conclusively proven wrong (d) All of the above

6. Financial Leverage means [ a ]
   (a) Increase in total earnings per share in the company
   (b) Maximising equity
   (c) Minimising debts
   (d) The balance between equity and debt

7. How can Optimal capital structure be maintained? [ b ]
   (a) Increase in the credit rating of the firm (b) A good record of revenue
   (c) A stable dividend policy (d) All of the above

8. What is financial seniority? [ b ]
   (a) A term used for old debts
   (b) The sequence of repayment in case of bankruptcy.
   (c) All of the above
   (d) None of the above

9. The number of components financial seniority has are: [ d ]

(a) 2 (b) 5

(c) 7 (d) 4

10. When is financial leverage profitable? [ c ]

(a) When debts are lesser than equity (b) When debts and equity are in balance

(c) When the company is growing exponentially (d) When the cost of capital decreases

# Fill in the Blanks

1. The most crucial component of starting a business is _____.
2. Risk of cash _____ arises due to failure to pay fixed interest liabilities.
3. _____ discipline promotes regular savings and consistent investments, contributing to long-term financial security and potential wealth accumulation.
4. The _____ puzzle refers to the observation that the leverage ratio of firms does not seem to change much over time, even with changes in the financial market and cost of debt capital.
5. The _____ theory emanates from information asymmetries between firm management and shareholders.
6. _____ is denotes as that portion of profits which is allocated to the shareholders of the company.
7. _____ flexibility is refers to as the ability of an organization to access and restructure it's financing needs at a low cost.
8. _____ structure is defined as the combination of equity and debt that is put into use by a company in order to finance the overall operations of the company and for its growth.
9. A sound capital structure of a company helps to increase the _____ of shares and securities
10. _____ leverage is the ability of the firm to use fixed financial charges to magnify the effects of changes in EBIT on the firm's earnings per share.



## Answers

1. Capital
2. Insolvency
3. Financial
4. Capital structure
5. Signalling
6. Dividend
7. Financial
8. Capital
9. Market price
10. Financial

UNIT V

**Mergers, Acquisitions and Value Based Management:** Mergers and Acquisitions, Need, Strategy, Diversification and Mergers and Acquisitions, Value Creation in Mergers and Acquisitions. Theories of Mergers, Types of Mergers, Cost of Mergers, Government guidelines for Takeover, Problems on Mergers and Acquisitions and Cases. Value-based Management: Introduction, Elements and Importance of Value-based Management. Approaches to Value-based Management: Marakon, Alcar, McKinsey, BCG, Economic Value Added, Market Value Added and Cash Value Added.

## 5.1 MERGERS AND ACQUISITIONS

### 5.1.1 Need

**Q1. Define Merger and Acquisitions. Explain the reasons for merger.**

**(OR)**

**Discuss the reasons behind mergers.**

**(OR)**

**Explain the economies of merger.**

*Ans :* **(Sep.-20, Dec,-19, Imp.)**

**Meaning**

**1. Merger**

A merger refers to integration or combination of two or more companies but, only one company continues its business. The other company which discontinues its business transfer its assets, debts, etc., to the company which is in existence.

**2. Acquisitions**

This refers to the purchase of controlling interest by one company in the share capital of an existing company. This may be by :

**(a)** An agreement with majority holder of interest.

**(b)** Purchase of new shares by private agreement.

**(c)** Purchase of shares in open market (open offer)

**(d)** Acquisition of share capital of a company by means by cash, issuance of shares.

**(e)** Making a buyout offer to general body of shareholders.

**Reasons**

**1. Strategic Benefit**

If a firm has decided to enter or expand in a particular industry, acquisition of a firm engaged in that industry, rather than dependence on internal expansion, may offer several strategic advantages:

**(i)** As a pre-emptive move it can prevent a competitor from establishing a similar position in that industry,

**(ii)** It offers a special 'timing' advantage because the merger alternative enables a firm to 'leap frog' several stages in the process of expansion,

**(iii)** It may entail less risk and even less cost,

**(iv)** In a 'saturated' market, simultaneous expansion and replacement (through a merger) makes more sense than creation of additional capacity through internal expansion.

**2. Economies of Scale**

When two or more firms combine, certain economies are realised due to the larger volume of operations of the combined entity. These economies arise because of more intensive utilisation of production capacities, distribution networks, engineering services, research and development facilities, data processing systems, so on and so forth.

**3. Economies of Scope**

A company may use a specific set of skills or assets that it possesses to widen the scope of its activities. For example, Proctor and Gamble can enjoy economies of scope if it acquires a consumer product company that benefits from its highly regarded consumer marketing skills.

**4. Economies of Vertical Integration**

When companies engaged at different stages of production or value chain merge, economies of vertical integration may be realised.

**For example,** the merger of a company engaged in oil exploration and production (like ONGC) with a company engaged in refining and marketing (like HPCL) may improve coordination and control.

**5. Complementary Resources**

If two firms have complementary resources, it may make sense for them to merge.

**For example,** a small firm with an innovative product may need the engineering capability and marketing reach of a big firm. With the merger of the two firms it may be possible to successfully manufacture and market the innovative product. Thus, the two firms, thanks to their complementary resources, are worth more together than they are separately.

**6. Tax Shields**

When a firm with accumulated losses and/or unabsorbed depreciation merges with a profit-making firm, tax shields are utilised better. The firm with accumulated losses and/or unabsorbed depreciation may not be able to derive tax advantages for a long time.

**Q2. Explain the reasons for acquisition.**

**(OR)**

**Discuss the reasons behind acquisition.**

*Ans :*

There are many reasons as to why the firms go for acquisitions. Some of the reasons behind acquisition (or need for acquisition) are as follows :

**1. Increasing Market Power**

Greater/Good market power helps a firm to sell its products at highly competitive prices in the competitive market. Increased market power of the firm would help the firm to become the market leader.

As a result, the most qualitative products can be offered to the consumers at lower competitive prices. Market power is usually influenced by the size, resources and capabilities of a firm.

In order to improve size, increase resources and enhance capabilities of the firm, acquisition strategy is adopted. Firms acquire competitor firm, supplier, distributor or related businesses.

**2. Overcoming Entry Barriers**

Entering into new markets is not always an easy task for business firms. In some markets, there are large number of entry barriers which block the entry of a new firm. The existing firms usually hold strong share in the markets.

These firms make use of various distinctive competitive strategies and enjoy large share of customer loyalty. Thus, it becomes very difficult for the firms to adjust in market.

Therefore, acquiring an existing firm would be the best option for the firms to overcome the entry barriers. By acquiring the existing firm, it would be easier to study and analyse the markets within short period.

**3. Less Risk Compared to New Product Development**

New Product Development (NPD) requires huge capital and a number of resources. Apart from this, NPD involves huge risk as one may not be sure whether the new product would be successful in the market or not.

But in case of acquisition, products are not new to the customers. They are the products with good demand in the market. Therefore, acquisition involve less risk than compared to NPD.

**4. Increased Diversification**

Basically, when a firm aims to diversify its operations into unrelated products, it need to improve its capacity to produce them.

Acquiring a readymade business of unrelated products would be more beneficial compared to increasing the existing capacity levels.

**5. Minimizing Dependency**

Carrying out the business by marketing only single product would make a firm dependent on that particular product for success.

The firm would enjoy good returns in the favourable market conditions. In case of high competition, low demand or any other unfavourable market conditions, the returns from the particular product would be very low.

As a result the complete operations of the firm would get disturbed. But in case of acquisition, firm won't be dependent on one particular product. Therefore, acquisition minimizes dependency.

**Q3. What is meant by reverse Merger & Acquisition?**

*Ans :* **(Sep.-23, Imp.)**

**1. Reverse merger**

A reverse merger occurs when a smaller, private company acquires a larger, publicly listed company. Also known as a *reverse takeover*, the "reverse" term refers to the uncommon process of a smaller company acquiring a larger one.

**2. Reverse acquisition**

In a *reverse acquisition*, the accounting acquirer usually issues no consideration for the acquiree. Instead, the accounting acquiree usually issues its equity shares to the owners of the accounting acquirer.

## 5.2 MERGERS AND ACQUISITIONS STRATEGY

**Q4. Explain how mergers and acquisitions strategies are framed and implemented.**

*Ans :*

**(i)** When compared to the acquisitions which emerge from opportunistic reactions to the appearance of candidates, the acquisitions depending on a fundamental strategy would be more successful.

**(ii)** The decisions related to the acquisitions from opportunistic reactions are irregular and varies from normal experience and are done on restricted information so as to maintain the secrecy.

**(iii)** The first step involves organizing the strategy behind the merger or acquisition and ascertaining the responsibility for the process.

**(iv)** This requires a clear understanding of what the acquisition would bring about and the reason behind the strategy.

**(v)** These acquisitions help the firm to get strength and also to change its direction.

**(vi)** Acquisitions can develop the value when they can improve the capabilities of both the firms and the managers are responsible to maintain the balance between the need for independence of the acquired firm with the need to exchange the capacities between the two.

**(vii)** For the creation of an acquisition strategy, identifying various types of acquisitions which makes varied contributions to the firms improvement are also needed and they are as follows,

**1.** Strengthen the firms presence in the existing region and this can be obtained from,

**(a)** By identifying the urge to reinforce its position in the industry

**(b)** By the urge to tackle with the overcapacity in the industry

**(c)** The urge to integration.

Acquisition helps the acquiring firm to become more efficient and to decrease the costs through economies of scale, whereas the acquirer starts integrating the firms in a fragmented industry so as to achieve the economies of scale.

**2.** Increase the firm area in terms of products, markets or capabilities depending on the cross-border acquisitions and by expanding the firm into new geographic markets.

**3.** Acquisition helps the firms to expand into new areas and new businesses which need new potentials. This type of acquisition can replace internal research and development.

**Implementation of Merger Strategy**

The aspects that need to be considered for implementation of mergers are - effective date of the merger, registration of merger, taking approvals from board and shareholders, public announcement, informing stock exchanges and so on.

**Implementation of Acquisition Strategies**

According to Drucker, acquisition strategy can be successfully implemented with the help of the following criteria,

**(i)** The organization/acquirer should contribute something to the organization which it acquired through acquisition strategy.

**(ii)** There should be a common core of unity between two organizations (acquirer and acquiry).

**(iii)** The business of acquired organization should be respected by acquirer.

**Q5. Explain the process of Mergers and Acquisitions.**

*Ans :*

The process involving merger and acquisition is important as it can dictate the benefits derived from the deal. The process involves the following steps:

**1. Preliminary Valuation**

This step primarily focuses on the business assessment of the target company. Not only the latest financials of the target company are scrutinized, its expected market value in future is also calculated. This close analysis includes the company's products, capital requirements, brand value, organizational structure, etc.

**2. Proposal Phase**

Once the target company's business performance is analyzed and reviewed, the proposal for the business transaction is given. It could be either a merger or an acquisition. Generally, the mode of giving a proposal is an issuance of a non-binding offer document.

**3. Planning for Exit**

After the proposal is given to the target company and it takes the offer, the target company then engages in planning for the exit. This includes planning the right time to exit and considering all the options such as a full sale or partial sale. This is also a time for tax planning and evaluating the reinvestment options.

**4. Marketing**

Once the exit plan is finalized, the target company engages in a marketing plan and aims to achieve the highest selling price.

**5. Agreement**

In the case of an acquisition deal, the purchase agreement is finalized. In the case of a merger, the final agreement is signed.

**6. Integration**

This is the final step that involves the complete integration of the two companies. It is important to ensure that the same rules are followed throughout in the new company.

**Q6. Outline the detailed steps involved in analyzing and planning a prospective merger from the stand point of the acquiring firm.**

*Ans :* **(April-23, Imp.)**

**1. Develop an Acquisition Strategy**

Developing a good acquisition strategy revolves around the acquirer having a clear idea of what they expect to gain from making the acquisition – what their business purpose is for acquiring the target company (e.g., expand product lines or gain access to new markets).

**2. Set the M and A Search Criteria**

Determining the key criteria for identifying potential target companies (e.g., profit margins, geographic location, or customer base).

**3. Search for Potential Acquisition Targets**

The acquirer uses their identified search criteria to look for and then evaluate potential target companies.

**4. Begin Acquisition Planning**

The acquirer makes contact with one or more companies that meet its search criteria and appear to offer good value; the purpose of initial conversations is to get more information and to see how amenable to a merger or acquisition the target company is

**5. Perform Valuation Analysis**

Assuming initial contact and conversations go well, the acquirer asks the target company to provide substantial information (current financials, etc.) that will enable the acquirer to further evaluate the target, both as a business on its own and as a suitable acquisition target.

**6. Negotiations**

After producing several valuation models of the target company, the acquirer should have sufficient information to enable it to construct a reasonable offer; Once the initial offer has been presented, the two companies can negotiate terms in more detail.

**7. M and A due Diligence**

Due diligence is an exhaustive process that begins when the offer has been accepted; due dili-

gence aims to confirm or correct the acquirer's assessment of the value of the target company by conducting a detailed examination and analysis of every aspect of the target company's operations – its financial metrics, assets and liabilities, customers, human resources, etc.

**8. Purchase and Sale Contract**

Assuming due diligence is completed with no major problems or concerns arising, the next step forward is executing a final contract for sale; the parties make a final decision on the type of purchase agreement, whether it is to be an asset purchase or share purchase.

**9. Financing Strategy for the Acquisition**

The acquirer will, of course, have explored financing options for the deal earlier, but the details of financing typically come together after the purchase and sale agreement has been signed.

**10. Closing and Integration of the Acquisition**

The acquisition deal closes, and management teams of the target and acquirer work together on the process of merging the two firms.

**Q7. Can a merger be considered a means of raising additional equity capital? Explain.**

*Ans :* **(April-23)**

**(i)** A merger happens when two companies combine to form a single entity.

**(ii)** Public companies often merge with the declared goal of increasing shareholder value, by gaining market share or from entering new business segments.

**(iii)** Unlike an acquisition, a merger can result in a brand new entity formed from the two merging firms.

**(iv)** A merger typically combines two companies of roughly equivalent size. The purchase of a company by a larger entity is often called an acquisition.

**(v)** Mergers often involve the exchange of shares rather than cash consideration.

**(vi)** For example, in August 2017 Dow Chemical merged with polymers manufacturer DuPont to form DowDuPont (DWDP) by exchanging Dow and DuPont shares for those in the combined company.

**Q8. Discuss the issues that arises while dealing with mergers.**

*Ans :* **(Imp.)**

**(i) Financial Issues**

Financial issues include the valuation of business and shares of seller company and the financing sources by the acquiring company. Valuation is done on the basis of current earnings, assets and stock value.

For valuation, the discounted cash flow method (DCF) can be adopted.

The other methods include profit earning capacity value, net tangible asset value, fair value or a combination of these methods. Capital asset pricing method (CAPM) is more preferable in case of liquidation of assets (i.e., amalgamation or consolidation).

Evaluation is carried out mainly to determine the affect of the merger on earning per share (EPS). There is a possibility that EPS may increase or remain unchanged or it may decline.

**(ii) Legal Issues**

Legal issues relate to the legal aspects such as provisions of law of mergers. Companies Act 1956, provides the various provisions relating to mergers and amalgamations. It is essential to have a complete understanding of the related legal provisions for the implementation of mergers or acquisitions. The entire process involve several legal issues that are to be analyzed and resolved in an appropriate manner. Any negligence may lead to the problems in merger process.

**(iii) Strategic Issues**

Strategic issues are nothing but the strategic interests between the buyer and seller firms. There could be the commodity/conflict of interests between the two firms. It is important to analyze these issues to determine whether the mergers would provide synergistic benefits to a great extent or not. This requires the analysis of competencies, objectives, strategic perceptions of the merging companies.

**(iv) Managerial Issues**

Managerial issues are considered as the most sensitive issues as it involves man, management and staff members. These issues may arise both during and after merger. Many changes are brought in mergers, specially the changes of staff i.e., senior and top-level management, reallocation of jobs etc. The impact of these changes can be clearly observed in financial management, tension, performance reporting, performance target-setting, and even resignations.

**Q9. Distinguish between mergers and acquisitions.**

**(OR)**

**Distinguish mergers from acquisition.**

**(OR)**

**Differentiate between mergers and acquisitions.**

**(OR)**

**Compare and contract between mergers and acquisitions.**

*Ans :* **(Dec.-19, May-19, Imp.)**

| S.No. | Merger | S.No. | Acquisition |
|---|---|---|---|
| 1. | Merger is an integration of two or more companies but only one company continues its business. | 1. | Acquisition is an activity in which one company controls the other company. |
| 2. | In mergers, the CEO's of both the companies agrees for combining their business. | 2. | In acquisitions, the company which is acquired may not be willing to combine. |
| 3. | Mergers are financed by stock swap. | 3. | Acquisitions are financed by cash and debt combination. |
| 4. | Horizontal, vertical, conglomerate and congeneric are the different types of mergers. | 4. | Horizontal, vertical, related and cross-border mergers acquisitions are the different types of acquisitions |
| 5. | Merger is a narrow, technical term of specific legal procedure which may or may not follow | 5. | Acquisition is a generic term used to explain a transfer of ownership, acquisition. |
| 6. | In mergers, one company purchases the stock of company and second company closes down quantity i.e., 51 percent. | 6. | In acquisitions, one company controls the other other company by purchasing voting shares in large its business. |
| 7. | Example: ITC Kakatiya and Sherton merged into a single entity. | 7. | Example: Walt Disney company acquired capital cities/ABC Inc. |

**Q10. Evaluate the payment methods in mergers and acquistions.**

*Ans :* **(Sep.-23, Imp.)**

The payment methods in M&A are following

**1. Cash**

It is cheap as compare to other methods , it is often appreciated by the shareholders who are not able to sell their stock by any other means. The degree that cash is preferred is indicated to which the sellers are willing

to accept a small amount of cash rather than larger payment made in stock or debt. Payment in cash also means that the selling shareholders also pay income taxes on gains immediately.

**2. Debt**

It is expensive but do no require to pay income tax until payment for debts are received. It is relatively easy to come by and is more flexible than cash when it comes to repayment. If we see as a long perspective this method shouldn't be accepted as if acquirer were to enter the bankruptcy , the seller's shareholders will be categorized among another creditors to be paid out of remaining asset.

**3. Equity**

Here, the selling of shares for the shares of the acquirer , here the shareholders agree upon giving their shares of stock exchange for the set of number of shares of the acquiring company's stock.

**Factors**

**1. Payment by shares**

When the stock price is unusually high ,it is useful as it can offer fewer shares to pay for an acquisition by the acquirer and here seller is at reverse situation as if it believes acquirer stock selling at too high level, high risk is involved ,price will subsequently reduced.

**2. Payment by Cash**

When acquirer obtains a good price for an acquisition , it will be less inclined for paying its own stock ,hence the price of stock will increase , acquirer would be more interested in buying for cash as it will benefit the existing shareholders.

**Q11. Explain the advantages and disadvantages of mergers and acquisitions.**

*Ans :* **(Sep.-20, Imp.)**

**Advantages**

The following are the advantages of the mergers and acquisitions:

**1. Cost Efficiency**

The merger results in improving the purchasing power of the company which helps in negotiating the bulk orders and leads to cost efficiency. The reduction in staff reduces the salary costs and increases the margins of the company.

**2. Competitive Edge**

The combined talent and resources of the new company helps it gain and maintain a competitive edge.

**3. New Markets**

The market reach is improved by the merger due to the diversification or the combination of two businesses. This results in better sales opportunities.

**4. To Become Bigger**

Most of the companies enter into M&A agreements to increase their size and to eliminate their rivals from the market. In the normal circumstances, it can take many years for a company to double its size, but the same can be achieved much more rapidly through mergers or acquisitions.

**5. To Eliminate Competition**

M&A deals are usually done so as to allow the acquirer company to eliminate the future competition by gaining a larger market share in its product's market.

**6. Synergies and Economies of Scale**

This is usually one of the primary motivating factors for small companies as they have limited resources and usually deal with financial constraints.

**7. Tax Purposes**

Companies also enter M&A agreements for tax purposes, although this may be an implied rather than an overt motive.

**Disadvantages**

The following are the disadvantages of the mergers and acquisitions:

**1. Lack of Research**

Acquisition requires gathering a lot of data and information and analyzing it. It requires exten-

sive research. A carelessly carried out research about the acquisition causes the destruction of acquirer's wealth.

**2. Size Issues**

A mismatch in the size between acquirer and target has been found to lead to poor acquisition performance. Many acquisitions fail either because of 'acquisition indigestion' through buying too big targets or failed to give the smaller acquisitions the time and attention it required

**3. Excessive Premium**

In a competitive bidding situation, a company may tend to pay more. Often highest bidder is one who overestimates value out of ignorance. Though the emerges as the winner, he happens to be in a way the unfortunate winner. This is called winners curse hypothesis.

**4. Substantial Increase in Prices**

A merger reduces competition and thus can give the acquiring company the monopoly power in the market. With less competition and greater market share, the new firm can increase prices of the products for consumers.

**5. Job Losses**

A merger can lead to a situation wherein the employees have to lose their jobs. Usually, while a merger or acquisition takes place, the companies tend to reduce and remove those assets which will not be resulting in their profiting rearing process.

**6. Diseconomies of Scale**

The new company may experience diseconomies of scale from the increased size. After a merger, since the size of the company is increased, it may lack the same degree of control and thus may struggle to motivate workers.

**7. Loss in Productivity**

In cases where the small companies are being merged or acquired by big companies, the employees of the small companies may require exhaustive re-skilling.

## 5.3 DIVERSIFICATION

**Q12. Define diversification ? Explain different types of diversification.**

**(OR)**

**Discuss briefly about diversification strategies.**

*Ans :* **(May-19, Imp.)**

**Meaning**

Diversification is a business development strategy allowing a company to enter additional lines of business that are different from the current products, services and markets.

Diversification of business activities brings competitive advantages allowing companies to reduce business risks. That is why it is a great tool for business development. However, its successful implementation requires profound knowledge and thorough preliminary assessment of the company and its environment. And, although sometimes diversification is difficult for the small companies, it can prove to be inevitable when their original markets become unviable.

**Types**

Diversification is a strategic approach adopting different forms. Depending on the applied criteria, there are different classifications.

Depending on the direction of company diversification, the different types are:

**1. Horizontal Diversification**

Acquiring or developing new products or offering new services that could appeal to the company´s current customer groups. In this case the company relies on sales and technological relations to the existing product lines.

**2. Vertical Diversification**

Occurs when the company goes back to previous stages of its production cycle or moves forward to subsequent stages of the same cycle - produc-

tion of raw materials or distribution of the final product.

**3. Concentric Diversification**

Enlarging the production portfolio by adding new products with the aim of fully utilising the potential of the existing technologies and marketing system. The concentric diversification can be a lot more financially efficient as a strategy, since the business may benefit from some synergies in this diversification model. It may enforce some investments related to modernizing or upgrading the existing processes or systems.

**4. Heterogeneous (conglomerate) diversification**

Is moving to new products or services that have no technological or commercial relation with current products, equipment, distribution channels, but which may appeal to new groups of customers. The major motive behind this kind of diversification is the high return on investments in the new industry.

**5. Corporate Diversification**

Involves production of unrelated but definitely profitable goods. It is often tied to large investments where there may also be high returns.

**Q13. Why firms diversify?**

**(OR)**

**What are the reasons are diversification?**

*Ans :*

Diversification strategy is observed when new products are introduced in a completely new market by the company. The strategy is loaded with hurdles because it requires a lot of investment and a lot of man power as well as focus of the top management. But still, in the long run, diversification strategy is one of the best growth strategy in the long run.

**Reasons**

Here are seven reasons for the support of diversification strategy.

**1. Companies gain more technological capability**

With more R&D expenditure, it is likely that the company will develop technological capabilities. The goal of R&D is mostly technological advancement bringing new and better products in the market. Thus, once you implement diversification strategy, you are bound to gain more technological capability for your company.

**2. Economies of scale**

Economies of scale comes in the picture when you are using same fixed Cost for more output. Whenever you are using the same factory to manufacture more number of products, naturally with advantage of economies of scale, your cost comes down and margins goes up. This is another advantage of diversification strategy.

**3. Cross selling**

Cross selling becomes more possible with the diversification strategy. You can introduce older products in the new market or introduce the new products in older and more mature market. An example in this case is LG which gives a large variety of products to end consumers and hence cross sells its own products.

**4. Brand Equity**

It receives a substantial boost with more products and more presence in the market, brand surges in brand recall as well as brand reach. This results in long term benefits for your brand. Perfect example in this case is Samsung. Samsung smart phones have created a tremendous boost for the Samsung brand, which has resulted in all of its products receiving a positive vice because its Samsung.

**5. Risk factor is reduced**

Due to diversification strategy, and introduction of new products in new markets, your reliance on one single product or one single market is reduced and you begin to have advantage of more products and more markets to rely on. Thus, overall risk of the company is reduced.

**Q14. What are the difference between merger and consolidation?**

*Ans :* **(April-23, Imp.)**

| S.No. | Merger | S.No. | Consolidation |
|---|---|---|---|
| 1. | In a merger, one company takes over another including all assets and liabilities. The company that takes over remains active, while the one that is acquired essentially ceases to exit. | 1. | In a consolidation two or more companies merge to for one new, larger company. All of each company's assets and liabilities then become the property of the new another. |
| 2. | Firms involved are differently sized. | 2. | Firms involved are nearly equally sized. |

**Q15. Distinguish between related diversification and unrelated diversification.**

*Ans :*

| S.No. | Basis | Related Diversification | Unrelated Diversification |
|---|---|---|---|
| 1. | **Concept** | Related diversification takes place when an organization spreads/extends into a related but different business, business. | Unrelated diversification takes place when an organization expand its activities into areas which are unrelated to its existing |
| 2. | **Another Name** | Related diversification is also known as 'Concentric diversification'. | Unrelated diversification is also known as 'Conglomerate diversification'. |
| 3. | **Focus** | Related diversification focuses on operational matters in order to obtain the benefits of synergies. | Unrelated diversification focuses on financial matters by spreading risk to various unrelated businesses. |
| 4. | **Objective** | The main objective of related diversification is to enhance shareholder value via 'Synergy'. | The main objective of unrelated diversification is to enhance shareholder value by profit maximization. |
| 5. | **Level of Risk** | Related diversification involves less risk when compared to unrelated diversification. | Unrelated diversification involves high risk when compared to related diversification. |



## 5.4 THEORIES OF MERGERS

**Q16. Explain the various theories of mergers?**

*Ans :* **(Dec.-18, Imp.)**

The following are the various theories of mergers are :

**A) Differential Efficiency**

**(i)** According to this theory if the management of firm A is more efficient than the firm B and if the firm Acquires firm B, the efficiency of firm B is likely to be brought up to the level of the firm A.

**(ii)** The theory implies that some firms operate below their potential and as a result have below average efficiency.

**(iii)** Such firms are most vulnerable to acquisition by other more efficient firms in the same industry. This is because firms with greater efficiency would be able to identify firms with good potential but operating at lower efficiency.

**B) Inefficient Management Theory**

**(i)** This is similar to the concept of managerial efficiency but it is different in that inefficient management means that the management of one company simply is not performing uptoits potential.

**(ii)** Inefficient management theory simply represents that is incompetent in the complete sense.

**C) Synergy**

**1.** Synergy refers to the type of reactions that occur when two substances or factors combine to produce a greater effect together than that which the sum of the two operating independently could account for.

**2.** The ability of a combination of two firms to be more profitable than the two firms individually.

There are two types of synergy:

**(i)** Financial synergy.

**(ii)** Operating synergy.

**(i) Financial Synergy**

Financial synergies refer to lower cost of capital, tax benefits, low transactions costs and reduced corporate risk.

According to financial synergies theory, when the cash flow rate of the acquirer is greater than that of the acquired firm, capital is relocated to the acquired firm and its investment opportunities improve.

**(ii) Operating Synergy**

Refers to efficiencies in production, supply chain, R & D and Technology. Improved operational efficiency through economies of scale and scope by acquiring a customers, suppliers and competitors. Accordingly the synergies can be classified as follows :

**(a)** Economies of Scale

**(b)** Economies of Scope

**(a) Economies of Scale**

**(i)** It means reduction of average cost with increase in volume or production. Because of fixed overhead expenses such as steel, pharmaceutical, chemical and aircraft manufacturing.

**(ii)** In that merging of company in same line of business such as horizontal merger it eliminates duplication and concentrate a great volume of activity in available facility. In vertical mergers comexpands forward towards the customer or backward towards the source of raw material (suppliers).

**(iii)** By acquiring come control over the distribution and purchasing bring in economies of scale.

**(b) Economies of Scope**

**(i)** Using a physical asset in its physical production or services.

**(ii)** Deploying specific skill set of its manpower currently employed in its physical production or services.

**D) Pure Diversification**

Diversification provides numerous benefits to managers, employees, owners of the firms and to the firm itself. Diversification through mergers is commonly preferred to diversification through internal growth, given that the firm may lack internal resources or capabilities requires.

**E) Strategic Realignment to Changing Environment**

It suggests that the firms use the strategy of M & As as ways to rapidly adjust to changes in their external environments. When a company has an opportunity of growth available only for a limited period of time slow internal growth may not be sufficient.

**F) Hubris Hypothesis**

**(i)** Hubris hypothesis implies that managers look for acquisition of firms for their own potential motives and that the economic gains are not the only motivation for the acquisitions.

**(ii)** This theory is particularly evident in case of competitive tender offer to acquire a target. The urge to win the game often results in the winners curse refers to the ironic hypothesis that states that the firm which over estimates the value of the target mostly wins the contest.

**G) Empire Building Managerialism**

**(i)** Mergers become a threat for the firms due to managerial inefficiency or agency problem. It happens with the contradiction of share holders goals as there exists a managerial and owners differentials.

**(ii)** This happens when managers hold little equity and shareholders are too dispersed to take action against non-value maximization behaviour, insiders may deploy corporate actions to obtain personal benefits, such as shirking and perquisite consumption. When ownership and control is divided within a company, agency cost arise.

- Objective is to increase the size for pay through size of the firm.
- Managers may increase the size of the firm through mergers in the beliefs that their compensation is determined by size.
- In practice management compensation is determined by profitability.

## 5.5 TYPES OF MERGERS

**Q17. What are the different types of mergers?**

**(OR)**

**Explain different types of mergers.**

**(OR)**

**Discuss in brief the various types of mergers.**

**(OR)**

**Describe the different types of Mergers, with suitable examples.**

*Ans :* **(Oct.-22, Sep.-20, Dec.-19, Imp.)**

A company can merge with another company in four different types. They are as follows,

1. Horizontal merger
2. Vertical merger
3. Conglomerate merger
4. Congeneric merger.
5. Reverse merger

**1. Horizontal Merger**

The two companies which have merged are in the same industry, normally the market share of the new consolidated company would be larger and it is possible that it may move closer to being a monopoly or a near monopoly to avoid competition.

**Example:** Combination of two book publishers or two pharmaceutical manufacturing companies.

In this type of merger, companies expand their business and enjoy economies of scale and reduces competitors.

**Causes**

**(i)** Companies prefer horizontal merger in order to diversify their businesses.

**(ii)** Availing economies of scale and economies of scope could be one of the reason behind horizontal merger.

**(iii)** Companies aiming of increasing their market share would go for horizontal merger.

**(iv)** In order to reduce the number of competitors, companies undergo horizontal merger.

**(v)** The complementary skills and resources of the companies can be shared with each other in horizontal merger.

**2. Vertical Merger**

This merger happens when two companies that have 'buyer-seller' relationship (or potential buyer-seller relationship) come together.

**Example:** Combining a automobile manufacturing company and automobile marketing company or combining eatables manufacturing company and its packaging company.

Vertical merger can also exist in the form of forward and backward merger. When a specific company merges with it suppliers, it is backward merger and if a company merges with its customers, it is a forward merger.

**Causes**

**(i)** Vertical merger ensures free flow of information among supply chain intermediaries.

**(ii)** Companies undergo vertical merger to increase synergies such as financial synergy, operating synergy, managerial synergy and so on.

**(iii)** Efficient quality control is ensured through vertical merger.

**3. Conglomerate Merger**

Such mergers involve firms engaged in unrelated type of business operations. In other words, the business activities of acquirer and the target are neither related to each other horizontally (i.e., producing the same or competiting products) nor vertically (having relationship of buyer and supplier).

**Example**

Combination of cement manufacturing, electronic products, insurance investment and advertising agencies. Conglomerate firms must have knowledge about research, production, marketing, etc., then only a conglomerate merger becomes successful.

**4. Congeneric Merger**

In these mergers, the acquirer and the target companies are related through basic technologies, production processes or markets. The acquired company represents an extension of product-line, market participants or technologies of the acquirer. These mergers represent an outward movement by the acquirer from its current business scenario to other related business activities within the overarching industry structure.

**Example**

A pharmaceutical company producing antiulcer drugs merging with company producing anticancer drugs.

Congeneric merger is useful for these companies who are in sales and distribution channels, to benefit customers of both the businesses.

**5. Reverse Merger**

Such mergers involve acquisition of a public (Shell Company) by a private company, as it helps private company to by-pass lengthy and complex process required to be followed in case it is interested in going public.

Sometimes, it might be possible that a public company continuously a public traded corporation but it has no or very little assets and what remains only its internal structure and shareholders. This type of merger is also known as 'back door listing'. This kind of merger has been started as an alternative to go for public issue without incurring huge expenses and passing through cumbersome process. Thus, it can be said that reverse merger leads to the following benefits for acquiring company :

- Easy access to capital market.
- Increase in visibility of the company in corporate world.
- Tax benefits on carry forward losses acquired (public) company.
- Cheaper and easier route to become a public company.

## 5.6 COST OF MERGERS

**Q18. Explain briefly about Cost of Mergers.**

*Ans :*

In a merger, there may be two or more parties involved. One who is acquiring the business and the other who is ready to merge or sell the business. The decision of acquiring firm is referred as capital investment decision whereas the decision of other firm who is selling the business in referred as capital divestment decision. However, in order to calculate the net present value (NPV) of both firms, it is required to determine the cost and benefit of the merger.

Cost and benefit can be calculated by using the following formulas,

**Note:**

Assume Firm X as acquiring firm and firm T as selling firm.

Cost

$$\text{Cost} = \text{Cash payment} - PV_Y$$

Cost = From the perspective of acquiring firm X, cost of merger would be the cash compensation paid to firm 'Y'.

Cash payment = Cash payment made to firm Y for acquiring its firm.

$PV_Y$ = Present value of firm Tasa separate entity.

**Benefit**

Benefit can be calculated with the help of the following formula,

$$\text{Benefit} = PV_{XY} - (PV_X + PV_Y)$$

The difference between combined present value (PV) and separate entity present values is referred as benefit or merger from the perspective of firm 'X'.

Since, NPV of merger from the perspective of firm 'X can be calculated as,

$$\text{NPV} = \text{Benefit} - \text{Cost}$$

$$= [(PV_{XY} - (PV_X + PV_Y))] - (\text{Cash payment} - PV_{XY})$$

$$= PV_{XY} - PV_X - \text{Cash payment}$$

However, from the perspective of firm 'Y', NPV can be calculated as,

$$\text{NPV} = \text{Cash payment} - PV_Y$$

## 5.7 GOVERNMENT GUIDELINES FOR TAKEOVER

**Q19. Discuss different government guidelines for takeover.**

**(OR)**

**What are the different government guidelines for takeover?**

**(OR)**

**Explain the government guidelines for takeover of the companies.**

**(OR)**

**Critically examine the role of government in avoiding the hostile takeovers**

*Ans :* **(May-19, Imp.)**

The salient features of some of the important guidelines as follows :

**1. Disclosure of share acquisition/holding**

Any person who acquires 5% or 10% or 14% shares or voting rights of the target company, should disclose of his holdings at every stage to the target company and the Stock Exchanges within 2 days of acquisition or receipt of intimation of allotment of shares.

Any person who holds more than 15% but less than 75% shares or voting rights of target company, and who purchases or sells shares aggregating to 2% or more shall within 2 days disclose such purchase or sale along with the aggregate of his share holding to the target company and the Stock Exchanges.

**2. Public announcement and open offer**

An acquirer who intends to acquire shares which along with his existing share holding would entitle him to exercise 15% or more voting rights, can acquire such additional shares only after making a public announcement to acquire at least additional 20% of the voting capital of target company from the shareholders through an open offer.

An acquirer who holds 15% or more but less than 75% of shares or voting rights of a target company, can acquire such additional shares as would entitle him to exercise more than 5% of the voting rights in any financial year ending March 31 only after making a public announcement to acquire at least additional 20% shares of target company from the shareholders through an open offer.

**(i) Offer Price**

The acquirer is required to ensure that all the relevant parameters are taken into consideration while determining the offer price and that justification for the same is disclosed in the letter of offer.

**(ii) Disclosure**

The offer should disclose the detailed terms of the offer, identity of the offerer, details of the offerer's existing holdings in the offeree company etc. and the information should be made available to all the shareholders at the same time and in the same manner.

**(iii) Offer document**

The offer document should contain the offer's financial information, its intention to continue the offeree company's business and to make major change and long-term commercial justification for the offer.

The objectives of the Companies Act and the guidelines for takeover are to ensure full disclosure about the mergers and takeovers and to protect the interests of the shareholders, particularly the small shareholders. The main thrust is that public authorities should be notified within two days.

**3. Legal procedures**

The following is the summary of legal procedures for merger or acquisition laid down in the Companies Act, 1956:

**(i) Permission for merger**

Two or more companies can amalgamate only when amalgamation is permitted under their memorandum of association: Also, the acquiring company should have the permission in its object clause to carry on the business of the acquired company.

**(ii) Information to the stock exchange**

The acquiring and the acquired companies should inform the stock exchanges where they are listed about the merger.

**(iii) Approval of board of directors**

The boards of the directors of the individual companies should approve the draft proposal for amalgamation and authorize the managements of companies to further pursue the proposal.

**(iv) Application in the highcourt**

An application for approving the draft amalgamation proposal duly approved by the boards of directors of the individual companies should be made to the High Court. The High Court would convene a meeting of the shareholders and creditors to approve the amalgamation proposal. The notice of meeting should be sent to them at least 21 days in advance.

**(v) Shareholders and creditors meetings**

The individual companies should hold separate meetings of their shareholders and creditors for approving the amalgamation scheme. At least, 75 per cent of shareholders and creditors in separate meeting, voting in person or by proxy, must accord their approval to the scheme.

**(vi) Sanction by the highcourt**

After the approval of shareholders and creditors, on the petitions of the companies, the High Court will pass order sanctioning the amalgamation scheme after it is satisfied that the scheme is fair and reasonable. If it deems so, it can modify the scheme. The date of the court's hearing will be published in two newspapers, and also, the Regional Director of the Company Law Board will be intimated.

**(vii) Filing of the court order**

After the Court order, its certified true copies will be filed with the Registrar of Companies.

## 5.8 Problems on Mergers and Acquisitions

**1. Olive Ltd. is acquiring all the outstanding equity shares of Star Ltd. by exchanging one share of its own equity shares for each share of Star Ltd. Olive Ltd. has a policy of keeping 50 percent of its capital structure in debt. The capital structure of both these firms before the merger is as follows,**

| Particulars | Olive Ltd. (in ` Lakhs) | Star Ltd. (in ` Lakhs) |
|---|---|---|
| Equity Capital (of ` 100 each) | 20 | 5 |
| Retained Earnings | 25 | 25 |
| 14% Preference Shares | 5 | – |
| 13% debt | 50 | – |

**(a) What will the capital structure of the merged firm be? Determine the percentage share of the debt in the merged firm.**

**(b) Has the merged firm's Financial risk declined?**

**(c) How much additional debt can be combined firm borrow to retain a capital structure, 50% of which is debt?**

*Sol :*

**(a) (i) Capital Structure of Merged firm:**

| Particulars | Amount (` in Lakhs) |
|---|---|
| Equity Capital (20,00,000 + 5,00,000) | 25,00,000 |
| Retained Earnings (25,00,000 + 25,00,000) | 50,00,000 |
| 14% Preference Shares | 5,00,000 |
| 13% Debt | 50,00,000 |
| **Total Capital** | **1,30,00,000** |

**(ii) Percentage Share of Debt**

$$\text{Debit Ratio} = \frac{\text{Debt}}{\text{Total Capital}} \times 100 = \frac{50,00,000}{1,30,00,000} \times 100 = 38.46 \cong 38.5 \text{ percent}$$

**(b)** Yes, there is decline in financial risk due to low debt ratio of the merged firm.

**(c)** $0.50 = \frac{(50,00,000 + x)}{1,30,00,000 + x}$

x denotes the additional debt After cross multiplication, we get

$0.5(1,30,00,000 + x) = 50,00,000 + x$

$65,00,000 + 0.5\,x = 50,00,000 + x$

$65,00,000 - 50,00,000 = -0.5\,x + x$

$15,00,000 = 0.5\,x$

$$x = \frac{15,00,000}{0.5}$$

$x =$ ` 30,00,000.

Combined firm can borrow an additional debt of ` 30,00,000 to retain a capital structure.

**2. A "Large Company Ltd" (LCL) wants to acquire a "Small Company Ltd" (SCL), by exchanging 0.5 shares for every share of Small Company Ltd. Analyze the financial data furnished in the table and answer the questions given below:**

| Particulars | Large Co. Ltd. | Small Co. Ltd. |
|---|---|---|
| Earnings after taxes (`) | 18,00,000 | 3,60,000 |
| Number of equity shares outstanding | 6,00,000 | 1,80,000 |
| Market price per share (`) | 30 | 14 |
| EPS (`) | 3 | 2 |
| PIE ratio (Number of times) | 10 | 7 |

**(a) What is the number of equity shares required to be issued by LCL for the acquisition of SCL?**

**(b) What is the EPS of LCL after the acquisition?**

**(c) Determine the equivalent earnings per share of SCL?**

**(d) What is the expected market price per share of LCL after the acquisition, assuming its P/E multiple remains unchanged?**

**(e) Determine the market value of LCL after acquisition of SCL.**

*Sol :*

(a) Calculation of Number of Equity Shares Required to be Issued by LCL for the Acquisition of SCL

Number of Equity Shares issued by LCL = Shares of SCL × Exchange Ratio

= 1,80,000 × 0.5

= 90,000

**(b) Calculation of EPS of LCL After Acquisition**

EPS of LCL after acquisition =

$$\frac{\text{Earnings After Tax of LCL Ltd + Earnings After Tax of SCL Ltd}}{\text{Number of Equity Shares Outstanding of LCL Ltd + Number of Equity Shares Issued by LCL}}$$

$$= \frac{18,00,000 + 3,60,000}{6,00,000 + 90,000}$$

$$= \frac{21,60,000}{6,90,000} = \text{` } 3.13$$

**(c) Calculation of Equivalent earnings per share of SCL**

Equivalent EPS of SCL Ltd. = EPS after the Acquisition × Exchange Ratio

= 3.13 × 0.5 = ` 1.565

**(d) Calculation of Expected market price per share of LCL After Acquisition**

Expected Market Price Per Share of LCL Ltd. = EPS of the LCL after Acquisition × $\frac{P}{E}$ Ratio

= 3.13 × 10 = ` 31.3

**(e) Calculation of Market value of LCL after acquisition of SCL**

Market Value of LCL after acquisition of SCL = Market Price per share after acquisition × Shares Outstanding

| | |
|---|---|
| Number of Shares Outstanding of LCL Ltd: | 6,00,000 |
| (+) Number of Equity Shares Issued by LCL Ltd: | 90,000 |
| Shares Outstanding of LCL Ltd | 6,90,000 |

Market Value of SCL after acquisition of LCL = 31.3 × 6,90,000 = ` 21,59,7000

Total Market Value = ` 2,15,97,000.

**3. Rosy Ltd. is contemplating the purchase of Lily ltd. Rosy ltd has 3,00,000 shares having a market price of ` 30 per share while Lily ltd has 2,00,000 shares selling at ` 20 per share. The EPS of rosy ltd and Lily ltd are ` 4 and ` 2.25 respectively. There is a proposal for exchange of 0.5 share of Rosy Ltd for 1 share of Lily ltd. Calculate EPS after merger and the impact on EPS for the shareholders of both the companies.**

*Sol :*

**(a) Calculation of Total Earnings After Merger**

| Company | Original Number of Shares | EPS Total | Earnings After Tax |
|---|---|---|---|
| Rosy Ltd | 3,00,000 | 4 | 12,00,000 |
| Lily Ltd | 2,00,000 | 2.25 | 4,50,000 |
| Total Earnings After Merger | | | 16,50,000 |

**EPS After Merger When Share Exchange Ratio is 0.5**

| | |
|---|---|
| Earnings after merger | ` 16,50,000 |
| Total number of shares after merger [3,00,000 +1,00,000 (i.e., 0.5 × 2,00,000)] | 4,00,000 |
| Combined EPS after merger $\left[\frac{16,50,000}{4,00,000} = 4.125\right]$ | ` 4,125 |

**(b) Impact on EPS for the Shareholders of Rosy Ltd. and Lily Ltd. when Share Exchange Ratio is 0.5**

| Particulars | ` |
|---|---|
| **Shareholders of Rosy Ltd.** | |
| EPS after merger $\left[\frac{16,50,000}{4,00,000}\right]$ | 4,125 |
| EPS after merger | 4,000 |
| **Less:** EPS before merger | 4.000 |
| Accretion in EPS | 0.125 |
| **Shareholders of Lily Ltd.** | |
| EPS after merger (4.125 × 0.5) | 2.0625 |
| **Less:** EPS before merger | 2.2500 |
| Dilution in EPS | – 0.1875 |

**Conclusion**

1. There is an accretion in the EPS for the shareholders of Rosy Ltd., so shareholders of Rosy Ltd gain.
2. There is a dilution in EPS for the shareholders of Lily Ltd., so shareholders of Lily Ltd., lose.

**4. Company A plans to acquire Company B. The relevant financial details of the two firms, prior to merger announcement, are given below:**

| Particulars | Company A | Company B |
|---|---|---|
| Market price per share in rupees | 60 | 25 |
| Number of shares | 3,00,000 | 2,00,000 |

**The merger is expected to bring gains which have a present value of Rs.40 lakhs. Company A offers one share in exchange for every two shares of Company B.**

**a) What is the true cost of Company A for acquiring Company B?**

**b) What is the net present value of the merger to Company A?**

**c) What is the net present value of the merger to Company B?**

*Sol :* **(Aug.-21, Imp.)**

Market Value of Company A, $PV_A$ = Market Price Per Share × Number of Shares

= 60 × 3,00,000 = ` 1,80,00,000

Market Value of Company B, $PV_B$ = Market Price Per Share × Number of Shares

= 25 × 2,00,000 = ` 50,00,000

The share of B company in the combined entity (i.e., AB),

$$a = \frac{\text{Number of Shares of AB Given in Exchange}}{\text{Total Number of Shares of AB After the Merger}}$$

$$a = \frac{1,00,000}{3,00,000 + 1,00,000} = 0.25$$

$PV_{KB} = PV_A + PV_B$ + Merger's Benefit

= 1,80,00,000 + 50,00,000 + 40,00,000 [ ∴ Merger's Benefit = ` 40,000]

= ` 2,70,00,000

**(a) True Cost of Company A for Acquiring Company B,**

= $aPV_{AB} - PV_B$

= (0.25 × 2,70,00,000) – (50,00,000)

= 67,50,00 – 50,00,000

= ` 17,50,000

**(b) Net Present Value of the Merger to Company A**

= Benefit – Cost of Acquiring Company B

= 40,00,000 – 17,50,000

= ` 22,50,000

**(c) Net Present Value of the Merger to Company B,**

Cost of Acquiring Company B = ` 17,50,000

**Working Note**

Number of Shares of AB Given in Exchange (i.e., Exchange Ratio = 1:2)

$$= \text{Number of Shares of Company B} \times \frac{1}{2}$$

$$= 2,00,000 \times \frac{1}{2} = 1,00,000 \text{ shares}$$

---

**5. Given below is the financial data of two companies Company 'A' and Company 'B', Company 'A' is acquiring Company 'B' by exchanging its shares on a one-to-one basis for Company 'B'. The exchange ratio is based on the market prices of the shares of the two companies.**

| Particulars | Company 'A' | Company 'B' |
|---|---|---|
| Earning after taxes (Rs.) | 10,00,000 | 7,00,000 |
| Equity shares outstanding (Number) | 4,00,000 | 2,00,000 |
| Earning per share (Rs) | 2.50 | 3.50 |
| Price earnings ratio (P/E) | 14 | 10 |
| Market price per ratio (Rs) | 35 | 35 |

**You are required to calculate the following after Acquisition/Merger:**

**(i) EPS (Post merger)**

**(ii) Change in EPS for the shareholders of the companies 'A' and 'B'**

**(iii) Market value of the firm, post-merger (Assuming that P/E ratio of the company 'A'; remains unchanged)**

**(iv) Profit accruing to shareholders of both the firms.**

*Sol :* **(Oct.-22, Imp.)**

To calculate the post-merger financial data, we first need to determine the combined earnings and number of shares outstanding after the merger.

**(i) Earnings per Share (EPS) Post Merger**

Combined earnings after taxes: 10,00,000 (Company A) + 7,00,000 (Company B) = 17,00,000

Since the exchange ratio is one-to-one, the combined number of shares outstanding will be:

4,00,000 (Company A) + 2,00,000 (Company B) = 6,00,000 shares

Post-merger EPS = Combined earnings / Combined shares outstanding

Post-merger EPS = 17,00,000 / 6,00,000 = 2.83

**(ii) Change in EPS for the shareholders of the companies A' and 'B'**

Change in EPS for Company A shareholders = Post-merger EPS – Pre-merger EPS (Company A)

Change in EPS for Company A shareholders = 2.83 – 2.50 = 0.33

Change in EPS for Company B shareholders = Post-merger EPS – Pre-merger EPS (Company B)

Change in EPS for Company B shareholders = 2.83 – 3.50 = – 0.67

**(iii) Market value of the firm, post-merger (Assuming that P/E ratio of Company A remains unchanged)**

Post-merger P/E ratio (Company A) = 14

Post-merger market price per share = Post-merger P/E ratio × Post-merger EPS

Post-merger market price per share = 14 × 2.83 = 39.62

Market value of the firm, post-merger = Post-merger market price per share * Combined shares outstanding

Market value of the firm, post-merger = 39.62 × 6,00,000 = 23,772,000

**(iv) Profit accruing to shareholders of both firms**

For Company A shareholders, profit per share = Change in EPS for Company A shareholders * Pre-merger shares outstanding (Company A)

Profit for Company A shareholders = 0.33× 4,00,000 = 1,32,000

For Company B shareholders, profit per share = – Change in EPS for Company B shareholders * Pre-merger shares outstanding (Company B)

Profit for Company B shareholders = – (– 0.67) × 2,00,000 = 1,34,000

**6. Gama Fertilizers Company is taking over Theta Petrochemical Company. The shareholders of Theta would receive 0.8 shares of Gama for each share held by them. The merger is not expected to yield in economies of scale & operating synergy. The relevant data for the two companies is as follow:**

| Particulars | Gama | Theta |
|---|---|---|
| Net Sales (Rs Crore) | 335 | 118 |
| Profit after tax (Rs Crore) | 58 | 12 |
| Number of share (Crore) | 12 | 3 |
| Earnings per share (Rs) | 4.83 | 4 |
| Market value per share (Rs) | 30 | 20 |
| Price-earnings ratio | 6.21 | 5 |

**For the combined company (after merger), you are required to calculate:**

**a) EPS.**

**b) P/E Ratio.**

**c) Market value per share.**

**d) Number of shares.**

**e) Total market capitalization.**

*Sol :* **(Sep.-23, Imp.)**

**Premium paid to Theta's Share holders :**

Value of each share in Gama : 0.8 × Rs. 30 = Rs. 24

Value of Theta's share before merger = Rs. 20

Premium = Rs. 4

Premium percentage = 4/20 = 20 per cent

Number of shares paid to Theta's shareholders : 3 × 0.8 = 2.4 Crore

Number of share of the combined company : 12 + 2.4 = 14.40 Crore.

Combined profit after tax Rs. 58 + Rs. 12 = Rs. 70

Combined price earnings ratio : 6.21 × (58/70) + 5 × (12/70) = 6.00

**Combined firms market capitalization**

Market value per share P/E ratio × EPS = 6.00 × 4.86 = Rs.29.16

**Capitalization :** MVPS × No.of shares = Rs. 29.16 ×14.40 = Rs.419.90 Crore.

**7. Nelson Electronic Company acquires Borton Electronic Company on 'share for share exchange' basis. The position before takeover was as under :**

| Particulars | Nelson Company | Borton Company |
|---|---|---|
| Number of Shares | 20,000 | 10,000 |
| Total Earnings (`) | 2,00,000 | 1,00,000 |
| Market Price of (`) | 20 | 15 |

**The shareholders of Borton Company are offered 7,500 shares of Nelson Electronic Company for 10,000 shares (i.e., each shareholder of Borton electronic company gets 0.75 shares of Nelson electronic company for 1 share of Borton electronic company).**

**You are required to calculate the EPS of the amalgamated company vis-a-vis before takeover position of the two companies and the gain/loss of the shareholders of the two independent companies consequent to amalgamation.**

*Sol :* **(Sep.-20, Imp.)**

**(a) Calculation of EPS of Nelson Company and Borton Company Pre and Post Amalgamation**

| Particulars | Pre-Amalgamation | | Post-Amalgamation |
|---|---|---|---|
| | Nelson | Borton | Combined |
| Total Earnings (`) | 2,00,000 | 1,00,000 | 3,00,000 |
| Number of Shares | 20,000 | 10,000 | 27,500 (i.e., 20,000 + 7,500) |
| Earnings Per Share (`) $\left[\frac{\text{Total Earnings}}{\text{Number of Shares}}\right]$ | 10 | 10 | 10.91 |

**(b) (i) Calculation of Gain/Loss to Shareholder in Terms of EPS**

| Particulars | Amount |
|---|---|
| **Nelson Company** | |
| EPS Post Amalgamation | 10.91 |
| **Less :** EPS Pre-Amalgamation | 10.00 |
| Gain to Shareholders of Nelson Company | 0.91 |
| **Borton Company** | |
| EPS Post-Amalgamation (EPS Corresponding to 1 Share) | 8.18 |
| (0.75 × 10.91 = 8.18) | |
| **Less :** EPS Pre-Amalgamation | 10.00 |
| Loss to Shareholders to Borton Company | (1.82) |

**(ii) Calculation of Gain/Loss to Shareholder in Terms of Valuation**

| Particulars | | Amount |
|---|---|---|
| **Post-Amalgamation Value** | | 6,00,000 |
| 27,500 Shares × $\frac{3,00,000}{27,500}$ × 2 | | |
| (assuming Nelson Company Maintain its existing P/E Ratio of 2 (i.e., 20 ÷ 10) | | |
| **Less :** Pre-Amalgamation Market Value | | |
| Nelson Company 20,000 × 20 = | 4,00,000 | |
| Borton Company 10,000 × 15 = | 1,50,000 | 5,50,000 |
| **Total Gain from the Amalgamation** | | 50,000 |

**(iii) Calculation of Gain/Loss to Shareholder in Terms of EPS**

| | |
|---|---|
| Post-Amalgamation Value | 4,36,363.64 |
| $\left[20,000 \text{ Shares} \times \frac{30,00,000}{27,500} \times 2\right]$ | |
| **Less :** Pre-Amalgamation Market Value | 4,00,000.00 |
| [20,000 Shares × ` 20 (Market Price Per Share)] | |
| Gain from the Amalgamation | 36,363.64 |

**(iv) Calculation of Gain/Loss to Shareholder in Terms of EPS**

| | |
|---|---|
| Post-Amalgamation Value | 1,63,636.36 |
| $\left[7,500 \text{ Shares} \times \frac{3,00,000}{27,500} \times 2\right]$ | |
| **Less :** Pre-Amalgamation Market Value | 1,50,000.00 |
| [10,000 Shares × ` 15 (Market Price Per Share)] | |
| Gain from the Amalgamation | 13,636.36 |

**Working Notes :**

| | |
|---|---|
| Number of Shares of Nelson Electronic Company before takeover | 20,000 |
| (+) Shares offered to Borton Company by Nelson Company | 7,500 |
| Combined Shares After Amalgamation | 27,500 |

## 5.9 Mergers and Acquisition Cases

**Q20. Explain the Mergers and Acquisition Cases in India.**

*Ans :*

**(i)** Tata Steel acquired 100% stake in Cores Group on January 30, 2007. It was an all cash deal which cumulatively amounted to $12.2 billion.

**(ii)** Vodafone purchased administering interest of 67% owned by Hutch-Essar for a total worth of $11.1 billion on February 11, 2007.

**(iii)** India Aluminium and copper giant Hindalco Industries purchased Canada-based firm Novelis Inc in February 2007. The total worth of the deal was $6-billion.

**(iv)** Indian pharma industry registered its first biggest in 2008 M&A deal through the acquisition of Japanese pharmaceutical company Daichi Sankyo by Indian major Ranbaxy for $4.5 billion.

**(v)** The Oil and Natural Gas Corp purchased Imperial Energy Plc in January 2009. The deal amounted to $2.8 billion and was considered as one of the biggest takeovers after 96.8% of London based companies' shareholders acknowledged the buyout proposal.

**(vi)** In November 2008 NTT DoCoMo, the Japan based telecom firm acquired 26% stake in Tata Teleservices for USD 2.7 billion.

**(vii)** India's financial industry saw the merging of two prominent banks - HDFC Bank and Centurion Bank of Punjab. The deal took place in February 2008 for $2.4 billion.

**(viii)** Tata Motors acquired Jaguar and Land Rover brands from Ford Motor in March 2008. The deal amounted to $2.3 billion.

**(ix)** 2009 saw the acquisition Asarco LLC by Sterlite Industries Ltd's for $1.8 billion making it ninth biggest-ever M&A agreement involving an Indian company.

**(x)** In May 2007, Suzlon Energy obtained the Germany-based wind turbine producer Repower. The 10th largest in India, the M&A deal amounted to $1.7 billion.

**Biggest mergery and acquistions of 2016**

1. **The $32 billion deal between Shire and Baxalta (Industry: Pharmaceuticals) :** After a lengthy six month courtship, London-based drugmaker Shire announced plans to buy Baxalta in a $32 billion cash and stock offer, giving Shire a better foothold in treating rare diseases. The year though, is just halfway through. One major deal that could supplant the crown is the back-and-forth between German pharmaceutical giant, Bayer, and its intended target, Monsanto. Bayer offered a whopping $62 billion to the latter in May. Monsanto then rejected the offer, calling the proposal "incomplete and financially inadequate." Discussions for that deal are still ongoing.

2. **The $30.6 billion bid for St Jude Medical by Abbott Laboratories (Industry: Medical Appliances and Equipment) :** In April, Abbot Labs announced plans to buy St. Jude Medical for $25 billion in a cash and stock deal, and assume or refinance St. Jude's net debt of about $5.7 billion. One of the flurry of mergers and acquisitions in the healthcare space this year, the combined company will have a stronger medical-devices business in an increasingly competitive market. Increased scale will also give Abbot Labs more pricing power in the market.

3. **The $28.1 billion acquisition of LinkedIn by Microsoft (Sector: Tech) :** On Monday, Microsoft announced it would buy social networking company, LinkedIn for a smooth $26.2 billion in an all-cash deal. That took LinkedIn's stock up 47% in trading. The deal, Microsoft's' largest ever by a $20 billion long shot, will "accelerate the growth of LinkedIn, as well as Microsoft Office 365 and Dynamics," according to Microsoft CEO Satya Nadella. The deal is also sixth largest tech merger and acquisition on record, according to Dealogic.

4. **The $16.6 billion deal for Tyco International by Johnson Controls (Sector: Auto Parts) :** In January, car parks manufacturer, Johnson Controls and Ireland-based security systems maker, Tyco International agreed to merge in a deal that would help Johnson Controls dodge the high, about 35%, corporate tax rate in the U.S. by moving headquarters to Ireland. The deal will lead to at least $500 million in savings in the first three years, and at least $150 million in annual tax savings, the companies said.

5. **The $13.6 billion bid to buy Starwood by Marriott International (Sector: Service) :** Perhaps one of the most tense mergers and acquisitions of 2016 that ended with Starwood's top bidder, Anbang Insurance, calling it quits, the acquisition of Starwood by Marriott International takes number four on the list. After several months of bidding, the two companies agreed to merge in March, becoming the world's largest hotel chain in a cash and stock deal. The merger would give the combined company scale to combat smaller, and rapidly growing competitors such as Airbnb. Its new size would also allow the company to negotiate better fees with online booking sites including Expedia.

6. **The $13.2 billion acquisition of Columbia Pipeline Group by TransCanada (Sector: Oil and Gas) :** The company behind the controversial Keystone XL oil pipeline, TransCanada, agreed to buy Columbia Pipeline Group for $10.2 billion in March, making the combined giant one of North America's largest regulated natural gas transmission businesses in an all cash deal. For TransCanada, the deal allows them to take Columbia off its list of rivals, and also access the cheaper gas from Marcellus and Utica shale regions. Competition from the latter has been eating away at TransCanada's revenue.

7. **A $12.8 billion merger between IMS Health Holdings and Quintiles Transnational Holdings (Sector: Biotech) :** Contract medical research provider, Quintiles, agreed to merge with healthcare information company, IMS Health to make a giant known as Quintiles IMS in an all-stock deal. This combination addresses life-science companies' most pressing needs: to transform the clinical development of innovative medicines, demonstrate the value of these medicines in the real world, and drive commercial success," Ari Bousbib, chairman and CEO of IMS Health said in a statement.

8. **The $12.4 billion acquisition of ADT by Protection 1 (Sector: Security):** In February, a security service for residential and small business properties, ADT, agreed to be acquired by an affiliate of Apollo Global Management, and merged with another home security firm, Protection 1. The merger would give the combined company greater reach throughout the U.S. and Canada, and also help ADT accelerate its expansion into the commercial sector.

9. **Great Plains Energy's Bid for Westar Energy Worth $12.2 billion (Sector: Electrical Utilities) :** Great Plains Energy, based out of Kansas City, Mo., and Westar Energy, based out of Kansas, announced the deal late May in a cash and stock transaction. "The utility industry is facing rising customer expectations, increasing environmental standards and emerging cyber security threats. These factors, coupled with slower demand growth for electricity, are driving our costs and customer rates higher," said Terry Bassham, chairman and chief executive officer of Great Plains Energy. By buying Westar however, the company hopes to reduce expenses and combine operations.

10. **The $11.4 billion acquisition of Fortis by ITC Holdings announced in February (Sector: Electric Utility):** Canadian utility operator Fortis announced plans to buy Novi-Mich.-based ITC Holdings in February. For Fortis, the acquisition would give the company a foothold in the Midwest, and give the combined company a chance to expand.

## 5.10 VALUE-BASED MANAGEMENT

### 5.10.1 Introduction

**Q21. Define Value-based Management. Explain the benefits of Value-based Management.**

*Ans :*

**Meaning**

Value Based Management (VBM) is the management philosophy and approach that enables and supports maximum value creation in organizations, typically the maximization of shareholder value. VBM encompasses the processes for creating, managing, and measuring value. Value Based Management is an approach to organizational leadership in work. It says that organizations should define what they consider value to be, then focus on maximizing it. Organizations usually define value as shareholder value.

**Benefits**

1. It helps the organizations in the creation of value on a constant and continuous basis.
2. It helps to increase the level of corporate transparency.

3. It helps and facilitates the organizations to deal on the global level as well with the deregulated markets.
4. Defines and aligns the interest and objectives of the top management with that of the shareholders and stakeholders of the company.
5. It facilitates the smooth flow of communication amongst the investors, analysts, and stakeholders.
6. Helps to define the business plans and strategies for improving the internal communication
7. Prevents the undervaluation of the stocks and shares of the company
8. Helps the management to set the priorities straight with regards the aims and objectives
9. Improves the decision-making process
10. Facilitates to balance the short-term, long-term, and middle-term trade-offs
11. Improves the proper and optimum allocation of the business resources
12. Aligns and streamlines the processes of planning and budgeting
13. Helps to set the targets for compensation
14. Helps and facilitates the proper use of company stocks for the purposes of mergers and acquisitions
15. Helps in the prevention of takeovers
16. Helps the management to deal with the complexities of the market, competition, uncertainties, and risks

### 5.10.2 Elements and Importance of Value-based Management

**Q22. Explain the elements and importance of value-based management.**

*Ans :*

**Elements**

**1. To create value**

The model of Value Based Management is more or less like a business strategy with its main focus on helping the organizations to generate and increase the future value.

**2. To manage value**

It involves the aspects of leadership, communication, organizational culture, governance, and change management.

**3. To measure value**

The model of Value Based Management focuses on and is dependent on the corporate values and purposes. The corporate purpose can be economic in nature or can aim at the stakeholder values directly.

**Importance**

1. It helps the organizations to market their products and services in an optimum and successful fashion gaining the competitive advantage over their contemporary brands in the market.
2. It helps to attract the investors for the organizations resulting in the attainment of the financial goals and objectives.
3. It helps the organization to formulate the levels of corporate management and control that helps it restructuring the hierarchy, and prepares it for the threat of takeover and buy-out.
4. The helps the organization to build a favorable and a qualitative image in the market that will attract top talent from the industry

### 5.10.3 Approaches to Value-based Management

#### 5.10.3.1 Marakon

**Q23. Explain Marakon approache to value-based management.**

*Ans :*

**Meaning**

Marakon Associates, an international management consulting firm started in 1978, with a simple yet powerful idea of helping executives of large corporations in effective management of business by combining innovations and strategic management. Marakon Associates pioneered in "Value- based Portfolio Management". In 1980s, US companies have taken this as a big idea, a great platform for developing their business. James M. McTaggart founding member of Marakon, helped in opening the field of Value-based management .

Brief explanation of each step is as follows :

**1. Specifying Determinants of Value**

From the above discussion, we can say that the determinants of value are return on equity (r),

growth rate in dividends (g), and cost of equity (ke). Recollect the formula we used for computing value of equity stock — value of stock is based on cost of equity (ke) and growth rate in dividends. Apart from these two, return on equity is also given as determinants of value according Marakon approach.

**2. Understanding the Strategic Determinants of Value**

As discussed in the previous point, shareholders' value is driven by the spread between return on equity (r), and the cost of equity (ke); and growth rate in dividends. But increase in return on equity (r), and growth rate in dividends are influenced by market economies, and competitive position. Market economies depends on intensity of direct competition; threat of entry; supplier's pressures; regulatory pressures; intensity of direct competition and customer's pressures. Except regulatory pressures, the remaining five determinants are just like five forces given by Porter. Porter's five forces are :

**(i)** The threat of new entrants (Threat of entry),

**(ii)** The bargaining power of buyers (Customer's pressure),

**(iii)** The bargaining of suppliers (Supplier's pressures),

**(iv)** The threat of substitute products (Intensity of indirect competition), and

**(v)** The intensity of rivalry among competitors in an industry (Intensity of direct competition).

**3. Formulate High Value Strategies**

Any Firm will be able to create value when it is able to identify the markets in which it can enter, and the ability to create competitive advantage. In other words, participation strategy refers identifying new markets to enter, and exit from the market that is not profitable.

**4. Develop Superior Organizational Capabilities**

This step involves overcoming weaknesses, and increasing strengths. Developing superior organizational capabilities helps creating value, by making balance between executives' interests and objective of shareholders. The main organizational capabilities are having:

**(i)** Competent and committed CEO

**(ii)** Well-defined compensation plan for top executives "relative pay for relative performance"

**(iii)** Efficient resource allocation system

**(iv)** Good corporate governance mechanism that makes executives responsible for value creation, or destruction of existing wealth.

### 5.10.3.2 Alcar

**Q24. Explain Alcar approaches to value-based management.**

*Ans :* **(Imp.)**

The Alcar model, developed by the Alcar Group a company into management education and software development, uses the discounted cash flow analysis to identify value adding strategies.

According to the Alcar approach of value-based management, a strategy should be implemented if it generates additional value for a firm. The value of the equity is arrived at by deducting the market value of the firm's debt from its present value.

According to Alcar Model of Value Based Management, there are seven ' value drivers' that affect a firm's value. These are

1. The growth rate of sales
2. Operating profit margin
3. Income tax rate
4. Incremental investment in working capital
5. Incremental investment in fixed assets
6. Value growth duration
7. Cost of capital

The first six factors affect the value of the strategy for the firm by determining the cash flows generated by a strategy. The last term, i.e. the cost of capital, affects the value of the strategy by determining the present value of these cash flows.

According to the Alcar approach of value based management, a strategy should be implemented if it generates additional value for a firm. For ascertaining the value generating capability of a strategy, the value of the firm's equity without the strategy is

compared to the value of the firm's equity if the strategy is implemented. The strategy is implemented if the latter is higher than the former.

### 5.10.3.3 McKinsey

**Q25. Explain McKinsey approaches to value-based management.**

**(OR)**

**Discuss in detail the steps involved in McKinsey approach.**

*Ans :* **(Imp.)**

**Meaning**

McKinsey & Company is one of the world's top management consulting firms. It was founded by Jaimes McKinsey in 1926. McKinsey & Company, has developed a method to value-based management, which promised companies a way to align their aspirations, management processes, and mindsets with day-to-day decision-mating that would create shareholder value.

The approach articulated by Tom Copeland (previously partner and co-leader of the Corporate (Finance Practice at McKinsey & Co., Inc.), Tim Koller (partner at McKinsey & Company Inc., and co-leader of Corporate Finance and Corporate Strategy Practice), and Jack Murrin (previously partner and co-leader of Corporate Finance Practice at McKinsey & Company) in their book "Valuation — Measuring and Managing the Value of Companies.

**Definition**

**(i)** **According to them, VBM is simple** "property executed, VBM'is an approach to management that aligns a company's overall aspirations, analytical techniques, and management processes to focus management decision-making on the key drivers of value, thereby help create value for shareholders".

**Steps:**

**1.** **Ensure Top Management Embrace Shareholder Value Creation as Ultimate Financial Objective:** This is primary step, because unless top management executives are committed to shareholder value creation it will not be possible to implement VBM system in the firm. When top executives accept creating value to shareholders as top priority, then leave using traditional measures of financial performance evaluation (EPS, ARR, etc.), and accept discounted cash flow method of evaluation.

**2.** **Identifying Value Drivers:** As studied earlier, knowing value drivers is the very essential in VBM, without which value creation will not be possible. According to Tom Copeland, there are three levels at which value drivers should be identified. The three levels are

**(i)** **Generic Level:** The value driver is ROI.

**(ii)** **Business Unit Level:** When we use business unit level, there would be different products therefore product mix, customer-mix, operating leverage are the value drivers; and

**(iii)** **Grass Roots Level:** This level is also known as operating level. At this level, the value drivers are capacity utilization, revenue generated per visit, cost per delivery.

**3.** **Setup Appropriate Managerial Process:** VBM is a process. Any system that expects performance from employees, will definitely have a predecided strategy, targets, budgets, performance measurement and incentive payment system.

**4.** **Implementation:** VBM is a process, but it is not a simple process, because it involves changes in the deep rooted mindset of decision-makers. A Value-based system is said to be well implemented when it satisfies the following six conditions.

**(i)** It should be performance-oriented.

**(ii)** Decisions should be taken on the basis of creation of value.

**(iii)** VBM should have implemented at top level as well at bottom level.

**(iv)** It should have free flow of two-way communication.

**(v)** Organisation should have strong self-reinforcing process.

**(vi)** Firm should have a low-cost VBM system.

### 5.10.3.4 BCG

**Q26. Explain BCG approach to value-based management.**

*Ans :* **(Imp.)**

BCG approach was proposed by Boston Consulting Group. Two concepts arc at the base of this approach: Total shareholder return and Total business return. For applying these concepts two performance metrics are used: Cash flow return on investment and Cash value added.

The Boston Consulting Group (BCG) growth-share matrix is a planning tool that uses graphical representations of a company's products and services in an effort to help the company decide what it should keep. sell, or invest more in.

The matrix plots a company's offerings in a four-square matrix, with the y-axis representing the rate of market growth and the x-axis representing market share. It was introduced by the Boston Consulting Group in 1970.

**1. Understanding a BCG Growth-Share Matrix**

The BCG growth-share matrix breaks down products into four categories, known heuristically as "dogs," "cash cows," "stars," and "question marks " Each category quadrant has its own set of unique characteristics.

**2. Dogs (or) Pets**

If a company 's product has a low market share and is at a low rate of growth, it is considered as "dog" and should be sold, liquidated, or repositioned. Dogs, found in the lower right quadrant of the grid, don't generate much cash for the company since they have low market share and little to no growth. Because of this, dogs can turn out to be cash traps, tying up company funds for long periods of time. For this reason, they arc prime candidates for divestiture.

**3. Cash Cows**

Products that arc in low-growth areas but for which the company has a relatively large market share are considered "cash cows," and the company should thus milk the cash cow for as long as it can. Cash cows, seen in the lower left quadrant, arc typically leading products in markets that arc mature. Generally, these products generate returns that arc higher than the market's growth rate and sustain itself from a cash flow perspective. These products should be taken advantage of for as long as possible. The value of cash cow s can be easily calculated since their cash flow patterns are highly predictable. In effect, low-growth, high-share cash cows should be milked for cash to reinvest in high-growth, high-share "stars'" with high future potential.

**4. Stars**

Products that arc in high growth markets and that make up a sizable portion of that market are considered "stars" and should be invested in more. In the upper left quadrant are stars, which generate high income but also consume large amounts of company cash. If a star can remain a market leader, it eventually becomes a cash cow when the market's overall growth rate declines.

**5. Question Marks**

Questionable opportunities are those in high growth rate markets but in which the company docs not maintain a large market share. Question marks arc in the upper right portion of the grid. They typically grow fast but consume large amounts of company resources. Products in this quadrant should be analysed frequently and closely to see if they are worth maintaining.

### 5.10.3.5 Economic Value Added

**Q27. Define Economic Value Added. Explain various steps for the calculation of Economic Value Added.**

*Ans :* **(Imp.)**

Economic Value Added (EVA) is a holistic method of evaluating a company's financial performance, which means that EVA is used not only as a mere valuation technique but also to find the economic contribution of a company to the society at large. The core concept behind EVA is that a company generates 'value' only if there is a creation of wealth in terms of returns in excess of its cost of capital invested. EVA insists on separation of firm's operation from its financing. So. if a company's UVA is negative, it means the company is not generating value from the funds invested into the business. Conversely, a positive EVA shows a company is producing value from the funds invested in it.

Thus. Economic value added (EVA) is a measure of a company's financial performance based on the residual wealth calculated by deducting its cost of

capital from its operating profit, adjusted for taxes on a cash basis. EVA can also be referred to as economic profit, as it attempts to capture the true economic profit of a company. This measure was devised by management consulting firm Stern Value Management, originally incorporated as Stern Stewart & Co.

There are five steps in the calculation of EVA:

1. Calculate Net Operating Profit After Tax (NOPAT)
2. Calculate Total Invested Capital (TC)
3. Determine the Weighted Average Cost of Capital (WACO
4. Calculate the capital charge by multiplying capital invested by WACC
5. Calculation of EVA

**Formula for EVA**

EVA adopts almost the same form as residual income and can be expressed as follows:

EVA = NOPAT – (WACC × Capital invested)

OR

EVA = NOPAT – Capital Charge

Where,

- NOPAT = Net operating profits after tax
- WACC = Weighted Average Cost of Capital
- Capital invested = Equity + long-term debt at the beginning of the period
- (WCC* Capital invested) is also known as a finance charge

**PROBLEMS**

**8. Compute EVA of A Ltd. with the following information:**

**Profit and Loss Statement**

| Particulars | Rs. in lakhs |
|---|---|
| Sales Revenue | 1000 |
| Direct Costs | -390 |
| Selling, General & Admin. Expenses. | -200 |
| EBIT | 410 |
| Less Interest | 10 |
| EBT | 400 |
| Tax Expense | 120 |
| EAT | 280 |

**Balance Sheet**

| Particulars | Rs. in lakhs |
|---|---|
| PPE | 1,000 |
| Current Assets. | 300 |
| Total | 1,300 |
| Equity | 700 |
| Reserves | 100 |
| Non-Current Borrowings | 100 |
| Current Liabilities & Provisions | 400 |
| Total | 1,300 |

**Assume Bad Debts provision of Rs.20 Lakhs is included in the Selling and General expenses and same amount is reduced from the trade receivables in current assets. Also assume that the pre-tax Cost of Debt is 12%, Tax Rate is 30% and Cost of Equity (i.e., shareholder's expected return) is 8.45%.**

*Sol :*

**Step I : Computation of NOPAT**

| Particulars | Rs. in lakhs |
|---|---|
| EBIT | 410 |
| **Less :** Taxes (410 × 30%) | –123 |
| **Add :** Non - Cash Expenses | 20 |
| NOPAT | 307 |

**Step II : Finding out the Invested Capital :**

| Particulars | Rs. in lakhs |
|---|---|
| Total Assets | 1,300 |
| **Less :** Non-interest-bearing securities (C.L) | 400 |
| | **900** |
| **Add :** Non-Cash adjustment | **20** |
| **Invested Capital** | **920** |

**Step III : Compute the WACC**

WACC = Cost of equity + Cost of debt

WACC = (800/900*8.45%) + [100/900*12% (1 – 0.30)] = 8.44 %

**Step IV : Find out the Capital Charge**

Capital Charge = Invested Capital * WACC = 920 * 8.44% = 77.65

**Step V : Calculate EVA**

EVA = Adjusted NOPAT – Capital Charge = 307 – 77.65 = 229.35 Lakhs.

**9. Program Limited has reported a net operating profit after tax (NOPAT) to capital employed as 2.5% plus weighted average capital for the year 31st March 2021. Economic Value Added is 4 Crore as on 31st March 2021. You are required to calculate.**

**(i) Amount of capital employed**

**(ii) NOPAT, if WACC is 10%**

*Sol :*

**Step I : Finding out the Invested Capital:**

Let the capital invested be 'x'

NOPAT will be 2.5% + 10% = 12.5 of x = 0.125x

EVA = NOPAT -(Invested Capital HI × WACC)

4 Crore = 0.125 x – 0.10x

4 Crore = 0.025 x

X = 4 /.0.025 = 160 Crore

Capital Invested = 160 Crore.

NOPAT = 0.125x = 0.125 × 160 = 20 Crore.

**10. The following data pertains to XYZ Inc. engaged in software consultancy business as on 3th December 2021.**

**Statement of Profit and loss**

| Particulars | Rs. in millions |
|---|---|
| Income from consultancy | 935.00 |
| EBIT | 180.00 |
| Less: Interest on Loan | 18.00 |
| EBT | 162.00 |
| Less: Tax at 35% | 56.70 |
| EAT | 105.30 |

**Balance Sheet**

| Equity and Liabilities | Rs. in millions | Assets | Rs. in millions |
|---|---|---|---|
| Equity Share capital 10 Million | | Land and Buildings | 200 |
| Shares of Rs. 10 each | 100 | Computer and Software | 295 |
| | | Current assets | |
| Reserve and Surplus | 325 | Stock | 150 |
| Loans | 180 | Debtors | 100 |
| Current liabilities | 180 | Cash | 40 |
| Total | 785 | Total | 785 |

**With the above information and following:**

**(a) Economic Value Added**

**(b) Assuming that: WACC is 12%.**

*Sol :* **(Imp.)**

**Step 1: Computation of NOPAT**

| Particulars | Rs. in million |
|---|---|
| EBIT | 180,000 |
| **Less:** Taxes (180 × 35%) | 63,00 |
| NOPAT | 117,00 |

**Step II: Finding out the Invested Capital**

| Particulars | Rs. in million |
|---|---|
| Total Assets | 785,00 |
| **Less:** Current Liabilities | 180,00 |
| Invested Capital | 605,00 |

**Step III: Find out the Capital Charge**

Capital Charge = Invested Capital * WAC 2 = 605.00 × 0.12 = 72.60 million

**Step IV: Calculate EVA**

EVA – Adjusted NOPAT – Capital Charge = 117.00 – 72.60 = 44.40 million.

**11. Following is the condensed income statement of a firm for the current year.**

**Income statement (Rs. In Lakhs)**

| Particulars | Rs. in lakhs |
|---|---|
| **Sales Revenue** | **500** |
| **Operating Costs** | **300** |
| **Interest cost** | **12** |
| **Earning Before Tax** | **188** |
| **Taxes at 40%** | **75.20** |
| **Earnings After Taxes** | **112.80** |

**The firms existing capital consists of Rs. 150 Lakhs Equity funds, having 15% cost and Rs.100 lakhs 12% Debt. Determine the EVA during the year.**

**Assume the sales revenue Rs.330 lakhs what is the earnings after taxes and EVA?**

*Sol :*

**Step I: Computation of NOPAT**

| Particulars | Rs. in lakhs |
|---|---|
| Sales Revenue | 500 |
| **Less:** Operating cost | 300 |
| **EBIT** | 200 |
| **Less:** Taxes at 40% | 80 |
| NOPAT | 120 |

**Step II: Finding out the Invested Capital:**

| Particulars | Rs. in lakhs |
|---|---|
| Equity Funds | 150 |
| Debt | 100 |
| Total invested Capital: | 250 |

**Step III: Compute the WACC**

WACC = Cost of equity + Cost of

WACC = (150/250*15%) + [100/225 of 12% (1 – 0.40)

= 9% + 2.88% = 11.88%

**Step IV: Find out the Capital Charge**

Capital Charge = Invested Capital *WACC = 250 × 11.88% = 29.7 lakhs

**Step V: Calculate EVA**

EVA = Adjusted NOPAT – Capital Charge = 120 – 29.70 = 90.30 Lakhs.

If sales Revenue is Rs.330 Lakhs

**Computation of NOPAT**

| Particulars | Rs. in lakhs |
|---|---|
| Sales Revenue | 330 |
| **Less:** Operating cost (330 × 60%) | 198 |
| EBIT | 132 |
| **Less:** Taxes at 40% | 52.8 |
| NOPAT | 79.2 |

**Calculate EVA**

EVA = Adjusted NOPAT – Capital Charge = 79.20- 29.70 = 49.50 Lakhs.

## 5.10.4 Market Value Added

**Q28. Define Market Value Added. Explain the advantages of Market Value Added.**

*Ans :* **(Imp.)**

Market value added (MVA) is the amount of wealth that a company is able to create for its stakeholders since its foundation. In simple terms, it's the difference between the current market value of the company's stock and the initial capital that was invested in the company by both bondholders and stockholders.

MVA = Market Value of Shares – Book Value of Shareholders Equity

**Advantages of Market Value Added (MVA)**

**1. Makes companies more attractive to potential investors**

Investors will always prefer companies with higher MVA because it shows the firm's ability to create wealth for its stockholders. In other words, a high MVA shows that the organization is healthy and succeeding – a factor that signals a high probability of generating significant returns later on. So, for investors who are not interested in high-return investments, a firm with a high MVA seems like a safe option.

**2. Boosts the survival chances of a company**

In the corporate world, nothing is 100% sure. A company could be making billions of profits one minute and declaring bankruptcy the next time. However, for a company to register a high MVA, its likelihood to thrive is certainly high.

A high MVA means the company is generating enough wealth so it will continue to attract investors. It then means that it will continue to expand its operations, earn more profit, and stay ahead of its competitors.

## 5.10.5 Cash Value Added

**Q29. Explain briefly about Cash Value Added approach in value based management.**

*Ans :*

Cash value added (CVA) is a measure of a company's ability to generate cash flow above and beyond the required return to its investors. Generally speaking, a high CVA indicates a company's ability to produce liquid profits from one financial period to another.

Cash value added is a somewhat esoteric metric developed by the BCG, the management consulting firm formerly named firm Boston Consulting Group. It can be used as an alternative to economic value added (EVA) or earnings before interest, taxes, depreciation, and amortization (EBITDA).

The cash value added metric is one way to measure the real profitability of a business, beyond what is required to pay the bills and satisfy the investors.

The Boston Consulting Group designed the following two calculation methods for cash value added:

**(i)** **Direct:** CVA = gross cash flow – economic depreciation – capital charge

**(ii)** **Indirect:** CVA = (CFROI – cost of capital) × gross investment

Where,

- CFROI is cash flow return on investment, or [(gross cash flow – economic depreciation) / gross investment]
- Economic depreciation is $[WACC / (1+WACC)^{n-1}]$
- Gross cash flow is adjusted profit + interest expense + depreciation
- The capital charge is the cost of capital × gross investment
- Gross investment is net current assets + historical initial cost

**Q30. Briefly explain the disadvantages of VBM.**

*Ans :* **(Imp.)**

The following are main disadvantages of VBM.

- It difficult change organisational culture.
- It requires huge time, resources, and patience to implement successfully.
- It needs 100 per cent support from CEO, and from Board.
- Providing comprehensive training on VBM to employees necessary. So it is quite costly.
- There are so many VB Models available, but which are to be used and where? It is confusing.
- VBM is a system for transforming the corporate culture, i.e., moving from man based to system based.
- Creating shareholder value is the widely accepted corporate objective. This motivated companies to adopt VBM system.
- VBM is an approach where company's overall aspirations, analytical techniques and management processes are aligned to help company maximise its value by focusing management decision-making on the key drivers of shareholder value.

# Short Questions and Answers

**1. Define Merger.**

*Ans :*

A merger refers to integration or combination of two or more companies but, only one company continues its business. The other company which discontinues its business transfer its assets, debts, etc., to the company which is in existence.

**2. Acquisitions.**

*Ans :*

This refers to the purchase of controlling interest by one company in the share capital of an existing company. This may be by :

**(a)** An agreement with majority holder of interest.

**(b)** Purchase of new shares by private agreement.

**(c)** Purchase of shares in open market (open offer)

**(d)** Acquisition of share capital of a company by means by cash, issuance of shares.

**(e)** Making a buyout offer to general body of shareholders.

**3. Reverse Merger.**

*Ans :*

A reverse merger occurs when a smaller, private company acquires a larger, publicly listed company. Also known as a reverse takeover, the "reverse" term refers to the uncommon process of a smaller company acquiring a larger one.

**4. Reverse Acquisition.**

*Ans :*

In a reverse acquisition, the accounting acquirer usually issues no consideration for the acquiree. Instead, the accounting acquiree usually issues its equity shares to the owners of the accounting acquirer.

**5. Diversification.**

*Ans :*

Diversification is a business development strategy allowing a company to enter additional lines of business that are different from the current products, services and markets.

**6. What are the difference between merger and consolidation?**

*Ans :*

| S.No. | Merger | S.No. | Consolidation |
|---|---|---|---|
| 1. | In a merger, one compay takes over another including all assets and liabilities. The company that takes over remains active, while the one that is acquired essentially ceases to exit. | 1. | In a consolidation two or more companies merge to for one new, larger company. All of each company's assets and liabilities then become the property of the new another. |
| 2. | Firms involved are differently sized. | 2. | Firms involved are nearly equally sized. |

**7. Horizontal Merger.**

*Ans :*

The two companies which have merged are in the same industry, normally the market share of the new consolidated company would be larger and it is possible that it may move closer to being a monopoly or a near monopoly to avoid competition.

**Example,** Combination of two book publishers or two pharmaceutical manufacturing companies.

In this type of merger, companies expand their business and enjoy economies of scale and reduces competitors.

**8. Vertical Merger.**

*Ans :*

This merger happens when two companies that have 'buyer-seller' relationship (or potential buyer-seller relationship) come together.

**Example,** Combining a automobile manufacturing company and automobile marketing company or combining eatables manufacturing company and its packaging company.

Vertical merger can also exist in the form of forward and backward merger. When a specific company merges with it suppliers, it is backward merger and if a company merges with its customers, it is a forward merger.

**9. Define Value-based Management.**

*Ans :*

Value Based Management (VBM) is the management philosophy and approach that enables and supports maximum value creation in organizations, typically the maximization of shareholder value. VBM encompasses the processes for creating, managing, and measuring value. Value Based Management is an approach to organizational leadership in work. It says that organizations should define what they consider value to be, then focus on maximizing it. Organizations usually define value as shareholder value.

**10. Explain the elements and importance of value-based management.**

*Ans :*

**Elements**

**(i) To create value**

The model of Value Based Management is more or less like a business strategy with its main focus on helping the organizations to generate and increase the future value.

**(ii) To manage value**

It involves the aspects of leadership, communication, organizational culture, governance, and change management.

**(iii) To measure value**

The model of Value Based Management focuses on and is dependent on the corporate values and purposes. The corporate purpose can be economic in nature or can aim at the stakeholder values directly. '

**Importance**

**(i)** It helps the organizations to market their products and services in an optimum and successful fashion gaining the competitive advantage over their contemporary brands in the market.

**(ii)** It helps to attract the investors for the organizations resulting in the attainment of the financial goals and objectives.

**(iii)** It helps the organization to formulate the levels of corporate management and control that helps it restructuring the hierarchy, and prepares it for the threat of takeover and buy-out.

**(iv)** The helps the organization to build a favorable and a qualitative image in the market that will attract top talent from the industry

**11. Define Economic Value Added.**

*Ans :*

Economic Value Added (EVA) is a holistic method of evaluating a company's financial performance, which means that EVA is used not only as a mere valuation technique but also to find the economic contribution of a company to the society at large. The core concept behind EVA is that a company generates 'value' only if there is a creation of wealth in terms of returns in excess of its cost of capital invested. EVA insists on separation of firm's operation from its financing. So. if a company's UVA is negative, it means the company is not generating value from the funds invested into the business. Conversely, a positive EVA shows a company is producing value from the funds invested in it.

**12. Can a merger be considered a means of raising additional equity capital? Explain.**

*Ans :*

A merger happens when two companies combine to form a single entity. Public companies often merge with the declared goal of increasing shareholder value, by gaining market share or from entering new business segments. Unlike an acquisition, a merger can result in a brand new entity formed from the two merging firms.

A merger typically combines two companies of roughly equivalent size. The purchase of a company by a larger entity is often called an acquisition. Mergers often involve the exchange of shares rather than cash consideration. For example, in August 2017 Dow Chemical merged with polymers manufacturer DuPont to form DowDuPont (DWDP) by exchanging Dow and DuPont shares for those in the combined company.

# Exercise Problems

1. A Ltd. is considering takeover of B Ltd. and C Ltd. The financial data for the three companies are as follows:

| Particulars | A Ltd. | B Ltd. | C Ltd. |
|---|---|---|---|
| Equity Share Capital of Rs. 10 each (Rs. crores) | 450 | 180 | 90 |
| Earnings (Rs. crores) | 90 | 18 | 18 |
| Market price of each share (Rs.) | 60 | 37 | 46 |

Calculate :

(i) Price earnings ratios

(ii) Earnings per share of A Ltd. after the acquisition of B Ltd. and C Ltd. separately. Will you recommend the merger of either/both of the companies? Justify your answer.

**[Ans : (i) A = 40, B = 37, C = 23), (ii) B = 1.93, C = 2.08)**

2. X Ltd. is considering the proposal to acquire V Ltd. and their financial information is given below :

| Particulars | X Ltd. | Y Ltd. |
|---|---|---|
| No. of Equity shares | 10,00,000 | 6,00,000 |
| Market price per share (Rs.) | 30 | 18 |
| Market Capitalization (Rs.) | 3,00,00,000 | 1,08,00,000 |

X Ltd. intend to pay Rs. 1,40,00,000 in cash for Y Ltd., if Y Ltd.'s market price reflects only its value as a separate entity. Calculate the cost of merger:

(i) When merger is financed by cash

(ii) When merger is financed by stock

**[Ans : (i) 32,00,000, (ii) 28,00,000]**

3. XYZ Ltd. is considering merger with ABC Ltd. XYZ Ltd.'s shares are currently traded at Rs. 25. It has 2,00,000 shares outstanding and its profits after taxes (PAT) amount to Rs. Rs. 4,00,000. ABC Ltd. has 1,00,000 shares outstanding. Its current market price is Rs. 12.50 and its PAT are Rs. 1,00,000. The merger will be effected by means of a stock swap (exchange). ABC Ltd. has agreed to a plan under which XYZ Ltd. will offer the current market value of ABC Ltd.'s shares:

(i) What is the pre-merger earnings per share (EPS) and P/E ratios of both the companies?

(ii) If ABC Ltd.'s P/E ratio is 8, what is its current market price? What is the exchange ratio? What will XYZ Ltd.'s post-merger EPS be?

(iii) What must the exchange ratio be for XYZ Ltd.'s that pre and post-merger EPS to be the same?

**[Ans : (i) 12.50, (ii) 216, (iii) 0.50]**

# Choose the Correct Answers

1. _____ merger involves firm engaged in unrelated types of activities. [ c ]

   (a) Vertical (b) Horizontal

   (c) Conglomerate (d) Demerger

2. When existing company is dissolved to form few new companies, it is called as _____. [ c ]

   (a) Sin off (b) Split off

   (c) Split up (d) All of the above

3. _____ means an acquirer takes over the control of the target company. [ b ]

   (a) Joint Venture (b) Takeover

   (c) Disinvestment (d) Demerger

4. _____ means the action of an organization or government selling or liquidating an asset or subsidiary. [ d ]

   (a) Merger (b) Joint Venture

   (c) Takeover (d) Disinvestment

5. _____ is an arrangement whereby the assets of two or more companies come under the control of one company. [ a ]

   (a) Merger (b) Buyout

   (c) Joint Venture (d) Demerger

6. _____ may be defined as an arrangement where one party grants another party the right to use trade name. [ b ]

   (a) Alliance (b) Franchising

   (c) Slump sale (d) Joint Venture

7. _____ merger is a merger of two or more companies that compete in the same industry. [ b ]

   (a) Vertical (b) Horizontal

   (c) Co generic (d) Conglomerate

8. _____ helps a firm to grow and expand. [ a ]

   (a) Corporate Restructuring (b) Merger

   (c) Takeover (d) Demerger

9. _____ is the fusion of two or more existing companies. [ a ]

(a) Merger (b) Takeover

(c) Bailout (d) Demerger

10. _____ takes place when a healthy company merges with a financially weak company. [ a ]

(a) Reverse Merger (b) Demerger

(c) Takeover (d) Disinvestment

# Fill in the blanks

1. Traditional view of shareholder value was determined without deducting _____ capital charge.
2. Use of Time value of money in evaluating projects was given by _____ in _____.
3. _____ developed discounting cash flow method in project evaluation.
4. Activity-based and Transaction-based Costing Systems developed in the _____.
5. Balanced scored model developed by _____.
6. Marakon, and Alkar Models are based on_____.
7. EVA is the result of: NOPAT less_____charge.
8. TSR, and TBR are metrics developed by _____.
9. _____ depreciation is the amount of sinking fund kept aside to cover the replacement cost of the asset.
10 Cash value is superior performance measure to _____.

**ANSWERS**

1. Equity
2. Grant, 1938
3. Dean
4. 1980
5. Kaplan and Norton
6. DCFS
7. Capital
8. BCG
9. Economic
10. EVA

# Internal Assessment (Mid Examinations)

In CIE, for theory subjects, during a semester, there shall be two mid-term examinations. Each MidTerm examination consists of two parts i) Part – A for 10 marks, ii) Part – B for 20 marks with a total duration of 2 hours as follows:

1. Mid-Term Examination for 30 marks:

   (a) Part - A: Objective/quiz paper/Short Note questions for 10 marks.

   (b) Part - B: Descriptive paper for 20 marks.

   The objective/quiz paper is set with multiple choice, fill-in the blanks and match the following type of questions for a total of 10 marks. The descriptive paper shall contain 6 full questions out of which, the student has to answer 4 questions, each carrying 5 marks. The average of the two Mid Term Examinations shall be taken as the final marks for Mid Term Examination (for 30 marks). The remaining 10 marks of Continuous Internal Evaluation are distributed as:

2. Assignment for 5 marks. (Average of 2 Assignments each for 5 marks)

3. PPT/Poster Presentation/ Case Study/Video presentation/Survey/Field Study/Group discussion /Role Play on a topic in the concerned subject for 5 marks before II Mid-Term Examination.

   While the first mid-term examination shall be conducted on 50% of the syllabus, the second mid-term examination shall be conducted on the remaining 50% of the syllabus.

   Five (5) marks are allocated for assignments (as specified by the subject teacher concerned). The first assignment should be submitted before the conduct of the first mid-term examination, and the second assignment should be submitted before the conduct of the second mid-term examination. The average of the two assignments shall be taken as the final marks for assignment (for 5 marks).

   PPT/Poster Presentation/ Case Study/Video presentation/Survey/Field Study/Group discussion /Role Play on a topic in the concerned subject for 5 marks before II Mid-Term Examination.

## UNIT - I

### Part - A

**Multiple Choice Questions**

1. From the below-mentioned items which are financial assets? [ d ]

   (a) Machines (b) Bonds

   (c) Stocks (d) B and C

2. The market value of the shares is decided by [ a ]

   (a) The investment market (b) The government

   (c) Shareholders (d) The respective companies

3. The repurchase of stock _____ the earnings per share and _____ the market price of stock. [ a ]

   (a) Increases; Increases (b) Decreases; Decreases

   (c) Increases; Decreases (d) Decreases; Increases

**Fill in the Blanks**

4. _____ refers to the study of finance with a long term perspective which takes into account the strategic goals of the enterprise. **[Strategic Financial Management]**
5. _____ entails estimating the flow of cash in and out of the company over a set fiscal period. **[Cash flow forecasting]**
6. _____ is a set of activities designed to analysd a situation systematically and generate, implement, and evaluate solutions. **[Problem solving]**

**Short Notes**

7. Nature **(Unit-I, SQA-2)**
8. Define Financial Forecasting. **(Unit-I, SQA-4)**
9. Income forecasting **(Unit-I, SQA-6)**
10. Define Financial Planning. **(Unit-I, SQA-8)**

**Part - B**

1. Define Strategic Financial Management. Explain the nature of Strategic Financial Management. **(Unit-I, Q.No. 1)**
2. Explain the Scope and Importance of Strategic Financial Management. **(Unit-I, Q.No. 3)**
3. Explain the elements of Strategic Financial Management. **(Unit-I, Q.No. 4)**
4. Explain the Constraints in Strategic Financial Management. **(Unit-I, Q.No. 6)**
5. Explain different types of Financial Forecasting. **(Unit-I, Q.No. 8)**
6. Explain the principles governing a financial plan. **(Unit-I, Q.No. 12)**

## UNIT - II

**Part - A**

**Multiple Choice Questions**

1. Risk arises from various sources such as _____. [ d ]
   (a) Market Risk (b) Competition Risk
   (c) International Risk (d) All of the above
2. Scenario Analysis is considered under scenarios such as _____. [ d ]
   (a) Worst Case Scenario (b) Base Case Scenario
   (c) Best Case Scenario (d) All of the above
3. Sensitivity analysis is useful in decision making because _____. [ b ]
   (a) It shows the probabilities associated with each outcome
   (b) It tells the user how much critical each input is for the Output value
   (c) It allows to calculate the probable results under different scenarios
   (d) The results of Sensitivity Analysis are reliable

**Fill in the Blanks**

4. Cash flows of any project having conventional CF pattern, involves _____ basic elements. **(Three)**
5. _____ and _____ charges should be added to the cash outflows. **(NWC, Installation)**
6. The variations in the actual returns arising from a project is known as _____. **(Risk)**

**Short Notes**

7. Define Uncertainty **(Unit-II, SQA-2)**
8. Define expected value of perfect information **(Unit-II, SQA-4)**
9. Define Probability distribution of cashflows **(Unit-II, SQA-6)**
10. Define Sensitivity analysis. **(Unit-II, SQA-8)**

**Part - B**

1. Explain the techniques for decision making under risk. **(Unit-II, Q.No. 2)**
2. What is certainty equivalent coefficient? **(Unit-II, Q.No. 6)**
3. What is a sensitivity analysis? Explain its impact on project investment decisions. **(Unit-II, Q.No. 9)**
4. Briefly discuss the procedure for simulation analysis. **(Unit-II, Q.No. 12)**
5. What is Corporate Cost of Capital? Explain briefly about various techniques of corporate cost of capital? **(Unit-II, Q.No. 18)**
6. Let consider the following payoff matrix : **(Unit-II, Prob. 3)**

| | | Act | | |
|---|---|---|---|---|
| State of Nature | Probability | Do not Expand (`) | Expand 200 Unit (`) | Expand 400 Units (`) |
| High Demand | 0.4 | 2,500 | 3,500 | 4,900 |
| Medium Demand | 0.4 | 2,500 | 3,500 | 2,500 |
| Low Demand | 0.2 | 2,500 | 1,500 | 1,000 |

Determine which act must be select using EMV criterion.

## UNIT - III

**Part - A**

**Multiple Choice Questions**

1. Which of the following is the term that describes the amount of time taken for a capital budgeting project to recover its initial investment? [ c ]

   (a) Investment period (b) Redemption period

   (c) Payback period (d) Maturity period

2. Which of the accompanying addresses how much time it takes for a capital budgeting undertaking to recuperate its underlying expense? [ b ]

   (a) Maturity period (b) Payback period

   (c) Redemption period (d) Investment period

3. Integrating floatation costs into the examination of a task will: [ d ]
   (a) Have no impact on the current worth of the venture.
   (b) Increase the NPV of the venture.
   (c) Increase the task's pace of return.
   (d) Increase the underlying money outpouring of the task.

**Fill in the Blanks**

4. _____ option allows company to delay making an investment. **(Timing)**
5. IRR is also known as _____ **(Yield method)**
6. _____ method is a traditional method of capital budgeting. **(Payback period)**

**Short Notes**

7. Timing of Option **(Unit-III, SQA-2)**
8. Define IRR ? **(Unit-III, SQA-4)**
9. Mixed investment **(Unit-III, SQA-8)**
10. Discounted Pay back **(Unit-III, SQA-12)**
11. Payback Reciprocal Method (PRM) **(Unit-III, SQA-13)**

**Part - B**

1. Summarize the concept of Capital Budgeting. **(Unit-III, Q.No. 2)**
2. Define IRR ? Explain the merits and demerits of IRR. **(Unit-III, Q.No. 4)**
3. Write a short notes on Modified IRR? **(Unit-III, Q.No. 6)**
4. Define Terminal Value Method. **(Unit-III, Q.No. 18)**
5. Explain briefly about Hertz simulation ? Elaborate the process of Hertz simulation. **(Unit-III, Q.No. 24)**
6. X company is considering two projects M & N, each of which require an initial outlay of Rs.50 lakhs. The expected cash inflows from these projects are: **(Unit-III, Prob. 17)**

| Year | Project M | Project N |
|---|---|---|
| 1 | 12 | 37 |
| 2 | 18 | 24 |
| 3 | 33 | 19 |
| 4 | 36 | 12 |

   a) What is the PBP for each of the project?
   b) If the two projects are mutually exclusive and the cost of capital is 15%. Which project should the firm invest in?
   c) If cost of capital is 14%, What is the modified IRR of each project?

## UNIT - IV

**Part - A**

**Multiple Choice Questions**

1. What are the components of capital structure? [ b ]
   (a) Debts and Equity
   (b) Debts, Preferred stock and Equity
   (c) Debts, revenue and equity
   (d) All of the above

2. Financial Leverage means [ a ]
   (a) Increase in total earnings per share in the company
   (b) Maximising equity
   (c) Minimising debts
   (d) The balance between equity and debt
3. The number of components financial seniority has are: [ d ]
   (a) 2 (b) 5
   (c) 7 (d) 4

**Fill in the Blanks**

4. The most crucial component of starting a business is _____. **(Capital)**
5. The _____ theory emanates from information asymmetries between firm management and shareholders. **(Signalling)**
6. _____ is denotes as that portion of profits which is allocated to the shareholders of the company. **(Dividend)**

**Short Notes**

7. Define Mergers. **(Unit-IV, SQA-2)**
8. What are joint ventures? **(Unit-IV, SQA-6)**
9. What is diversification strategy? **(Unit-IV, SQA-7)**
10. Concentric Diversification **(Unit-IV, SQA-9)**
11. Concentric Diversification **(Unit-IV, SQA-10)**

**Part - B**

1. Explain the factors determining capital structure. **(Unit-IV, Q.No. 2)**
2. Discuss about Signaling Theory. **(Unit-IV, Q.No. 4)**
3. Explain briefly about Capital Structure Puzzle. **(Unit-IV, Q.No. 8)**
4. Explain briefly about Linter's Dividend Model. **(Unit-IV, Q.No. 12)**
5. Explain the various methods of Buy Back of Shares. **(Unit-IV, Q.No. 16)**
6. Explain the Impacts of Share Buybacks. **(Unit-IV, Q.No. 18)**

## UNIT - V

**Part - A**

**Multiple Choice Questions**

1. _____ means the action of an organization or government selling or liquidating an asset or subsidiary. [ d ]
   (a) Merger (b) Joint Venture
   (c) Takeover (d) Disinvestment

2. _____ merger is a merger of two or more companies that compete in the same industry. [ b ]

(a) Vertical (b) Horizontal

(c) Co generic (d) Conglomerate

3. _____ helps a firm to grow and expand. [ a ]

(a) Corporate Restructuring (b) Merger

(c) Takeover (d) Demerger

**Fill in the Blanks**

4. Use of Time value of money in evaluating projects was given by _____ in _____. **(Grant, 1938)**

5. _____ developed discounting cash flow method in project evaluation. **(Dean)**

6. Balanced scored model developed by _____. **(Kaplan and Norton)**

**Short Notes**

7. Acquisitions. **(Unit-V, SQA-2)**

8. Reverse Acquisition. **(Unit-V, SQA-4)**

9. What are the difference between merger and consolidation? **(Unit-V, SQA-6)**

10. Define Economic Value Added. **(Unit-V, SQA-11)**

**Part - B**

1. Explain how mergers and acquisitions strategies are framed and implemented. **(Unit-V, Q.No. 4)**

2. Outline the detailed steps involved in analyzing and planning a prospective merger from the stand point of the acquiring firm. **(Unit-V, Q.No. 6)**

3. Discuss the issues that arises while dealing with mergers. **(Unit-V, Q.No. 8)**

4. Define diversification ? Explain different types of diversification. **(Unit-V, Q.No. 12)**

5. Company A plans to acquire Company B. The relevant financial details of the two firms, prior to merger announcement, are given below: **(Unit-V, Prob. 4)**

| Particulars | Company A | Company B |
|---|---|---|
| Market price per share in rupees | 60 | 25 |
| Number of shares | 3,00,000 | 2,00,000 |

The merger is expected to bring gains which have a present value of Rs.40 lakhs. Company A offers one share in exchange for every two shares of Company B.

a) What is the true cost of Company A for acquiring Company B?

b) What is the net present value of the merger to Company A?

c) What is the net present value of the merger to Company B?

6. Explain Marakon approach to value-based management. **(Unit-V, Q.No. 23)**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

**MBA IV - Semester Examinations**

**R22**

**Model Paper - I**

# STRATEGIC FINANCIAL MANAGEMENT

**Time : 3 Hours]** **[Max. Marks : 60**

**Note :** This question paper contains two parts **A** and **B**.

**Part A** is compulsory which carries 10 marks. Answer all questions in **Part A.**

**Part B** consists of 5 Units. Answer any **One** full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

**PART - A (10 × 1 = 10 Marks)**

**ANSWERS**

1. (a) Define Strategic Financial Management. **(Unit-I, SQA-1)**
   (b) Define Financial Forecasting. **(Unit-I, SQA-4)**
   (c) Define Sensitivity analysis. **(Unit-II, SQA-8)**
   (d) Define Expected Value of Perfect Information **(Unit-II, SQA-4)**
   (e) Mixed investment **(Unit-III, SQA-8)**
   (f) Capital Budgeting **(Unit-III, SQA-3)**
   (g) Define financial discipline. **(Unit-IV, SQA-4)**
   (h) What is Capital Structure? **(Unit-IV, SQA-1)**
   (i) What are the difference between merger and consolidation? **(Unit-V, SQA-6)**
   (j) Vertical Merger. **(Unit-V, SQA-8)**

**PART - B (5 × 10 = 50 Marks)**

2. Discuss the various elements of strategic financial management. **(Unit-I, Q.No.4)**

OR

3. Define Agency Theory. Explain different types of Agency Theory. **(Unit-I, Q.No.19)**
4. (a) What are the types of investment decisions that can be adopted under uncertainity. **(Unit-II, Q.No.3)**
   (b) What is simulation ? Explain the nature of simulation. **(Unit-II, Q.No.10)**

OR

5. (a) A company is considering new equipment. The net cash flows of the equipment have been estimated as given below. The equipment's life is estimated to be two years.

| | Year 1 | Probability | Year 2 | Probability |
|---|---|---|---|---|
| NCF | 10,000 | 0.4 | 8,000 | 0.5 |
| | | | 12,000 | 0.5 |
| NCF | 12,000 | 0.6 | 16,000 | 0.4 |
| | | | 20,000 | 0.6 |

The cost of equipment is ` 20,000 and the company's cost of capital is 12 per cent. Use the decision tree approach to recommend whether the equipment should be bought or not. **(Unit-II, Prob.9)**

(b) Briefly discuss the procedure for simulation analysis. **(Unit-II, Q.No.12)**

6. (a) Explain briefly about abandonment decision of a capital budgeting process ? **(Unit-III, Q.No.3)**

(b) A project cost ` 96,000 and is expected to generate cash inflows of ` 48,000, ` 12,000 and ` 36,000 at the end of each year for next 3 years. Calculate project's IRR. **(Unit-III, Prob.3)**

OR

7. (a) Explain briefly about Hertz simulation ? Elaborate the process of Hertz simulation. **(Unit-III, Q.No.24)**

(b) The expected cash flows of a project are as follows:

| Year | Cash flow Rs. |
|---|---|
| 0 | –12,00,000 |
| 1 | 5,00,000 |
| 2 | 4,00,000 |
| 3 | 4,00,000 |
| 4 | 5,00,000 |
| 5 | 3,00,000 |

The cost of capital is 12 percent. Calculate

(a) Calculation of MIRR

(b) The discounted payback period. **(Unit-III, Prob.19)**

8. (a) Explain the factors determining capital structure. **(Unit-IV, Q.No.2)**

(b) Discuss the salient features of Linter's Dividend Model. **(Unit-IV, Q.No.12)**

OR

9. (a) Define Financial Distress. Explain the Characteristics of Financial Distress. **(Unit-IV, Q.No.20)**

(b) What is Insolvency and Bankruptcy Code? State the objectives of IBC. **(Unit-IV, Q.No.25)**

10. Rosy Ltd. is contemplating the purchase of Lily ltd. Rosy ltd has 3,00,000 shares having a market price of ` 30 per share while Lily ltd has 2,00,000 shares selling at ` 20 per share. The EPS of rosy ltd and Lily ltd are ` 4 and ` 2.25 respectively. There is a proposal for exchange of 0.5 share of Rosy Ltd for 1 share of Lily ltd. Calculate EPS after merger and the impact on EPS for the shareholders of both the companies. **(Unit-V, Prob.3)**

OR

11. Explain McKinsey approaches to value-based management. **(Unit-V, Q.No.25)**

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

## MBA IV - Semester Examinations

**R22**

## Model Paper - II

## STRATEGIC FINANCIAL MANAGEMENT

**Time : 3 Hours]** **[Max. Marks : 60**

**Note :** This question paper contains two parts **A** and **B**.

**Part A** is compulsory which carries 10 marks. Answer all questions in **Part A.**

**Part B** consists of 5 Units. Answer any **One** full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

**PART - A (10 × 1 = 10 Marks)**

**ANSWERS**

1. (a) Decision-making **(Unit-I, SQA-8)**
   (b) Characteristics of Strategic Financial Management. **(Unit-I, SQA-3)**
   (c) What is Corporate Cost of Capital **(Unit-II, SQA-12)**
   (d) Define Risk. **(Unit-II, SQA-1)**
   (e) Discounted Pay back **(Unit-III, SQA-12)**
   (f) Timing of Option **(Unit-III, SQA-2)**
   (g) Define Buy Back of Shares. **(Unit-IV, SQA-9)**
   (h) What is Financial Flexibility? **(Unit-IV, SQA-3)**
   (i) Define Value-based Management. **(Unit-V, SQA-9)**
   (j) Acquisitions. **(Unit-V, SQA-2)**

**PART - B (5 × 10 = 50 Marks)**

2. Explain the Scope and Importance of Strategic Financial Management. **(Unit-I, Q.No.3)**

OR

3. Explain the Success Factors of Strategic Financial Management. **(Unit-I, Q.No.5)**

4. (a) Explain briefly about various criteria involved in the process of decision making under risk. **(Unit-II, Q.No.2)**
   (b) What is Capital Rationing? Explain different types of Capital Rationing. **(Unit-II, Q.No.14)**

OR

5. (a) Rahul Company Ltd. considers the purchase of a new investment. For which two alternatives investments are available (X and Y) each costing Rs. 1,00,000. Cash inflows are as follows,

Cash Inflows

| Year | Investment 'X' (Rs.) | Investment 'Y' (Rs.) |
|---|---|---|
| 1 | 50,000 | 45,000 |
| 2 | 45,000 | 25,000 |
| 3 | 35,000 | 20,000 |
| 4 | 25,000 | 40,000 |

The company has a target return on capital of 12%. Risk premium rates are 4% and 10% respectively for investments X and Y. Suggest which investment should be preferred. **(Unit-II, Prob.5)**

(b) How can investment decisions be taken under Capital Constraints. **(Unit-II, Q.No.16)**

6. (a) Discuss the effect of Inflation on Capital Budgeting Decisions. **(Unit-III, Q.No.14)**

(b) Cummings products company is considering two mutually exclusive investment.

The project expected net cash flows are as follows,

| Year | A | B |
|---|---|---|
| 0 | (300) | (405) |
| 1 | (387) | 134 |
| 2 | (193) | 134 |
| 3 | 000) | 134 |
| 4 | 600 | 134 |
| 5 | 600 | 134 |
| 6 | 850 | 134 |
| 7 | (180) | 0 |

(a) Construct NPV profiles for A and B projects discounted at 10%.

(b) What is each projects MIRR at a cost of capital 10%? **(Unit-III, Prob.7)**

OR

7. (a) Discuss the Hillier Approach in analysis and appraisal of project. **(Unit-III, Q.No.25)**

(b) A firm has a set of projects P, Q, R, S and T whose cashflows are as follows,

| | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| P | -200 | 40 | 80 | 120 | 160 |
| Q | -300 | 100 | 200 | 100 | 280 |
| R | -120 | -40 | 80 | 80 | - |
| S | -200 | 120 | 120 | 200 | 80 |
| T | -100 | -140 | 80 | 120 | 60 |

Under non rationing situation, the selection of project is based on NPV of the projects.

The NPV of the projects can be determined by discounting the cashflows at a rate of 10%.

**(Unit-III, Prob.26)**

8. (a) Explain briefly about Signaling Theory. **(Unit-IV, Q.No.4)**

(b) What are the assumptions and arguments used by Modigliani and Miller in support of the irrelevance of dividends? Are dividends really irrelevant ? Discuss. **(Unit-IV, Q.No.14)**

OR

9. (a) Explain the Impacts of Share Buybacks. **(Unit-IV, Q.No.18)**

(b) Define Financial Distress Restructuring. Explain the benefits and causes of Financial Distress Restructuring. **(Unit-IV, Q.No.24)**

10. Explain the government guidelines for takeover of the companies. **(Unit-V, Q.No.19)**

OR

11. Given below is the financial data of two companies Company 'A' and Company 'B', Company 'A' is acquiring Company 'B' by exchanging its shares on a one-to-one basis for Company 'B'. The exchange ratio is based on the market prices of the shares of the two companies.

| Particulars | Company 'A' | Company 'B' |
|---|---|---|
| Earning after taxes (Rs.) | 10,00,000 | 7,00,000 |
| Equity shares outstanding (Number) | 4,00,000 | 2,00,000 |
| Earning per share (Rs) | 2.50 | 3.50 |
| Price earnings ratio (P/E) | 14 | 10 |
| Market price per ratio (Rs) | 35 | 35 |

You are required to calculate the following after Acquisition/Merger:

(i) EPS (Post merger)

(ii) Change in EPS for the shareholders of the companies 'A' and 'B'

(iii) Market value of the firm, post-merger (Assuming that P/E ratio of the company 'A'; remains unchanged)

(iv) Profit accruing to shareholders of both the firms. **(Unit-V, Prob.5)**

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

## MBA IV - Semester Examinations

**R22**

## Model Paper - III

## STRATEGIC FINANCIAL MANAGEMENT

**Time : 3 Hours]** **[Max. Marks : 60**

**Note :** This question paper contains two parts **A** and **B**.

**Part A** is compulsory which carries 10 marks. Answer all questions in **Part A.**

**Part B** consists of 5 Units. Answer any **One** full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

**PART - A (10 × 1 = 10 Marks)**

**ANSWERS**

1. (a) Decision-making **(Unit-I, SQA-9)**
   (b) Importance of Financial Forecasting. **(Unit-I, SQA-5)**
   (c) Define Simulation. **(Unit-II, SQA-9)**
   (d) Define Probability distribution of cashflows **(Unit-II, SQA-6)**
   (e) Pure Investment **(Unit-III, SQA-9)**
   (f) Modified IRR **(Unit-III, SQA-6)**
   (g) Define Dividend Puzzle **(Unit-IV, SQA-8)**
   (h) Define Financial Distress. **(Unit-IV, SQA-10)**
   (i) Reverse Merger. **(Unit-V, SQA-3)**
   (j) Define Merger. **(Unit-V, SQA-1)**

**PART - B (5 × 10 = 50 Marks)**

2. Explain the process of Financial Planning. **(Unit-I, Q.No.13)**

OR

3. Define Strategic Financial Management. Explain the nature of Strategic Financial Management. **(Unit-I, Q.No.1)**

4. (a) Explain briefly about probability distribution of cashflows ? **(Unit-II, Q.No.7)**
   (b) What is Corporate Cost of Capital? Explain briefly about various techniques of corporate cost of capital? **(Unit-II, Q.No.18)**

OR

5. (a) The Delta corporation is considering an investment in one of the two mutually exclusive proposals: project A which involves an initial outlay of 1,50,000. The certainty equivalent approach is employed in evaluating risky investments. The current yield on treasury bills is 0.05 and the company uses as the riskless rate.

   The expected values of net cash flows with their respectively certainty-equivalents

are :

| | Project A | | Project B | |
|---|---|---|---|---|
| Year | Cash flows (` Thousands) | Certainty-equivalent | Cash flows (` Thousands) | Certainty-equivalent |
| 1 | 90 | 0.8 | 90 | 0.9 |
| 2 | 100 | 0.7 | 90 | 0.8 |
| 3 | 110 | 0.5 | 100 | 0.6 |

(a) Which project should be acceptable to the company?

(b) Which project is riskier ? How do you know?

(c) If the company was to use the risk-adjusted discount rate method, which project would analyzed with higher rate ? **(Unit-II, Prob.6)**

(b) What are the constraints while making investments in the new projects? Explain. **(Unit-II, Q.No.17)**

6. (a) Explain briefly about multi period capital constraints an unresolved problem. **(Unit-III, Q.No.20)**

(b) Calculate discounted pay-back period from the information given below :

| | |
|---|---|
| Cost of project | Rs. 6,00,000 |
| Life of the project | 5 years |
| Cut off rate 10% | Rs. 2,00,000 |

**(Unit-III, Prob.11)**

OR

7. (a) Define Pay Back Period. Explain merits and demerits of Pay Back Period. **(Unit-III, Q.No.15)**

(b) A company is considering two mutually exclusive projects X and Y Project X costs Rs. 30,000 and Project Y Rs. 36,000. You have been given below the net present value probability distribution for each project :

| Project X | | Project Y | |
|---|---|---|---|
| NPV Estimate Rs. | Probability | NPV Estimate Rs. | Probability |
| 3,000 | 0.1 | 3,000 | 0.2 |
| 6,000 | 0.4 | 6,000 | 0.3 |
| 12,000 | 0.4 | 12,000 | 0.3 |
| 15,000 | 0.1 | 15,000 | 0.2 |

(i) Compute the expected net present value of projects X and Y.

(ii) Compute the risk attached to each project i.e., standard deviation of each probability distribution.

(iii) Which project do you consider more risky and why ?

(iv) Compute the profitability index of each project. **(Unit-III, Prob.30)**

8. (a) Explain the determinants of dividend policy in a fast growing company. Should there be a dividend freeze? **(Unit-IV, Q.No.10)**

(b) Define Buy Back of Shares. Explain the characteristics of Buy Back of Shares. **(Unit-IV, Q.No.15)**

OR

9. (a) Explain the Benefits and Constraints to Buy Back of Shares. **(Unit-IV, Q.No.17)**

(b) Explain the process of Corporate Insolvency Resolution. **(Unit-IV, Q.No.28)**

10. Define Economic Value Added. Explain various steps for the calculation of Economic Value Added. **(Unit-V, Q.No.27)**

OR

11. Define diversification ? Explain different types of diversification. **(Unit-V, Q.No.12)**

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

**M.B.A IV - Semester Examination** **R17**

**April / May - 2019**

## STRATEGIC INVESTMENT AND FINANCING DECISIONS

Time : 3 Hours] [Max. Marks : 75

**Note** : This question paper contains two Parts **A** and **B.**
**Part A** is compulsory which carries 25 marks. Answer **all** questions in **Part** A.
**Part B** consists of 5 Units. Answer any **one** full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

**PART - A (5 × 5 = 25 Marks)**

**ANSWERS**

1. (a) What is sensitivity analysis? Explain its impact on project investment decisions. **(Unit-II, Q.No. 9)**

   (b) Define pure, simple and mixed investments. **(Unit-III, Q.No. 8)**

   (c) Compare single period constraints and multi period capital constraint. **(Unit-III, Q.No. 21)**

   (d) Define a lease. Elucidate its advantages. **(Out of Syllabus)**

   (e) Differentiate mergers and acquisitions. **(Unit-V, Q.No. 9)**

**Part - B (5 × 10 = 50 Marks)**

2. What are the constraints while making investments in the new projects? Explain. **(Unit-II, Q.No. 17)**

OR

3. The Delta corporation is considering an investment in one of the two mutually exclusive proposals: project A which involves an initial outlay of 1,50,000. The certainty equivalent approach is employed in evaluating risky investments. The current yield on treasury bills is 0.05 and the company uses as the riskless rate. The expected values of net cash flows with their respectively certainty-equivalents are :

| Year | Project A | | Project B | |
|---|---|---|---|---|
| | Cash flows (` Thousands) | Certainty-equivalent | Cash flows (` Thousands) | Certainty-equivalent |
| 1 | 90 | 0.8 | 90 | 0.9 |
| 2 | 100 | 0.7 | 90 | 0.8 |
| 3 | 110 | 0.5 | 100 | 0.6 |

   (a) Which project should be acceptable to the company?

   (b) Which project is riskier ? How do you know?

   (c) If the company was to use the risk-adjusted discount rate method, which project would analyzed with higher rate ? **(Unit-II, Prob. 6)**

4. What are the different types of investments? What is the rationale behind choosing each ? **(Unit-III, Q.No. 8)**

OR

5. A plastic manufacturer has under consideration the proposal of production of high quality plastic glasses. The necessary equipment to manufacture the glasses would cost `1 lakh and would last 5 years. The tax relevant rate of depreciation is 25 per cent on written down value. There is no other asset in this block. The expected salvage value is ` 10,000. The glasses can be sold at ` 4 each. Regardless of the level of production, the manufacturer will incur cash cost of ` 25,000 each year if the project is undertaken. The overhead costs allocated to this new line would be ` 5,000. The variable costs are estimated at ` 2 per glass. The manufacturer estimates it will sell about 75,000 glasses per year; the tax rate is 35 per cent. Should the proposed equipment be purchased? Assume 20 per cent cost of capital and additional working requirement, ` 50,000. **(Unit-III, Prob. 8)**

6. Write a short note on :

   (a) Discount pay back **(Unit-III, Q.No. 16)**

   (b) Post payback **(Unit-III, Q.No. 16)**

   (c) Surplus payback **(Unit-III, Q.No. 16)**

OR

7. Briefly discuss the Hillier approach and Hertz simulation. **(Unit-III, Q.No. 25, 24)**

8. Welsh Limited is faced with a decision to purchase or acquire on lease a mini car. The cost of the mini car is ` 1,26,965. It has a life of 5 years. The mini car can be obtained on lease by paying in advance equal lease rentals annually. The leasing company desires a return of 10 per cent on the gross value of the asset. Welsh Limited can also obtain 100 per cent finance from its regular banking channel. The annual rate of interest will be 15 percent and the loan will be paid in 5 annual equal installments, inclusive of interest, each installment becoming due at the beginning of the year. The effective tax rate of the company is 40 percent. For the purpose of taxation, it is to be assumed that the asset will be written off over a period of 5 years on a straight line basis.

   (a) Advice welsh Limited about the method of acquiring the car.

   (b) What should be the annual lease rental to be charged by the leasing company to match the loan option? **(Out of Syllabus)**

OR

9. How do lease financial decisions evaluated compare to hire purchase? **(Out of Syllabus)**

10. What are the government guidelines for takeover? **(Unit-V, Q.No. 19)**

OR

11. Discuss diversification strategies. **(Unit-V, Q.No. 12)**

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

**M.B.A IV - Semester Examination** **R17**

**December - 2019**

## STRATEGIC INVESTMENT AND FINANCING DECISIONS

Time : 3 Hours] [Max. Marks : 75

**Note** : This question paper contains two Parts **A** and **B.**
**Part A** is compulsory which carries 25 marks. Answer **all** questions in **Part** A.
**Part B** consists of 5 Units. Answer any **one** full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

**PART - A (5 × 5 = 25 Marks)**

**ANSWERS**

1. (a) What is Certainty Equivalent Approach? **(Unit-II, Q.No. 6)**
   (b) What is risk adjusted NPV? **(Unit-III, Q.No. 11)**
   (c) What is modified IRR? **(Unit-III, SQA-6)**
   (d) What is Lease Financing? What are its advantages? **(Out of Syllabus)**
   (e) Why mergers are necessitated? **(Unit-V, Q.No. 1)**

**Part - B (5 × 10 = 50 Marks)**

2. Calculate portfolio return and risk form the following information. The portfolio consists of equal weights of security X and Y.

| Rx **(%)** | 13 | 15 | 13 | 17 | 14 |
|---|---|---|---|---|---|
| Ry **(%)** | 21 | 23 | 26 | 19 | 24 |

**(Out of Syllabus)**

OR

3. Explain the Methods of Capital Rationing. **(Unit-II, Q.No. 15)**
4. Differentiate among Simple, Pure and Mixed Investment. **(Unit-III, Q.No. 9)**

OR

5. Discuss the multiple IRR and modified IRR. **(Unit-III, Q.No. 5, 6)**
6. A Project cost ` 28,000 and has a scrap value of ` 5,000 after 5 years. The net profit before depreciation and taxes for the five years period are expected to be ` 4,000, ` 6,000, ` 7000, ` 9,000, ` 12,000. Calculate the ARR assuming 35% rate of tax and depreciation on straight line method. **(Unit-III, Prob. 21)**

OR

7. Explain the model of Hertz's Simulation. **(Unit-III, Q.No. 24)**
8. Explain the hire purchase and installment decisions. **(Out of Syllabus)**

OR

9. Compare hire purchase versus leasing an asset. **(Out of Syllabus)**
10. Distinguish merger from Acquisition. Evaluate the two strategies. **(Unit-V, Q.No. 9)**

OR

11. Explain different types of mergers. **(Unit-V, Q.No. 17)**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

**MBA IV Semester Examination**

**R17**

**September - 2020**

# STRATEGIC INVESTMENT AND FINANCING DECISIONS

Time : 2 Hours ] [Max. Marks : 75

**ANSWERS**

**Note :** Answer any Five questions.

All questions carry equal marks

1. Explain Monte Carlo approach to simulation. **(Unit-II, Q.No. 13)**

2. Explain the impact of inflation on Capital Budgeting decisions. **(Unit-III, Q.No. 14)**

3. Write a short note on:

   (a) Bailout payback **(Unit-III, Q.No. 16)**

   (b) Hertz simulation **(Unit-III, Q.No. 24)**

4. Discuss the advantages of leasing. **(Out of Syllabus)**

5. Nelson Electronic Company acquires Borton Electronic Company on 'share for share exchange' basis. The position before takeover was as under:

| Particulars | Nelson Company | Borton Company |
|---|---|---|
| Number of Shares | 20,000 | 10,000 |
| Total Earnings (`) 2,00,000 | 1,00,000 | |
| Market Price of Share (`) | 20 | 15 |

The shareholders of Borton Company are offered 7,500 shares of Nelson Electronic Company for 10,000 shares (i.e., each shareholder of Borton electronic company gets 0.75 shares of Nelson electronic company for 1 share of Borton electronic company).

You are required to calculate the EPS of the amalgamated company vis-a-vis before takeover position of the two companies and the gain/loss of the shareholder of the two independent companies consequent to amalgamation. **(Unit-V, Prob. 7)**

6. Explain scope and importance of information and data bank in project selection. **(Out of Syllabus)**

7. Define merger. Explain different types of mergers. Outline its advantages. **(Unit-V, Q.No. 1, 11, 17)**

8. Write short notes on:

   (a) Modified IRR **(Unit-III, Q.No. 6)**

   (b) Hire purchase and Installment Decisions. **(Out of Syllabus)**

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

**MBA IV-Semester Examination**

**R19**

**July/August - 2021**

## STRATEGIC INVESTMENT AND FINANCING DECISIONS

Time : 2 Hours] [Max. Marks : 75

Answer any Five questions

All questions carry equal marks

**ANSWERS**

1. An automobile company has come up with an electric car. The firm is ready for pilot production and test marketing. This will cost ` 200 crore and take six months. Management believes that there is 70 percent chance that the pilot production and test marketing will be successful. In case of success, the company can build a plant costing ` 1500 crores. The plant will generate an annual cash inflow of ` 300 crore for 20 years if the demand is high or an annual cash inflow of ` 200 crore if the demand is low. High demand has a probability of 0.6; low demand has a probability of 0.4. Suggest the optimal course of action using decision tree analysis. **(Unit-II, Prob. 11)**

2. (a) Briefly discuss the procedure for simulation analysis. **(Unit-II, Q.No. 12)**

   (b) What is the risk of a portfolio? **(Out of Syllabus)**

3. The expected cash flows of a project are as follows:

| Year | Cash flow (`) |
|---|---|
| 0 | 10,00,000 |
| 1 | 2,00,000 |
| 2 | 3,00,000 |
| 3 | 4,00,000 |
| 4 | 5,00,000 |
| 5 | 3,00,000 |

   The cost of capital is 12 percent. Calculate:

   (a) Benefit cost ratio.

   (b) MIRR

   (c) The discounted payback period. **(Unit-III, Prob. 15)**

4. (a) What are the factors to be analyzed in reaching a decision for abandonment of business operation? **(Unit-III, Q.No. 3)**

   (b) How would you account for inflation premium in capital budgeting decisions? **(Unit-III, Q.No. 14)**

5. (a) If cash flows of different years perfectly correlated, how is the standard deviation of NPV defined by the Hillier model? **(Unit-III, Q.No. 25)**

   (b) What is the procedure for simulation analysis? **(Unit-II, Q.No. 12)**

6. A company is considering two projects Project M and project N, each of which requires an initial outlay of Rs. 50 crores. The expected cash inflows from these projects in crores of Rupees are:

| Year | Project M | Project N |
|---|---|---|
| 1 | 11 | 38 |
| 2 | 19 | 22 |
| 3 | 32 | 18 |
| 4 | 37 | 10 |

(a) What is the discounted payback period for each of the projects if the cost of capital is 12 percent?

(b) What is post-payback profitability index for each of the projects? **(Unit-III, Prob. 16)**

7. Apex Ltd. requires an asset costing Rs.2 crore. Bhavani finance Ltd. offers a hire purchase proposal for a period of three years at a flat interest of 12 percent. It also gives a lease proposal wherein the lease rental would be 28% for the first 5 years (primary period) and 1% for the next five years (secondary period). Thereafter the asset would revert to Bhavani finance Ltd.

The depreciation rate on the asset is 25 percent (WDV) and its net salvage value after 10 years would be Rs. 20,00,000. Apex has a tax rate of 40 percent and its post-tax cost of debt is 10 percent. Should Apex choose the hire-purchase or the leasing option? **(Out of Syllabus)**

8. Company A plans to acquire Company B. The relevant financial details of the two firms, prior to merger announcement, are given below:

| Particulars | Company A | Company B |
|---|---|---|
| Market price per share in rupees | 60 | 25 |
| Number of shares | 3,00,000 | 2,00,000 |

The merger is expected to bring gains which have a present value of Rs.40 lakhs. Company A offers one share in exchange for every two shares of Company B.

(a) What is the true cost of Company A for acquiring Company B?

(b) What is the net present value of the merger to Company A?

(c) What is the net present value of the merger to Company B? **(Unit-V, Prob. 4)**

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

## MBA IV Semester Examinations

**R19**

## September / October - 2022

## STRATEGIC INVESTMENT AND FINANCING DECISIONS

Time : 3 Hours] [Max. Marks : 75

Answer any **five** questions
All questions carry equal marks

**ANSWERS**

1. (a) Explain the techniques for decision marking under Risk and Uncertainty. **(Unit-II, Q.No. 2, 3)**

   (b) A project with an initial cash outflow of Rs. 100 Lakhs is expected to have cash flows of Rs. 65 Lakhs, Rs. 60 Lakhs, Rs. 55 Lakhs and Rs. 50 Lakhs over its life at the end of 1st, 2nd, 3rd and 4th year respectively. The cost of capital is 10%. If the certainty equivalents of the cash flows are taken as 80%, 70%, 60% and 50% respectively for 1 to 4 years, is it worthwhile to undertake the project? **(Unit-II, Prob. 7)**

2. A project, with an initial investment of Rs. 15 crores gives an annual cash flow of Rs. 5.5 crores per annum for 4 years. The cost of capital for the project is 14%. The annuity factor for 4 years @ 14% is 2.9137 and @ 18% for 4 years is 2.6667. Calculate sensitivity for,

   (i) Project cost,

   (ii) Annual cash flow and

   (iii) Cost of capital. Which of the above three variable is more sensitive? **(Unit-II, Prob. 13)**

3. (a) Abandonment of a project at right time is also a good strategy? Illustrate the circumstances, under which abandonment of a project is prudent? **(Unit-III, Q.No. 3)**

   (b) Explain the concept of "Multiple IRRs" with suitable examples. **(Unit-III, Q.No. 5)**

4. (a) Explain the impact of inflation on the capital budgeting decisions. **(Unit-III, Q.No. 14)**

   (b) What is "Adjusted NPV"? What for it is calculated? **(Unit-III, Q.No. 11)**

5. (a) Examine the utility of Hertz's simulation model, in assessing risky project proposals for investment decisions. **(Unit-III, Q.No. 24)**

   (b) Explain the concept NPV mean variance analysis. **(Unit-III, Q.No. 22, 23)**

6. (a) A company invested Rs. 20 lakhs in a project. The expected cash flow are Rs. 5 lakhs per annum. the salvage value at the end of 1st, 2nd, 3rd, 4th and 5th years are Rupees 12 lakhs, 10 lakhs, 8 lakhs, 6 lakhs and zero respectively. Calculate the Payback period and the bailed payback period. **(Unit-III, Prob. 18)**

   (b) Explain the significance of information and data bank in project selections. **(Out of Syllabus)**

7. (a) Analyze the risks and rewards in Lease Financing. **(Out of Syllabus)**

   (b) Examine the three financing decisions: "Purchase, Leasing and Hire purchasing" from taxation point of view. **(Out of Syllabus)**

8. (a) Given below is the financial data of two companies Company 'A' and Company 'B', Company 'A' is acquiring Company 'B' by exchanging its shares on a one-to-one basis for Company 'B'. The exchange ratio is based on the market prices of the shares of the two companies.

| Financial data | Company 'A' | Company 'B' |
|---|---|---|
| Earning after taxes (Rs.) | 10,00,000 | 7,00,000 |
| Equity shares outstanding (Number) | 4,00,000 | 2,00,000 |
| Earning per share (Rs) | 2.50 | 3.50 |
| Price earnings ratio (P/E) | 14 | 10 |
| Market price per ratio (Rs) | 35 | 35 |

You are required to calculate the following after Acquisition/Merger:

(i) EPS (Post merger)

(ii) Change in EPS for the shareholders of the companies 'A' and 'B'

(iii) Market value of the firm, post-merger (Assuming that P/E ratio of the company 'A'; remains unchanged)

(iv) Profit accruing to shareholders of both the firms. **(Unit-V, Prob. 5)**

(b) Describe the different types of mergers with suitable examples. **(Unit-V, Q.No. 17)**

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

## MBA IV Semester Examinations

**R19**

## March / April - 2023

## STRATEGIC INVESTMENT AND FINANCING DECISIONS

Time : 3 Hours] [Max. Marks : 75

**Note:** (i) Question paper consists of Part - A, Part - B.

(ii) Part - A is compulsory, which carries 25 marks. In Part - A, Answer all questions.

(iii) In Part - B. Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

### PART - A (25 Marks)

**ANSWERS**

1. (a) When must capital be rationed? How should investment opportunities be selected? **(Unit-II, SQA-30)**

   (b) Briefly discuss how inflation affects capital budgeting and the ways for factoring it, in budgeting decisions. **(Unit-III, Q.No. 14)**

   (c) What is the importance of feasibility analysis in securing, all round material information, on proposed project? **(Out of Syllabus)**

   (d) What roles are played by the lessor and lessee? How are lease payments treated for tax purposes? **(Out of Syllabus)**

   (e) Can a merger be considered a means of raising additional equity capital? Explain. **(Unit-V, SQA-12)**

### PART - B

2. A firm is considering two mutually exclusive projects whose annual net flows have the following distribution:

| Project-A net cash flow Rs. | Probability of Project A | Project B - net cash flow in Rs. | Probability of Project B |
|---|---|---|---|
| 2,00,000 | 0.1 | 2,10,000 | 0.2 |
| 3,00,000 | 0.6 | 3,30,000 | 0.6 |
| 4,50,000 | 0.3 | 4,50,000 | 0.2 |

Project A requires an initial investment of Rs. 11,00,000 whereas Project B calls for investing Rs. 10,00,000. Both project would last for 5 years.

Calculate the standard deviation for the net cash flows for both projects. Which one is riskier? **(Unit-II, Prob. 1)**

(OR)

3. (a) How does diversification mitigate portfolio risks? **(Out of Syllabus)**

   (b) Briefly explain how uncertainty differs from risks? **(Unit-II, Q.No. 1)**

4. The expected cash flows of a project are as follows:

| Year | Cash flow Rs. |
|---|---|
| 0 | –12,00,000 |
| 1 | 5,00,000 |
| 2 | 4,00,000 |
| 3 | 4,00,000 |
| 4 | 5,00,000 |
| 5 | 3,00,000 |

The cost of capital is 12 percent. Calculate

(a) MIRR

(b) The discounted payback period. **(Unit-III, Prob. 19)**

5. (a) What is a mixed investment? What is its nature and what is the motivation for it? **(Unit-III, Q.No. 8)**

(b) How does adjusted NPV vary from NPV? **(Unit-III, Q.No. 13)**

6. A company is considering two projects P and project Q, each of which requires an initial outlay of Rs. 40 crores. The expected cash inflows from these projects in crores of Rupees are:

| Year | Project P | Project Q |
|---|---|---|
| 1 | 11 | 34 |
| 2 | 19 | 20 |
| 3 | 30 | 18 |
| 4 | 32 | 10 |

What is the discounted payback period for each of the projects if the cost of capital is 10 percent? **(Unit-III, Prob. 20)**

(OR)

7. (a) Evaluate the following proposal using Terminal value method

(i) Original outlay Rs. 8,00,000 (ii) Life of the project 3 years.

(iii) Cash inflows: Rs. 4,00,000 p.a. for three years (iv) Cost of capital 10%

Expected interest rates at which the cash flow will be re-invested.

| Year end | % |
|---|---|
| 1 | 8 |
| 2 | 8 |
| 3 | 8 |

**(Unit-III, Prob. 25)**

(b) Write a short note on capital disinvestment. **(Out of Syllabus)**

8. A company wants to acquire a high end computer at Rs. 20,00,000. The company has a 40 percent marginal tax rate. If owned, the computer would be depreciated on a straight-line basis to a book salvage value of zero. The actual cash salvage value is expected to be Rs. 2,00,000 at the end of 10 years. If the computer is purchased, the company could borrow the needed funds at an annual pretax interest rate of 10 percent. If purchased the company will incur annual maintenance expense of Rs. 10,000. These expenses would not be incurred if the computer is leased. The lease rate would be Rs. 2,80,000 per year payable at the beginning of each year. The company's weighted after tax cost of capital is 12 percent. Compute the net advantage of leasing. **(Out of Syllabus)**

(OR)

9. Oswal spinning has decided to acquire a piece of equipment but has not yet decided to buy or lease. The lease payments would be Rs. 1,40,105 paid annually at the end of each year. If purchased at a cost of Rs. 4,00,000 the equipment would be financed with debt costing 10%, which can be repaid at any time within the four year period. The life of the equipment is four years. The lease is a firm commitment to make four payments. There is no salvage value. Should the firm lease or buy-borrow? There are no taxes. **(Out of Syllabus)**

10. (a) What is the difference between merger and consolidation? **(Unit-V, Q.No. 14)**

    (b) Explain the economies of mergers. **(Unit-V, Q.No. 1)**

(OR)

11. Outline the detailed steps involved in analyzing and planning a prospective merger from the standpoint of the acquiring firm. **(Unit-V, Q.No. 6)**

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

## MBA IV Semester Examinations

**R19**

## September - 2023

## STRATEGIC INVESTMENT AND FINANCING DECISIONS

Time : 3 Hours] [Max. Marks : 75

**Note:** (i) Question paper consists of Part - A, Part - B.

(ii) Part - A is compulsory, which carries 25 marks. In Part - A, Answer all questions.

(iii) In Part - B. Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

### PART - A (25 Marks)

**ANSWERS**

1. (a) Examine the importance of discounted Pay-back method. **(Unit-II, Q.No. 16)**

   (b) Summarize the concept of Capital Budgeting. **(Unit-III, Q.No. 2)**

   (c) Discuss the importance of data bank in Project Selection. **(Out of Syllabus)**

   (d) Identify the features of Lease financing. **(Out of Syllabus)**

   (e) What is meant by reverse Merger & Acquisition? **(Unit-V, SQA-1)**

### PART - B (50 Marks)

2. (a) Interpret Sensitivity analysis method of investment analysis with an example. **(Unit-II, Q.No. 9)**

   (b) Discuss the investment decisions under capital constraints. **(Unit-II, Q.No. 16)**

(OR)

3. An investment of $40,000 today is expected to give rise to annual contribution of $25,000. This is based on selling one product, with a sales volume of 10,000 units, selling price of $12.50 and variable costs per unit of $10. Annual fixed cost of $10,000 will be incurred for the next four years; the discount rate is 10%.

   (a) Calculate the NPV of this investment.

   (b) Calculate the sensitivity of your calculation to the following:

   (i) Initial Investment.

   (ii) Selling price per unit.

   (iii) Sales volume.

   (iv) Fixed costs.

   (v) Discount rate. **(Unit-II, Prob. 16)**

4. (a) Discuss the disinvestment methods available for corporates. **(Out of Syllabus)**

   (b) Describe the project abandonment decisions. **(Unit-III, Q.No. 3)**

(OR)

5. X company is considering two projects M&N, each of which require an initial outlay of Rs.50 lakhs. The expected cash inflows from these projects are:

| Year | Project M | Project N |
|---|---|---|
| 1 | 12 | 37 |
| 2 | 18 | 24 |
| 3 | 33 | 19 |
| 4 | 36 | 12 |

(a) What is the PBP for each of the project?

(b) If the two projects are mutually exclusive and the cost of capital is 15%. Which project should the firm invest in? **(Unit-III, Prob. 17)**

6. Discuss about examination of the secondary information for reliability and relevance for the consideration purpose. **(Out of Syllabus)**

(OR)

7. (a) Explain in detail about Hertz Simulation and Hillier approaches? **(Unit-III, Q.No. 25, 24)**

(b) Describe the terms surplus life and surplus playback. **(Unit-III, Q.No. 16)**

8. (a) Identify the steps considered while making investment decision of leasing or buying. **(Out of Syllabus)**

(b) Discuss the role of operating risk in security analysis. **(Out of Syllabus)**

(OR)

9. A company is considering the lease of an equipment which has a purchase price of Rs.3,50,000. The equipment has an estimated economic life of 5 years. As per the Income Tax Rule, a written down depreciation at 25 per cent is allowed. The lease rentals per year are Rs.1,20,000. Assume that the company's marginal corporate tax rate is 50 per cent. If the before-tax borrowing rate for the company is 16 per cent, should the company lease the equipment? Ignore tax shield on depreciation after 5 years. **(Out of Syllabus)**

10. (a) Evaluate the payment methods in M&A. **(Unit-V, Q.No. 10)**

(b) What are the benefits of stock payment merger? **(Unit-V, Q.No. 11)**

(OR)

11. Gama Fertilizers Company is taking over Theta Petrochemical Company. The shareholders of Theta would receive 0.8 shares of Gama for each share held by them. The merger is not expected to yield in economies of scale & operating synergy. The relevant data for the two companies is as follow:

| Particulars | Gama | Theta |
|---|---|---|
| Net Sales (Rs Crore) | 335 | 118 |
| Profit after tax (Rs Crore) | 58 | 12 |
| Number of share (Crore) | 12 | 3 |
| Earnings per share (Rs) | 4.83 | 4 |
| Market value per share (Rs) | 30 | 20 |
| Price-earnings ratio | 6.21 | 5 |

For the combined company (after merger), you are required to calculate:

(a) EPS.

(b) P/E Ratio.

(c) Market value per share.

(d) Number of shares.

(e) Total market capitalization. **(Unit-V, Prob. 6)**