

# index

	<b>Sr. No.</b>	<b>CHAPTER</b>
	<b>1</b>	<b>NATURE AND SCOPE OF FINANCIAL MANAGEMENT</b>
	<b>2</b>	<b>TIME VALUE OF MONEY</b>
	<b>3</b>	<b>LEVERAGE</b>
	<b>4</b>	<b>COST OF CAPITAL</b>
	<b>5</b>	<b>CAPITAL STRUCTURE</b>
	<b>6</b>	<b>CAPITAL BUDGETING</b>
	<b>7</b>	<b>DIVIDEND POLICY</b>
	<b>8</b>	<b>WORKING CAPITAL MANAGAEMT</b>
	<b>9</b>	<b>MANAGEMENT OF CASH AND CASH RECEIVABLE</b>
	<b>10</b>	<b>PORTFOLIO MANAGEMENT</b>
	<b>11</b>	<b>MANAGEMENT OF ACCOUNT RECEIVABLE</b>
	<b>12</b>	<b>FOREIGN EXCHANGE MANAGEMENT</b>
	<b>13</b>	<b>TREASURY MANAGEMENT</b>
	<b>14</b>	<b>DERIVATIVE</b>



## 1

# Nature & Scope of Financial Management



## Introduction

In the modern times we cannot imagine a world without the use of money. In fact, money is the life-blood of the present day world and all our economic activities are carried out through the use of money. For carrying on business we need resources which are pooled in terms of money. **Financial Management, to be more precise, is concerned with investment, financing and dividend decisions in relation to objectives of the company.** Such decisions have to take care of the interests of the shareholders. They are upheld by maximization of shareholders' wealth which depends upon increase in the net worth – capital invested in the business plus ploughed back profits for growth and prosperity of the company. It is for such reasons that the market is prepared to pay a lower or higher price for the shares of some company or the other. Nature of Financial Management therefore can be judged by the study of the nature of investment decisions, nature of financing decisions and the nature of dividend decisions.

We will like to explain Financial Management by giving a very simple scenario. For the purpose of starting any new business/venture, an entrepreneur goes through the following stages of decision making:

Stage 1	Stage 2	Stage 3	Stage 4
Decide which assets	Determining what is total investment	Apart from buying assets the entrepreneur	The next stage is to decide what all sources, does the
(premises, machinery, equipment etc) to buy.	(since assets cost money) required for buying assets.	would also need to determine how much cash he would need to run the daily operations (payment for raw material, salaries, wages etc.). In other words this is also defined as Working Capital requirement.	entrepreneur need to tap to finance the total investment (assets and working capital). The sources could be Share Capital (Including Entrepreneur's own funds) or Borrowing from Banks or Investment from Financial Institutions etc.

### Meaning of Finance

**Meaning:** Finance may be defined as an art or a science of managing money. It includes financial service and financial instruments. Finance is also referred as the provision of money at the time when it is needed. Finance function is the procurement of funds and their effective utilization in business concerns.

### Meaning of Business Finance

According to the Wheeler, "Business finance is that business activity which concerns with the acquisition and conversion of capital funds in meeting financial needs and overall objectives of a business enterprise". According to the Guthumann and Dougall, "Business finance can broadly be defined as the activity concerned with planning, raising, controlling, administering of the funds used in the business".

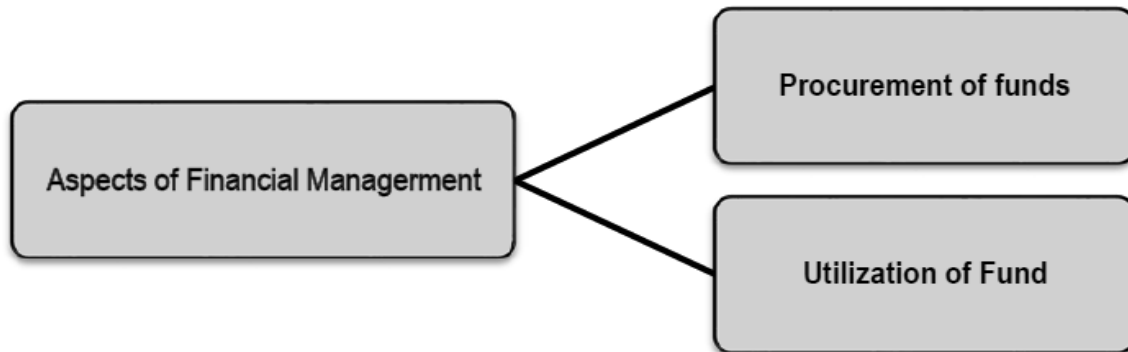
Corporate finance is concerned with budgeting, financial forecasting, cash management, credit administration, investment analysis and fund procurement of the business needs to adopt modern technology and application suitable to the dynamic global environment.

### Definition of Financial Management

**Definition:** Financial Management comprises the forecasting, planning, organizing, directing, coordinating and controlling of all activities relating to acquisition and application of the financial resources of an undertaking in keeping with its financial objective." **Raymond Chambers**

Financial management “is the operational activity of a business that is responsible for obtaining and effectively utilizing the funds necessary for efficient operations. – **Joseph and Massie**.

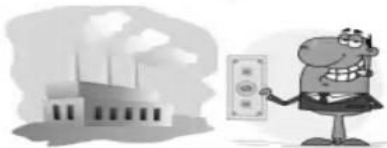
There are two basic aspects of financial management viz., procurement of funds and an effective use of these funds to achieve business objectives.



## Nature, Significance and Scope of Financial Management

### Scope of Financial Management

- Financial management involves:



#### Investment Decisions

- Decisions as to which assets the firm should acquire.



#### Financing Decisions

- Decisions as to how to raise the funds to pay for investment in assets.



#### Dividend Decisions

- Decisions as to how much, how frequently and in what form to return cash to the owners.

**Meaning:** Investment ordinarily means utilization of money for profits or returns. This could be done by creating physical assets with the money and carrying on business or purchasing shares or debentures of a company or sometimes, though erroneously, purchasing a consumer durable like building. Capital budgeting is a major aspect of investment decision making process. Investment decisions and capital budgeting are considered as synonymous in the business world. Investment decisions are concerned with the question whether adding to capital assets today will increase the revenue of tomorrow to cover costs. Thus Investment decisions are commitments of monetary resources at different times in expectation of economic returns in future. Investment decisions have, thus, become the most important area in the decision making process of a company. Such

decisions are essentially made after evaluating the different proposals with reference to growth and profitability projections of the company.

Thus, investment decisions encompass wide and complex matters involving the following areas:

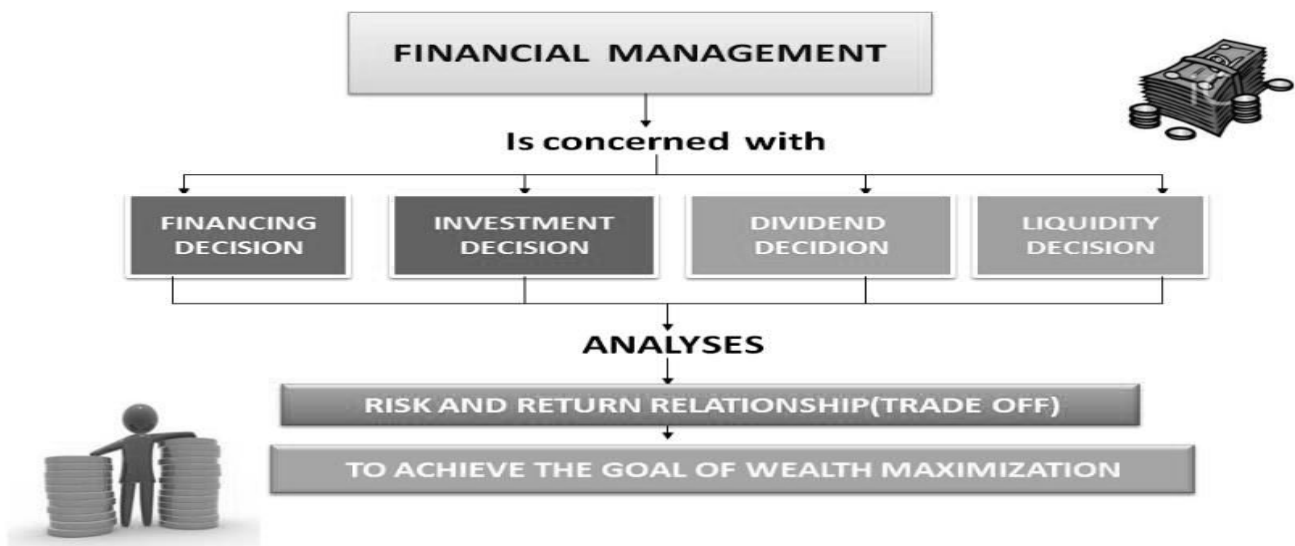
- Capital budgeting.
- Cost of capital.
- Measuring risk.
- Management of liquidity and current assets (Working Capital Management).
- Expansion and contraction involving business failure and re-organizations buy or hire or lease an asset.

## NATURE OF FINANCING DECISIONS

The dividend decision is another major area of financial management. The financial manager must decide whether the firm should distribute all profits or retain them or distribute a portion and retain the balance. Theoretically, this decision should depend on whether the company or its shareholders are in the position to better utilize the funds, and to earn a higher rate of return on funds. However, in practice, a number of other factors like the market price of shares, the trend of earning, the tax position of the shareholders, cash flow position, requirement of funds for future growth, and restrictions under the Companies Act etc. play an important role in the determination of dividend policy of business enterprise.

## DECISION CRITERIA

### AN OVERVIEW OF FINANCIAL MANAGEMENT



Decision criteria depends upon the objective to be achieved through the instrumentality of decision making process. The main objectives which a business organization pursues are maximization of return

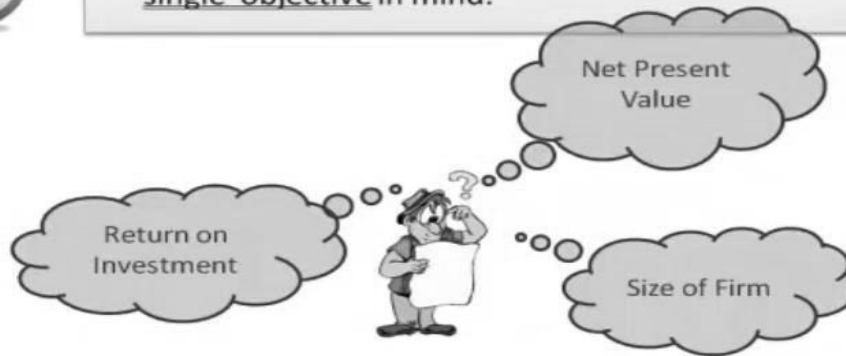
and minimization of costs. A fair decision criterion should distinguish between acceptable and unacceptable proposals and solve the problem of selection of the best alternatives from amongst the various alternatives available in a given situation to achieve the above objectives. A fair decision criterion should follow the following two fundamental principles i.e. (1) the “Bigger and Better” principle; (2) “A Bird in Hand is better than two in the Bush” principle. The first principle suggests that bigger benefits are preferable to smaller ones; whereas the second one suggests that early benefits are preferable to later benefits.

## OBJECTIVES OF FINANCIAL MANAGEMENT

### Objectives of Financial Management



- The financial decisions of a firm must be made with some single objective in mind.



Financial management of any business firm has to set goals for itself and to interpret them in relation to the objective of the firm.

(1) Primary Objectives	(2) Other Objectives
Profit Maximization. Value or Wealth Maximization.	Customer Satisfaction, i.e. value for money, quality goods, etc. Employee Welfare, i.e. good standard of living, giving fair wages, etc. Maintaining and improving Market Share. Market Leadership in terms of products, services, technology, management techniques, etc. Good Corporate Citizenship in terms of tax remittance, maintaining ecological balance, etc.

#### (a) Profit Maximization:

Profit maximization is considered as an important goal in financial decision making in an organization. It ensures that firm utilizes its available resources most efficiently under conditions of

competitive markets. Profit maximization as corporate goal is criticized by scholars mainly on the following grounds:

- i. It is vague conceptually.
- ii. It ignores timing of returns.
- iii. It ignores the risk factor.
- iv. It may tempt to make such decisions which may in the long run prove Disastrous.
- v. Its emphasis is generally on short run projects.
- vi. It may cause decreasing share prices.
- vii. The profit is only one of the many objectives and variables that a firm considers.

Advantages	Disadvantages / Limitations
<p>Must for survival of business, else, Capital is lost.</p> <p>Essential for growth and development of business.</p> <p>Impact on society through factor payments.</p> <p>Profit-making firms only can pursue social obligations.</p>	<p>The term "Profit" is vague.</p> <p>Higher the profits, higher the risks involved.</p> <p>It ignores time pattern of returns.</p> <p>It ignores social and moral obligations of the business.</p>

**(b) Wealth maximization:**



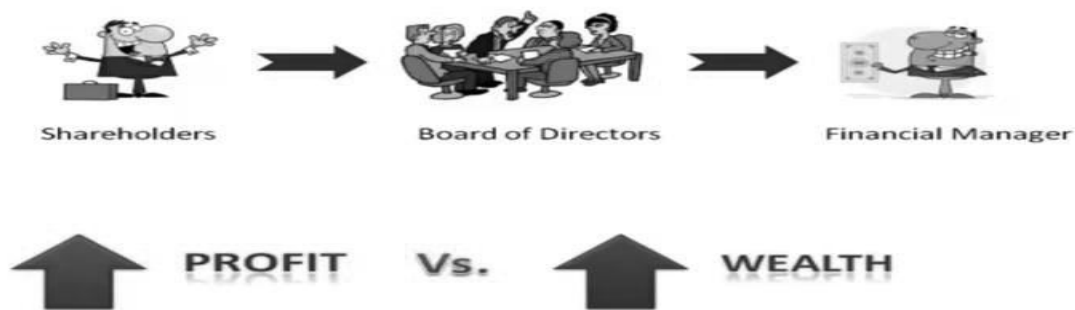
Presently, maximization of present value (or wealth) of a course of action is considered appropriate operationally flexible goal for financial decision-making in an organization. The management of an organization maximizes the present value not only for shareholders but for all including employees, customers, suppliers and community at large. This goal for the maximum present value is generally justified on the following grounds:



- i. It is consistent with the object of maximizing owner's economic welfare.
- ii. It focuses on the long run picture.
- iii. It considers risk.
- iv. It recognizes the value of regular dividend payments.
- v. It takes into account time value of money.
- vi. It maintains market price of its shares.
- vii. It seeks growth in sales and earnings.

However, profit maximization can be part of a wealth maximization strategy. Quite often two objectives can be pursued simultaneously but the maximization of profit should never be permitted to overshadow the objectives of wealth maximization.

### PROFIT MAXIMIZATION VERSUS SHAREHOLDER WEALTH MAXIMIZATION:



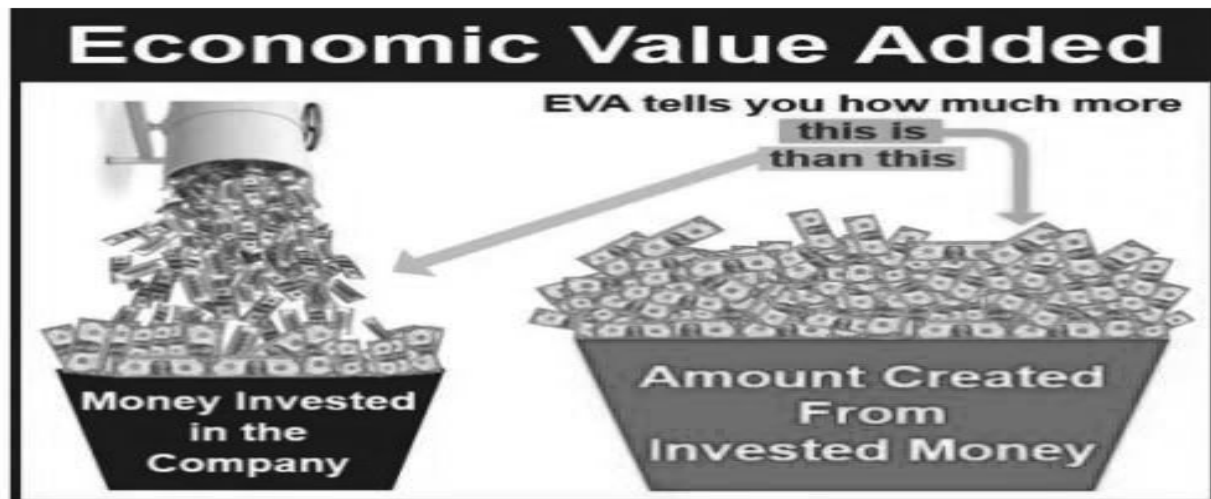
Profit maximization is basically a single-period or, at the most, a short-term goal. It is usually interpreted to mean the maximization of profits within a given period of time. A firm may maximize its short-term profits at the expenses of its long-term profitability and still realize this goal. In contrast, shareholder wealth maximization is a long-term goal shareholder are interested in future as well as present profits. Wealth maximization is generally preferred because it considers (1) wealth for the Long term, (2) risk or uncertainty, (3) the timing of returns, and (4) the shareholders return.

Profit Maximization versus Shareholder Wealth Maximization:

Profit Maximization	Wealth Maximization
Does not consider the effect of future cash flows, dividend decisions, EPS, etc.	Recognises the effect of all future cash flows, dividends, BPS, etc.
A Firm with Profit Maximization objective may refrain from payment of dividend to its Shareholders.	A Firm with Wealth Maximization objective may pay regular dividends to its Shareholders.

Ignores time pattern of returns.	Recognises the time pattern of returns.
Focus on Short-Term.	Focus on Medium / Long Term
Does not consider the effect of uncertain/ risk.	Recognises the risk-return relationships.
Comparatively easy to determine the relationship between financial decisions and Profits	Offers no clear or specific relationship between financial decisions and share market prices.

### ECONOMIC VALUE – ADDED (EVA)



The term Economic Value Added (EVA) is a registered trade mark of Stern Stewart & Co. U.S.A. This term is of recent origin. The recent thinking is that economic value added is the true measure of corporate surplus or effectiveness. Stern Stewart is best known for their proprietary EVA, framework, which FORTUNE magazine has called today's holiest financial idea and getting hotter. AT & T, Coca – Cola, SmithKline Beechain, Whirlpool are some of the companies that have successfully adopted EVA.

It is Widely recognized that only earning profit is not sufficient. A business entity should earn sufficient to:

- Cover its cost of Capital, and
- Surplus to grow.

Any profit caused over and above the cost of Capital is economic value added. It is felt these days that maximization of shareholders wealth is linked to a basic proposition that return on Capital employed (NOPAT as a percentage of Capital employed) is better than cost of Capital i.e.  $ROCE > k_o$ .

Ability to generate profit is no longer a test of profit adequacy. Ability to generate economic value added is the only test of profit adequacy. "any surplus generated from operating activities over and above the cost of capital is termed as "Economic Value Added" (EVA).

The economic value added (EVA) is a measure of the surplus value created by a business/investment. It is computed as the product of the "excess return" made on an investment and the capital invested in that investment.

It is a new measure of Corporate Surplus. It is the Corporate surplus, that should be shared by the employees, management and shareholders.

Thus, EVA is defined as – "Excess Profit of a firm after charging Cost of Capital".

Steps to Compute Economic Value Added (EVA)

Step I: Identify Market Return.

Step II: Identify Risk Free Rate.

Step III: Identify Beta.

Step IV: Compute Cost of Specific sources and Weighted Average Cost of Capital.

Step V: Calculate the Return on Capital Employed.

Step VI: Calculate Spread.

Step VII: Computation of Economic Value Added.

EVA can be computed as follows :

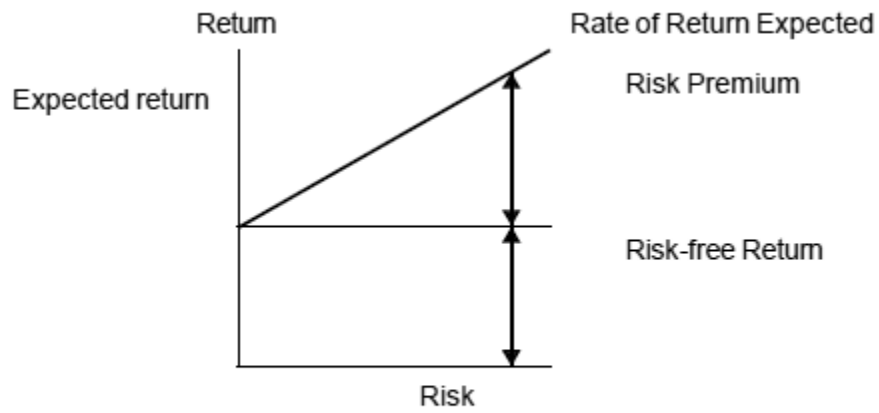
Economic value added = NOPAT – capital charge

NOPAT = Net operating profit after tax

Capital charge = [Weighted average cost of capital x capital employed

## VALUE OF FIRM RISK AND RETURN

The financial manager tries to achieve the proper balance between the considerations of risk and return associated with various financial management decisions to maximize the market value of the firm. It is well known that higher the return, other things being equal, higher the market value; higher the risk, other things being equal, lower the market value. In fact, risk and return go together. This implies that a decision alternative with high risk tends to promise higher return and the reverse is also true.



**The Risk-return relationship**

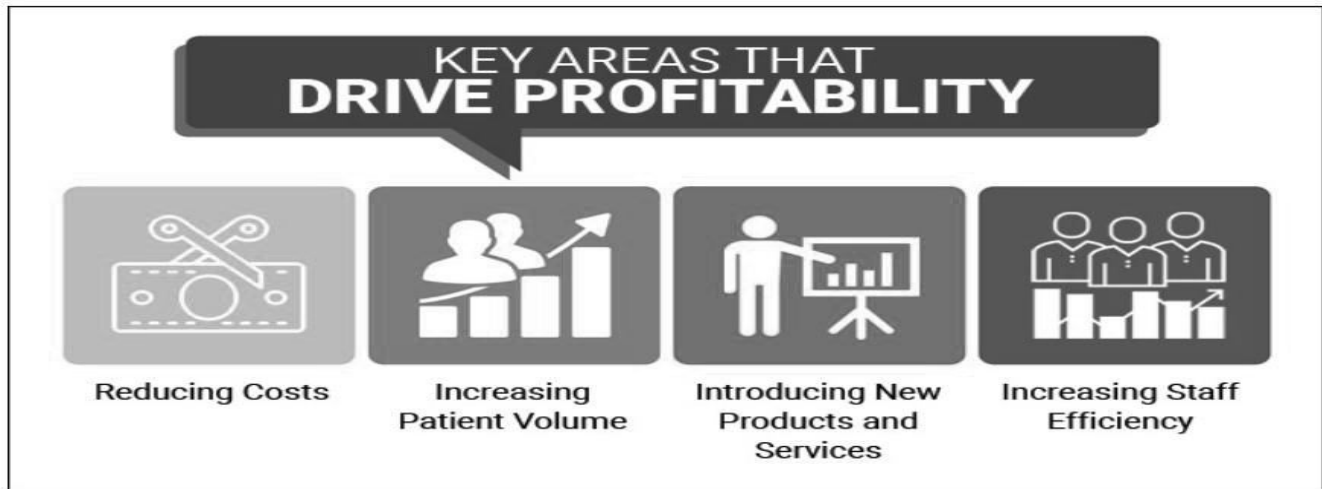
LIQUIDITY



It is an important concept in financial management and is defined as ability of the business to meet short-term obligations. It shows the quickness with which a business/company can convert its assets into cash to pay what it owes in the near future. According to Ezra soloman, it measures a company's ability to meet expected as well as unexpected requirements of cash to expand its assets, reduce its liabilities and cover up any operating losses. Liquidity, as a decision criterion is an important tool in financial management. Financial decisions are affected by liquidity analysis of a company in the following areas:

1. Management of cash and marketable securities;
2. Credit policy of a firm and procedures for realization;
3. Management and control of inventories;
4. Administration of fixed assets;
5. Taking decisions for efficient use of current assets at minimum cost; and
6. Decisions to keep the company's position on sound basis to avoid eventualities.

The above analysis of liquidity suggests evaluation of current assets of a company. On liabilities side also, liquidity position is analyzed and managed through assessment of long and medium term debts of the company, and the arrangements for their repayments. This is done purely from the precautionary point of view so that the company could be saved from the risk of bankruptcy for non-payment of its debt to the lenders.

**PROFITABILITY**

Profitability as a decision criterion is another important tool in financial management for taking decisions from different angles after evaluating the performance of the company in different spheres. For example, if it becomes essential for the company to examine profit per unit of sale then it is done by estimating profitability per rupee of sales. It is used as a measure of comparison and standard of performance. Profitability as decision making criterion in financial management is crucial for business managers. Business works as a system comprised of sub-systems. Different criteria assess different aspects and assist in viewing different situations which have an aggregate impact on business activity, and therefore form the basis of financial management.

**FINANCIAL TOOLS**

**Meaning:** Financial tools are the techniques that can be employed by the finance manager to solve the problem properly, effectively and efficiently. *Finance Manager has to decide optimum capital*

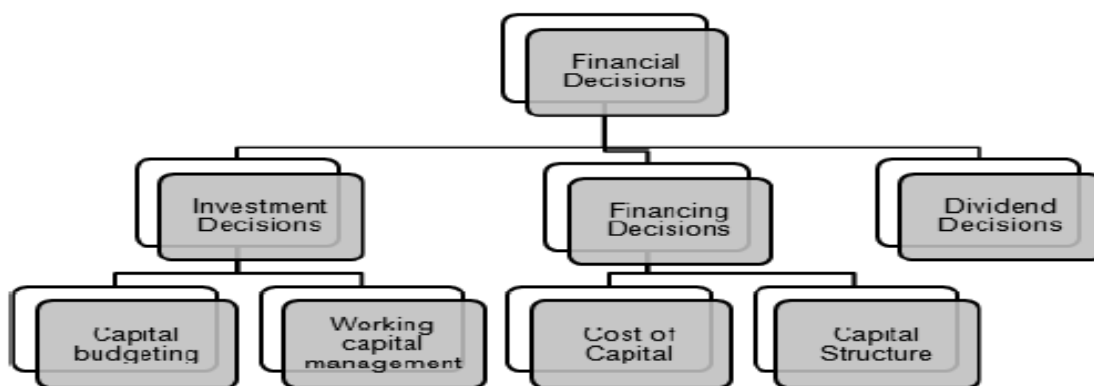
*structure to maximize the wealth of the shareholders.* For this judicious use of financial leverage or trading on equity is important to increase the return to shareholders. In planning the capital structure, the aim is to have proper *mix of debt, equity and retained earnings*. EPS Analysis, PE Ratios and mathematical models are used to determine the proper debt-equity mix of derive advantages to the owners and enterprise.

*In the area of investment decisions* pay back methods, average rate of returns, internal rate of return, net present value, profitability index are some of the methods, in evaluating capital expenditure proposals.

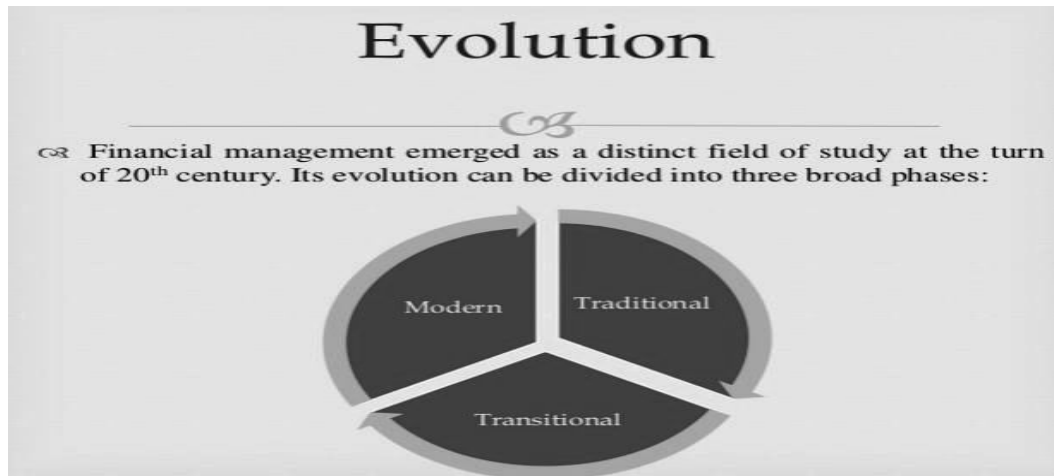
*In the area of working capital management,* certain techniques are adopted such as ABC Analysis. Economic order quantities, Cash management models, etc. to improve liquidity and to maintain adequate circulating capital.

*For evaluation of firm's performance,* Ratio analysis is pressed into service-with the help of ratios an investor can decide whether to invest in a firm or not. Funds flow statement, cash flow statement and projected financial statements help a lot to the finance manager in providing funds in right quantities and at right time.

Type of Decision	Tool/Method
Financing Decision – To maximize wealth of shareholders.	Financial Leverage / Trading on Equity, Cost of Capital.
Investment Decision – To maximize return on investment made.	Capital Budgeting – Payback, Average Rate of Return, Net Present Value, Internal Rate of Return, Profitability Index etc.
Performance Evaluation Decision	Budgetary Control, Ratio Analysis, Cash Flow and Fund Flow Analysis etc.



**Types of Financial Decisions**

**EVOLUTION OF FINANCIAL MANAGEMENT**

**Meaning:** Financial management evolved gradually over the past 50 years. The evolution of financial management is divided into three phases. Financial Management evolved as a separate field of study at the beginning of the century. The three stages of its evolution are:

**The Traditional Phase:** During this phase, financial management was considered necessary only during occasional events such as takeovers, mergers, expansion, liquidation, etc. Also, when taking financial decisions in the organization, the needs of outsiders (investment bankers, people who lend money to the business and other such people) to the business was kept in mind.

**The Transitional Phase:** During this phase, the day-to-day problems that financial managers faced were given importance. The general problems related to funds analysis, planning and control were given more attention in this phase.

**The Modern Phase:** Modern phase is still going on. The scope of financial management has greatly increased now. It is important to carry out financial analysis for a company. This analysis helps in decision making. During this phase, many theories have been developed regarding efficient markets, capital budgeting, option pricing, valuation models and also in several other important fields in financial management.

**“Financial management in India has changed substantially in scope and complexity in view of recent government policy”.**

Financial management is undergoing fundamental change as a result of two major sets of external forces – the globalization of competition in product and factor markets and the deregulation and integration of world financial markets. These two forces, together with major advances in the analytical and information technologies underlying financial transactions, are broadening the role of finance in corporate management well beyond its traditional task of raising and managing funds.



The new competitive and financial environment is thus creating two often opposing pulls on financial transactions, are broadening the role of finance in corporate management well beyond its traditional tasks of raising and managing funds.

The new competitive and financial environment is thus creating two often opposing plus on financial management. On the one hand it calls for deepening of financial technology and, hence, an increase in the specialist nature of financial management. At the same time, it calls for greater integration of financial perspectives into overall strategic and operation management decisions. This is especially clear in the task of coping with volatile exchange rates.

Financial management in India has also changed substantially in scope and complexity in view of recent government policy. The traditional concept of Financial Management viz., (i) Raising of funds (ii) Operation and investment of funds and (iii) Disbursement of dividends and issue of bonus shares. Modern approach of financial management basically provides a conceptual and analytical frame work for financial decision making. It emphasizes on an efficient and effective use of financial resources through investment, financing and dividend decisions. In last few year, Indian economy has experiences drastic changes in terms of economic reforms. Some of the changes include introduction of new financial instruments and transactions like options, options in future contracts, foreign currency swaps, and interest rate swaps, GDR (Global Depository Receipts). Euro issues, globalization of capital markets, liberalization measures taken by government etc. All these have emphasized the need for effective and efficient modern approach to corporate finance.

Under the changed circumstances, financial management covers the following :

- (a) **Raising of funds** : Apart from Indian Public and Financial Institutions, Companies like Essar Shipping, Reliance, Larsen & Toubro etc. have raised funds in the International markets by way of Euro Issues. International Financial Institutions etc. Foreign currency loans are availed from foreign banks due to globalization and Foreign Institutional Investors (FII) are eagerly waiting for participation in Indian equity market due to liberalization of economy.
- (b) **Investment decisions** : Presently investment decisions of firms are not confined to Indian territory but spread over globally. Foreign investors are encouraged. Hence, the competitions in India as well as from abroad make the financial management more complex and foreign exchange management has become highly specialized area in financial management. The time value of money coupled with exchange rate fluctuation make the decision making more complex and compelled and decision makers to make the use of various management techniques like probability theory, capital rationing and sensitivity analysis to overcome the problem.
- (c) **Dividend payment** : In view of wealth maximization of firm, the internal generation of funds is not paid out by way of dividend or issue of bonus shares. They are utilized in portfolio management by floating Mutual Funds etc. In order to avoid Scam the Government brings new regulations like establishment of SEBI etc. which increase the scope of financial management wider and complex.

However, in true sense, as such there is no change of scope of financial management in India. Rather it is extensions in earlier coverage.

### IMPORTANCE OF FINANCIAL MANAGEMENT

Importance of Financial Management cannot be over-emphasized. It is, indeed, the key to successful business operations. Without proper administration of finance, no business enterprise can reach its full potentials for growth and success. Money is to an enterprise, what oil is to an engine.

Financial management is all about planning investment, funding the investment, monitoring expenses against budget and managing gains from the investments. Financial management means management of all matters related to an organization's finances.

The best way to demonstrate the importance of good financial management is to describe some of the tasks that it involves:-

- Taking care not to over-invest in fixed assets
- Balancing cash-outflow with cash-inflows
- Ensuring that there is a sufficient level of short-term working capital
- Setting sales revenue targets that will deliver growth
- Increasing gross profit by setting the correct pricing for products or services
- Controlling the level of general and administrative expenses by finding more cost-efficient ways of running the day-to-day business operations, and
- Tax planning that will minimize the taxes a business has to pay.

#### Example:

The company earns money by selling textiles. Let us assume that it earns Rs. 10 lakhs every month. This is known as revenue. A company has many expenses. Some of the major expenses of the company can be listed as wages to workers, raw materials for making the textile, electricity and water bills and purchase and repair of machines that are used to manufacture the textile.

All these expenses are paid out of the revenues. If the revenues are more than the expenses, then the company will make profit. But, if the expenses are more than revenues, then it will face losses. If it continues like that, eventually, it will lose all its assets. In other words it will lose its property and all that it owns. In that case, even the workers may be asked to leave the company. To avoid this situation, the company has to manage the cash inflows (cash coming into the company) and outflows (various expenses that the company has to meet). This is one of the tasks within the ambit of Financial Management.

### Impact of globalisation on the financial decision making of corporate enterprises

Globalization means integration of national economy to the world economy. In economic sense, globalization refers to borderless world where there is free flow of money and currencies, ideas and expertise, fostering partnership and alliance to serve the customers best.

Financial decision making deals with financial matter of a corporate enterprise i.e. kind of assets to be acquired, pattern of capital structure and distribution of corporate income etc. in order to maximize shareholders wealth in the organization.

Globalization integrates national financial market to global financial market and thus creates new financial environment which brings new opportunities and challenges and influences the financial decision (investment decisions, financing decisions and dividend decisions) making in the organization in following way :

- **Complicates the task of investment decisions** : Presently the investment decision making has become a complicated and tedious exercise. Corporate units now along with national conditions also take into account global view i.e. foreign exchange risk exposure, economic, political, legal and tax parameters while making investment decisions. It demands higher level of expertise from finance executives to understand the situation and to arrive at optimal investment decisions.
- **Widens the scope of raising funds** : Corporate units now have access to foreign market to raise the resources at competitive rates. Foreign institutional investors and NRI may also participate in this process and this helps in attaining the least cost capital structure.
- **Dividend decisions** : Dividend decisions have to be taken in the light of global scenario and available portfolio opportunities and internal needs of the corporate units.

### Liberalization

**Liberalization** is a process which is aimed at to create an atmosphere of free competition among different agents of production and distribution of goods and services, finance and trade both public and private, domestic and foreign, small and large alike. The major components of liberalization process include changes in industrial policy which amounted to radical transformation of the entire industrial environment. **The major impact of liberalization on the Indian industry includes the following :**

- Optimum utilization of financial, material and human resources;
- Effective role of market mechanism in determination of allocation of resources;
- Boost in trade and commerce;
- Encouragement to foreign investment and integration of country's economy with global economy;
- Increase in number of foreign collaborations and transfer of technologies;
- Capital inflows and improvement in foreign reserve position;

- Improvement in overall efficiency;
- Development of infrastructure.

## FINANCIAL DISTRESS AND INSOLVENCY

Generally the affairs of a firm should be managed in such a way that the total risk – business as well as financial – borne by equity holders is minimized and is manageable, otherwise, the firm would obviously face difficulties. In managing business risk, the firm has to cope with the variability of the demand for its products, their prices, input prices, etc. It has also to keep a tab on fixed costs. As regards financial risk, high proportion of debt in the capital structure entails a high level of interest payments. If cash inflow is inadequate. The firm will face difficulties in payment of interest and repayment of principal. If the situation continues long enough, a time will come when the firm would face pressure from creditors.

Failure of a firm is technical if it is unable to meet its current obligations. The failure could be temporary and might be remediable. When liabilities exceed assets i.e., the net worth becomes negative, bankruptcy, as commonly understood, arises. Technical bankruptcy can be ascertained by comparing current assets and current liabilities i.e, working out current ratio or quick ratio.

**“Today’s financial managers are seized with the problem of financial distress and are trying to overcome it by innovative means”**

Financial distress is an important area of concern for the financial managers in a corporate unit. Financial distress basically refers to any condition in which difficulties with the financial obligations of the firm affect the firm's operation. For example, if a firm has to sell its productive equipment to meet its interest payments, the firm is in financial distress because the financial obligation of the firm requires an alteration of the firm's operating policy. There are many degrees of financial distress. The ultimate kind of financial distress is bankruptcy, a condition in which the firm is unable to meet its obligations and ceases operations. In the present prevailing environment of competition and liberalization, the financial managers are overcoming the problem of financial distress by using new financial instruments and method; Some of these methods and instruments include the following :

- Commercial Paper:** A commercial paper is a short term money market instrument. It has the character of an unsecured promissory note with a fixed maturity of 3 to 6 months. Banking and non-banking companies can issue this for raising short term debt. It also carries an attractive rate of interest.
- Zero Interest Convertible Debenture /Bonds:** It is a debenture/bond which carries no interest but the investor is rewarded through conversion into equity share after a time lag at a predetermined price and at a specified date in future.

- (iii) **Deep Discount Bond:** These bonds are sold at discounted value and on the maturity the face value is paid to the investors. In such bonds, there are no interest pay outs during lock in period. DDB's have only one yield redemption yield. These bonds offer higher return because of liquidity premium.
- (iv) **Indexed linked gilt Bonds:** These are the instruments having a fixed maturity. This maturity value is linked to the index prevailing as on the date of maturity. Hence they are inflation free instruments.
- (v) **Option Bonds:** These are cumulative and non-cumulative bonds where interest is payable on maturity or periodically. Redemption premium is also offered to attract investors.
- (vi) **Secured Premium Bonds:** These are the instruments which carry no interest for three years. In other words, the interest will be paid only after three years and hence companies with high capital intensive investments can resort to this type of financing.
- (vii) **Convertible Bonds:** A convertible bond is one which can be converted into equity shares at predetermined timing either fully or partially.
- (viii) **Derivative Security:** A derivative security is a security whose value depends upon the value of other basic asset backing the security. In most cases, these assets are nothing but the traded securities.
- (ix) **Factoring:** It is an arrangement under which a financial intermediary assumes the credit risk in collection of book debts for its clients.
- (x) **Forfaiting:** It is a technique by which a forfaitor discounts an export bill and pays ready cash to the exporter who can concentrate on the export front without bothering about collection of export bills.

In additions to above the financial managers also resort to various methods such as financial reorganization and restructuring to overcome the problem of financial distress in the company.

### IMPACT OF TAXATION ON CORPORATE FINANCIAL MANGEMENT :

The tax payments represent a cash outflow from business and therefore, these tax cash outflows are critical part of the financial decision making in a business. Taxation affects a firm in numerous ways, the most significant effects are as under :

1. While considering the financial aspects or arranging the funds for carrying out the business, the tax implications arising there from should also be taken into account. The Income of all business undertakings is subject to tax at the rates given in Finance Act. The weighted average cost of capital is reduced because interest payments are allowable for computing taxable income.

2. Where a segment of the firm incurs loss, but the firm gets overall profits from other segments, loss of loss making segment will reduce the overall tax liability of the firm by set off of losses.
3. The Income Tax Act allows depreciation on machinery, plant, furniture and buildings owned by the assessee and used by him for carrying on his business, occupation, profession. This depreciation is allowed for full year if an asset was used for the purposes of business or profession for more than 180 days. Unabsorbed depreciation can be carried forward for eight years. Further, depreciation will also be available on intangible assets acquired on or after 1.4.1998 owned by the assessee and used for the purpose of his business.
4. The setting up of a new project involves consideration of the tax effects. The decision to set up a project under a particular form of business organization, at a particular place, choice of the nature of the business and the type of activities to be undertaken etc. requires that a number of tax considerations should be taken into account before arriving at the appropriate decision from the angle of sound financial management. The choice of a particular manufacturing activity may be influenced by the special tax concessions available such as :
  - (i) Higher depreciation allowance.
  - (ii) Amortisation of expenditures on know-how, scientific research related to business; preliminary expenses, etc.
  - (iii) Deductions in respect of profit derived from the publications of books etc.
  - (iv) Deductions in respect of profit derived from export business.

### FINANCIAL MANAGEMENT AS SCIENCE OR ART

Financial management is a subject within the compass of social science as it deals with people. Its nature is nearer to applied sciences as it envisages use of classified and tested knowledge as a help in practical affairs and solving business.

Theory of financial management is based on certain systematic principles, some of which can be tested in mathematical equations like the law of physics and chemistry.

Financial management contains a much larger body of rules or tendencies that hold true in general and on the average. The use of computers, operations research, statistical techniques and econometric models find wide application in financial management as tools for solving corporate financial problems like budgeting, choice of investments, acquisition or mergers etc. This takes the financial management nearer to treatment as a subject of science. Nevertheless, there remains a wide scope for application of value judgement in financial decisions making. Most practical problems of finance have no hard and fast answers that can be worked out mathematically or programmed on a computer. They must be solved by judgment, intuition and the “feel” of experience. Thus, despite its frequent acceptance as an applied science, finance remains largely an art.

A very interesting presentation has been made by Weston in his book “**Methodology in Finance**”. The finance functions are mainly three viz., planning, organization and financial control. In each of these finance functions elements of science and art can be observed. Wherever methodology is to be applied in decision making in all these areas, the subject matter becomes a science confronted with the framework of techniques and tools. On the other hand, when the question of choice to make selection out of the alternative results arises the subject matter becomes an art requiring human Skills for value judgement.

### **FUNCTIONS OF FINANCIAL EXECUTIVES:**

To achieve the objective of the financial management i.e. to maximize the owner’s wealth, the financial executives have to perform variety of tasks to discharge their responsibilities. In the light of different responsibilities of the financial manager, he performs mainly the following duties :

1. **Forecasting of Cash Flow** : This is necessary for the successful day to day operations of the business so that it can discharge its obligations as and when they arise.
2. **Raising Funds** : The Financial Manager has to plan for mobilizing funds from different sources so that the requisite amount of funds are made available to the business enterprise to meet its requirements for short term, medium term and long term.
3. **Managing the Flow of Internal Funds** : Here the Manager has to keep a track of the surplus in various bank accounts of the organization and ensure that they are properly utilized to meet the requirements of the business.
4. **To Facilitate Cost Control** : The Financial Manager is generally the first person to recognize when the costs for the supplies or production processes are exceeding the standard costs/budgeted figures.
5. **To Facilitate Pricing of Product, Product Lines and Services** : The Financial Manager can supply important information about cost changes and cost at varying levels of production and the profit margins needed to carry on the business successfully.
6. **Forecasting Profits** : The Financial manager is usually responsible for collecting the relevant data to make forecasts of profit levels in future.
7. **Measuring Required Return** : The acceptance or rejection of an investment proposal depends on whether the expected return from the proposed investment is equal to or more than the required return.

8. **Managing Assets** : The function of asset management focuses on the decision making role of the financial manager. Finance personnel meet with other officers of the firm and participate in making decisions affecting the current and future utilization of the firm's resources.
  
9. **Managing Funds** : Funds may be viewed as the liquid assets of the firm. In the management of funds, the financial manager acts as a specialized staff officer to the Chief Executive of the company. The manager is responsible for having sufficient funds for the firm to conduct its business and to pay its bills. Money must be located to finance receivables and inventories, to make arrangements for the purchase of assets, and to identify the sources of long-term financing.



## 2

**Time Value of Money**

**Time Value  
of Money**  
It Grows!

**Concept of Time Value of Money**

Let's start a discussion on Time Value of Money by taking a very simple scenario. If you are offered the choice between having Rs. 10,000 today and having Rs. 10,000 at a future date, you will usually prefer to have Rs. 10,000 now. Similarly, if the choice is between paying Rs. 10,000 now or paying the same Rs. 10,000 at a future date, you will usually prefer to pay Rs. 10,000 later. It is simple common sense. In the first case by accepting Rs. 10,000 early, you can simply put the money in the bank and earn some interest. Similarly in the second case by deferring the payment, you can earn interest by keeping the money in the bank. Therefore the time gap allowed helps us to make some money. This incremental gain is time value of money.

Now let me ask a question, if the bank interest was zero (which is generally not the case), what would be the time value of money? As you rightly guessed it would also be zero. As we understood above, the interest plays an important role in determining the time value of money. Interest rate is the cost of borrowing money as a yearly percentage. For investors, interest rate is the rate earned on an investment as a yearly percentage.

## Reasons Why Money in the Future is Worth Less Than Similar Money Today

There are three reasons why money can be more valuable today than in the future. Let's discuss them:

- 1) **Preference for Present Consumption:** Individuals have a preference for current consumption in comparison to future consumption. In order to forego the present consumption for a future one, they need a strong incentive. Say for example, if the individual's present preference is very strong then he has to be offered a very high incentive to forego it like a higher rate of interest and vice versa.
- 2) **Inflation:** Inflation means when prices of things rise faster than they actually should. When there is inflation, the value of currency decreases over time. If the inflation is more, then the gap between the value of money today to the value of money in future is more. So, greater the inflation, greater is the gap and vice versa.
- 3) **Risk:** Risk of uncertainty in the future lowers the value of money. Say for example, nonreceipt of payment, uncertainty of investor's life or any other contingency which may result in non-payment or reduction in payment. Time value of money results from the concept of interest.

## SIMPLE INTEREST

**Simple Interest**

Interest Earned

$I = Prt$

P = the principal      r = interest rate      t = time in years

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**Simple Interest:** It may be defined as Interest that is calculated as a simple percentage of the original principal amount. Please note the word "Original". The formula for calculating simple interest is:

**Interest is paid only once at the end of time**

$$I = (Pnr) / 100$$

$$A = P + I$$

$$A = P \left[ 1 + \frac{nr}{100} \right]$$

Here,

P = principle = initial money deposited

R = rate of interest

N = number of year

= number of month /12

= number of days / 365

## Compound interest

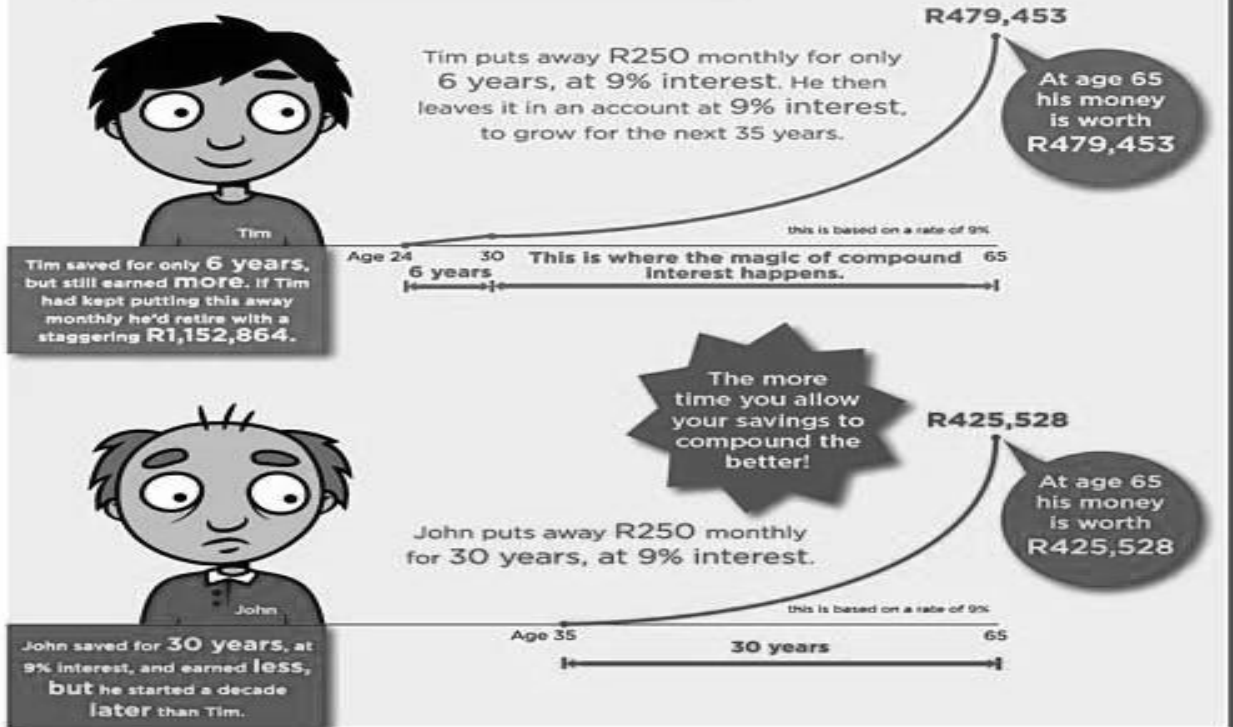
### What is compound interest?

The basic principle of compound interest is earning **additional interest on interest.**

Once you earn your **first** interest payment, it is **added** to the principle.



### How compound interest can work for you



**Compound Interest:** If interest is calculated on original principal amount it is simple interest. When interest is calculated on total of previously earned interest and the original principal it compound interest. Naturally, the amount calculated on the basis of compound interest rate is higher than when calculated with the simple rate.

### Interest is paid continuously

$$A = P (1 + i)^n$$

$$I = A - P$$

Here,

$N$  = number of conversion period = no of years \* (1or or 4 or 12)

$i$  = (rate of interest) / (1 or 2 or 4 or 12)

Note: When  $n = 1$  & interest is paid annually then Simple interest = compound interest

### Applications of compound interest

**a. In the problems of population:**

$$A = P (1 + i)^n$$

here,  $A$  = final population

$p$  = initial population

$i$  = rate of growth of population = birth rate – death rate

**b. In the problems of depreciation:**

$$SV = CP (1 - i)^n$$

$SV$  = scrap value

$CP$  = cost price

$i$  = rate of depreciation

$n$  = effective life of machine

**c. Effective rate of interest:**

$$i_e = (1 + i)^n - 1$$

Where,

$i_e$  = effective interest rate

$i$  = actual / nominal interest rate

$n$  = 1 year \* 1/ 2 / 4/ 12

### Future value:

**Future Value:** This is also known as terminal value. The accrued amount  $FV_n$  on a principal  $P$  after  $n$  payment periods at  $i$  (in decimal) rate of interest per payment period is given by:

**a. By annuity regular: (payment at end)**

$$F.V = \frac{A \left[ (1+i)^n - 1 \right]}{i}$$

where,

A = annuity

**b. By annuity due: (payment at start)**

$$F.V = \frac{A \left[ (1+i)^n - 1 \right]}{i} \times (1 + i)$$

- If instalments are paid initially & total amount is to be received after certain years then use future value formula.
- Future value is also used for sinking fund problems.

### Present value

**Present Value:** “Present Value” is the current value of a “Future Amount”. It can also be defined as the amount to be invested today (Present Value) at a given rate over specified period to equal the “Future Amount”. If we reverse the flow by saying that we expect a fixed amount after n number of years, and we also know the current prevailing interest rate, then by discounting the future amount, at the given interest rate, we will get the present value of investment to be made.

Discounting future amount converts it into present value amount. Similarly, compounding converts present value amount into future value amount. Therefore, we can say that the present value of a sum of money to be received at a future date is determined by discounting the future value at the interest rate that the money could earn over the period. This process is known as Discounting.

The present value interest rate or the future value interest rate is known as the discount rate. This discount rate is the rate with which the present value or the future value is traded off. A higher discount rate will result in a lower value for the amount in the future. This rate also represents the opportunity cost as it captures the returns that an individual would have made on the next best opportunity.

**c. By annuity regular:**

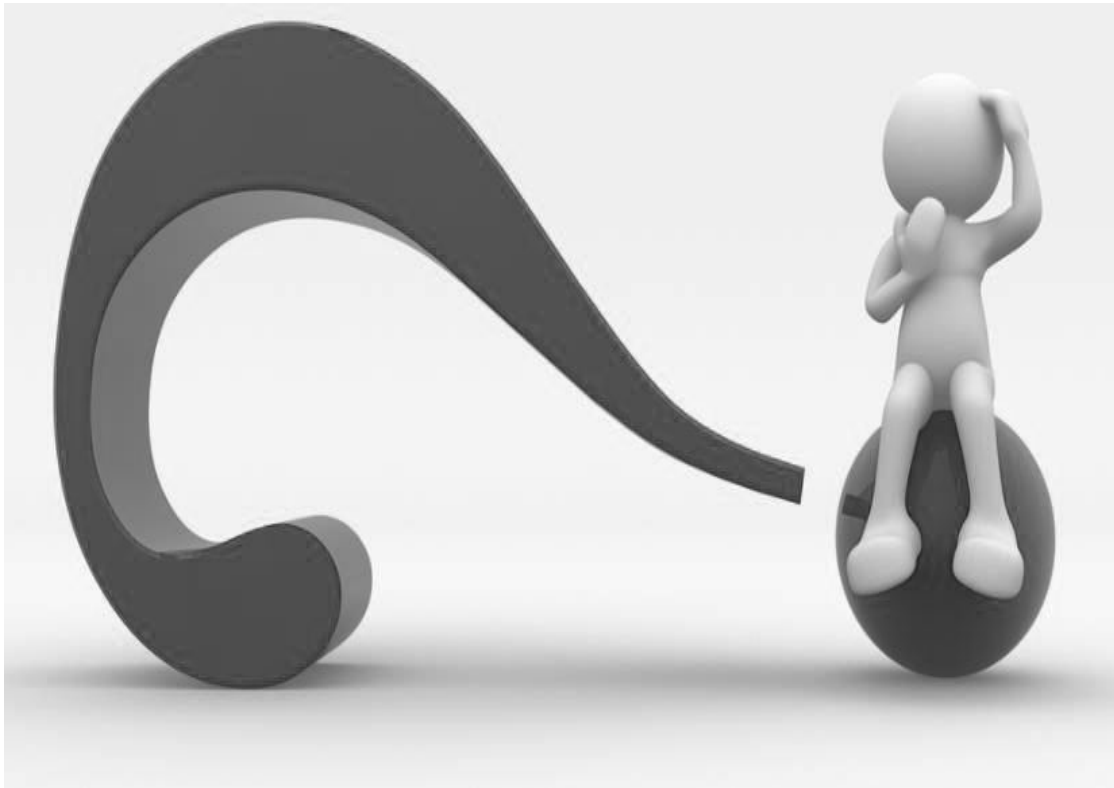
$$V = \frac{A \left[ (1+i)^n - 1 \right]}{i(1+i)^n} = A \cdot P(n, i)$$

**d. By annuity due:**

$$V = A \frac{[(1+i)^{n-1} - 1]}{i(1+i)^{n-1}}$$

- If total amount is received initially & instalments are paid later on then use present value.
- Present value is applicable in the problems of house property, loan or borrow.
- Amount of loan, amount of money borrowed & amount of house property is taken as present value.

# PRACTICAL QUESTIONS



PROBLEMS OF SIMPLE INTEREST:



1. S.I on Rs. 3500 for 3 years at 12% per annum is:
  - a) Rs. 1,200
  - b) 1,260
  - c) 2,260
  - d) None of the these.
  
2. The sum required to earn a monthly interest of Rs. 1,200 at 18% per annum SI is:
  - a) Rs. 50,000.
  - b) Rs. 60,000
  - c) Rs. 80,000
  - d) none of these.
  
3. The simple interest on a certain sum of money at 4% p.a. for  $3\frac{1}{2}$  years is Rs. 2,800. The sum is:
  - a) Rs. 24,000
  - b) Rs. 20,000
  - c) Rs. 18,000
  - d) Rs. 16,000.
  
4. The simple interest on a sum of money at 4% p.a. for 2 years is Rs. 3,750. The sum is:
  - a) Rs. 64,875
  - b) Rs. 46,875
  - c) Rs. 84,675
  - d) Rs. 48,675
  
5. What sum of money will earn a simple interest of Rs. 38,400 in five years at the rate of 16% p.a.?
  - a) Rs. 7,680
  - b) Rs. 48,000
  - c) Rs. 30,720
  - d) Rs. 9,600.

### BASIC PROBLEMS OF COMPOUND INTEREST:

6. If  $P = \text{Rs. } 1,000$ ,  $R = 5\%$  p.a.  $n = 4$ ; What is Amount and C.I. is
  - a) Rs. 1,215.50, Rs. 215.50
  - b) Rs. 1,25, Rs. 125
  - c) Rs. 2,115, Rs. 115
  - d) none of these.
  
7. Rs. 100 will become after 20 years at 5% p.a. compound interest amount:
  - a) Rs. 250
  - b) Rs. 205
  - c) Rs. 265.50
  - d) none of these.
  
8. The C.I. on Rs. 16,000 for  $1\frac{1}{2}$  years at 10% p.a. payable half-yearly is:
  - a) Rs. 2,222
  - b) Rs. 2,522
  - c) Rs. 2,500
  - d) none of these.
  
9. The C.I. on Rs. 40,000 at 10% p.a. for 1 year when the interest is payable quarterly is:



**18.** Find the present value of an annuity of Rs. 1,000 payables at the end of each year for 10 years. If rate of interest is 6% compounding per annul:

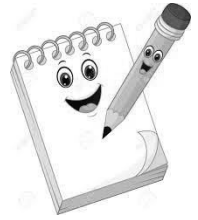
- (a) Rs. 7,360                      (b) Rs. 8,360  
(b) (c) Rs. 12,000                (d) None of these

**19.** A loan of Rs. 10,000 is to be paid back in 30 equal instalments. The amount of each instalment to cover the principal and at 4% p.a. CI is:

- a) Rs. 587.87                      c) Rs. 578.87  
b) Rs. 587                            d) None of these.

## 3

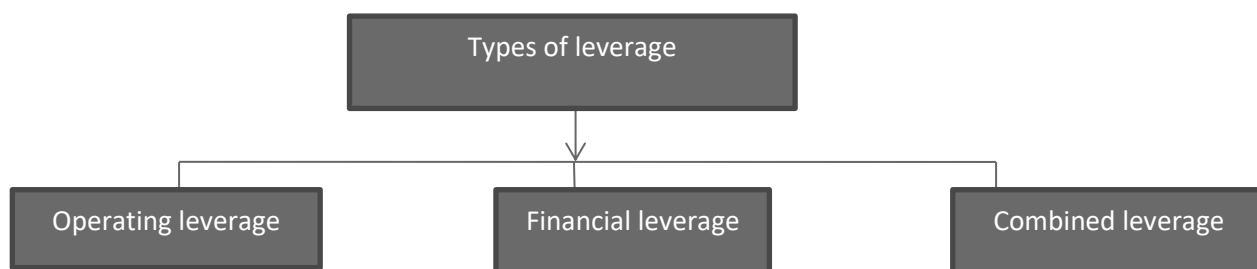
## LEVERAGE

**MEANING OF LEVERAGE:**

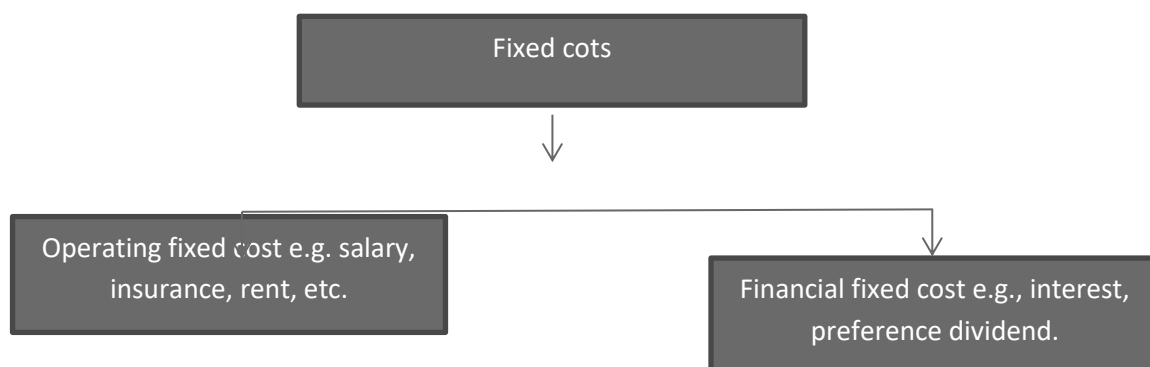
- # The concept of leverage has its origin in science. It means influence of one over another.
- # In the context of financial management, the term 'leverage' means sensitiveness of one financial variable to change in another. **Use of one financial variable to create an impact on other financial variable**
- # For example
  - Increase in sales leads to increase in EBIT.
  - Increase in EBIT leads to increase in EPS.
  -
- # The term leverage in general, refers to advantage gained for any purpose

**What is advantage**

## TYPES OF LEVERAGE



## FIXED COSTS



## Format of income statement :

Particulars	Rs.
Sale	
<b>-Variable cost</b> -----	
Contribution	
- Fixed cost -----	
EBIT	
-interest -----	
EBT	
-tax -----	
PAT	
- dividend to PS -----	
Earning available for ESH	
No	
EPS	

## OPERATING LEVERAGE :

- (a) **Definition:** operating leverage is defined as the “firm’s ability to use fixed operating costs to magnify effects of changes in sales on its earnings before interest and taxes.”
- (b) **Explanation:** a change in sales will lead to a change in profit i.e. earnings before interest and taxes (EBIT). The effect of change in sales on EBIT is measured by operating leverage. Since fixed costs remain the same irrespective of level of output, percentage in EBIT will be higher than increase in sales.
- (c) **Measurement :** The degree of operating leverage (DOL) is measured by (expressed in times)

$$\frac{\% \text{ change in EBIT}}{\% \text{ change in sales}} \quad \text{or} \quad \frac{\text{contribution}}{\text{EBIT}}$$

(d) **Significance:**

- **Effect on EBIT:** DOL measures the impact of change in sales on operating income. Suppose DOL of a firm is 1.67 times, it implies that 1% change in sales will lead to 1.67% change in EBIT. Hence, if sales increases by 20%, EBIT increases by  $20\% \times 1.67 = 33\%$ . Also, if sales decreases by say 40% , EBIT falls by 67%
- **Impact of fixed costs:** DOL depends on fixed costs. If fixed costs are higher, DOL is higher and vice-versa.
- **Effect of high DOL:** if DOL is high, it implies that fixed costs are high, Due to the high, hence the break even point (no profit – no loss situation) would be reached at a higher level of sales. Due to the high break-even point, the margin of safety and profits would low. This means that the operating risks are higher hence a low DOL is preferred.
- A high DOL means that profits (EBIT) may be wiped off. Even for a marginal reduction in sales. Hence it is preferred to operate sufficiently above break-even point to avoid the danger of fluctuations in sales and profits.

(e) **Operating breakeven point** =  $\frac{\text{fixed cost}}{\text{contribution per unit}}$  or  $\frac{\text{fixed cost}}{\text{PV ratio}}$

### Important points about operating leverage

- 1) DOL is undefined at break – even point.

- 2) DOL is negative below break – even point.
- 3) DOL is positive above break –even point.
- 4) DOL decrease as sales increases, because risk reduces.
- 5) Each level of sales has different operating leverage

## FINANCIAL LEVERAGE :

- (a) **Meaning:** financial leverage is defined as the ability of a firm to use fixed financial charges (interest) to magnify the effect of changes in E.B.I.T/ Operating profits on the firm's earning per share (EPS).
- (b) **Explanation:** financial leverage occurs when a company has debt content in its capital structure and fixed financial charges e. g. interest on debentures. These fixed financial charges do not vary with the EBIT. They are fixed and are to be paid irrespective of level of EBIT. Hence an increase in EBIT will lead to a higher percentage increase in earnings per share (EPS). This is measured by the financial leverage.
- (c) **Measurement :** the degree of financial leverage (DFL) is measured by : (expressed in times)

$$DFL = \frac{\% \text{ change in EPS}}{\% \text{ change in EBIT}}$$

$$= \frac{EBIT}{EBT} \quad \dots\dots \text{it is used when there are no preference shares}$$

$$= \frac{EBIT}{EBIT - INT - \frac{PREF.div}{1 - \text{tax rate}}} \quad \dots \text{ used when there are preference shares}$$

(d) **Significance:**

- **Effect on EPS:** DFL measures the impact of change in EBIT (operating income) on EPS (earnings per share).supposes DFL of a firm is 4 times, it implies that 1% change in EBIT will lead to 4% change in EPS. Hence, if EBIT increases by 10% EPS increases by 10% × 4= 40%. Also, if EBIT decreases by say 5% EPS, fall by 20%

- Indicator of financial risk

**(e) Impact of fixed financial charges:**

**DFL** depends on the magnitude of interest and fixed financial charges. If these costs are higher, DFL is higher and vice-versa.

**Effect of high DFL:** if DFL is high, it implies that fixed interest charges are high. This means that the financial risks are higher. The DFL is considered to be favourable or advantageous to the firm, when it earns more on its total investments than what it pays towards debt capital. In other words, DFL is advantageous only if return on capital employed (ROCE) is greater than rate of interest on debt.

Financial BEP – it is that level of EBIT at which EPS is zero.

$$\text{Financial break-even point} = 1 + \frac{PD}{1 - \text{TAX RATE}}$$

Where, I = interest, PD = pref. dividend

**Important points about financial leverage :**

- 1) **DFL is UNDEFINED AT FINANCIAL BEP.**
- 2) **DFL is negative below financial BEP.**
- 3) **DFL is positive above financial BEP**
- 4) **DFL decreases as EBIT increase, because the risk reduces.**
- 5) **Each, level of EBIT has different DFL.**
- 6) **When there is no interest and preference dividend, DFL = 1**

❖ **WHEN IS A FIRM SAID TO BE FINANCIALLY FAVOURABLY LEVERAGED :**

To determine whether the degree of financial leverage is favourable or not, the return on capital employed (ROCE) should be compared with rate of interest on debt.

**1. When ROCE greater than interest rate:**

DFL is considered to be favourable or advantageous to the firm, when it earns more on its total investment than what it pays towards debt capital. In other words, DFL is advantageous only if return on capital employed (ROCE) is greater than rate of interest on debt.

This is because shareholders gain in a situation where the company earns a high rate of return and pays a lower rate of return to the supplier of long term debt funds. Financial leverage in such cases is therefore also called trading on equity.

The difference, between the return (EBIT) and the cost of the debt funds would enhance the earnings of shareholders.



Further, in case of debt funds the interest cost also tax deductible.

**2. When ROCE is less than interest rate:**

Where the rate of return on investment falls below the rate of interest the shareholders suffer because their earnings fall more sharply than the fall in the return on investment. This is because fixed interest costs have to be met, irrespective of the level of EBIT. In such cases, a high DFL is disadvantageous; in fact, the use of debt funds involving fixed commitment of interest rate on debt, DFL should be maintained low.

- 3. Conclusion:** DFL should be high when return on capital employed (ROCE) is greater than interest rate on debt, if ROCE is less than interest rate on debt, DFL should be maintained low.

## COMBINED LEVERAGE :

**(a) Meaning:** combined leverage is used to measure the total risk of a firm i.e. operating risk and financial Risk.

**(b) Explanation:** effect of fixed operating costs (i.e. operating risks) is measured by operating leverage (DOL). Effect of fixed interest charges (i.e. financial risks) is measured by financial leverage (DFL). The combined effect of these is measured by combined leverage (DCL).

**(c) Measurement :** the degree of combined leverage (DCL) is measured as  $DOL \times DFL$

Therefore,

$$\begin{aligned} DCL &= \frac{\text{contribution}}{EBT} \\ &= \frac{\text{Contribution}}{EBIT - Int - \frac{\text{pref.Div}}{1 - \text{tax rate}}} \end{aligned}$$

**(d) Significance:** DOL measures impact of change in sales on EBIT. DFL measures the impact of change in EBIT on EPS; DCL measures the combined impact, i.e. effect of change in sales on EPS. IF DCL is 2 times. It implies that a 10% increase in sales will lead to 20% increase in EPS.

## PROBLEMS

### ❖ BASIC PROBLEMS :

1. Sales 1,00,000 units @ Rs. 2 per unit  
 Variable cost per unit = 0.70  
 Fixed cost = Rs. 1,00,000  
 Interest = 3,668  
 Find  
 a) Degree of operating leverage  
 b) Degree of financial leverage  
 c) combined leverage
  
2. Calculate the degree of operating leverage (DOL), degree of financial leverage (DFL) and the degree of combined leverage (DCL) for the following firms and interpret the results.

	Firm A	Firm B	Firm C
1) Output (units )	60, 000	15, 000	1, 00, 000
2) Fixed costs (Rs.)	7, 000	14, 000	1, 500
3) Variable cost per unit (Rs.)	0.20	1.50	0.02
4) Interest on borrowed funds (Rs.)	4, 000	8, 000	-
5) Selling price per unit (Rs.)	0.60	5.00	0.10

3. A firm sells its products for Rs. 60 per unit, has variable operating costs of Rs. 40 per unit and fixed operating costs of Rs. 7,000 per year. Its current level of sales is 400 units. Determine the degree of operating leverage. What will happen to EBIT if sales change: (a) rise to 480 units, and (b) decrease to 300 units?
  
4. The data of two firms Rama and Krishna, having the same PV ratio, is given below. Make relevant computations and comment on their operating risks.

Particulars	Rama	Krishna
Sales	Rs. 2,00,000	Rs. 2,00,000
Less : Variable Cost	Rs. 1,20,000	Rs. 1,20,000
Contribution	Rs. 80,000	Rs. 80,000
Less : Fixed Costs	Rs. 30,000	Rs. 50,000
Profit	Rs. 50,000	Rs. 30,000

5. A firm has sales of 10, 00, 000 variable cost of Rs. 7, 00, 000 and fixed cost of Rs. 2, 00, 000 and debt of Rs. 5, 00, 000 at 10% rate of interest. What are the operating, financial and combined leverages? If the firm wants to double its earnings before

interest and tax (EBIT), how much of a rise in sales would be needed on a percentage basis?

6. A firm has sales of Rs. 50 Lakhs, Variable costs of Rs. 35 Lakhs, Fixed Cost of Rs. 7 lakhs, 10% Debt of Rs. 30 Lakhs, and Equity Capital of Rs. 55 Lakhs. Calculate Operating and Financial leverage.
7. Compute the combined leverage from the following data – (a) EBIT = Rs. 10,00,000 (b) Fixed costs = Rs. 20,00,000 and (c) EBT = Rs. 8,00,000.
8. The following information is available for ABC& co.
- |                   |                 |
|-------------------|-----------------|
| EBIT              | Rs. 11, 20, 000 |
| Profit before tax | 3, 20, 000      |
| Fixed costs       | 7, 00, 000      |
- Calculate % change in EPS if the sales are expected to increase by 5%
9. X Corporation has estimated that for a new product its break-even point is 2,000 units if the item is sold for Rs. 14 per unit; the cost accounting department has currently identified variable cost of Rs. 9 per unit. Calculate the degree of operating leverage for sales volume of 2, 500 units and 3,000 units. What do you infer from the degree of operating leverage at the sales volumes of 2,500 units and 3, 000 units and difference if any?
10. Consider the following data for Omega Ltd: EBIT = Rs. 15,750 Lakhs, EBT = Rs. 7,000 Lakhs and Fixed Operating Costs = Rs. 1,575 Lakhs. Calculate Percentage change in EPS, if sales increase by 5%.
11. Arun Ltd sells 2000 units at Rs. 10 per unit. Its variable costs ratio is 70% and fixed cost is Rs. 1000. The company had raised the required funds by issue of 100, 10% Debentures at Rs. 100 each and 2000 equity shares at Rs. 10 per share. The company's sales are expected to increase by 20%. Assuming a tax rate of 50%, find out the impact of increase in sales on its EPS.
12. You are a finance manager in Big Pen Ltd. The degree of operating leverage of your company is 5.0. The degree of financial leverage of your company is 3.0. Your managing director has found that the degree of operating leverage and the degree of financial leverage of your nearest competitor Small



Sales		Rs.
33, 81, 000		
Wages & salaries	Rs. 13, 20, 000	
Raw materials	8, 73, 000	
General expenses (Fixed)	3, 46, 000	
Other fixed assets costs	<u>3, 80, 000</u>	29, 19,000
Profit before interest & tax		
4, 62, 000		
Interest		
<u>84, 000</u>		
Profit & before tax		
3, 78, 000		
Tax @40%		
<u>1, 51, 200</u>		
Profit for equity shareholders		
<u>2, 26, 800</u>		

The company is considering to -take up a project which will reduce the labor cost by 20% and increased other fixed cots by Rs. 85, 000 p. a. the capital expenditure on this project would be Rs. 8, 20, 000 to be financed by 15% loan. If the project is taken – up, the sales are expected to increases by 15% in the earnings fall; the dividend per share is kept constant.

Analysis the DOL and DFL of the company before and after taking up the project

17. The following details of Alpha Ltd. for the year ended 2010 are furnished :

Financial Leverage	2:1
Operating leverage	3:1
Interest charges per annum	Rs. 20 lakh
Corporate tax rate	40%
Variable cost as percentage of sales	60%

18.

Particulars	A	B	C
Variable cost as % of sales	66.666	75	50
Interest expense	200	300	1000
DOL	5	6	2

DFL	3	4	2
Tax rate	35%	35%	35%

Prepare income statement for the company A , B & C.

19. From the following prepare income statements of A,B and C. briefly comment on each firms performance :

	Firm a	Firm B	Firm C
Financial leverage	3:1	4:1	2:1
Interest	200	300	1, 000
Operating leverage	4:1	4:1	4:1
Variable cost as a % of sales	66.67%	75%	50%
Income – tax rate	45%	45%	45%

20. Balance sheet of ABC Ltd is given below :

Liability	Rs.	Asset	Rs.
Equity share capital ( Rs. 10 each)	60,000	Net fixed asset	1,50,000
10% long term debt	80,000	Current asset	50,000
Retained earning	20,000		
Current liability	40,000		

Company's total asset turnover ratio is 3. Its fixed operating cost are Rs. 1,00,000.

Variable cost ratio is 40 %. Tax rate is 35%.

- a) Calculate all type of leverage  
 b) Determine likely level of EBIT if EPS is i) Rs.1 ii) Rs. 3 iii) zero

21. The balance sheet of alpha numeric company is given below:

Liabilities	Amount	Assets	Amount
Equity capital (Rs.10 per share )	Rs. 90, 000	Fixed assets	Rs. 2,25, 000
Retained earnings	30, 000	Current assets	75, 000
10% Debt	1, 20, 000		
Current	60, 000		
	<u>3, 00, 000</u>		<u>30, 00, 000</u>

The company's total assets turnover ratio is 3, its fixed operating cost is Rs. 1, 50, 000 and its variable operating cost ratio is 50%. The income – tax rate is 50%

You are required to:

- i) Calculate the different type of leverage for the company  
 ii) Find put of the EBIT if EPS is (a) Re, (b) Rs.2(c) Re.0

22. A firm's total costs are totally variable. You are required to answer the following – (a) What is DOL? (b) What will happen to EBIT if sales increases by 100% and if sales fall by 50% (c) What is the condition for the firm incurring losses?
23. X Ltd has estimated that for a new product its break-even point is 2,000 units if the items is sold for Rs. 14 per unit; the cost accounting department has currently identified variable cost of Rs. 9 per unit. Calculate the degree of operating leverage for sales volume of 2,500 units and 3,000 units.
24. From the following data of company A and Company B, prepare their Income statements.

Particulars	Company A	Company B
Variable costs	Rs. 56,000	60% of sales
Fixed costs	Rs. 20,000	?
Interest Expenses	Rs. 12,000	Rs. 9,000
Financial Leverage	5:1	?
Operating Leverage	?	4:1
Income tax rate	30%	30%
Sales	?	Rs. 1,05,000

25. Complete the following statement with the given data:-

Sales	?
Less: Variable costs	?
Contribution	?
Less: Fixed Costs	?
EBIT	?
Less: Income tax	?
EAT	?

PAT = 5% on sales, Income tax rate = 50%, DOL = 4 times, Debt = Nil, Variable costs = Rs. 3 lakhs.

26. Calculate the EBT and Financial Leverage if Net worth = Rs. 25 Lakhs, Debt/Equity = 3:1, Interest rate = 12% and operating profit = Rs. 20 Lakhs.
- 27.
- i) Find out operating leverage from the following data:
- |                |         |
|----------------|---------|
| Sales          | 50, 000 |
| Variable costs | 60%     |
| Fixed costs    | 12, 000 |
- ii) Find out the financial leverage from the following data:

Net worth	Rs. 25, 00, 000
Debt/equity	3:1
Interest rate	12%
Operating profit	Rs. 20, 00, 000

28. Prepare the income statement and balance sheet from the following data:

- Price-Earning ratio = 3 times
- Market price per share = Rs. 18
- No of equity shares of Rs. 10 each = 10,000
- No of 12% Preference shares of Rs. 100 each = 1,000
- Degree of financial leverage = 2
- Degree of operating leverage = 2
- Income tax rate = 40%
- Variable cost as % of sales = 60%
- Rate of interest on debt = 10%

29. A firm has a total capital of Rs. 12 Lakhs with a D-E ratio of 2:1. Its DFL is 1.67 times. If interest on debt is Rs. 1.2 lakhs, find out (a) interest rate on debt (b) EAT if tax rate is 40% and (c) EPS if face value is Rs. 10 (d) ROI

30. Consider the following information for Omega Ltd.:

	₹ in Lakhs
<b>EBIT(Earnings before interest and Tax)</b>	<b>15,750</b>
<b>Earnings before Tax (EBT):</b>	<b>7,000</b>
<b>Fixed Operating costs:</b>	<b>1,575</b>

Required: Calculate percentage change in earnings per share, if sales increase by 5%



## ❖ EXTRA PROBLEMS FOR PRACTICE :

31.

A Company operates at a Production level of 5,000 units. The contribution is ₹ 60 Per unit, operating leverage is 6, combined leverage is 24. If tax rate is 30%, what would be its earnings after tax?

32.

A Company operates at a Production level of 1,000 Units. The contribution is ₹ 60 per unit, operating leverage is 6, and combined leverage is 24. If tax rate is 30%, what would be its earnings after tax,?

33.

The net sales of A Ltd. is ₹ 30 crores. Earnings before interest and tax of the company as a percentage of net sales is 12%. The capital employed comprises ₹ 10 crores of equity, ₹ 2 crores of 13% Cumulative Preference Share Capital and 15% Debentures of ₹ 6 crores. Income-tax rate is 40%.

- 1) Calculate the Return-on-equity for the company and indicate its segments due to the presence of Preference Share Capital and Borrowing (Debentures).
- 2) Calculate the Opening Leverage of the Company given that combined leverage is 3.

34.

The following summarises the percentage Change in operating income, percentage changes in revenues, and betas for four pharmaceutical firms.

Firm	Change in revenue	Change in operating income	Beta
PQR Ltd.	27%	25%	1.00
RST Ltd.	25%	32%	1.15
TUV Ltd.	23%	36%	1.30
WXY Ltd.	21%	40%	1.40

Required:

- 1) Calculate the degree of operating leverage for each of these firms. Comment also.

- 2) Use the Operating leverage to explain why these firms have different beta.



- ✚ It is also the *minimum rate of return that a firm must earn on its investment* which will maintain the market value of share at its current level and attract funds.
- ✚ It can be stated as the *opportunity cost* of an investment, i.e. the rate of return that a company would otherwise be able to earn at the same risk level as the investment that has been selected.
- ✚ The cost of capital determines *how a company can raise money* may be through a stock issue. Borrowing or a mix of the two. This is the rate of return that a firm would receive if it invested its money someplace else with similar risk.

### Features of Cost of Capital

- 1) Cost of Capital is not a Cost as such. It is the rate of return that a firm required to earn from its investments.
- 2) It is the minimum rate of return
- 3) It comprises of 3 components:
  - a) The expected normal rate of return at Zero risk level is the rate of Interest by Bank.
  - b) The premium for business risk
  - c) The premium for financial risk.

### Importance of Cost of Capital

The cost of capital is very important in financial management and plays a crucial role in the following areas

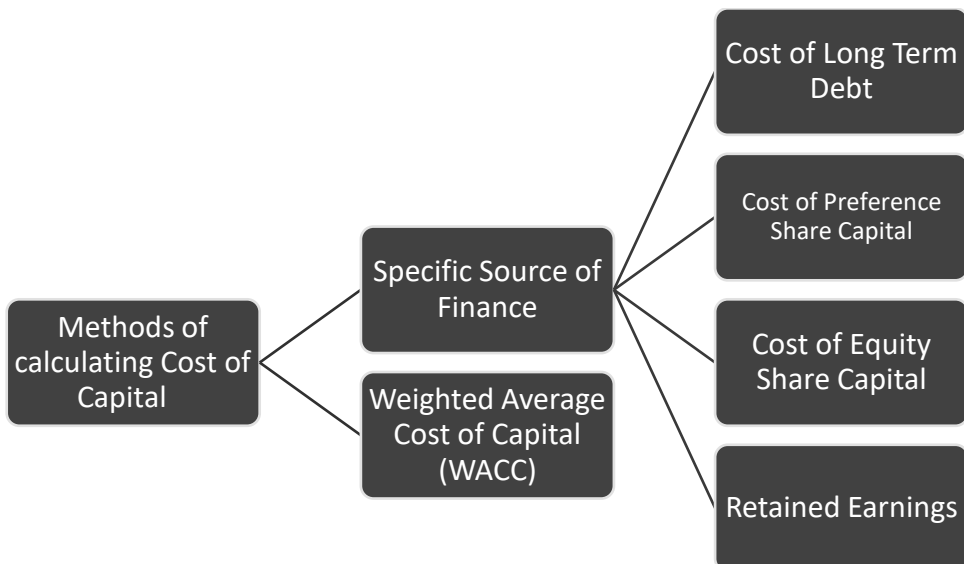
- 1) **Capital budgeting decisions:** Cost of capital is used for discounting cash flows under net present value method for investment proposals. Every investment option may have different cost of capital hence it is very important to use the cost of capital which is relevant to the options available. Here Internal Rate of Return (IRR) is treated as cost of capital for evaluation of two options. So, it is very useful in capital budgeting decisions.
- 2) **Capital structure decisions:** An optimal capital is that structure at which the value of the firm is maximum, and cost of capital is the lowest, so cost of capital is crucial in designing optimal capital structure.
- 3) **Performance Appraisal:** Cost of capital is used to appraise the performance of a business. The performance of business is compared against the cost of capital which is known as cut off rate or hurdle rate.

- 4) **Other financial decisions:** Cost of capital is also useful in making such other financial decisions as dividend policy. Capitalization of points making the rights issue etc.
- 5) **Designing of optimum credit policy:** While appraising the credit period to be allowed to the customers, the cost of allowing credit period is compared against the benefit/profit earned by providing credit to customers. Here cost of capital is used to arrive at the present value of costs & benefits received.

### Computation of Cost of Capital

Computation of cost capital of a firm involves the following steps:

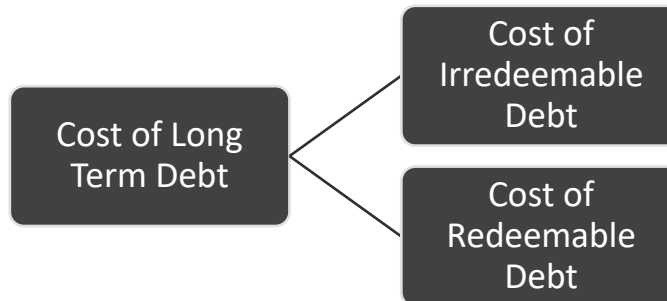
- i) Computation of cost of specific sources of a capital i.e. Long Term Debt, Preference capital, Equity and Retained earnings, and
- ii) Computation of Weighted average cost of capital.



### A) Specific Source of Finance

## 1) Cost of Long Term Debt Capital - $k_d$

### a) Redeemable Debentures & Bonds



**Meaning:** External Debt do not confer ownership to the providers of finance. They do not participate in the affairs of the company but enjoys profit before tax.

#### Features of Redeemable Debentures & Bonds:

- a) **Face Value:** Debentures or Bonds are denominated with some value, this denominated value is called face value.
  - b) **Interest (Coupon Rate):** Each debenture bears a fixed rate of interest (except Zero Coupon Bond & Deep Discount Bond) which is payable to holders periodically at the face value of debenture.
  - c) **Maturity Period:** Debentures or Bonds has fixed maturity period for redemption. In case of irredeemable debentures maturity period is not defined.
  - d) **Redemption Value:** Redemption value of Redeemable debentures or Bonds may vary from the face value of debentures.
  - e) Debt may be perpetual or redeemable debt moreover, it may be issued at par, at premium or discount interest is allowed to be deducted for computation of tax. So adjustment for tax is required.
  - f) **Benefit of Tax shield:** Payment for interest are allowed as expenses for the purpose of corporate tax determination. Therefore, interest expense saves the tax liability of the company. Saving the tax liability is also known as tax shield.
- Example:** There are two companies A Ltd. & B Ltd. The capital of A Ltd. Is fully financed by the shareholders whereas A Ld. uses debt fund as well. The below is the profitability statement of both the companies:

Particulars	A Ltd. (₹ in lakh)	B Ltd. (₹ in lakh)
Earning before Interest & Taxes (EBIT) (A)	100	100
Interest paid to Debenture holders (B)	-	(40)
Profit before Tax (PBT) C= (A-B)	100	60
<b>Tax @ 50% (D)</b>	<b>(50)</b>	<b>(30)</b>
Profit after tax (PAT) E= (C-D)	50	30

**Analysis:** A comparison of the two companies' shows that the interest payment of ₹ 40 by the B Ltd. Results in a tax shield of ₹ 20 lakh (₹ 40 lakh paid as interest \* 50% tax rate). Therefore effective interest rate is ₹ 20 lakh.

**b) Irredeemable Debentures:** Cost of debentures which are not redeemed by the issuer of the debenture is known as irredeemable debentures. Cost of debentures *not redeemable during the life time of the company.*

Cost of Debt Capital can be computed as under:- denoted as (Kd)

**Cost of Redeemable Debt:**

$$\frac{(\text{interest} \times [1 - \text{tax rate}] + [RV - \text{Net proceeds}] / N)}{([RV + \text{Net proceeds}] / 2)}$$

**Cost of Irredeemable Debt:**

$$\frac{(\text{Interest} \times [1 - \text{tax rate}])}{(\text{Net proceeds of issue})}$$

Where –

RV= Redeemable value of debt

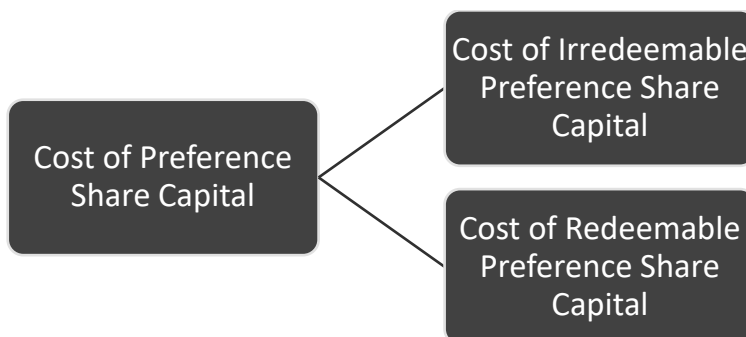
N = Life of the redeemable debt.

**Important Notes relevant for solving practical problems:**

1. If *redemption value is not given*, assume redemption is *at par*.
2. If *net proceeds are not given* than assume *current market price as net proceeds* because if the company raises the funds today it can raise an amount equal to current market price.
3. If *current market price is also not given*, then assume *face value as net proceeds*.

## 2) Cost of Preference Share Capital (PSC) – kp

*Preference share capital is paid dividend at a fixed rate.* However, the dividends are not allowed to be deducted for computation of tax. So, no adjustment for tax is required just like debentures preference share may be perpetual or redeemable. *Hence dividend paid to preference shareholders does not reduce the tax liability of the company. Dividend is treated as appropriation of after tax profit.* Further, they may be issued at Par, Premium or Discount. Preference share capital is categorised as Irredeemable & Redeemable.



**a) Irredeemable PSC:** Cost is calculated by dividing the preference dividend with the current market price or net proceeds from the issue.

**b) Redeemable PSC:** Preference shares issued by company which are *redeemable on its maturity* are Redeemable Preference Share Capital. Cost of Redeemable Preference Share Capital is same as Redeemable Debentures.

**Cost of preference share capital (PSC) can be computed as under: (denoted as KP)**



**Cost of Redeemable PSC:**

$$\frac{(\text{Preference Dividend} + [RV - \text{Net proceeds}] / N)}{([RV + \text{Net proceeds}] / 2)}$$

**Cost of Irredeemable PSC:**

$$\frac{(\text{Preference Dividend})}{(\text{Net proceeds of issue})}$$

Where –

RV = Redeemable value of preference shares

N = Life of the redeemable preference shares.

**Important Notes relevant for solving practical problems:**

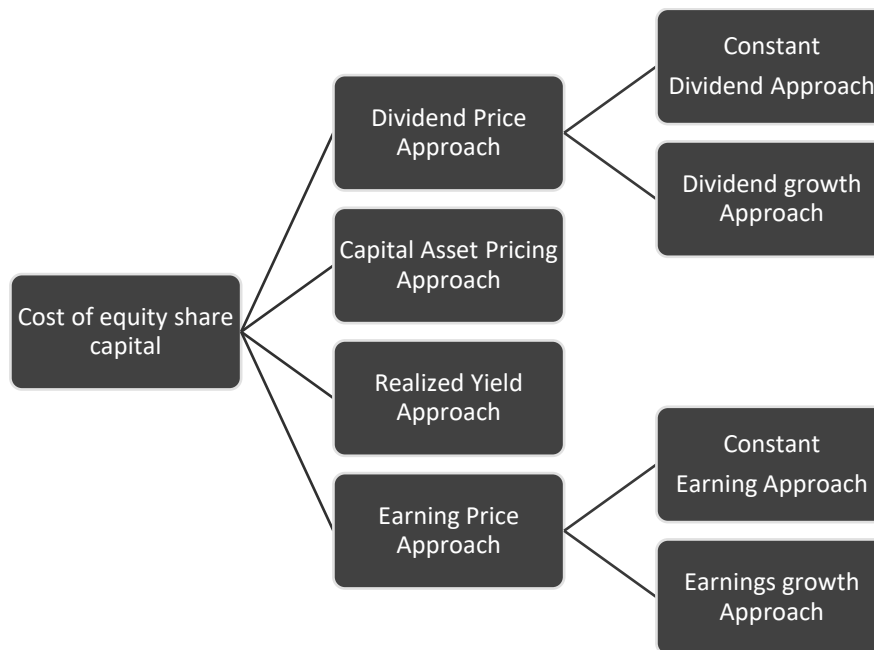
1. If *redeemable value is not given* assume *redemption is at par*.
2. If *net proceeds are not given*, then assume *current market price as net proceeds* because if the company raises the funds today it can raise an amount equal to current market price.
3. If *current market price is also not given*, then assume *face value as net proceeds*.

**Example:** Company issued 10,000. 10% preference share of ₹10 each, cost of issue is ₹ 2 per share. Calculate cost of preference capital if these shares are issued at par.

**Solution:**

### 3) COST OF EQUITY SHARE CAPITAL (ESC) - $k_e$

Cost of equity capital (denoted by  $k_e$ ) represents the expectations of Equity Shareholders from a company. *It is relatively highest cost of capital, due to relative higher risk, equity shareholders expect higher return hence the cost of capital is also high.* Based on investors behaviour and expectations, the cost of equity capital can be determined by any of the following approaches:



#### a) Dividend price Approach:

- This approach is also known as Dividend Valuation Model.
- It assumes that dividends influence the share price.
- It assumes that *price of the share today is the present value of expected future dividend*
- This model assumes that *dividends are paid at a constant rate to perpetuity.*
- Here cost of equity capital is computed by dividing the current dividend by average market price per share. This dividend price ratio expresses the cost of equity capital in relation to what yield the company should pay to attract investors.

- i) **Dividend Price Approach with Constant Dividend Method:** In this approach *dividend is constant, which means there is no growth or zero growth in dividend.* The cost of equity is calculated as follows:

$$K_e = (D_1/P_0)$$

Where,

$K_e$  = Cost of Equity

$D_1$  = Annual dividend

$P_0$  = Market value of equity (ex-dividend)

**Demerit:**

- However, this method cannot be used to calculate cost of equity of units suffering losses.
- It ignores the importance of retained earnings on the market price of equity shares.

**Suitability:**

- This method is suitable only when the company has stable earnings and stable dividend policy over a period of time.

- ii) **Dividend Price Approach with Dividend Growth Approach:** Under this approach *earnings and dividends do not remain constant and the price of equity shares is also directly influenced by the growth rate in dividends*. Where earnings, dividends and equity share price all grow at the same rate, the cost of equity is computed as follows:

$$K_e = (D_1/P_0) + G$$

Where,

$K_e$  = Cost of Equity

$D_1$  = Expected dividend per share ( $D_1 = D_0 (1+g)$ )

$P_0$  = Current Market price per share

$G$  = Annual growth rate of earnings of dividend.

### b) Capital Asset Pricing Model Approach (CAPM):

This model describes the linear *relationship between risk and return for securities*, the risk for a security is exposed to are diversifiable and non-diversifiable *risk can be eliminated through a portfolio*, consisting of large number of well diversified securities. The non- diversifiable risk is assessed in terms of beta coefficient (b or  $\beta$ ) through fitting regression equation between return of a security and the return on a market portfolio.

Thus, the cost of equity capital can be calculated under this approach as:

$$K_e = R_f + B (R_m - R_f)$$

Where,

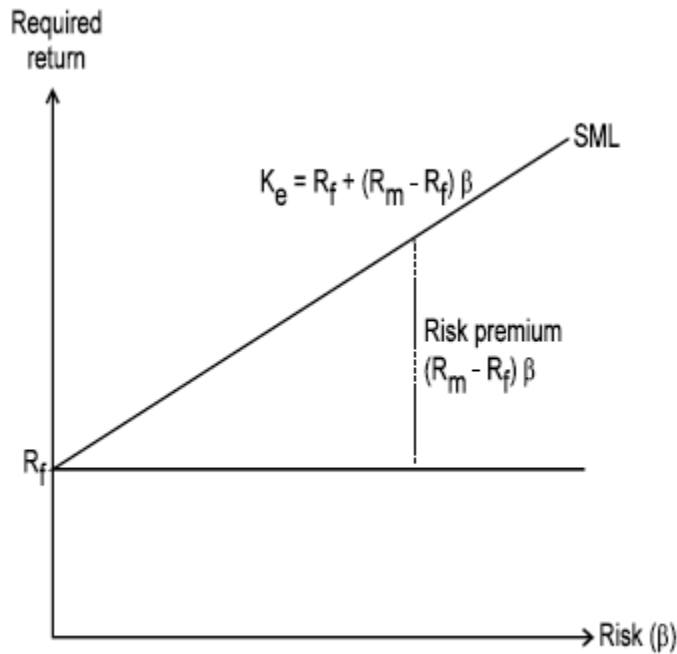
$K_e$  = Cost of Equity

$R_f$  = Rate of return on security

$B$  = Beta coefficient

$R_m$  = Rate of return on market portfolio

$(R_m - R_f)$  = Market Premium



Cost of Equity under CAPM

Therefore, required rate of return = risk free rate + risk premium

The idea behind CAPM is that investors need to be compensated in two ways – Time value of money and risk.

- The time value of money is represented by the risk-free rate in the formula and compensates the investors for placing money in any investment over a period of time.
- The other half of the formula represents risk and calculates the amount of compensation the investor needs for taking an additional risk.
- The CAPM says that the *expected return does not meet or beat the required return, and then the investment should not be undertaken.*
- The capital asset pricing approach is useful in calculating cost of equity even when the firm is suffering losses.

### c) Realized yield approach:

According to this approach, the *average rate of return realized in the past few years is historically regarded as expected return in the future.* It computes the cost of equity based on the past records of the dividend actually realised by the equity shareholders. The yield of equity for the year is:

$$Y_1 = (D_t + (P_t - P_{t-1})) / (P_t - 1)$$

Where,

$Y_1$  = Yield for the year t

$D_t$  = dividend for share at the end of the year t

$P_t$  = price per share at the end of the year t

$P_{t-1}$  = price per share at the beginning of year t.

Though this approach provides a single mechanism of calculating cost of equity, it has unrealistic assumptions. If the earnings do not remain stable this method is not practical.

#### d) Earnings / price approach:

- The advantages of this approach co- relate the earnings of the company with the market price of its share.
- Accordingly, *the cost of ordinary share capital would be based upon the expected rate of earnings of a company.*
- The argument is that each investor expects a certain amount of earnings whether distributed or not from the company in whose shares he invests.

**Example:** If an investor expects that the company in which he is going to subscribe for shares should have at least a 20% rate of earnings, the cost of ordinary share capital can be construed on this basis. Suppose the company is expected to earn 30% the investor will be prepared to pay ₹ 150 ( $₹30/20 \times 100$ ) for each share of ₹ 100. This approach is similar to the dividend price approach only it seeks to nullify the effect of changes in the dividend policy. This approach also does not seem to be a complete answer to the problem of determining the cost of ordinary share since it ignores the factor of capital appreciation or depreciation in the market value of shares.

- i) **Earning/Price Approach with Constant Earnings:** Cost of capital is calculated based upon the *expected rate of return of the company*.

$$K_e = (E/P)$$

Where,

$K_e$  = Cost of Equity

E = Current earnings per share

P = Market share price

- ii) **Earning/Price Approach with Growth in Earnings:**

This approach is an improvement over the earlier methods, but even this method assume that *dividend will increase at the same rate as earnings and the equity share price is the regular of this growth* as deemed by the investor. However, in actual practice, rate of dividend is recommended by the board of directors and shareholders cannot change it. Thus, rate of growth of dividend subsequently depends on director's attitude. The dividend method should therefore be modified by substituting earnings for dividends. So, cost of equity will be given by:

$$K_e = (E/P) + G$$

Where,

$K_e$  = Cost of Equity

E = Current earnings per share

P = Market share price

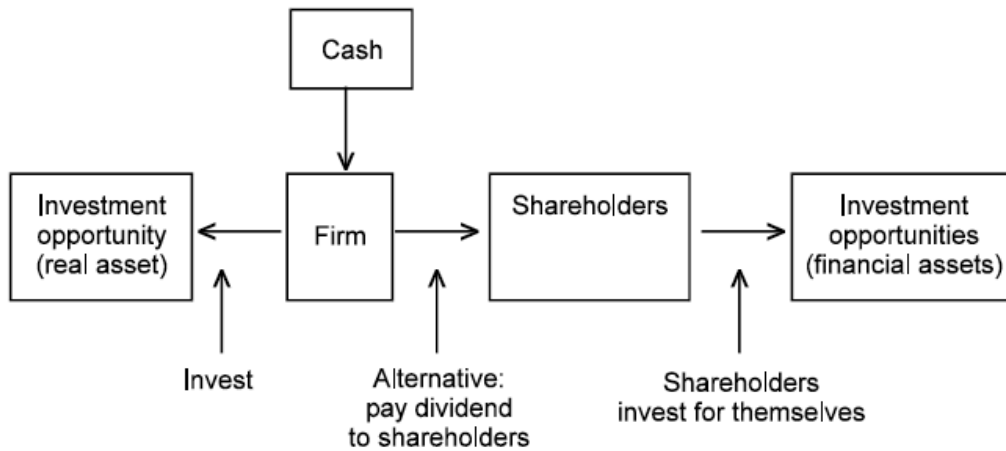
G = Annual growth rate of earnings

The calculation of G (the growth rate) is an important factor in calculating cost of equity capital. The past trend in earnings and dividends may be used as an approximation to predict the future growth rate if the growth rate of dividend is fairly stable in the past.

#### 4) **COST OF RETAINED EARNING - $K_s$ :**

Cost of retained earnings or reserve are generally taken as the same as cost of equity this is because, *if earnings are paid out as dividends without being retained and*

simultaneously a rights issue is made the investors would be subscribing to the issue based on some expected return this is taken as the indicator of the cost of reserves or retained earnings.



There are *two approaches* to measure this opportunity cost one approach is by using *Discounted cash flow (DCF)* method and the second approach is by using *capital asset pricing model (CAPM)*.

#### Discounted Cash Flow Approach (DCF)

$$K_e = (D_1/P_0) + G$$

Where,

$K_e$  = Cost of Equity

$D_1$  = Dividend per share

$P_0$  = Current Market price per share

$G$  = Annual growth rate

#### Capital Asset Pricing Model (CAPM)

$$K_s = R_f + B (R_m - R_f)$$

Where,

$K_s$  = Cost of equity capital

$R_f$  = Rate of return on risk – free security

$B$  = Beta coefficient

$R_m$  = Rate of return on market portfolio



- 5) **COST OF EXTERNAL EQUITY:** It means cost of raising fresh equity from the market price.

In case of growth

$$K_e = D_1 / (P_0 (1-f)) + g$$

Where,

$K_e$  = Cost of Equity

$f$  = Floatation cost

$g$  = Growth rate

$P_0$  = Current market price

In absence of growth

$$K_e = D_1 / (P_0 (1-f))$$

Where,

$K_e$  = Cost of Equity

$f$  = Floatation cost

$P_0$  = Current market price

### **B) WEIGTED AVERAGE COST OF CAPIATL (WACC):**

WACC denotes the weighted average cost of capital it is defined as the *overall cost of capital* computed by reference to the proportion of each component of capital as weights it is denoted by  $K_o$ .

Hence WACC = Sum of [cost of individual components x proportion i.e. capital]

The following format may be adopted for computation of WACC:

Component	Amount	Proportion or %	Individual cost	Multiplication
Debt ( $k_d$ )		W1	$K_d$	$K_d \times W1$
Preference capital ( $k_p$ )		W2	$K_p$	$K_p \times W2$

Retained earnings ( $k_e$ )		W3	$K_e$	$K_e \times W3$
Equity capital ( $k_e$ )		W4	$K_e$	$K_e \times W4$
Total ( $k_o$ )				<b>Ko = WACC = total of above</b>

The proportion or percentage of each component of *capital* may be determined by reference to either book values or market values of capital.

### IMPORTANCE OF WACC

The cost of weighted average method is preferred because *the proportions of various sources of funds in the capital structure are different*. To be representative, therefore cost of capital should take into account the relative proportions of different sources of finance.

- Securities analysis employ WACC all the time when valuing and selecting investments.
- In discounted *cash flow analysis WACC is used as a hurdle rate* against which to assess return on investment capital performance.
- It also plays a key role in economic value added (*EVA*) calculations.
- Investors use WACC as a *tool to decide whether to invest*
- The WACC represents the *minimum rate of return at which a company produces value for its investors*. Let's say a company produces a return of 20% and has a WACC of 11% by contract, if the company's return is less than WACC the company is shedding value which indicates that investors should put their money elsewhere.
- Therefore WACC serves as a useful *reality check for investors*

### Advantages of market values as weights

- a. Market values are *not affected by accounting policies*.
- b. Market values *represents the opportunity*
- c. It is *representing the present economic value of various sources of finance*.
- d. It is consistent with the definition of cost of capital i.e. *the cost of capital is the minimum rate of retain needed to maintain the market value of the firm*.
- e. Market value is the *true reflection of the firm's capital structure*.

### Disadvantages of market values as weight

- a. Market values are *not available in case of unlisted companies*.
- b. It is *not reliable when shares are not actively traded* (no purchases or sale of share)
- c. Market price fluctuates frequently and is affected by speculation. (*manipulation of share prices*)

### Advantages of using book values as weight

- a. The *data is easily available* from the balance sheet data.
- b. Firms set their capital structure in terms of book weights.
- c. Calculations are simple
- d. Less fluctuations in book value
- e. *Useful when market price is not available* (in case of an unlisted company) or when the shares are not activity traded
- f. Many times, the investor use book value weights to do the necessary analysis.

### Disadvantages of book values as weights

- a. *Affected by accounting policies.*
- b. Does not truly represent the opportunity cost of capital
- c. Does not represent the present economic values of various sources of finance.
- d. Not consistent with the definition of cost of capital.

### MARGINAL COST OF CAPITAL:

- Marginal cost of capital is the *cost of raising an additional rupee of capital*
- It is derived when the average cost of capital is computed with marginal weights. The weights represent the proportion of funds the firm intends to employ
- When funds are raised in the same proportion as at present and if the component costs remain unchanged there will be no difference between average cost of capital and marginal cost of capital
- As the level of capital employed increases the component costs may start increasing. In such a case both the WACC and marginal cost of capital will increase. But marginal cost of capital will rise at a faster rate.

# PRACTICAL QUESTIONS



### BASIC PROBLEMS:

#### 1) Cost of Irredeemable Debentures

1.

- (a) A company issues ₹10,00,000 16% debentures of ₹100 each. The company is in 35% tax bracket you are required to calculate the cost of debt after tax. If debentures are issue at (i) par (ii) 10% discount and (iii) 10% premium.

(b) If brokerage is paid at 2% what will be cost debentures if issue is at par

2. Dhruv has raised a term loan from Axis bank of ₹ 2 crores. The applicable interest rate on the loan is 12%. Tax rate is 40 %. Loan will be repaid after 8 years. Calculate cost of term loan to the company.

## 2) Cost of Redeemable Debentures

3. A Ltd has made an issue of debentures of ₹ 400 lakhs each debentures has a face value of ₹ 100 and carries a rate of interest of 14% the interest is payable annually and the debentures is redeemable at a premium of 5% after 10 years a Ltd relishes ₹ 97 per debentures and the corporate tax rate is 50% what is the cost of debentures?
4. A Ltd. Has issued 5000 10 % debentures of ₹ 100 each on 1.4.2005. The issue price was fixed at ₹ 102, flotation cost being 5%. The tax applicable to the company is 40%. The debentures are redeemable on 31.03.2012 at ₹ 105. What is the cost of debentures to the company.
5. A company issued ₹ 10,00,000/- 12% debenture of ₹ 100/-each. The debentures are redeemable after the expiry of fixed period of 7 years. The company is in 35% tax bracket.

## 3) Cost of Preference Share

6. Vaneeta enterprises issues ₹ 100 face value preference stock which carries 12 percent dividend and is redeemable after 12 years at par the net amount realized per preference share is ₹ 95. What is the cost of preference capital?
7. Shikhar Ltd. Issued ₹5,00,000/- 14% Preference Shares of ₹100/- each at 5% premium. The flotation cost was 4% The preference shares will be redeemed at a premium of 10% after 7 years. The marginal tax rate applicable to the company 40%. Compute the cost of preference shares to the company.

#### 4) Cost of equity shares

8. X Ltd presently pays a dividend of ₹ 100 per share and has a share price ₹ 20. If this dividend were expected to grow at a rate of 12% per annum forever what is the firm's expected or required return on equity using a dividend – discount model approach?
9. The market price per share of gamma Ltd is ₹ 20.00 the dividend expected a year hence is ₹ 3.00 the expected rate of dividend growth is 6% what is the cost of equity capital?
10. Shekhar Ltd. Issued 4,00,000/- equity shares of ₹10 each at 20% premium. The flotation cost was 8%. The next payable dividend is ₹2 per share which will grow at 6%p.a. compute the cost of equity shares to the company.
11. The on gilt edged securities is 5%. The expected return on market portfolio is 12%. The beta of Adarsh Ltd. Is 1.2. Compute the cost of equity of Adarsh Ltd.
12. Beta Ltd. Has recently paid a dividend of ₹1.50/-per share. If the required rate of return is 12% and the growth rate is 7%, then calculate the value of the shares of Beta Ltd.
13. Compute  $K_e$  if interest on Government Bonds is 6%, Market Return is 18%, Beta factor is 1.1.
14. The face value of equity shares of Blue sky Ltd. Is ₹100/- and the current market price of the shares is ₹80. The company is expected to declare a dividend of 20% during the current year. If the dividends are expected to decline at the rate of 10% p.a. then calculate the cost of equity.
15. Mr. X is planning to purchase the shares of D Ltd. His required rate of return is 20%. Dividends are expected to grow at a rate of 10%. What dividend had D Ltd paid last year if he is willing to pay ₹ 27.5 for a share?
16. Dividend-Payers Ltd. has a stable income and stable dividend policy. The average annual dividend pay-out is ₹ 27 per share (Face Value = ₹ 100). You are required to find out:
  - a. Cost of equity capital if market price in Year 1 is ₹ 150.



- b. Expected market price in Year 2 if cost of equity is expected to rise to 20%.
- c. Dividend pay-out in Year 2 if the company were to have an expected market price of ₹ 160 per share, at the existing cost of equity.

### 5) Cost of retained earnings

17. ABC company provides the following details;

$$D_0 = ₹ 4.10 \quad P_0 = ₹ 50 \quad G = 5\%$$

Calculate the cost of retained earnings based on DCF METHOD.

### 6) Cost of external equity

18. X Ltd's next expected dividend per share is ₹ 2.50. its growth rate is 6% and the company currently sells for ₹ 25 per share. Additional equity can be sold to public to net ₹ 21.00 per share. Calculate
1. X Ltd.'s floatation cost
  2. X Ltd.'s cost of external equity

### Calculation of weighted avg. cost of capital:

19. XYZ Ltd has the following book value capital structure

Particulars	(₹)
Equity capital (in share of ₹ 10 each fully paid up – at par)	₹ 15 Cr.
11% preference capital (in shares of ₹100 each fully paid up – at par)	₹ 1 Cr.
Retained earnings	₹ 20 Cr.
13.5% debentures (of ₹ 100 each)	₹ 10 Cr.
15% term loans	₹ 12.5 Cr.

The next expected dividend on equity shares per share is ₹ 3.60. The dividend per share is expected to grow at the rate of 7% the market price per share is ₹ 40.

Preference stock, redeemable after six years are selling at ₹ 75 per share.

Debentures redeemable after six year, is currently selling at ₹ 80 per share.

The income – tax rate for the company is 40%

Required

Calculate the weighted average cost of capital using:

- a. Book value proportions and
- b. Market value proportions.

**20.** The Capital structure of Supreme Ltd. Is an under

Particulars	(₹)
2000, 6% Debentures of ₹ 100 each [ I issue]	₹ 2,00,000
1000, 7% Debentures of ₹ 100 each [II issue]	₹ 1,00,000
2000, 8% Cumulative preference shares of ₹ 100 each	₹ 2,00,000
4000, Equity shares of ₹100 each	₹ 4,00,000
Retained earnings	₹ 1,00,000

Earnings per share of the company in the past many years has been ₹ 15/-. Shares of the company are sold in the market at book value. The company's tax rate is 30% and shareholders personal tax liability is 10%. Find out weighted average cost of capital of the company

**21.** M/s Robert Cement Corporation has a financial structure of 30% debt and 70% equity. The company is considering various investment proposals costing less than ₹ 30 lakhs. The corporation does not want to disturb its present capital structure. The cost of raising the debt and equity are as follows:

Project Cost	Cost of debt	Cost of equity
Up to ₹ 5 lakhs	9%	13%
Above ₹ 5 lakhs and up to ₹ 20 lakhs	10%	14%
Above ₹ 20 lakhs and up to ₹ 40 lakhs	11%	15%
Above ₹ 40 lakhs and up to ₹ 1 crore	12%	15.5%

Assuming the tax rate of 50% you are required to calculate

- Cost of capital of two project A and B whose funds requirement are ₹ 8 lakhs and ₹ 21 lakhs respectively, and
- If a project is expected to give after tax return of 11% determine under what condition it would be acceptable.

22. Following are the regarding capital structure of a company

Particulars	Book value (₹)	Market value (₹)	Specific cost (%)
Debenture	80,000	76,000	5
Preference capital	20,000	22,000	8
Equity capital	1,20,000	2,40,000	13
Retained earning	40,000	–	9
Total	2,60,000	3,38,000	

You are required to calculate the weighted average cost of capital using

- Book value as weights
- Market value as weight.

Can you imagine a situation weighted average cost of capital would be the same using either of the weights?

23. The Novex Company has the following capital structure on 31<sup>st</sup> March 1998

Particulars	(₹)
-------------	-----

Ordinary shares (4,00,000 shares)	80,00,000
10% preference shares	20,00,000
14% debenture	60,00,000
	1,60,00,000

The share of the company sells for ₹ 20. It is expected that company will pay next year a dividend of ₹ 2 per share which will grow at 7 per cent forever.

Assume a 40 per cent tax rate.

You are required to:

- (i) Compute a weighted average cost of capital based on existing capital structure.
- (ii) Compute the new weighted average cost of capital if the company raises a additional ₹ 40 lakhs debt by issuing 15 per cent debenture. This would result in increasing the expected dividend to ₹ 3 and leave the growth rate unchanged, but the price of share will fall to ₹ 15 per share.
- (iii) Compute the cost of capital if in (ii) above growth rate increase to 10 per cent

**24.** In considering the most desirable capital structure for a company, the following estimates of the cost of debt and equity capital (after tax) have been made at various levels of debt-equity mix

Debt as percentage of total capital employed	Cost of debt (%)	Cost of equity (%)
1	2	3
0	7.0	15.0
10	7.0	15.0
20	7.0	15.5
30	7.5	16.0
40	8.0	16.0
50	8.5	17.0
60	9.5	20.0

You are required to determine the optimal debt-equity mix for the company by calculating composite cost of capital.

25. The following figures are taken from the current balance sheet of Delaware & co.

Particulars	(₹)
Capital	₹ 8,00,000
Share premium	₹ 2,00,000
Reserves	₹ 6,00,000
Shareholder's funds	₹ 16,00,000
12% irredeemable debentures	₹ 4,00,000

An annual ordinary dividend of ₹ 2 per share has just been paid. In the past, ordinary dividends have grown at a rate of 10 per cent per annum and this rate of growth is expected to continue. Annual interest has recently been paid on the debentures. The ordinary shares are currently quoted at ₹ 27.5 and the debentures at 80 per cent. Ignore taxation.

You are required to estimate the weighted average cost of capital (based on market values) for Delaware & co.

26. The following information is available from the balance sheet of a company:

Particulars	(₹)
Equity share capital – 20,000 shares of ₹ 10 each	₹ 2,00,000
Reserve and surplus	₹ 1,30,000

8% debentures	₹ 1,70,000
---------------	------------

The rate of tax for the company is 50% current level of equity dividend is 12% calculate the weighted average cost of capital using the above figures

27. The following balances appear in the balance sheet of nag raj alloys ltd.

Particulars	(₹)
Equity shares of ₹ 5 each	₹ 8,00,000
10% pref. share of ₹ 10 each	₹ 5,00,000
Reserve & surplus	₹ 6,00,000
12% debentures	₹ 10,00,000

The company is expected to earn an EBIT of ₹ 9, 00, 000 p .a. and the tax rate is 40%. The current market prices of the equity and preference shares are ₹ 12.50 and ₹ 8 respectively. However, the debentures are being traded at par. Find out the WACC given that retained earnings and dividends are valued equally by shareholders.

28. The capital structure of XYZ & co. comprises of 12% debenture, 9% preference share and some equity share of ₹ 100 each in the ratio of 3:2:5. The company is considering introducing additional capital to meet the needs of expansion plans by raising 14% loan from financial institutions. As a result of this proposal, the proportions of different above source would go down by 1/10, 1/15 and 1/6 respectively.

In the light of the above proposal, find out the impact on the WACC of the firm given that

(i) tax rate is 50%

(ii) expected dividend of ₹ 9 at the end of the year and

(iii) the growth rate,  $g$ , may be taken at 5% no change is expected in dividends, growth rate market price of the share etc., after availing the propose loan.

29. The Capital Structure of All-Good Ltd. is – Equity Capital ₹ 5 lakhs; Reserves and Surplus ₹ 2 lakhs and Debentures ₹ 3 lakhs. The Cost of capital before tax is (a)

Equity – 18% and (b) Debentures – 10%. You are required to compute the Weighted Average Cost of Capital.

**30.** From the following information, compute WACC of Super-Good Ltd.

- ◆ Debt to Total Funds : 2 : 5.
- ◆ Preference Capital to Equity Capital : 1 : 1
- ◆ Preference Dividend Rate : 15%
- ◆ Interest on Debentures : ₹ 20,000 for half-year
- ◆ EBIT at 30% of Capital Employed : ₹ 3 lakhs
- ◆ Cost of Equity Capital is 24%.

**31.** Backward Ltd. has a Debt Equity Ratio of 2 : 1 and a WACC of 12%. Its Debentures bear interest of 15%. Find out the cost of Equity Capital.

**32.** In order to finance an expansion plan, XYZ Ltd requires ₹ 20 lakhs and provides you the following information:

- a) Target debt-equity ratio = 3:2
- b) Debt will carry an interest rate of 12% for the first ₹ 4 lakhs and 12.5% for the balance.
- c) EPS for the current year is ₹ 20 per share. Dividend payout ratio is 60%. Anticipated dividend growth rate is 5%. Current market price per equity share is ₹ 90. Floatation cost is ₹ 6 per share.
- d) Reserves & Surplus is ₹ 2 Lakhs.
- e) Corporate tax rate is 30%.

Prepare the statement of Weighted Marginal cost of capital.

**33.** An electric equipment manufacturing company wishes to determine the weighted average cost of capital for evaluating capital begetting projects. You have been supplied with the following information:

#### BALANCE SHEET

Liabilities	Amount	Amount	Amount
Equity share capital	₹ 12,00,000	Fixed assets	₹ 25,00,000
Pref. share capital	4, 50, 000	Current assets	15, 00, 000
Retained earnings	4,50, 000		

Debentures	9, 00, 000		
Current liabilities	10, 00, 000		
	40, 00, 000		40, 00, 000

Additional information:

- i) 20 years 14% debentures of ₹ 2,500 face value redeemable at 5% premium can be sold at par. 2% floatation costs.
- ii) 15% preference shares: sale price ₹ 100 per share, 2% flotation costs.
- iii) Equity share: sale price ₹ 115 per share, flotation costs, ₹ 5 per share.

The corporate tax rate is 55% and the expected growth in equity dividend is 8% per year. The expected dividend at the end of the current financial year is ₹11 per share. Assume that the company is satisfied with its present capital structure and intends to maintain it.

**34.** The following is the capital structure of Simon's company Ltd. as on 31.12.1998:

Particulars	(₹)
Equity shares: 10,000 shares (of ₹ 100 each)	₹ 10,00,000
10% preference shares (of ₹ 100 each)	₹ 40,00,000
12% debentures	₹ 6,00,000
	₹ 20,00,000

The market price of the company's share is ₹ 110 and it is expected that a dividend ₹ 10 per share would be declared after 1 year. The dividend growth rate is 6%:

- i) If the company is in the 50% tax bracket, compute the weighted average cost of capital.
- ii) Assuming that in order to finance an expansion plan, the company intends to borrow a fund of ₹ 10 lacks bearing 14% rate of interest, what will be the company's revised weighted average cost of capital? This financing decision is expected to increase dividend from ₹ 110 to ₹ 105 per share.



35. The capital structure of a company as on 31<sup>st</sup> March is as follows:

Particulars	(₹)
Equity Capital: 6,00,000 Equity shares of ₹ 100 each	₹ 6 Crores
Reserves and Surplus	₹ 1.2 Crores
12% debentures of ₹ 100 each	₹ 1.8 Crores

For the year ended 31<sup>st</sup> March, the company has paid equity dividend at 24%. Dividend is likely to grow by 5% every year. Market price of Equity share is ₹ 600 per share. Income tax applicable to the company is 30%.

Required:

- Compute WACC
- The company has a plan to raise further ₹ 3 Crores by way of Long-term loan at 18% interest. If the loan is raised, the market price of equity share is expected to fall to ₹ 500 per share. What will be the new WACC of the company?

36. Zoya Ltd. Has obtained capital from the following sources. And the specific costs are given against them:

Type of capital	Book value (₹ in lakh)	Market value (₹ in lakh)	Cost of capital (%)
Debenture	4	3.8	5
Preference shares	1	1.1	8
Equity shares	6	9.0	13

Retained earning	2	3.0	9
Total	13	16.9	

You are required to calculate weighted average cost of capital using–

- i) Book value weight, and
- ii) Market value weight. **June-2016 (4 marks)**

**37.** Current price of share of a company is ₹ 60 and dividend per shares is ₹ 4. If its capitalization rate is 12%, what is the dividend growth rate? **June-2016 (4 marks)**

**38.** A company is currently paying a dividend of ₹ 2 per share. The dividend is expected to grow at 15% annually for three years, then at 10% rate for the next three years after which it is expected to grow at 5% rate forever.

- i) What is the present value of the share if the capitalization rate is 9%?
- ii) If the share is held for three years, what shall be its present value? **Dec-2016 (8 marks)**

**39.** King has purchased a bond for ₹ 1,000 with a coupon payment of ₹ 250 and sold for ₹ 1,200.

- i) What is the holding return of king?
- ii) If king sells the bond for ₹ 800 after receiving the ₹ 250 as coupon payment, then what is the holding return of king? **June-2017 (4 marks)**

**40.** If the firm pays tax at 40% compute the weighted average cost of capital from the following:

Particulars	(₹)
5,000 equity shares of ₹ 100 each	₹ 5, 00, 000

10% preference shares	₹ 1, 00, 000
12% debenture	₹ 4, 00, 000

The current market price of the share is ₹ 120. The company is expected to declare a dividend of ₹ 12 at the end of the current year, with an expected growth rate of 8%. Use book value weights. **June-2017 (4 marks)**

**41.** Consider a firm X Ltd., having the following details:

Particulars	(₹)
EBIT	₹ 1, 00, 000
Debt borrowed at the rate of 10%	₹ 5, 00, 000
Overall capitalization rate (K <sub>o</sub> )	12.5%

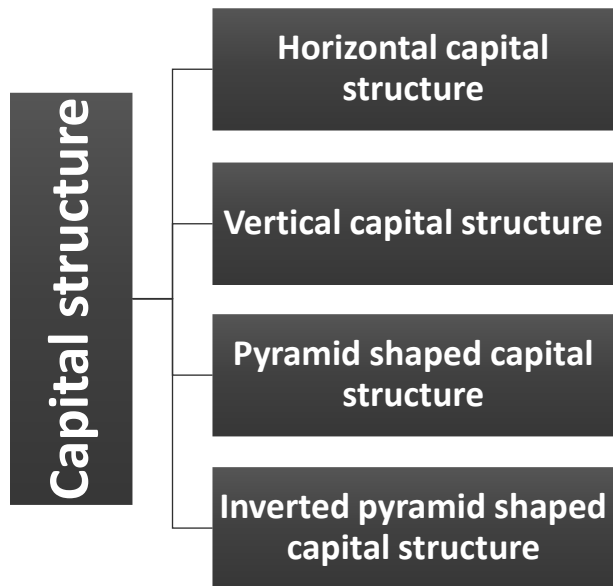
Find the value of the firm when:

- 1) Debt is increase by ₹ 2,00,000
- 2) Debt is decrease by ₹ 2,00,000

Also calculate cost of equity in each case. **June-2017 (4 marks)**



Capital structure can be of various kinds as described below:



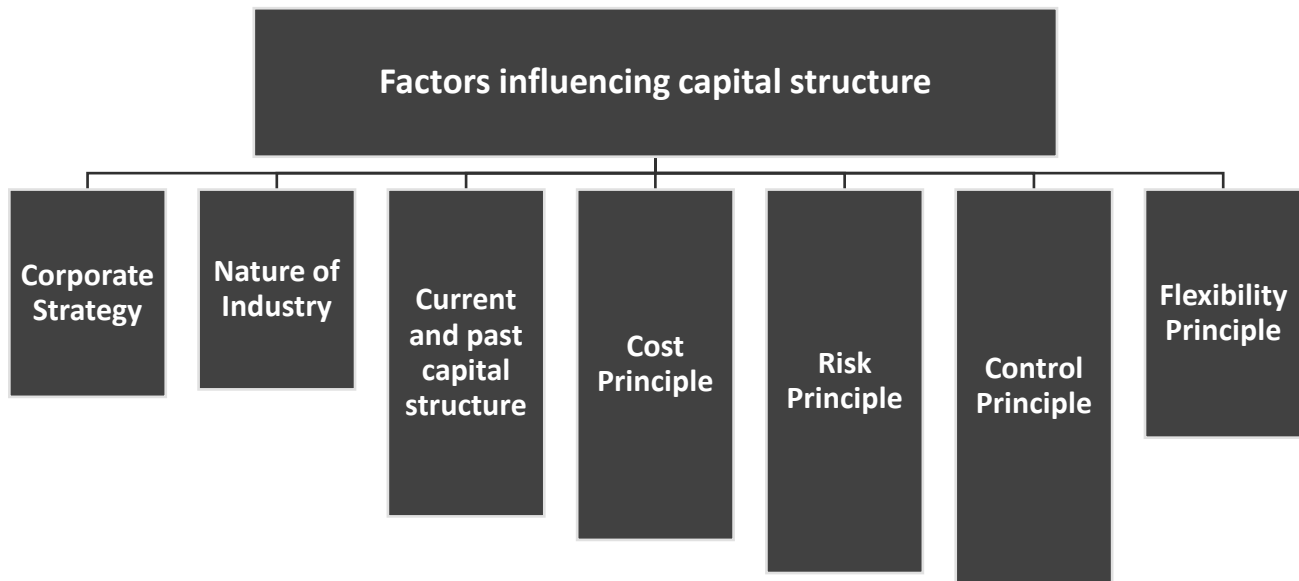
- 1) **Horizontal capital structure** - In a Horizontal capital structure, the *firm has zero debt components in the structure mix*. The structure is quite stable. Expansion of the firm takes in a lateral manner, i.e. *through equity or retained earning only*.
- 2) **Vertical capital structure** - In a vertical capital structure, the base of the *structure is formed by equity share capital*. This base serves as the foundation on which the super structure of preference share capital and debt is built. The Incremental addition in the capital structure is almost entirely in the form of debt. Quantum of retained earnings is low and the dividend pay-out ratio is quite high.
- 3) **Pyramid shaped capital structure** - A pyramid shaped *capital structure has a large proportion of consisting of equity capital and retained earnings* which have been ploughed back into the firm over a considerably large period of time. The cost of share capital and the retained earnings of the firm is usually lower than the cost of debt. This structure is indicating of risk averse conservative firms.
- 4) **Inverted pyramid shaped capital structure** - Such a *capital structure has a small component of equity capital, reasonable level of retained earnings but an ever-increasing component of debt*. All the increases in the capital structure in the recent past have been made through debt only.

#### SIGNIFICANCE OF CAPITAL STRUCTURE:

Capital structure is significant for a firm because the *long-term profitability and solvency of the firm is sustained by an optimal capital structure consisting of an appropriate mix of debt and equity*. The capital structure is also significant for the overall ranking of the firm in the industry group. We discuss hereunder the significance of the capital structure in greater detail:

- 1) **Reflects the firm's strategy** - The Capital structure reflects the overall strategy of the firm. The strategy includes the pace of growth of the firm. *In case the firm wants to grow at a faster rate; it would be required to incorporate debt in its capital structure to a greater extent.* Further, in case of growth through acquisitions or the inorganic mode of growth as it is called, the firm would find that financial leverage is an important tool in funding the acquisitions.
- 2) **Indicator of the risk profile of the firm** - One can get a reasonably accurate broad idea about the risk profile of the firm from its capital structure. *If the debt component in the capital structure is pre-dominant, the fixed interest cost of the firm increases thereby increasing its risk.*
- 3) **Acts as a tax management tool** - The capital structure acts as a tax management tool also. *Since the interest on borrowings is tax deductible, a firm having healthy growth in operating profits\_would find it worthwhile to incorporate debt in the capital structure in a greater measure.*
- 4) **Helps to brighten the image of the firm** - *A firm can build on the retained earnings component of the capital structure by issuing equity capital at a premium to a spread-out base of small investors.* Such an act has two benefits. On the one hand, it helps the firm to improve its image in the eyes of the investors. At the same time, it reduces chances of hostile take-over of the firm.

## FACTORS INFLUENCING CAPITAL STRUCTURE



A company can finance its operations both through equity and debt. These two types of financing require servicing. Interest is paid on debt and return is to be provided to stockholders in the form of equity. Normally a company wishes to raise capital by way of both equity and debt. In the real world, deciding on the capital structure is not so easy. In deciding the capital structure of a firm, following points need to be considered.

- 1) **Corporate strategy** - It is the main factor determining the financial structure of a company. The company has to determine the overall Capital Intensity Ratio (Debt/Equity) in line with its overall strategy. The company has to look at various options of debt equity mix. The cost of each option, the consequences of increase in equity on its valuation capability to service both debt and equity etc.
- 2) **Nature of industry** - The nature of the industry plays an important role in capital structure decisions. If the firm is capital intensive, it would rely more on debt than equity. Generally speaking, long term assets should be financed by a balance between debt and equity and short-term assets should be financed by long term sources and more by short-term debt. The current assets (short term assets) and fixed assets (long term assets) are determined.
- 3) **Current and past capital structure** - Current capital structure of a firm is determined largely by past decisions. Investment decision of the past, acquisition, takeovers, financing policy, dividends etc. go into forming the current capital structure which is difficult to change overnight.



4) **Cost Principle:** According to this principle, an ideal pattern or *capital structure is one that minimizes cost of capital structure and maximizes earnings per share (EPS).*

**Example:** Debt capital is cheaper than equity capital from the point of its cost and interest being deductible for income tax purpose, whereas no such deduction is allowed for dividends.

5) **Risk Principle:** According to this principle, *reliance is placed more on common equity for financing capital requirements than excessive use of debt.* Use of more and more debt means higher commitment in form of interest payout. This would lead to erosion of shareholders value in unfavorable business situation. There are *two risks associated with this principle:*

a) **Business risk:** It is an *unavoidable risk* because of the environment in which the firm has to operate and it is *represented by the variability of earnings before interest and tax (EBIT).* The variability in turn is influenced by revenues and expenses. Revenues and expenses are affected by demand of firm products, variations in prices and proportion of fixed cost in total cost.

b) **Financial risk:** It is a risk associated with the availability of earnings per share caused by use of financial leverage. It is the *additional risk borne by the shareholders when a firm uses debt in addition to equity financing.*

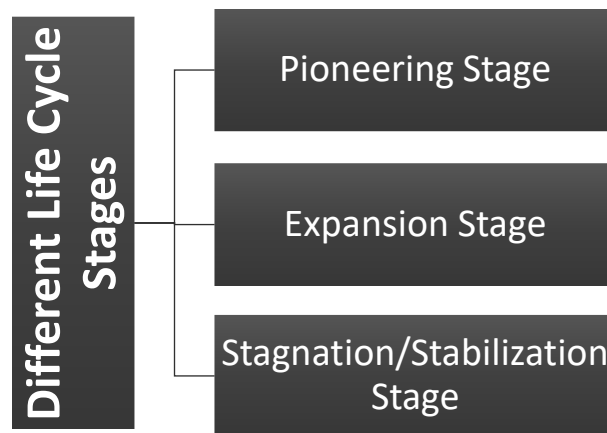
Generally, a firm should neither be exposed to high degree of business risk and low degree of financial risk or vice-versa, so that shareholders do not bear a higher risk.

6) **Control Principle:** While designing a capital structure, the finance manager may also keep in mind that *existing management control and ownership remains undisturbed.* Issue of new equity will *dilute existing control pattern and it involves higher cost.* Issue of more debt causes no dilution in control, but causes a higher degree of financial risk.

7) **Flexibility Principle:** By flexibility it means that the management chooses such a *combination of sources of financing which it finds easier to adjust according to changes in need of funds in future too.* While debt could be interchanged (If the company is loaded with a debt of 18% and funds are available at 15%, it can return old debt with new debt, at a lesser interest rate), but the same option may not be available in case of equity investment.

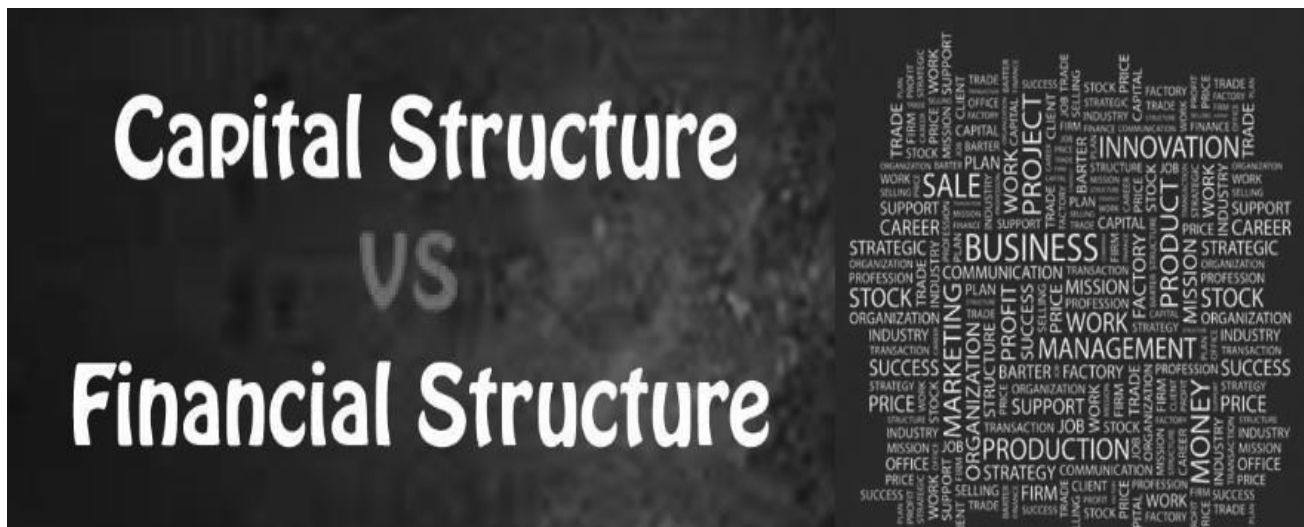
**While deciding upon the capital structure the firm has to consider the different life cycle stages which are:**

- a) The Pioneering Stage
- b) The Expansion Stage
- c) The Stagnation/Stabilization Stage.



- a) The **Pioneering stage** is one of *rapid increase in demand for the products / services at the starting stage of the life cycle of the company* and the efficient companies are the one to survive. The financial cost of borrowing is very high at this stage, due to risk perception about the company. To survive this stage, *the capital structure should orient more towards equity and avail more soft loans.*
- b) The **Expansion stage** is the next stage, during which the strong companies survive the competition struggle and aim to expand their market share and volumes. During this stage *huge investments are made to expand production / service capacity.* Requirement of funds is high during this stage. Subject to the corporate strategy of funding projects and market conditions, the company may raise capital at the lowest possible cost. As the earnings stabilize, the company will be in a position to make any small variations in business, then it can seek to financially leverage itself within a pre-fixed ceiling, by bank loans.
- c) The **Stabilization / stagnation stage** is the last and final stage. A dynamic management *will always be on the lookout for expansion / diversification into new projects.* It could again, depending on corporate strategy, go in for green-field projects or takeover existing units, seek mergers acquisitions and strategic alliances etc. Usually a recession in economy opens-up a vast number of such opportunities which cash rich companies can take advantage of. In case of lack of such opportunity, the company could reduce the financial leverage and save on interest.

## CAPITAL STRUCTURE VIS-À-VIS FINANCIAL STRUCTURE :

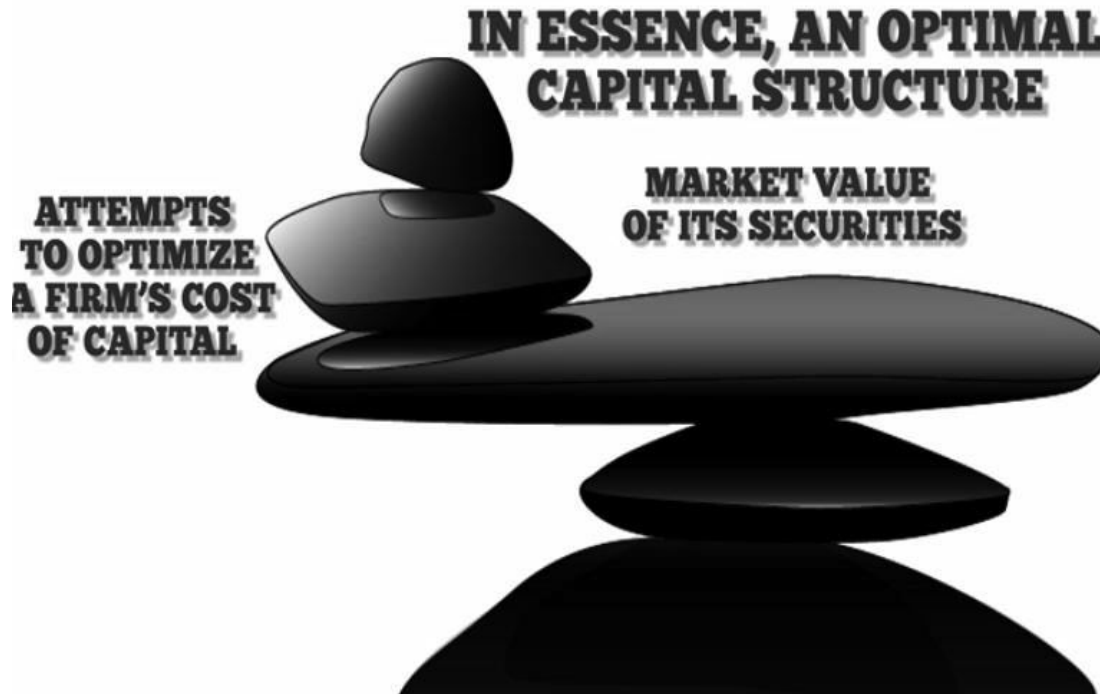


Capital structure of a firm is different from the financial structure. We shall illustrate the difference as under:

Sr. No.	CAPITAL STRUCTURE	FINANCIAL STRUCTURE
1)	Capital structure of a company refers to types of long term financing included in the capital	Financial Structure refers to the balance between all the company's liabilities and its equities. Financial structure thus concerns the entire "Liability" side of the Balance Sheet.
2)	Debt, common stock, preferred stock, retained earnings and reserves.	Financial structure on the other hands also includes short term debt and accounts payables.
3)	It represents source of funding.	It represents financial obligation of company.

4)	It includes both long-term & short-term sources of funds.	It includes only long-term sources of funds.
5)	It means the entire liabilities side of the balance sheet.	It means only long-term liabilities of the company.
6)	It will not be more important while determining the value of the firm.	It is one of the major determinations of the value of the firm.
7)	Capital structure relates to long term capital deployment for creation of long term assets.	Financial structure involves creation of both long term and short-term assets.
8)	Capital structure is the core element of the financial structure. Capital structure can exist without the current liabilities and in such cases, capital structure shall be equal to the financial structure. But we cannot have a situation where the firm has only current liabilities and no long-term capital.	The financial structure of a firm is considered to be a balanced one if the amount of current liabilities is less than the capital structure net of outside debt because in such cases the long-term capital is considered sufficient to pay current liabilities in case of sudden loss of current assets.

### OPTIMAL CAPITAL STRUCTURE:



**Meaning:** In general, the optimal capital structure is a *mix of debt and equity* that seeks to *lower the cost of capital and maximize the value of the firm*. To calculate the optimal capital structure of a firm, analysts calculate the weighted average cost of capital (WACC) to determine the level of risk that makes the expected return on capital greater than the cost of capital. By calculating the cost of debt and the cost of equity, analysts multiply the cost of debt by the weighted average cost of debt and the cost of equity by the weighted average cost of equity and add up the results from each security involved in the total capital of the company.

Is there an optimal capital structure for a firm? By the term optimal capital structure we mean a *particular arrangement of various components of the structure which is just in tune with the both the long term and short term objectives of the firm*.

The real world of business, however, is a dynamic world with ever changing demand and supply of various components of the capital structure. Hence, we cannot formulate the optimal capital structure in a static framework. The process has to be carried out in a dynamic framework of interdependent investment and financing decisions that yield optimal values within the constraints at the time and place when the decisions were made. We can, therefore, say that the optimal capital structure is an ideal situation which can function as the benchmark of performance for a firm. But this benchmark is invincible and the firm can expect to achieve moderated or toned down versions of this benchmark depending upon dynamics of each project.

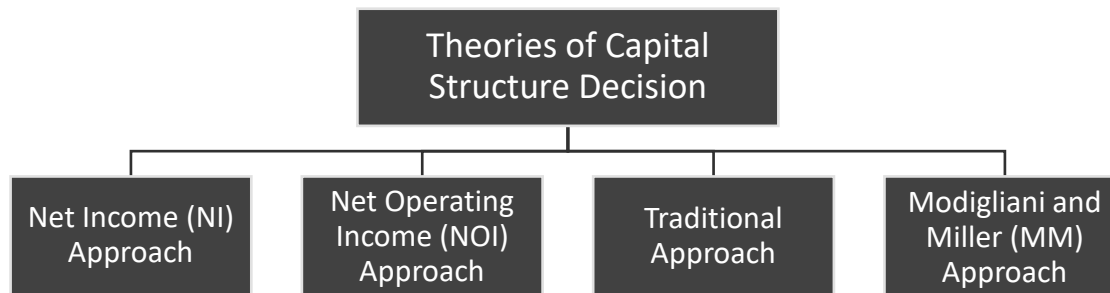
**Definition:** Optimal capital structure is a financial measurement that firms use to determine the best mix of debt and equity financing to use for operations and expansions. This structure seeks to lower the cost of capital so that a *firm is less dependent on creditors and more able to finance its core operations through equity.*

## CAPITAL STRUCTURE THEORIES:

### General Assumptions of Capital Structure Theories

The relationship between the leverage, cost of capital and the value of the firm has been analysed and examined in different ways. However, the following assumptions are made to understand this relationship.

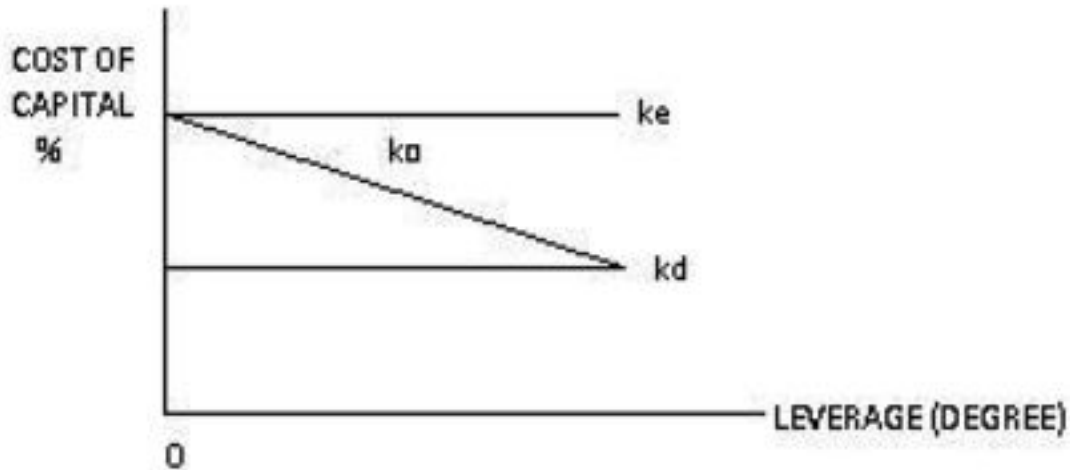
1. That there are only *two sources of funds* i.e., the equity and the debt, which is having fixed interest. [*No Preference Share Capital*]
2. That the total assets of the firm are given and there would be no change in the investment decisions of the firm. [*Total assets never change*]
3. That the firm has a policy of distributing the entire profits among the shareholders. [*No retained earnings*]
4. The operating profits of the firm are given and are not expected to grow. [*EBIT remains constant*]
5. The business risk complexion of the firm is given and is constant and is not affected by the financing mix. [*Business risk is constant*]
6. That there are no corporate or personal taxes. [*No taxation*]
7. The investors have the same subjective probability distribution of expected operating profits of the firm. [*No difference in investors' expectations*]

**There are basically four theories of capital structure decision:****1) NET INCOME APPROACH: (CAPITAL STRUCTURE MATTERS)**

As suggested by Durand, this theory states that there is a *relationship between capital structure and the value of the firm* and therefore, *the firm can affect its value by increasing or decreasing the debt proportion in the overall financing mix*. The NI approach makes the following additional assumptions:

1. That the total capital requirement of the firm is given and remain constant.
2. That  $k_d$  is less than  $k_e$
3. Both  $k_d$  and  $k_e$  remain constant and increase in financial leverage i.e., use of more and more debt financing in the capital structure does not affect the risk perception of the investors.

According to this approach, capital structure decision is relevant to the value of the firm. An increase in financial leverage will lead to decline in the weighted average cost of capital (WACC), while the value of the firm as well as market price of ordinary share will increase. Conversely, a decrease in the leverage will cause an increase in the overall cost of capital and a consequent decline in the value as well as market price of equity shares.



From the above diagram,  $K_e$  and  $K_d$  are assumed not to change with leverage. As debt increases, it causes weighted average cost of capital (WACC) to decrease.

The value of the firm based on Net Income Approach can be ascertained as follows:

$$V = S + D$$

Where,

$V$  = Value of the firm

$S$  = Market value of equity

$D$  = Market value of debt

$$\text{Market value of equity (S)} = NI / K_e$$

Where,

$NI$  = Earnings available for equity shareholders

$K_e$  = Equity Capitalization rate

Under, *NI approach*, the value of the firm will be maximum at a point where weighted average cost of capital (WACC) is minimum. Thus, the theory suggests total or maximum possible debt financing for minimizing the cost of capital.

The overall cost of capital under this approach is:

**Value of the firm**



Overall cost of capital = EBIT

Thus, according to this approach, *the firm can increase its total value by decreasing its overall cost of capital through increasing the degree of leverage*. The significant conclusion of this approach is that it pleads for the firm to employ as much debt as possible to maximize its value.

The NI approach starts from the argument that *change in financing mix of a firm will lead to change in WACC,  $k_o$  of the firm resulting in the change in value of the firm*. As  $k_d$  is less than  $K_e$ , the increasing use of cheaper debt (and simultaneous decrease in equity proportion) in the overall capital structure will result in the magnified returns available to the shareholders. The increased returns to the shareholders will increase the total value of the equity and thus increases the total value of the firm. The WACC,  $k_o$  will decrease and the value of the firm will increase. On the other hand, if the financial leverage is reduced by the decrease in the debt financing, the WACC,  $k_o$  of the firm will increase and the total value of the firm will decrease.

Thus, the NI approach though easy to understand, it is too simple to be realistic. It ignores, perhaps the most important aspect of leverage that the market price depends upon the risk which varies in direct relation to the changing proportion of debt in the capital structure.

## 2) NET OPERATING INCOME APPROACH: (CAPITAL STRUCTURE DOES NOT MATTER)

The Net Operating Income (*NOI*) approach is opposite to the NI approach. According to the NOI approach, the *market value of the firm depends upon the net operating profit or EBIT* and the overall cost of capital, WACC. The financing mix or the capital structure is irrelevant and does not affect the value of the firm. The NOI approach makes the following assumptions:

1. The investor sees the firm as a whole and thus capitalizes the total earnings of the firm to find the value of the firm as a whole.
2. The overall cost of capital,  $k_o$  of the firm is constant and depends upon the business risk which also is assumed to be unchanged.
3. The cost of debt,  $k_d$ , is also taken as constant.
4. The use of more and more debt in the capital structure increases the risk of the shareholders and thus results in the increase in the cost of equity capital i.e.,  $k_e$ . The increasing  $k_e$  is such as to completely offset the benefits of employing cheaper debt, and
5. That there is no tax.

The NOI approach is based on the argument that the market values the firm for a given risk complexion. Thus, for a given value of EBIT, the value of the firm remains same irrespective of the capital

composition and instead depends on the overall cost of capital. *The value of the Equity may be found by deducting the value of debt from the total value of the firm.* Thus, the financing mix is irrelevant and does not affect the value of the firm. The value remains same for all types of Debt-equity mix since there will be change in risk of the shareholders because of change in Debt-equity mix, therefore, the  $k_e$  will be changing linearly with change in debt proportions.

NOI means earnings before interest and tax (EBIT). According to this approach, capital structure decisions of the firm are irrelevant. *Any change in the leverage will not lead to any change in the total value of the firm and the market price of shares, as the overall cost of capital is independent of the degree of leverage.*

As a result, the division between debt and equity is irrelevant. As per this approach, an increase in the use of debt which is apparently cheaper is offset by an increase in the equity capitalization rate. This happens because equity investors seek higher compensation as they are opposed to greater risk due to the existence of fixed return securities in the capital structure.

**Value of equity = value of firm – value of debt.**

### 3) TRADITIONAL APPROACH: (A PRACTICAL VIEW POINT)

NI and the NOI approach hold extreme views on the relationship between the leverage, cost of capital and the value of the firm. In practical situations, both these approaches seem to be unrealistic. The traditional approach takes a compromising view between the two and incorporates the basic philosophy of both. *It takes a mid-way between the NI approach (that the value of the firm can be increased by increasing the leverage) and the NOI approach (that the value of the firm is constant irrespective of the degree of financial leverage).*

As per the traditional approach, *a firm should make a judicious use of both the debt and the equity to achieve a capital structure which may be called the optimal capital structure. At this capital structure, the overall cost of capital, WACC, of the firm will be minimum and the value of the firm maximum.* The traditional view states that the value of the firm increases with increase in financial leverage but up to a certain limit only. Beyond this limit, the increase in financial leverage will increase its WACC also, and the value of the firm will decline.

Under the traditional approach assumptions are:

- the cost of debt,  $k_d$ , is assumed to be less than the cost of equity,  $k_e$ .
- In the capital structure and the financial leverage increases, the  $k_e$  remains same as the equity investors expect a minimum leverage in every firm.

- The  $k_e$  does not increase even with increase in leverage. The argument for  $k_e$  remaining unchanged may be that up to a particular degree of leverage, the interest charge may not be large enough to pose a real threat to the dividend payable to the shareholders.
- This constant  $k_e$  and  $k_d$  makes the  $k_o$  to fall initially. Thus, it shows that the benefits of cheaper debts are available to the firm.

But this position does not continue when leverage is further increased. The increase in leverage beyond a limit increases the risk of the equity investors also and as a result the  $k_e$  also starts increasing. However, the benefits of use of debt may be so large that even after offsetting the effects of increase in  $k_e$ , the  $k_o$  may still go down or may become constant for some degree of leverages. If firm increases the leverage further, then the risk of the debt investor may also increase and consequently the  $k_d$  also starts increasing. The already increasing  $k_e$  and the now increasing  $k_d$  makes the  $k_o$  to increase. Therefore, the use of leverage beyond a point will have the effect of increase in the overall cost of capital of the firm and thus results in the decrease in value of the firm.

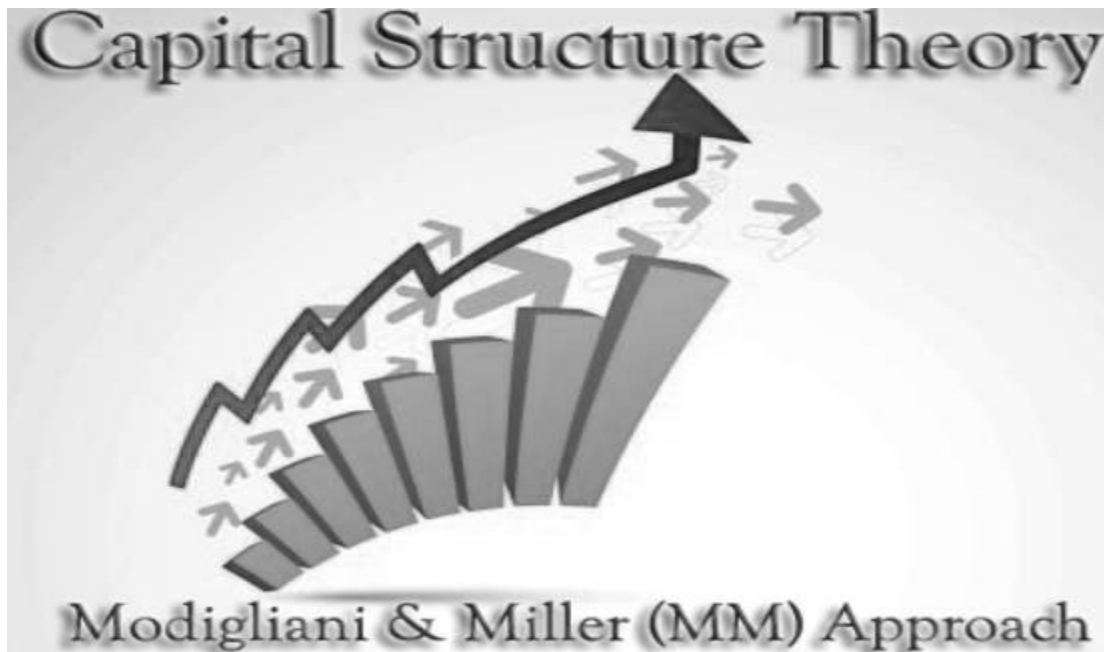
Thus if there is a level of financial leverage in any firm, up to which it favourably affects the value of the firm but thereafter if the leverage is increased further, then the effect may be adverse and the value of the firm may decrease. There may be a particular leverage or a range of leverage which separates the favourable leverage from the unfavourable leverage.

Thus, as per the traditional approach, a firm can be benefited from a moderate level of leverage when the advantages of using debt (having lower cost) outweigh the disadvantages of increasing  $k_e$  (as a result of higher financial risk). The overall cost of capital,  $k_o$  therefore is a function of the financial leverage. The value of the firm can be affected therefore, by the judicious use of debt and equity in the capital structure.

### **Main Highlights of Traditional Approach**

- a) *The firm should strive to reach the optimal capital structure and its total valuation through a judicious use of the both debt and equity in capital structure. At the optimal capital structure, the overall cost of capital will be minimum, and the value of the firm will be maximum.*
- b) *Value of the firm increases with financial leverage upto a certain point. Beyond this point the increase in financial leverage will increase its overall cost of capital and hence the value of firm will decline. This is because the benefits of use of debt may be so large that even after offsetting the effect of increase in cost of equity, the overall cost of capital may still go down. However, if financial leverage increases beyond an acceptable limit, the risk of debt investor may also increase, consequently cost of debt also starts increasing. The increasing cost of equity owing to increased financial risk and increasing cost of debt makes the overall cost of capital to increase.*

#### 4) MODIGLIANI – MILLER THEORY: (BEHAVIOURAL JUSTIFICATION OF THE NOI)



**Meaning:** In 1958, Franco Modigliani and Merton Miller (MM) published a theory of modern financial management – *they concluded that the value of a firm depends solely on its future earnings stream, and hence its value is unaffected by its debt/equity mix.* In short, they concluded that a firm's value stems from its assets, regardless of how those assets are financed. In other words, a variant of the net operating income approach discussed above.

**In their paper, MM began with a very restrictive set of following assumptions:**

1. The capital markets are perfect.
2. Complete information is cost less and readily available to all investors.
3. Firms can be categorized into “equivalent return” classes. All firms within a class have the same degree of business risk.
4. Investors can borrow and lend funds at the same rate and can move quickly from one security to another without incurring any transaction cost.
5. The securities are infinitely divisible.
6. Investors are rational and well-informed about the risk-return of all the securities.
7. All the investors have same probability distribution about the expected future earnings.
8. There is no corporate income tax. (However, this assumption was relaxed later).

**On the basis of these assumptions, the MM model derived that:**

- a. The total value of the firm is equal to the capitalized value of the operating earnings of the firm. The capitalization is to be made at a rate appropriate to the risk class of the firm.
- b. The total value of the firm is independent of the financing mix. i.e. the financial leverage.
- c. The cut-off rate for the investment decision of the firm depends upon the risk class to which the firm belongs, and thus is not affected by the financing pattern of these investments.

The MM model argues that if two firms are alike in all respect except that they differ in respect of their market value, then the investors will develop a tendency to sell the shares of the over-valued firm (creating a selling pressure) and to buy the shares of the under-valued firm (creating a demand pressure). This, buying and selling pressures will continue till the two firms have same market values.

**The Arbitrage Process:** The arbitrage process refers to undertaking by a person of two related actions or steps simultaneously in order to derive some benefit e.g. buying by a speculator in one market and selling the same at the same time in some other market; or selling one type of investment and investing the proceed in some other investment. The profit or benefit from the arbitrage process may be in any form increased income from the same level of investment or same income from lesser investment. This arbitrage process has been used by MM to testify their hypothesis of financial leverage, cost of capital and value of the firm.

Theoretically speaking, the MM, model, that there is no relationship between the leverage and the value of the firm, seems to be good enough in the light of the assumptions underlying the model. However, most of these assumptions are unrealistic and untenable. Moreover, the arbitrage process, which provides the behavioural justification for the model is itself questionable in the real life as the perfect competition is never found and the transaction costs are inevitable.

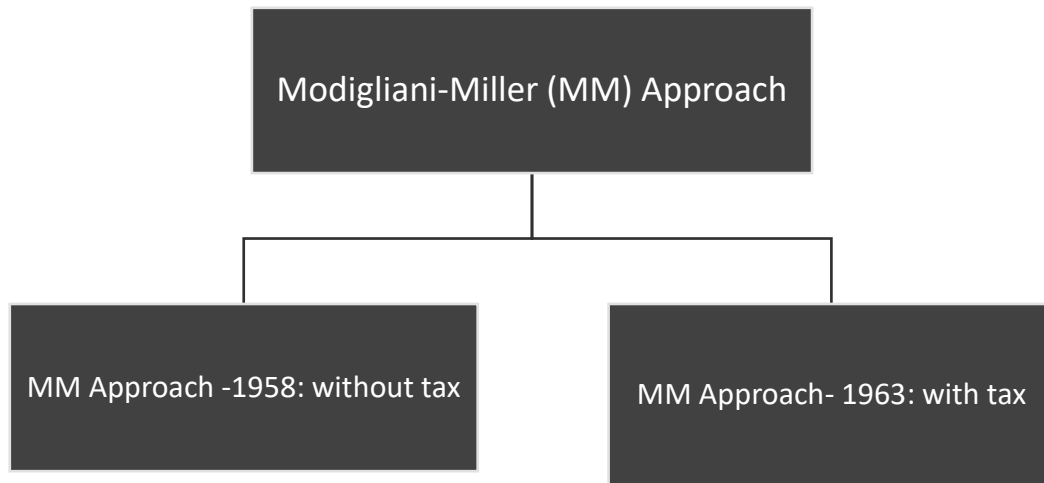
**The validity of the model, on practical considerations, can be examined as follows:**

**1) Non-substitutability of Personal and Corporate Leverages:** Under the MM model, the arbitrage mechanism operates on the assumption that the personal leverage of the investor and the corporate leverage are perfect substitute. However, this may not be true in real life. An individual cannot borrow or lend funds at the same rate at which a corporate firm can. Corporate entity having better credit standing in the market can definitely borrow at rates lower than the rates which an individual has to Pay.

- a) **Personal Gearing versus Corporate Gearing:** In the arbitrage process, when an investor takes a personal loan, he creates a personal gearing and then purchases shares of unlevered firm. So, as a result, the gearing has shifted from the corporate leverage to the personal leverage of the investor. Are these two gearings substitute? When an investor borrows funds in his personal capacity, he in fact incurs an

unlimited liability towards the lender. However, as a shareholder of the levered firm, his liability is limited only to the capital subscribed irrespective of the level of borrowings by the firm. So, the personal leverage is not a substitute of the corporate gearing.

- b) **Leverage Capacity:** The firms usually have a higher leverage capacity as compared to the leverage capacity of the individuals. The creditors may not lend, to an individual, beyond a particular level.
  - c) **Inconveniences of Personal Leverage:** Borrowings either by firms or by an individual involve a lot of formalities and inconveniences. An individual investor may have a preference for corporate borrowing, because in this case, he will remain an outsider to the act of borrowing. Thus, the personal leverage may not at all be sufficient replacement for corporate leverage.
- 2) **Transaction Costs:** The assumption of no transaction costs of the MM model is also imaginary. The buying and selling of shares by the investors will surely involve some transaction costs which will make the arbitrage process to stop short of completion.
  - 3) **Institutional Investor:** If an institution or a firm is a shareholder in a levered firm which is valued higher in the market, can this institutional investor take benefit by the arbitrage mechanism? Generally, it cannot. The reason being that the institutional investor may not be allowed to create a Personal leverage and then to buy the shares of unlevered firm.
  - 4) **Availability of Complete Information:** In real life, the assumption that all the investors have complete information, is also illusory. However, this assumption is compulsory otherwise the very emergence of the arbitrage process will become impossible.
  - 5) **Corporate Taxes:** The MM model is based on the assumption that there is no corporate tax. This assumption is also unrealistic and the tax aspects of the levered firm are very significant in practice.

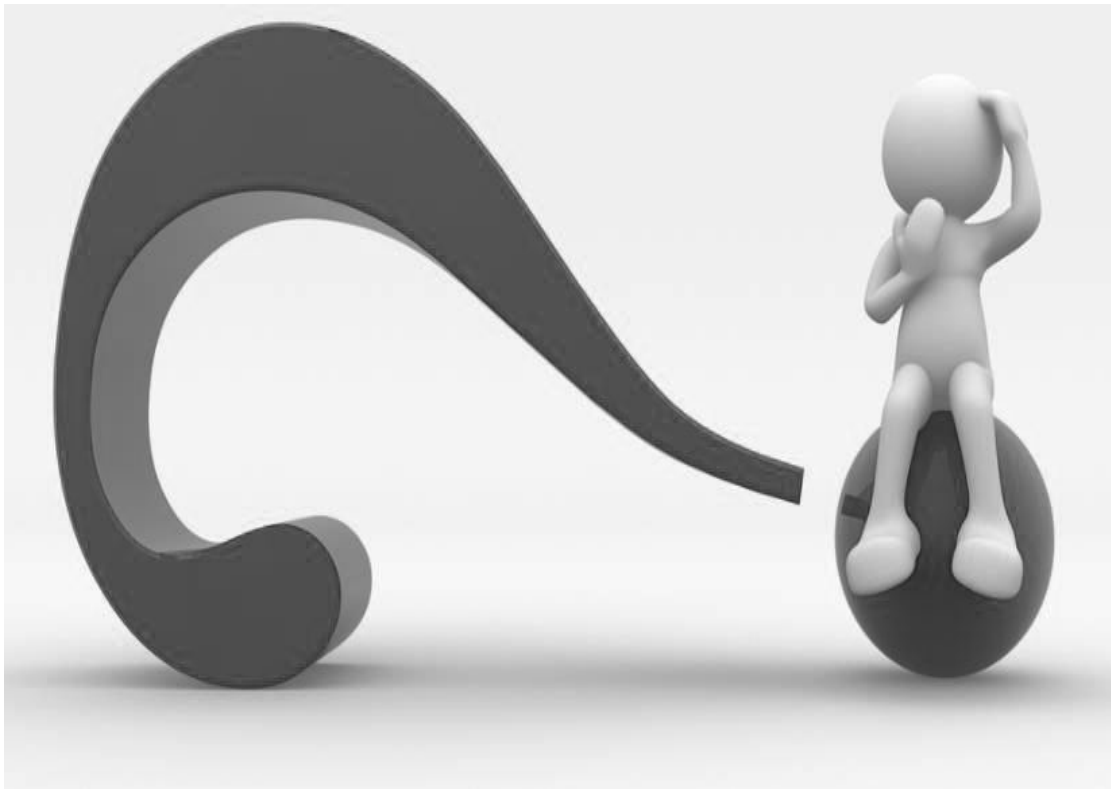
**Modigliani-Miller Approach (MM):****MM MODEL WITHOUT TAXES:**

1. That the firm's capital structure is irrelevant.
2. The WACC is the same no matter what mixture of debt and equity is used to finance the firm.
3. The value of the levered firm is equal to the value of the unlevered firm, and
4. Cost of equity,  $k_e = k_0 + (k_0 - k) D/E$ . It implies that the cost of Equity raises as the firm increases its use of debt.

**MM MODEL WITH TAXES:**

1. The value of the levered firm is equal to the value of unlevered firm + the present value of the interest tax shield, i.e,  $V_L = V_u + D (t)$  So, debt financing is advantageous, and it increases the value of the firm.
2. The WACC of the firm decreases, as the firm relies more and more on debt financing.
3. The cost of Equity,  $k_e = k_0 + k_0 - k_d) (D/E) (i-t)$  or  $= k_0 + (k_0 - k) [D (1-t)/E]$  where,  $k_0$  is the WACC of the unlevered firm.

# PRACTICAL QUESTIONS





### PROBLEMS OF FINANCIAL PLAN:

1. A Ltd as a share capital of ₹ 1,00,000 dividends into share of ₹10 each it has a major expansion program requiring an investment of another ₹ 50,000. The management is considering the following alternatives for raising this amount:

- i) Issue of 5,000 equity shares of ₹ 10 each.
- ii) Issue of 5,000 12% preference shares of ₹ 10 each.
- iii) Issue of 10% debentures of ₹ 50,000

The company's present earnings before interest and tax (EBIT) are ₹ 40,000 per annum subject to tax @ 50%. You are required to calculate the effect of each of the above financial plan on the earnings per share presuming:

- a) EBIT continues to be the same even after expansion.
- b) EBIT increases by ₹ 10,000

2. A company needs ₹ 12,00,000 for the installation of a new factory which is expected to earn all EBIT of ₹ 2,00,000 per annum. The company has the objective of maximizing the earnings per share. It is considering the possibility of issuing equity shares plus raising a debt of ₹ 2,00,000 or ₹ 6,00,000 or ₹ 10,00,000. The current market price of the share is ₹ 40 and will drop to ₹ 25 if the borrowings exceed ₹ 7,50,000. The cost of borrowings is indicated as under:

Up to ₹ 2,50,000	10%
₹ 2,50,000 - ₹ 6,25,000	14%
₹ 6,25,000 – ₹ 10,00,000	16%

Assuming the rate to be 50%, find out the EPS under different options.

3. The capital structure of the progressive corporation consists of ordinary share capital of ₹ 10,00,000 (shares of ₹ 100 each) and ₹ 10,00,000 of 10% debentures. The selling price is ₹ 10 per unit; variable costs amount to ₹ 6 per unit and fixed expenses amount to ₹ 2,00,000. The income tax rate is assumed to be 50%. The sales level is expected to increase from 1,00,000 units to 1,20,000 units.

- a) You are required to calculate:
- The percentage increase in earnings per share,
  - The degree of financial leverage at 1,00,000 units and 1,20,000 units.
  - The degree of operating leverage at 1,00,000 units and 1,20,000 units.
- b) Comment on the behaviour of operating and financial leverages in relation to increases in production from 1,00,000 units to 1,20,000 units.
4. Delta Ltd currently has an equity capital of ₹ 10,00,000 consisting of 1,00,000 equity shares of ₹ 10 each. The company is going through a major expansion plan requiring to raise funds to the tune of ₹ 6,00,000. To finance the expansion, the management has the following plans:

Plan	Description
1)	Issue of 60,000 Equity shares of ₹ 10 each
2)	Issue of 40,000 Equity share of ₹ 10 and the balance through long-term borrowing at 12% interest p.a.
3)	Issue of 30,000 Equity shares of ₹ 10 each and 3,000 ₹ 100 9% debentures
4)	Issue of 30,000 equity shares of ₹ 10 each and balance through 6% preference shares

The company's EBIT is expected to be at ₹ 4,00,000 p.a. Assume Corporate tax rate of 40%. Required:

- Calculate EPS in each of these plans
  - Ascertain the degree of Financial leverage in each plan.
5. Sales and earnings before interest and taxes for the XYZ Company during 2002, were ₹ 17,50,000 and ₹ 4,50,000, respectively. During 1988, interest expense was ₹ 4,000 and preferred dividends were ₹ 10,000. These fixed charges are expected to continue during 2003. An expansion is planned, which will require ₹ 1,75,000 and is expected to increase EBIT by ₹ 1,00,000 to ₹ 5,50,000.

The firm is considering the following financing alternative:

- Issue 5,000 shares of common stock to net the firm ₹ 35 per share. The firm currently has 40,000 share of common stock outstanding.
- Issue ₹ 1,75,000 of fifteen-year bonds at 8%. Sinking fund payment on these bonds will commence in 2012.
- Issue ₹ 1,75,000 of 8.5% preferred stock.

Assume a 50% income tax rate.

- i) Calculation the EPS for 2013 at the expected earnings before interest and taxes level of ₹ 5,50,000 of each financing alternatives.
  - ii) Calculation the equivalency level of earnings before interest and taxes between the debt and common stock alternatives.
  - iii) Calculate the equivalency level of earnings before interest and taxes between the preferred stock and common stock alternative.
6. MC Ltd is planning an expansion program which will require ₹ 30 cores and can be funded through one of the three following options:
- i) Issue further equity shares of ₹ 100 each at par.
  - ii) Raise a 15% loan, and
  - iii) Issue 12% preference shares.

The present paid up capital is 60 cores and the annual EBIT is ₹ 12 cores. The tax rate may be taken at 50%. After the expansion plan is adopted, the EBIT is expected to be ₹ 15 cores.

Calculate the EPS under all the three financing options indicating the alternative giving the highest return to the equity shareholders. Also determine the indifference point between the equity share capital and the debt financing (i.e. option 1 and option 2 above).

7. The existing capital structure of Abhishek Ltd is as under:

Particulars	Amount (₹)
Equity shares of ₹ 100 each	40,00,000
Retained Earnings	10,00,000
9% Preference shares	25,00,000
7% Debentures	25,00,000

The exiting rate of return on the company's capital is 12% and the income tax rate is 35%. The company requires a sum of ₹ 25,00,000 to finance its expansion programme for which it is considering the following alternatives-

- a) Issue of 20,000 equity shares at a premium of ₹ 25 per share
- b) Issue of 10% preference shares.

c) Issue of 8% debentures

It is estimated that the P/E ratios in the cases of Equity, Preference and debentures financing would be 2017 and 16 respectively.

Which of the alternatives would you consider to the best?

8. Alia Ltd. Plans to expand assets by 5-0% To finance the expansion, it is choosing between a straight 12 percent debt issue and ordinary shares. Its balance sheet and profit and loss account are shown.

#### BALANCE SHEET AS ON 31<sup>st</sup> December 2012

Liabilities	₹	Assets	₹
11 % Debentures	40,00,000	Total assets	2,00,00,000
Ordinary share Capital (1,00,000 shares of ₹10 each)			
Retained Earnings	1,00,00,000		
	60,00,000		
	2,00,00,000		2,00,00,000

#### Profit and Loss Account for the year ended 31<sup>st</sup> December 2012

Particulars	Amount (₹)
Sales (A)	600,00,000
Total costs (excluding interest) (B)	552,83,077
<b>Net income before taxes C= (A-B)</b>	<b>47,16,923</b>
Interest on debentures @11% (D)	4,40,000

<b>Income before taxes E = (C-D)</b>	<b>42,76,923</b>
Taxes @35% (F)	14,96,923
<b>Profits after tax G = (E-F)</b>	<b>27,80,000</b>
Earnings per share ₹ 27,80,000/ 10,00,000	₹ 2.78
Price/earnings ratio	7.5 times
Market price 7.5% x ₹2.7	₹ 20.85

If Alia Ltd. Finances ₹ 1 crore expansion with debt, the rate of the incremental debt will be 12 per cent and the price/ earnings ratio of the ordinary shares will be 5 times. If the expansion is financed by equity the new shares can be sold at ₹ 12 per share and the price / earnings ratio will remain at 7.5% times.

- a. Assuming that net income before interest and taxes (EBIT) is 10% of sales. Calculate earnings per share at sales of ₹ 4 crores, ₹ 8 crores and ₹ 10 crores when financing is with
    - (i) ordinary shares and
    - (ii) debt.
  - b. At what level of earnings before interest and taxes (EBIT) after the new capital is acquired; would earnings per share (EPS) be the same whether new funds are raised by issuing ordinary shares or raising debt?
  - c. Using the P/E ratio, calculate the market value per share for each sales level for both the debt and the equity financing?
9. X & Co. needs ₹ 10, 00,000 for construction of new plant for which it has three financing plans. The company wants to maximize EPS. Currently, the equity share is selling for ₹ 30 per share. The EBIT resulting from the plant operations are expected to run about ₹ 1, 80,000 per year. The company's marginal tax rate is 50%. Money can be borrowed at the rates indicated as under:

Up to ₹ 1,00,000 at 10%  
 Over ₹ 1,00,000 at ₹ 5,00,000 at 14%  
 Over ₹ 5,00,000 at 18%

If fund is excess of ₹ 5,00,000 are borrowed, the company anticipates a drop in the price of equity to ₹25 per share. The three financing plans are as follows:

Plan A – use ₹ 1,00,000 debt

Plan B – use ₹ 3,00,000 debt

Plan C – use ₹ 6,00,000 debt

You are required to determine the EPS for these plans and indicate the financial plan which will result in the highest EPS.

10. Calculate the P/E ratio from the following:

Particulars	Amount (₹)
Equity shares capital (₹ 20 each)	50,00,000
Reserves and surplus	5,00,000
Secured loans at 15%	25,00,000
Unsecured loans at 12.5%	10,00,000
Fixed Assets	30,00,000
Operating profit	5,00,000
Income-Tax rate	35%
Market price / share	50

11. Preity Ltd. A widely held company is considering a major expansion of its production facilities and the following alternatives are available.

Particulars	Amount (₹) in lakhs		
	A	B	C
Alternatives Share capital	50	20	10
14% debentures	-	20	15
Loan from a Financial Institution @ 18% p.a. Rate of Interest	-	10	25

Expected rate of return before tax is 25%. The rate of dividend of the company is not less than 20% the company at present has no debt. Corporate taxation 35%

Which of the alternatives you would choose?

12. The following figures are made available to you:

Particulars	Amount (₹)
Net profits for the year	18,00,000
Less: Interest on Secured Debentures at 15% p.a. (debentures were issued 3 months after the commencement of the year)	1,12,500
	<b>16,87,500</b>
Less: Income tax at 35%	5,906,25
	<b>10,96,875</b>
Number of equity shares (₹ 10 each)	100,000
Market Quotation of equity share	109.70

The company has accumulated Revenue Reserves of ₹12 lakhs. The company is examining a project calling for an investment obligation of ₹10 lakhs this investment is expected to earn the same rate of return as funds already employed.

You are informed that a debt-equity ratio (Debt dividend by plus equity) higher than 60% will cause the price-earnings ratio to come down by 25% the interest rate on additional borrowing will cost company 300 basis points more than on their current borrowing on secured debentures.

You are required to advise the company on the probable price of the equity share if:

- i) The additional investment was to be raised by way of loans; or
- ii) The additional investment was to be raised by way of equity.

13. A Ltd has agreed to buy the Net Assets of B Ltd. (having EBIT of ₹ 2,30,000) for ₹ 18,00,000. In order to finance the acquisition, the following three proposals are submitted;

- 1) To issue 5% debentures of ₹ 18,00,000 redeemable in 20 years.
- 2) To issue 5 ½ % cumulative preference shares of ₹ 18,00,000

3) To issue 60,000 equity shares at a premium of ₹ 10 per share.

The following are the Balance Sheet and Income Statement of A Ltd.

Particulars	Amount (₹)
EBIT	12,50,000
Interest	50, 000
Tax	6,00,000
Profit after tax	6,00,000
Dividend paid	1,25,000
Retained earnings	4,75,000

You are required to:

- Calculate the consolidated EPS of the new firm assuming that the EBIT and tax rate remains same and
- Calculate the additional net cash outlay during next year under each of the above three assuming that the rate of dividend will be same as in current year.

14. Tanaji Limited provides you with following figures:

Particulars	Amount (₹)
Profit	2,13,846
Less: Interest on debentures @ 12%	60,000
	<b>1,53,846</b>



Income tax 35%	53,846
Profit after tax	<b>1,00,000</b>
Number of equity shares (of ₹ 10 each)	40,000
EPS (Earning per shares)	2.5
Ruling price in market	25
P.E. Ratio (i.e. Price/ EPS)	10

The company has undistributed reserves of ₹ 60,00,000. The company needs ₹ 2,00,000 for expansion. This amount will earn at the same rate as funds already employed.

You are informed that debt – equity ratio is as follows:

$$\text{Debt Equity Ratio} = \frac{\text{Debt}}{\text{Debt+Equity}} * 100$$

Higher than 35% will push the P/E ratio down to 8 and raise the interest rate on additional amount borrowed to 14%.

You are required to ascertain the probable price of the share.

- I. If the additional funds are raised as debt; and
- II. If the amount is raised by issuing equity shares.

15. XYZ Ltd provides you the following information:

Particulars	Amount (₹)

Funds required	₹ 10,00,000
Financial plan 1	100% equity shares of ₹ 10 each, Current market price = ₹ 25
Financial plan 2	40% Equity shares of ₹ 10 each, Current market price = ₹ 20 and 60%, 10% Debentures of ₹ 100 each.
Financial plan 3	40% equity shares of ₹ 10 each; Premium in market 100%; 40%, 10% Debentures of ₹ 100 each; 20%, 15% Preference shares of ₹ 100 each
Tax rate	40%
EBIT	25% on capital employed

Which financial plan would you recommend and why? AB Ltd provided you the following figures;

Particulars	Amount (₹)
Profit	3,00,000
Less: Interest on debentures @ 12%	60,000
	<b>2,40,000</b>
Income tax 50%	1,20,000
Profit after tax	<b>1,20,000</b>
Number of equity shares (of ₹ 10 each)	40,000
EPS (Earning per shares)	3
Ruling price in market	30
P.E. Ratio (i.e. Price/ EPS)	10

The company has undistributed reserves of ₹ 6,00,000. The company needs ₹ 2,00,000 for expansion. This amount will earn at the same rate as funds already employed. You are informed that a debt equity ratio i.e. debt / (debt + equity) higher than 35% will push the PE ratio down to 8 and raise the interest rate on additional amount borrowed to 14%. You are required to ascertain the probable price of the share:

- i) If the additional funds are raised as debt: and

- ii) If the amount is raised by issuing equity shares.

### PROBLEMS OF APPROACHES:

- 16.** Company X and Company Y are in the same risk class and are identical in every respect except that the company X uses debt, while company Y does not. The levered firm has ₹ 9,00,000 debentures, carrying 10 rates of interest. Both the firms earn 20% operating profit on their total assets of ₹ 15 lakhs. Assume perfect capital markets, rational investors and so on; a tax rate of 35% and capitalization rate of 15% for all-equity firm.
- Compute the value of the firms using NI and NOI approach
  - Using the NOI approach, calculate the overall cost of capital for X and Y
  - Which of the two firms has an optimal capital structure according to NOI approach? Why?
- 17.** Companies U and L are identical in every respect except that U is unlevered and L is levered. Company L has ₹ 20 lakhs of 8 % debentures outstanding. Assume (i) that all the MM assumptions are met and (ii) that the tax rate is 35%, (iii) that EBIT is ₹ 6 Lakhs and that equity-capitalization rate for U is 10%
- What will be the values of each firm according to MM approach?
  - Suppose  $V(U) = ₹ 25,00,000$  and  $V(L) = ₹ 35,00,000$ . According to MM do they represent equilibrium values? If not, explain the process by which equilibrium will be restored.
- 18.** A company's current operating income is ₹ 4 lakh. The firm has ₹ 10 Lakh of 10 % debt outstanding. Its cost of capital is estimated to be 15%.
- Determine the current value of the firm, using traditional approach.
  - Calculate the overall capitalization rate as well as both types of leverage ratio – Debt-equity and debt-value ratio
  - The firm is considering increasing its leverage by raising an additional ₹ 5,00,000 debt and using the proceeds to retire that amount of equity. As a result of increased financial risk,  $K_d$  is likely to go up to 12% and  $K_e$  to 18%. Would you recommend the plan?
- 19.** A company's expected Annual Net Operating Income (EBIT) is ₹50,000 the company has ₹2,00,000 10% debentures. The Equity Capitalization rate is 12.5%. Find out the value of the firm and overall capitalisation rate of the firm.

20.

Particulars	Amount (₹)
Given Operating Income (EBIT)	50,000
Cost of Debt	10%
Outstanding Debt	2,00,000
Overall Capitalisation Rate	12.5%

- What will the total value of firm and the equity capitalization rate?
- If the firm increases the amount of debt from ₹ 2,00,000 to ₹ 3,00,000 and uses the proceeds of debt to repurchases equity shares, what will be equity capitalization rate?
- If the firm retires debt of ₹ 1,00,000 by issuing fresh equity shares of amount, what will be equity capitalization rate?

21. There are 2 firms P and S, identical in all respects. Firm P has 10% ₹ 500,000 Debentures. The EBIT of both firms is ₹1,00,000. The Equity Capitalization rate of firm P is slightly higher 16% of shares in Company P will be better off in switching his holding to company S.

22. A firm has 20% debt and given the EBIT, Interest (I) kd 10% and equity capitalization Rate (ke). Calculate the total market value of each firm and overall capitalisation rate.

23. Assuming no taxes and given the EBIT, Interest (I) kd 10% and equity capitalisation Rate (ke). Calculate the total market value of each firm and overall capitalisation rate.

Firms	EBIT (₹)	Interest (₹)	$K_e$
A	2,00,000	20,000	12%
B	3,00,000	60,000	16%
C	5,00,000	2,00,000	15%
D	6,00,000	2,40,000	18%

24. PM Ltd. is setting up a project with a capital outlay of ₹ 60,00,000. It has two alternatives in financing the project cost:

Alternative (i): 100% equity finance

Alternative (ii): debt- Equity Ratio 2:1

The rate of interest payable on the debts is 18% p.a. The Corporate tax rate is 40%. Calculate the difference point between the two alternative methods of financing.

25. Companies A and B are identical in all respects risk factors, except for debt/equity. A having Issued 10% debentures of ₹ .18 lakhs while B has only equity. Both the companies earn 20% before interest and taxes on their total assets of ₹30 lakhs.

Assuming a tax rate of 50% and capitalization rate of 15% for an all equity company, compute estimate the value of companies A and B using

- i) net income approach and
- ii) net operating income approach

26. In considering the most desirable capital structure for a company. The following estimate of the cost of debt and equity capital (after tax) have been made at various levels of debt-equity mix:

Debt as percentage of Capital Employed	Cost of Debt	Cost of Equity
0	5.0	12.0
10	5.0	12.0
20	5.0	12.5
30	5.5	13.0
40	6.0	14.0
50	6.5	16.0
60	7.0	20.0

27. A firm earns a NOI of ₹1,00,000. Its  $K_e$  is 10% and  $k_d$  is 6% and the market value of debt is ₹5,00,000

- a) Find the overall cost of capital and value of firm under Net Income Approach.

- b) What would be the position if the value of debt is ₹700,000?
- c) Find  $k_o$ ,  $S$ ,  $D$ , and  $V$  for the following level of Interest costs
- 10,000
  - 20,000
  - 50,000
  - 90,000
  - 1,00,000

where  $k_e=10\%$  and  $k_d=5\%$

28. Two companies, U and L belong to an equivalent risk class. These two firms are identical in every respect except that U is unlevered while company L has 10% debentures of ₹ 30 lakhs. The other relevant information regarding their valuation and capitalization rates are as follows:

Particulars	U	L
EBIT	₹ 7,50,000	₹ 7,50,000
Interest on Debt	-----	3,00,000
Earnings to equity shareholders	7,50,000	4,50,000
Equity Capitalization rate	15%	20%
Market Value of Equity	50,00,000	22,50,000
Market value of debt	-----	30,00,000
Total Value of the firm	50,00,000	52,50,000
Implied overall capitalization rate	15%	14.3%
Debt equity ratio	0	1.33

- (a) An investor owns 10% equity shares of company L. Show the arbitrage process and the amount by which he could reduce his outlay through the use of leverage.
- (b) According to MM, when will this arbitrage process come to an end?

29. Two companies X and Y belong to equivalent risk group. The two companies are identical in every respect except that company Y is levered, while X is unlevered. The outstanding amount of debt of the levered company is ₹ 6,00,000 in 10% debentures. The other information for the two companies is as follows:

Particulars	X	Y
NOI	₹ 1,50,000	₹ 1,50,000
Interest on debt	-----	60,000
Earnings to equity shareholders	1,50,000	90,000
Equity Capitalization rate	15%	20%
Market value of Equity	10,00,000	4,50,000
Market value of debt	-----	6,00,000
Total value of firm	10,00,000	10,50,000
Overall capitalization rate	15%	14.3%
Debt/Equity ratio	0	1.33

An investor owns 5% equity shares of company Y. Show the process and the amount by which he could reduce his outlay through use of the arbitrage process. Are there any limits to the process?

**30.** XYZ Ltd. has earnings before interest and taxes (EBIT) OF ₹ 4,00,000. The firm currently has outstanding debts of ₹ 15,00,000 at an average cost,  $k_d$ , of 10%. Its cost of equity capital  $k_e$ , is estimated to be 16%.

- Determine the current value of the firm using the traditional valuation approach.
- Determine the firm overall capitalization rate  $k_o$ .

**31.** The firm is considering to issue capital of 5,00,000 in order to redeem 5,00,000 debt. The cost of debt is expected to be unaffected. However, the firm cost of equity capital is to reduce to 14% as a result of decrease in leverage. Would you recommend the proposed action?

**32.** The following information is available for X Ltd. and Y Ltd. in respect of their present positing compute the equilibrium values ( $v$ ) and equity capitalization rate of the two companies, assume that (i) there is no income tax, and (ii) the overall rate of capitalization for such companies in the market is 12.5%

Particulars	X	Y
EBIT	₹1, 50, 000	₹ 1,50,000
Interest @ 5%	₹20,000	--

Net income for equity holders	₹ 1,30,000	₹1,50,000
Equity capitalization rate	0.13	0.12
Market value of debt	₹ 10,00, 000	₹ 12,50,000
Market value of debt	4,00,000	--
Total market value	14,00,000	12,00,000
Cost of capital, $K_0$ (EBIT /market value)	10.71%	12%

33. From the following selected data, determine the value of the firms, P and Q belonging to the homogenous risk class.

Particulars	Firm P	Firm Q
EBIT	₹2,25,000	₹ 2,25,000
Interest at 15%	₹ 75,000	--
Equity capitalization rate ( $K_e$ )	--	20%
Corporation tax	50%	50%

Which of the two firms has an optimal capital structure under the NOI approach?

34. The expected annual net operating income of a company is ₹ 10,00,000. The company has ₹50,00,000 10% debentures. The overall cost of capital is 12.5% calculate the value of the firm and costs of equity according to NOI approach. If the company increases the debt from ₹ 50,00,000 to ₹ 60,00,000, what would be the value of the firm?

35. Firm A and B are similar except that A is unlevered, while B has ₹2,00,000. 5 of 5 per cent debentures outstanding. Assume that the tax rate is 40%, not is ₹ 40,00,000 and the cost of equity is 10%

- Calculate the value of the firm, if the MM assumptions are met
- If the value of the firm B is ₹ 3,60,000 then do values represent equilibrium values.







prediction of things to come requiring high order of intellectual ability. The economic justification for a capital expenditure programme requires a long-term estimates of profits, which in turn involves projection of sales and cost of operation over a period of years.

### IMPORTANCE OF CAPITAL BUDGETING DECISION

#### Importance of Capital Budgeting Decision



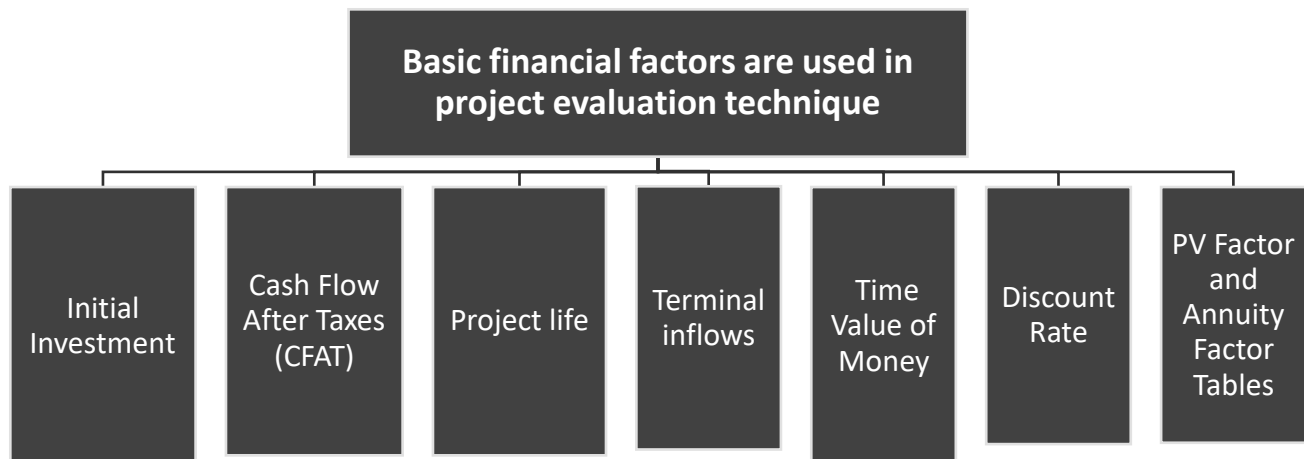
Capital Budgeting decisions should be taken after careful analysis and review. The importance of Capital Budgeting can be understood from the following points:

- a) **Cost:** *Initial investment* is substantial. Hence commitment of resources should be made properly.
- b) **Time:** The *effect of decision is known only in the future* and not immediately.
- c) **Irreversibility:** *Decisions are irreversible*, and commitment should be made on proper evaluation. For example, plant and machinery purchased for a textile mill project cannot be used for any purpose any purposed say refining of crude oil.
- d) **Complexity:** Decisions are based on *forecasting of future events and inflows*. Quantification of future events involves application of statistical and probabilistic techniques. Careful judgment and application of mind is necessary.
- e) **Risk and Uncertainly involved in appraisal:** Evaluation of capital expenditure proposal involves projections of the future. Future is always uncertain. Nobody can say with certainty about the quantum and frequency of the future cash flows. There are too many unknown and uncertain factors which influence cash flow and therefore, *it is important to recognize that each cash inflow or outflow is only a probable figure. It is necessary to consider risk and uncertainty while carrying out the capital budgeting*

*exercise. Risk and return have a direct relationship.* Higher the return from the project, higher would be the risk normally and vice versa. It is, therefore, necessary that the capital budgeting exercise should attempt to optimize both the return and risk factors.

- f) **Substantial expenditure:** Capital budgeting decisions involves the *investment of substantial amount of funds*. It is therefore necessary for a firm to make such decisions after a thoughtful consideration so as to result in the profitable use of its scarce resources. The hasty and incorrect decisions would not only result into huge losses but may also account for the failure of the firm.
- g) **Long time period:** *The capital budgeting decision has its effect over a long period of time.* These decisions not only affect the future benefits and costs of the firm but also influence the rate and direction of growth of the firm.

### BASIC FINANCIAL FACTORS ARE USED IN PROJECT EVALUATION TECHNIQUE



The following basic financial factors are used in project evaluation technique:

- a) **Initial Investment:** The equals the cash outflow at the initial stage, net of salvage value of old machinery if any.

**Initial Investment = Cost of New Asset purchased Less Sale Value of old assets if any.**

**It considers the following factors:**

- Cost of purchased of land, building, plant etc.
- Increase in level of working capital
- Salvage value from old asset (in case of replacement) or write off assets not fully depreciated

- Cost of installation and other incidental costs
- Opportunity cost of using existing resources
- Tax impact on sale of old assets
- Sunk costs should not be considered.

**b) Cash Flow After Taxes (CFAT):** This equals the cash inflows generated by the projects at various point of time.

**CFAT = PAT (Profit After Tax) + Depreciation and other amortizations.**

**The following principles should be kept in mind while estimating cash flows:**

- Decisions are based on cash flows and not accounting income.
- Cash flows are based on opportunity costs. Example – loss of lease rental if own building is used.
- Cash flows are analysed on after tax basis
- Include all costs and benefit resulting from the adoption of the proposed projects.
- The estimates should be on an incremental basis i.e. with and without projects.
- Indirect costs and benefit can be taken into account to the extent appropriate to the decision-making unit. Example – Diet Coke affecting the sale of normal Coke.
- Ignore sunk cost (e.g. Research cost).
- Ignore existing allocated overheads. Example – Allocated Head office expenses.
- Consider incremental overhead, if any. Example – increase in supervisor's salary.

**c) Project life:**

- 1) The time period during which the project generates positive Cash Flow After Taxes is called project life.
- 2) Project life may be finite or infinite.

**d) Terminal inflows:**

- 1) Amount expected to be realized at the end of project life.
- 2) If nothing is mentioned in the problem, assume working capital will be recovered in full.

**e) Time Value of Money:** the value of money differs at different point of time. So the present value of further cash flows will be computed by discounting the same at the appropriate discount rate.

**f) Discount Rate:**

1. It represents **the cut-off rate** for capital investment evaluation.

2. A project which does not earn at least the cut-off rate should not be accepted.
3. Generally, the rate used for discounting is the **Weighted Average Cost of Capital** of the enterprise.
4. **Discount rate should reflect opportunities cost of fund.**
5. **Riskiness of the Project** – higher the risk, higher the discount rate.
6. **Inflation** – higher the inflation, higher the discount rate.

**g) PV Factor and Annuity Factor Tables:** For the purpose of discounting future cash flows, the PV factor (Present Value Factor) and Annuity Factor tables are used. The utility of tables is as under:

- In case of uniform Cash Flows during the project life: Annuity Factor at the end of the project life.
- In case of different Cash Flows during the project life: PV Factors for each year.

### TAX SHIELD

- When a company incurs a loss on a project, it goes to reduce the taxable profits of the company either in that year or of any subsequent year during which loss is set-off.
- It is called tax shield. It is equal to:

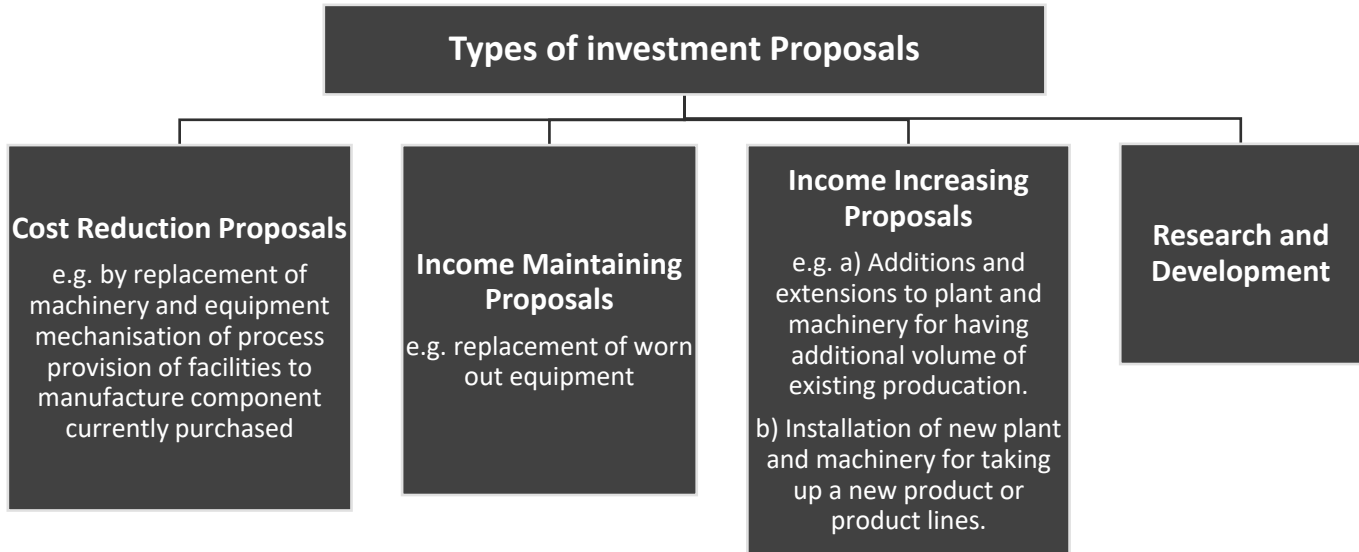
**Tax Shield = Loss Adjusted x Tax Rate.**

### DEPRECIATION

- 1) Depreciation is not an item of cash flows; hence it is not considered in cash flow analysis.
- 2) However, *Depreciation is relevant in capital budgeting on account of depreciation tax shield.* Tax shield on depreciation is an item of cash flow and hence must be recognized.
- 3) If in the question, tax is not applicable, depreciation is irrelevant.
- 4) *Depreciation should be computed as per Tax Laws* and not as per books of accounts.
- 5) If *tax rate both as per books of account and as per tax laws are given, use tax as per tax laws.*
- 6) Depreciation is charged by the owner of the asset for tax purpose.

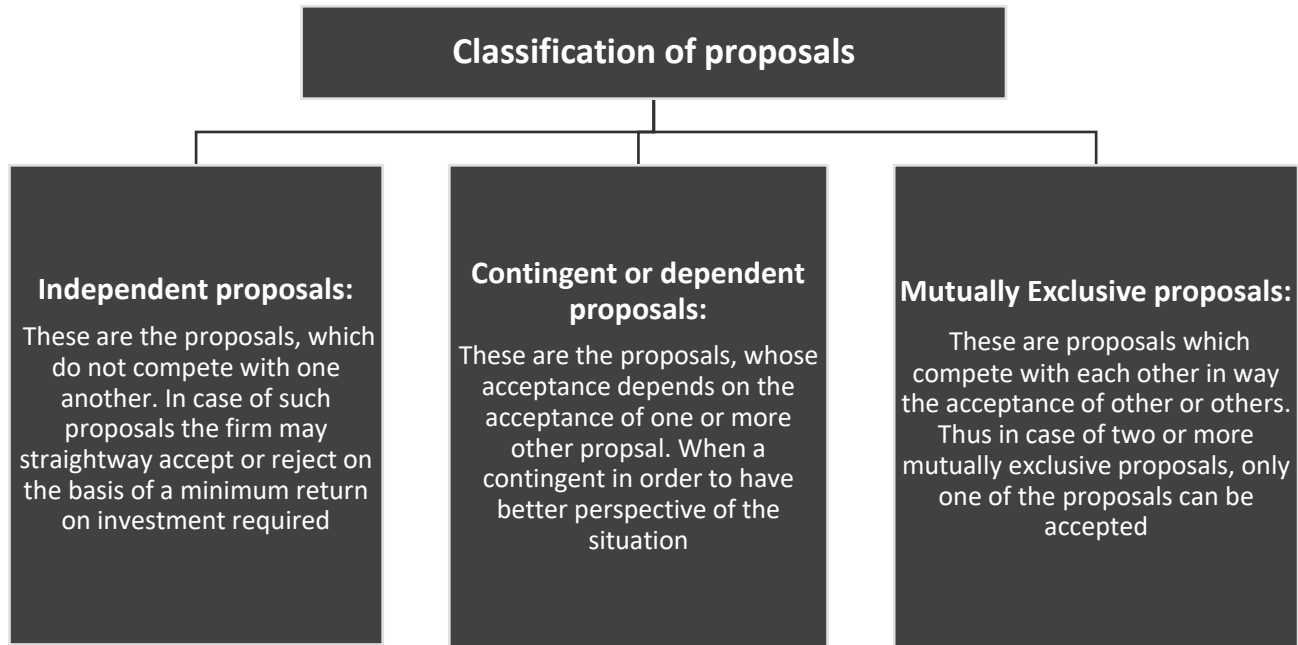
**Depreciation Tax Shield = Depreciation x Tax Rate.**

### TYPES OF INVESTMENT PROPOSAL



- a) **Cost Reduction Proposals:** The modernization decisions aim at to *improve operating efficiency*. This is known as modernization decisions. The modernization decisions are called *cost reduction decisions*.
- b) **Income Maintaining Proposals:** The replacement decisions aim at to improve operating efficiency and *to reduce cost*. Generally, *all types of plant and machinery require replacement either because of the economic life of the plant or machinery is over or because it has become technologically outdated*. The former decision is known as replacement decisions.
- c) **Income Increasing Proposals:** Existing successful firms may experience growth in demand of their product line. If such firms experience shortage or delay in the delivery of their products due to inadequate production facilities, they may consider proposal to add capacity to existing product line. These *decisions require evaluation of proposals to diversify into new product lines, new markets etc. for reducing the risk of failure by dealing in different products or by operating in several markets*.
- d) **Research & Development**

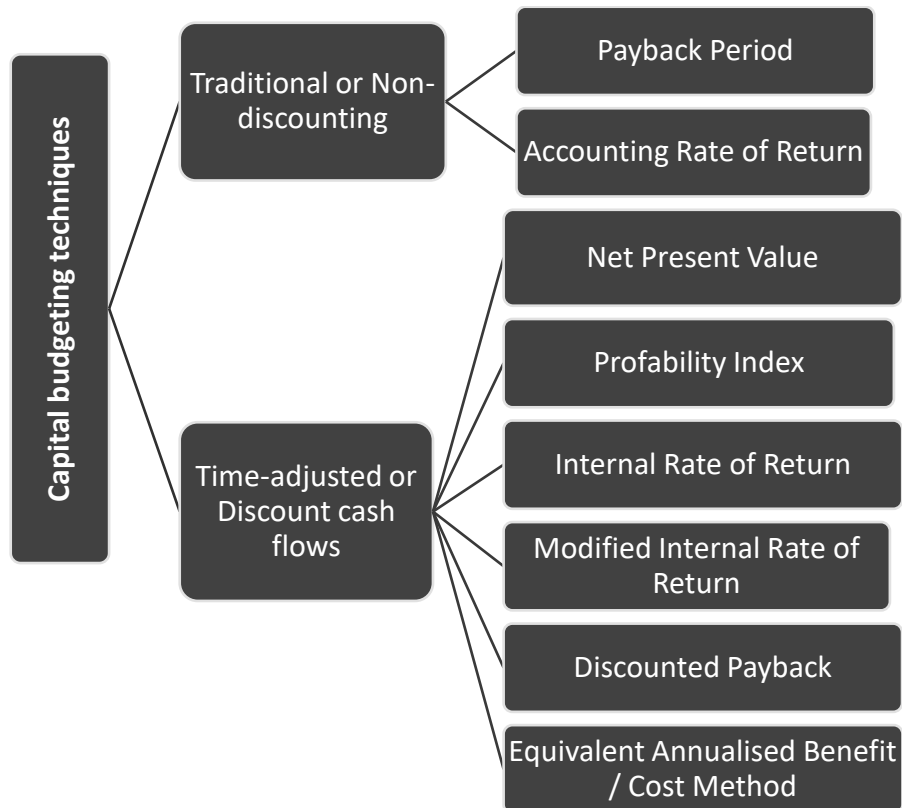
## CLASSIFICATION OF PROPOSAL



- a) Independent Proposals:** *The accept-reject decisions occur when proposals are independent and do not compete with each other.* The firm may accept or reject a proposal on the basis of a minimum return on the required investment. All those proposals which give a higher return than certain desired rate of return are accepted and the rest are rejected.
- b) Contingent or dependent proposals:** The contingent decisions are dependable proposals. *The investment in one proposal requires investment in one or more other proposals.* For example, if a company accepts a proposal to set up a factory in remote area it may have to invest in infrastructure also e.g. building of roads, houses for employees etc.
- c) Mutually exclusive proposals:** The decisions are said to be mutually exclusive *if two or more alternative proposals are such that the acceptance of one proposal will exclude the acceptance of the other alternative proposals.* For instance, a firm may be considering proposal to install a semi-automatic or highly automatic machine. If the firm installs a semi-automatic machine it excludes the acceptance of proposal to install highly automatic machine.

## METHOD OF RANKING INVESTMENT PROPOSALS





There are several method/technique for evaluation and ranking of the capital investment proposals. In case of all these methods the main emphasis is the return which will be derived on the capital investment in the project.

### 1) PAYBACK PERIOD:



Payback period refer to the period in which the project will generate the necessary cash to recoup the initial investment.

**In case of even cash flows:**

$$\text{Payback Period} = \frac{\text{Initial Investment}}{\text{Annual Cash Inflow}}$$

Where

Annual cash flows = Estimated cash inflows resulting from the proposed investment (i.e. net income on account of investment before depreciation but after taxation)

**a) Procedure for calculation of simple payback periods:**

Step	Procedure
1)	Determine the total outflow of the project. (Initial Investment)
2)	Determine the cash inflows after taxes (CFAT) for each year.
3)	Determine the cumulative CFAT at the end of every year.
4)	Determine the year in which cumulative CFAT exceed Initial Investment.

<b>5)</b>	<p>Compute payback period:</p> <p><b>In case of uniform CFAT:</b></p> <p>Payback period = Initial Investment /CFAT per annum</p> <p><b>In case of differential CFAT:</b></p> <p>Payback period = Time at which cumulative CFAT = Initial Investment</p>
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**b) Accept or reject criterion:**

- A project whose actual pay-back period is more than what has been predetermined by management will be straightway rejected.
- The payback period can also be used in case of mutually exclusive projects. The projects are then arranged in ascending order according to the length of their payback periods.
- It may be said that payback period is measure of liquidity of investments rather than their profitability. It should more appropriately be treated as a constraint to be satisfied rather than as a profitability measure to be maximized.

Sr. no.	Particulars	Decision
1)	Payback period < cut-off period predetermines by management	Accept
2)	Payback period > cut-off period predetermines by management	Reject
3)	Payback period = cut off period predetermine by management	Accept

**c) Merits / Advantage:**

1. This method is simple to understand and easy to operate.
2. When funds are limited, projects having shorter payback period should be selected, since they can be rotated more number of time.
3. This method is suitable in the case of industries where the risk of technological obsolescence is very high and hence only those projects which have a shorter payback period should be financed.
4. This method focuses on projects which generates cash inflows in earlier years, thereby eliminating projects bringing cash inflows in later years. As time period of cash flows increases, risk and uncertainty also increases. Thus payback period is useful during risk and uncertainty.

5. This method promotes liquidity by stressing on projects with earlier cash inflows. This is a very useful evaluation tool in case of liquidity crunch and high cost of capital.
6. The payback period can be compared to a break-even point, the point at which the costs are fully recovered but profits are yet to commence.
7. It clarifies the concept of profit or surplus. Surplus arises only if the initial investment is fully recovered. Hence, there is no profit on any project unless the payback period is over.

**d) Demerits / Limitations:**

1. It stresses on capital recovery rather than profitability
  2. It does not consider the post- payback cash flows. i.e. returns from the project after its payback period. Hence, it is not a good measure to evaluate where the comparison is between two projects, one involving a long gestation period and the other yield quick results but only for a short period.
  3. This method becomes an inadequate measure of evaluating two projects where the cash inflows are uneven. There may be projects with heavy initial inflows and very less inflows in later years. Other projects with moderately higher but uniform CFAT may be rejected because of longer payback.
  4. This method ignores the time value of money. Cash flows occurring at all points of time are treated equally. This goes against the basic principle of financial analysis which stipulates compounding or discounting of cash flows when they arise at different point of time.
- 2) DISCOUNTED PAYBACK PERIOD:** When the payback period is computed after discounting the cash flows by a predetermine rate, it is called as the 'Discounted payback period'. It is computed as under:

## Discounted Payback Period

Is a better option for calculating how much time a project would get back its initial investment.

Step	Procedure
1)	Determine the total outflow of the project. (Initial investment)
2)	Determine the cash inflow after taxes (CFAT) for each year.
3)	Determine the PV factor for each year and compute Discounted CFAT (DCFAT) for each year.
4)	Determine the cumulative DCFAT at the end of every year.
5)	Determine the year in which cumulative DCFAT exceeds Initial Investment.
6)	Compute Discounted Payback Period as the time at which cumulative DCFAT = Initial Investment
7)	Accept if Discounted Payback Period less than maximum / benchmark period; else reject the project.

The following format may be adopted for presentation of the answer:

Year	CFAT	PV Factor	DCF = CFAT X PV factor	Cumulative DCF
1)				
2)				
3)				

a) **Merits / Demerits**

- All merits and demerits are similar to Payback period method.
- However, this method considers time value of money.

3) **PAYBACK RECIPROCAL:** It is a reciprocal of payback period. It is calculated as follows:

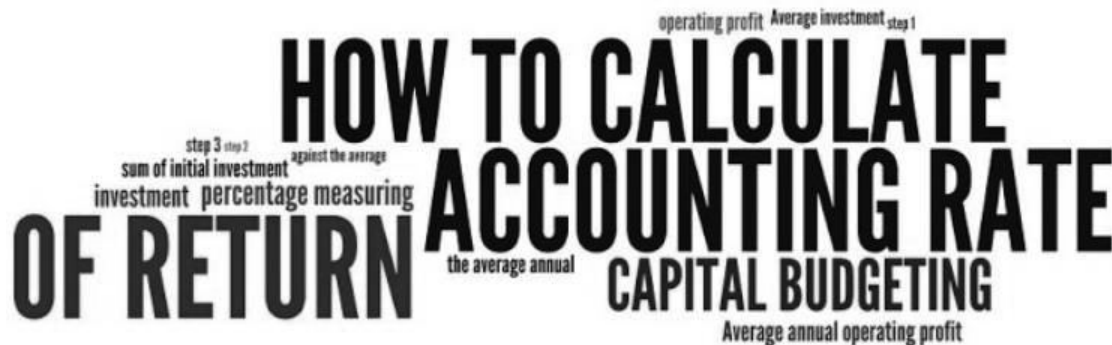
Payback Reciprocal:

$$= \frac{\text{Annual Cash Inflow}}{\text{Initial Investment}}$$

Payback period method does not cut-off period for the purpose of investment decision. The reciprocal of payback is a close approximation of the internal rate of return, if the life of the project is at least twice the payback period and project generate equal amount of the annual cash inflows.

**Example:** A project with an initial investment of Rs. 50 lakhs and life of 10 years generates CFAT of Rs. 10 lakhs per annum. Its payback reciprocal will be Rs. 10 lakhs / 50 lakhs = 20%.

#### 4) AVERAGE RATE OF RETURN:



According to this method, the capital investment proposals are judged on the basis of their relative profitability. For this purpose, capital employed and expected income are determined according to commonly accepted accounting principles and practices over the entire economic life of the project and then the average yield is calculated. Such a rate is termed as accounting rate of return. It may be calculated, according to either of the following formula:

$$\frac{\text{Average Annual Net Earnings}}{\text{Original Investment}} * 100 \quad \text{OR} \quad \frac{\text{Annual Average Net Earnings}}{\text{Average Investment}} * 100$$

Where,

1) The term “Average annual net earning” is the average of the earning (after depreciation and tax) over the whole of the economic life. One may calculate “Average annual net earnings” before tax. Such a rate is known as pre-tax accounting rate of return.

2) The amount of “Average Investment” is calculated as follows:

$$\frac{\text{Original investment} - \text{Scrap value}}{2} + \text{Additional Net Working Capital} + \text{Scrap Value}$$

#### a) Accept / reject criterion

Any project expected to give a return below minimum desired rate of return will be straightway rejected. In case of several projects, where a choice has to be made, the different projects may be ranked in the descending order on the basis of their rate of return.

#### b) Merits

- 1) The method is superior to payback period as it takes into account savings over the entire economic life, even though estimates of distant future may be subjected to wide margin of errors.
- 2) The projects differing widely in character can be compared properly.
- 3) The method embodies the concept of ‘Net earning’ after allowing for depreciation as it is of vital importance in the appraisal of a proposal.

#### c) Demerits:

- 1) The method suffers from the fundamental weakness as that of pay-back method. i.e. it ignores the fact that receipts occur at different time intervals i.e. it ignore time value of money.
- 2) The method has different variants, each of which emerge different rate of return for one proposal. This situation arises due to diverse concept of investments as well as earnings
- 3) Some analyst are of the opinion that as the method take into account earnings after depreciation, it is gross error because it is only the cash flows, that are relevant for the decision making purpose.

**5) DISCOUNTED CASHFLOW METHOD:**

An investment is essential outlay of funds in anticipation of future returns. The presence of time as a factor in investment is fundamental rather than incidental to the purpose of evaluation of investments. Time is always crucial for the investor, so that a sum received today is worth more than the same sum to be received tomorrow. Thus in evaluating investment projects, it is important to consider the things of return on investments.

**a) Assumption of Discounting Table:**

1. Opportunity for investment is available at any time for any amount.
2. Interest will accrue at the same rate.
3. Interest will be reinvested at the same opportunity rate.
4. Price level remains the same.

**6) NPV METHOD:**





The net present value is the difference between present value of benefits and present value of costs.

$$NPV = PV \text{ of Cash Inflows} - \text{Present Value of Cash Outflow}$$

Step	Procedure for consumption of NPV:
1)	Compute initial cash flow. <ul style="list-style-type: none"> <li>- Capital expenditure</li> <li>- Working capital</li> </ul>
2)	Compute in-between incremental cash flow after-tax.
3)	Compute terminal flow. <ul style="list-style-type: none"> <li>- Amount expected to be realized at the end of project's Life. It will include net salvage value of capital assets and recovery of working capital.</li> </ul>
4)	Calculate NPV.

- i) **Cash Outflows:** Generally, cash Outflows consist of (a) Initial investment which occurs at Time "0" and (b) Special Payment and outflows e.g. Working Capital outflow which arises in the year of commercial production, Tax paid on Capital Gain made by sale of old asset, if any.
- ii) **Cash Inflows:** Cash Inflows = CFAT = PAT + Depreciation. Also specific cash inflows like salvage value of new assets are recovery of working capital at the end of the project, tax saving on loss

due to sale of old assets, should be carefully considered. The general assumption is that all cash inflows occur at the end of each year.

**iii) Discounting cash inflows and outflows:** Each item of cash inflows and outflows is discounted to ascertain its present value. For this purpose, the discounting rate is generally taken as the Cost of the Capital since the project must be earn at least what is paid out on the funds blocked in the project. The present value tables are used to calculate the present value of various cash flows.

**iv) Use of Discounting Rate:** Instead of using the PV factor tables, the relevant discount factor can be computed as  $\frac{1}{(1-k)^n}$  where k = cost of capital and n = year in which the inflow or outflow takes place.

Hence, PV factor at 10% after one year =  $1/1.10 = 0.9091$

Similarly, PV factor at the end of two years =  $1/(1.10)^2 = 0.8264$  and so on.

**Note:** The NPV method will give valid results only if money can be immediately reinvested at a rate of return equal to the firm's cost of capital.

#### Relationship between NPV and Discount rate



**v) Accept or reject criterion**

Sr. No.	Particulars	Decision
A)	NPV > Zero	Accept
B)	NPV < Zero	Reject

C)	NPV = Zero	Accept
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**vi) Merits:**

1. It considers the time value of money.
2. Unlike payback period, all cash flows are considered
3. NPV constitutes addition to the wealth of shareholder's and thus focuses on the basic objective of financial management
4. Since all cash flows are converted into present value (current rupees), different projects can be compared on NPV basis.
5. NPV of two or more projects can be added.
6. Risk can be incorporated in capital budgeting decision by adjusting the discount rate.

**vii) Demerits:**

1. It involves complex calculations.
2. It involves forecasting cash flows and application of discount rate. Thus accuracy of NPV depends on accurate estimation of these two factors which may be quite difficult in practice.
3. NPV and ranking of project may differ at different discount rate, causing inconsistency in decision making.
4. It ignores the difference in initial outflows, size of different proposals etc. while evaluating mutually exclusive projects.
5. NPV method may not be useful if the life of two projects are different.

## SUMMARY OF CAPITAL BUDGETING

**1) Capital Budgeting:** *When a business makes a capital investment (assets such as equipment, building, land etc.) it incurs a cash outlay in the expectation of future benefits. Out of different investment proposals available to a business, it has to choose a proposal that provides the best return and the return equals to, or greater than, that required by the investors.*

**2) Importance of capital budgeting decision:**

- a) Cost
- b) Time
- c) Irreversibility
- d) Complexity
- e) Risk and Uncertainty involved in appraisal
- f) Substantial expenditure
- g) Long time period

**3) Basic financial factors are used in project evaluation technique:**

**a) Initial Investment:** This equals the cash outflow at the initial stage, net of salvage value of old machinery if any.

**Initial Investment = Cost of New Asset purchased Less Sale Value of old assets if any.**

**b) Cash Flow After Taxes (CFAT):** This equals the cash inflows generated by the projects at various points of time.

**CFAT = PAT (Profit After Tax) + Depreciation and other amortizations.**

**c) Project life:** The time period during which the project generates positive Cash Flow After Taxes is called project life. Project life may be finite or infinite.

**d) Terminal inflows:** Amount expected to be realized at the end of project life. If nothing is mentioned in the problem, assume working capital will be recovered in full.

**e) Time Value of Money:** the value of money differs at different points of time. So the present value of further cash flows will be computed by discounting the same at the appropriate discount rate.

**f) Discount Rate:** It represents **the cut-off rate** for capital investment evaluation.

**g) PV Factor and Annuity Factor Tables:** For the purpose of discounting future cash flows, the PV factor (Present Value Factor) and Annuity Factor tables are used. The utility of tables is as under:

- In case of uniform Cash Flows during the project life: Annuity Factor at the end of the project life.
- In case of different Cash Flows during the project life: PV Factors for each year.

4) **Tax shield:**  $\text{Tax Shield} = \text{Loss Adjusted} \times \text{Tax Rate}$ .

5) **Depreciation:** Depreciation is not an item of cash flows; hence it is not considered in cash flow analysis. However, *Depreciation is relevant in capital budgeting on account of depreciation tax shield*. Tax shield on depreciation is an item of cash flow and hence must be recognized.

$$\text{Depreciation Tax Shield} = \text{Depreciation} \times \text{Tax Rate}.$$

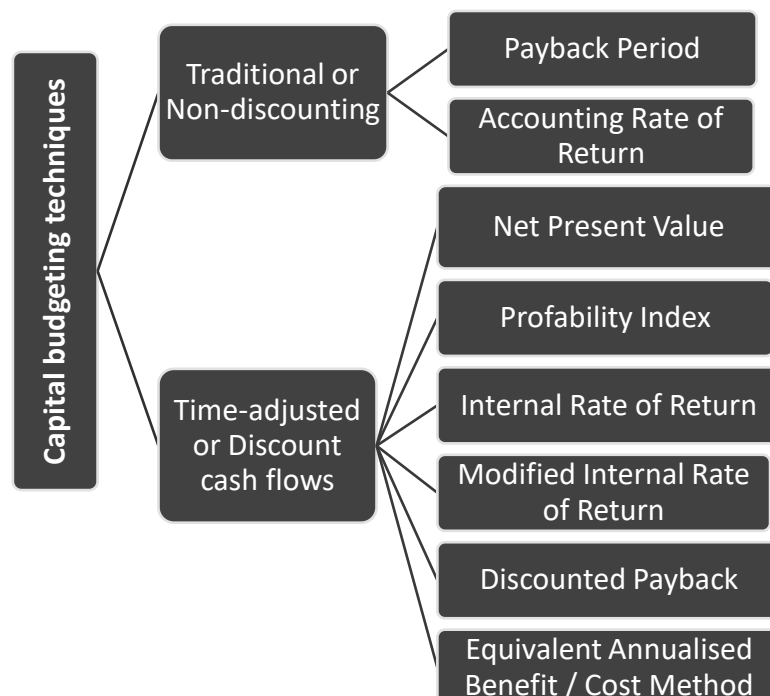
#### 6) Types of Investment Proposal

- Cost Reduction Proposals
- Income Maintaining Proposals
- Income Increasing Proposals
- Research and Development

#### 7) Classification of proposal

- Independent proposals:
- Contingent or dependent proposals
- Mutually Exclusive proposals

#### 8) Method of ranking investment proposals



9) **Pay Back Period** - Payback period refer to the period in which the project will generate the necessary cash to recoup the initial investment.

**In case of even cash flows:**

$$\text{Payback Period} = \frac{\text{Initial Investment}}{\text{Annual Cash Inflow}}$$

Where

Annual cash flows = Estimated cash inflows resulting from the proposed investment (i.e. net income on account of investment before depreciation but after taxation)

Sr. no.	Particulars	Decision
1)	Payback period < cut-off period predetermines by management	Accept
2)	Payback period > cut-off period predetermines by management	Reject
3)	Payback period = cut off period predetermine by management	Accept

10) **Discounted payback period:** When the payback period is computed after discounting the cash flows by a predetermine rate, it is called as the 'Discounted payback period'. It is computed as under:

11) **Payback reciprocal:** It is a reciprocal of payback period. It is calculated as follows

**Payback Reciprocal:**

$$= \frac{\text{Annual Cash Inflow}}{\text{Initial Investment}}$$

12) **Average rate of return:** According to this method, the capital investment proposals are judged on the basis of their relative profitability. For this purpose, capital employed and expected income are determined according to commonly accepted accounting principles and practices over the entire economic life of the project and then the average yield is calculated.

$$\frac{\text{Average Annual Net Earnings}}{\text{Original Investment}} * 100$$

OR

$$\frac{\text{Annual Average Net Earnings}}{\text{Average Investment}} * 100$$

Where,

a) The term “Average annual net earning” is the average of the earning (after depreciation and tax) over the whole of the economic life. One may calculate “Average annual net earning s” before tax. Such rate is known as pre-tax accounting rate of return.

b) The amount of “Average Investment” is calculated as follows:

$$\frac{\text{Original investment} - \text{Scrap value}}{2} + \text{Additional Net Working Capital} + \text{Scrap Value}$$

**13) Discounted cashflow method** - An investment is essential outlay of funds in anticipation of future returns. The presence of time as a factor in investment is fundamental rather than incidental to the purpose of evaluation of investments.

**14) NPV** - The net present value is the difference between present value of benefits and present value of costs.

$$NPV = \text{PV of Cash Inflows} - \text{Present Value of Cash Outflow}$$

Sr. No.	Particulars	Decision
A)	NPV > Zero	Accept
B)	NPV < Zero	Reject
C)	NPV = Zero	Accept

# PRACTICAL QUESTIONS





1. Following data in respect of two machines namely 'A' and 'B' are detailed below depreciation has been charged on straight line basis and estimated life of both machines is five years.

Item	Machine A (₹ in lakh)	Machine B (₹ in lakh)
Cost	56,125	56,125
<b>Net income after depreciation and taxes:</b>		
1 <sup>st</sup> year	3,375	11,375
2 <sup>nd</sup> year	5,375	9,375
3 <sup>rd</sup> year	7,375	7,375
4 <sup>th</sup> year	9,375	5,375
5 <sup>th</sup> year	11,375	3,375
	<b>36,875</b>	<b>36,875</b>

Find out:

- Average rate of return on 'A' and 'B' machines
  - Which machine is better from the point of view of pay-back period why?
  - Calculate average rate of return when salvage value of machine 'A' turns out to be Rs. 3,000 and when 'B' machine has zero salvage value.
2. A company is contemplating to purchase a machine. Two machine 'A' and 'B' are available, each costing Rs. 5, 00,000. In comparing the profitability of the machine, a discounted rate of 10% is to be used.

Earning after taxation are expected as follow:

Year	Machine A Cash flow (₹ in lakh)	Machine B Cash Flow (₹ in lakh)
1 <sup>st</sup> year	50,000	1,50,000
2 <sup>nd</sup> year	1,50,000	2,00,000

3 <sup>rd</sup> year	2,00,000	2,50,000
4 <sup>th</sup> year	3,00,000	1,50,000
5 <sup>th</sup> year	2,00,000	1,00,000

Indicate which of the machines would be profitable using the following methods of ranking investment proposals.

- (i) Pay back method
- (ii) Net present value method
- (iii) Post pay back profitably
- (iv) Average rate of return

The discount factor at 10% is:

1<sup>st</sup> year – .9091

2<sup>nd</sup> year – .8264

3<sup>rd</sup> year – .7513

4<sup>th</sup> year – .6830

5<sup>th</sup> year – .6209

3. Following are the details of three projects A, B and C

Particulars	A	B	C
Cost (Rs.)	50,000	70,000	70,000
Life	10 years	12 years	14 years
Estimated scrap (Rs.)	5,000	10,000	7,000
Annual profit			
Less: Taxation (Rs)	5,000	6,000	5,500

Select the best one using

- (i) Pay period
- (ii) Surplus life over payback period
- (iii) Surplus cash flow, as the decision criterion

4. The particulars relating to two alternative capital projects are furnished below:

Life of the project	PROJECT - X	PROJECT - Y
	4 years (in lakhs)	6 years (in lakhs)
Estimated cash flow	15	15
Estimated cash inflow		
1 <sup>st</sup> year	8	7
2 <sup>nd</sup> year	10	8
3 <sup>rd</sup> year	7	8
4 <sup>th</sup> year	3	6
5 <sup>th</sup> year	–	5
6 <sup>th</sup>	–	4

Compute internal rate of return of project X and Y and state which project you could recommended. You may use the present value table given below

PRESENT VALUE of Rs. 1							
After	20%	25%	30%	35%	40%	45%	50%
1 <sup>st</sup>	0.833	0.800	0.796	0.741	0.714	0.690	0.677
2 <sup>nd</sup>	0.694	0.640	0.592	0.549	0.510	0.476	0.444
3 <sup>rd</sup>	0.579	0.512	0.455	0.406	0.364	0.328	0.296
4 <sup>th</sup>	0.482	0.410	0.350	0.301	0.260	0.226	0.198
5 <sup>th</sup>	0.402	0.328	0.269	0.223	0.186	0.156	0.132
6 <sup>th</sup>	0.335	0.262	0.207	0.165	0.133	0.108	0.088

5. A company is faced with the problem of choosing between two mutually exclusive projects. Project 'A' requires a cash outlay of Rs. 1,00,000 and cash running expenses of Rs. 35,000 par years. On the other hand, project 'B' will be cost Rs. 1,50,000 and require cash running expenses of Rs. 20,000 per year. Both the project has eight-year life. Project 'A' has a Rs. 4,000 salvage value and project 'B' has a Rs. 14,000 salvage value. The company's tax rate is 50% and rate of return is 10%. Assume depreciation on straight line basis. Which project should be accepted? Present value of Rs. 1 at the

end of each year at 10% of 8 years is equal to Rs 5,335 and present value of Rs. 1 at the end of 8<sup>th</sup> years at 10% is equal to Rs. 0.467.

6. The Klein & Co. is contemplating either of two mutually exclusive projects. The data with respect to are given below. The initial investment for the both is equal to their depreciable value. Both will be depreciated straight line over a five-year life.

Particulars	Project A (Rs)	Project B (Rs)
Investment	1,00,000	1,40,000
Year	Profit after tax	
1	10,000	25,000
2	15,000	25,000
3	20,000	25,000
4	25,000	25,000
5	35,000	25,000

- Calculate the 'net present value' and 'benefit-cost ratio' for each project.
- Evaluate the acceptability of each project on the basis of above mentioned two technique
- Select the best project, using NPV and benefit cost ratios and comment on the resulting rankings.
- Assume that the Klein Co. has an 11% cost of capital.
- The following data relates to discounting factor.

7. M/s Lalvani & Co. has Rs. 2, 00,000 to invest. The following proposals are under consideration. The cost of capital for the company is estimated to be 15 percent.

Project	Initial outlay (Rs.)	Annual cash flow (Rs.)	Life of project (years)
A	1,00,000	25,000	10
B	70,000	20,000	8
C	30,000	6,000	20
D	50,000	15,000	10
E	50,000	12,000	20

Rank the above project on the basis of:

- (i) Pay-back method
- (ii) NPV method
- (iii) Profitability index method

Present value of annuity of Rs. 1 received in steady stream discount at the rate of 15%

8 years = 4.6586

10 years = 5.1790

20 years = 6.3345

8. Mohan & Co. is considering the purchase of a machine. Two machines X and Y each costing Rs. 50,000 is available. Earning after taxation are expected to be as under:

Year	Machine X (Rs)	Machine Y (Rs)	Discount factor at 10%
1 <sup>st</sup>	15,000	5,000	0.9091
2 <sup>nd</sup>	20,000	15,000	0.8264
3 <sup>rd</sup>	25,000	20,000	0.7513
4 <sup>th</sup>	15,000	30,000	0.6830
5 <sup>th</sup>	10,000	20,000	0.6209

Estimate the two alternatives according to:

- (i) Payback method
  - (ii) Return on investment method
  - (iii) Net present value method – a discount rate of 10% is to be used
9. Calculation the payback period, accounting rate of return, net present value and internal rate of return for the following investment:

Year	Cash flow (Rs.)
0	30,000
1	4,000

2	10,000
3	20,000
4	11,000

The discount rate for the discounted cash flow (DCF) calculation is 12 per cent. According profits are the same as cash flow except that the initial expenditure should be depreciated over 4 years; there is a no resale value at year 4.

- 10.** The management of company has two alternative projects under consideration. Project A require a capital outlay of Rs. 1,20,000 but project B need Rs. 1,80,000. Both are estimated to provide a cash flow for five years: A – Rs. 40,000 per year and B – Rs. 58,000 per year. The cost of capital is 10%. Show which of the two projects is preferable from the viewpoint of
- Net present value; and
  - internal rate of return.
- 11.** Andhra Pradesh Udyog is considering a new automatic blender. The new blender would last for 10 year and would be depreciated to zero over the 10-year period. The old blender would also last for 10 more years and would be depreciated to zero over the same 10-year period. The old blender has a book value of Rs. 20,000 but could be sold for Rs. 30,000 (the original cost was Rs. 40,000). The new blender would cost Rs. 1,00,000. It would reduce labour expense by Rs. 12,000 a year. The company is subject to a 50% tax rate on regular income and a 30% tax rate on capital gains. Their cost of capital is 8%. There is no investment tax credit in effect.
- You are require to –
- Identify all the relevant cash flows for this replacement decision
  - Compute the present value. Net present value and profitability index
  - Find out whether this is an attractive project?
- 12.** A most profitability company in the country is faced with the prospect of having to replace a large stamping machine. The machines currently being marketed will do the job satisfactorily. The zenith stamping machine costs Rs. 100,000 and will require cash running expenses of Rs. 40,000 the Gadrej stamping machine cost Rs. 150,000 but running expenses are only expected to be Rs. 30,000 per year. Both machines have a ten-year useful life with no salvage value and would be depreciated on a straight- line basis.
- If the company pays a 50% tax rate and has 10% after tax required rate or return, which machine should it purchase?
  - Would you answer be different if the required rate of return were 8%?

- 13.** Saroj & Co. is considering purchase of machine that will enable production to increase by 2.5% (40,000 units to 50,000 units). The machine costs Rs. 1 lakh and has a useful life of 10 years with a salvage value of 5%. The company is eligible for investment allowance of 25%. There will be increased requirement of working capital to the extent to Rs. 20,000. The following additional information is also furnished to you:

Variable cost (per unit) - Rs. 5  
 Fixed cost (per annum) - Rs. 1,00,000

The variable costs will remain the same, but the fixed cost will increase by the amount of depreciation on the new machine. The current selling price is Rs. 10 per unit, which may have to brought down by 50 paise in order to sell the entire production of 50,000 units. The company adopts straight line method of depreciation, tax rate is 50% and the minimum required rate of return is 15% P.V. factors at 15%.

- (i) Present value of an annuity of Rs. 1 at the end of 9 year = 4.772
- (ii) Present value of Rs. 1 receivable at the end of the 10 years = 0.247

Discuss if it would be advisable for the company to purchase the machine.

- 14.** Rama manufacturing company must choose between constructing a large or small factory to produce a new line of products. The large plant would be needed if the future brings a high demand for new products. But the large plant would have net cash inflows below the Rs. 20,00,000 outlays, if demand for the product is medium or low. The present value of cash inflows are Rs. 28,00,000 with high demand, Rs. 18,00,000 with medium demand and Rs. 12,00,000 with low demand. The smaller plant produce a lower return if demand is high but has positive net present value at medium demand for the products. It would cost Rs. 4,00,000 as a cash outlay and would return a present value inflow of Rs. 6,40,000 with high demand, Rs. 5,40,000 with medium demand and Rs. 3,60,000 with low demand. What is the net present value (NPV) of each alternative if there is 40% chance of high demand and 20% chance of low demand.
- 15.** A product is currently being manufactured on a machine that has a book value of Rs. 30,000. The machine was originally purchased for Rs. 60,000 ten years ago. The per unit cost of the product are: Direct labour Rs. 8.00; direct materials Rs. 10.00; variable overhead Rs. 5.00; fixed overhead Rs. 5.00; and total is Rs. 28.00. In the past year 6,000 units were produced and sold for Rs. 50.00 per unit. It is expected that the old machine can be used indefinitely in the future.

An equipment manufacturer has offered to accept the old machine at Rs. 20,000, a trade-in for a new version. The purchase price of new machine is Rs. 1,00,000. The projected per units cost associated with a new machine are:



Particulars	(Rs.)
Direct Labour	4
Direct Material	7
Variable Overhead	4
Fixed Overhead	7
<b>Total</b>	<b>22</b>

The management also expects that, if the new machine is purchased, the new working capital requirement of the company would be less by Rs. 10,000. The fixed overhead costs are allocation from other departments plus the depreciation of the equipment. The new machine has an expected life of ten year with no salvage value; the straight-line method of depreciation is employed by the company. It is also expected that the future demand of the product would remain at 6,000 units per year. Should the new equipment be acquired? Corporate tax is @ 50%.

Notes:

- (i) Present value of annuity of Rs. 1.00 at 10% rate of discount for the 9 year is 5.759.
- (ii) Present value of Rs. 1.00 at 10% rate of discount, received at the end of 10<sup>th</sup> year is 0.386.

16. Apollo Ltd. manufactures a special chemical for sale at Rs. 30 per kg. The variable cost of manufacture is Rs. 15 per kg. Fixed cost including depreciation is Rs. 2,50,000. Apollo Ltd. is currently operating at 50% capacity. It can produce a maximum of Rs. 1,00,000 kg. at full capacity.

The production manager suggests that if the existing machines are replaced, the company can achieve maximum capacity in the next 5 year gradually increasing the production by 10% a year.

The finance manager estimates that for each 10% increase in capacity, the additional increase in fixed cost will be Rs. 50,000. The existing machines with a current book value of Rs. 10, 00,000 and remaining useful life of 5 years can be disposed of for Rs. 5, 00,000. The vice-president (finance) is willing to replace the existing machines provided the NPV on replacement is Rs. 4, 53,000 at 15% cost of capital:

- a) You are required to compute the total value of machines necessary for replacement. For computations, you may assume the following:
  - (i) All the assets are in blocks. Depreciation will be on straight line basis and the same is allowed for tax purposes.
  - (ii) There will be no salvage for the new machines. The entire cost of the assets will be depreciated over a five-year period

- (iii) Tax rate is 46%
- (iv) Cash inflows will accrue at the end of the year.
- (v) Replacement outflow will be at the beginning of the year (year 0)

- b) On the basis of given above, the managing director feels that the replacement, if carried out, would at least yield a post-tax return of 15% in three year provided the capacity build up is 60%, 80% and 100% respectively. Do you agree? Give reasons.

Particulars	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Present value factor at 15%</b>	0.87	0.76	0.66	0.57	0.50
<b>Present value annuity factor at 15%</b>	0.87	1.63	2.29	2.86	3.36

- 17.** The management of Rohit Ltd. is considering the replacement of machine which has current written down value of Rs. 25,00,000 and a present sale value of Rs. 8,00,000. The machine is still usable for 5 year but will have no scrap value at the end of 5 year.

A new machine having a useful life of 5 years and scrap value of Rs. 1,00,00,000 at the end of this is available for Rs. 10,00,000. The installation of the new machine, it is estimated, would result in saving of Rs. 20,00,000 per annum in operating cost at the present level of production. The capacity of new machine is more than that of old, and since sales are no problem, utilization of additional capacity would bring in an additional contribution of Rs. 25,00,000 per annum (after meeting incremental costs of production and sale). The machine would be depreciated @ 25 per cent on written down basis.

The company has other assets in the block. Current income tax is 35 per cent. Considering the company's estimated cost of capital, it will not pay to purchase the new machine unless the net savings are 20% or more, on the added investment. Should the company replace the existing machine?

- 18.** Strong Enterprises Ltd. is a manufacturer of high-quality running shoes. Ms. Dazling, President, is considering computerizing the company's ordering, inventory and billing produces. She estimates that the annual savings from computerization include a reduction of ten clerical employees with annual salaries of Rs. 15,000 each Rs. 8,000 from reduced production delays caused by raw materials inventory problems, Rs. 12,000 from lost sale due to inventory stock outs and Rs. 3,000 associated with timely billing procedures. The purchase price of the system is Rs. 2, 00,000 and installation costs are Rs. 50,000. These outlays will be capitalized (depreciated) on a straight-line basis to a zero-book salvage value which is also its market value at the end of five years. Operation of the new system requires two computer specialists with annual salaries of Rs. 40,000 per person. Also, annual maintenance and operating cash expenses of Rs. 12,000 are

estimated to be required. The company's tax rate is 40% and its required rate of return (cost of capital) for this project is 12%.

You are required to –

- Find the project's initial net cash outlay.
- Find the projects after tax profit and cash flows over its 5-year life.
- Evaluate the project using Net present value (NPV) method.
- Evaluate the project using profitability index (PI) method.
- Calculate the project's payback period.
- If the project's cash flows and NPV [parts (a) through (c)] assuming that system can be sold for Rs. 25,000 at the end of five years even though the book salvage value will be zero.
- Find the projects cash flow and NPV [part (a) through (c)] assuming that the book salvage value of depreciation purposes is Rs. 20,000 even though the machine is worthless in term of its resale value

**NOTE:**

- Present value of annuity of Rs. 1 at 12% rate of discount for 5 years in 3.605
- Present value of Rs.1 at 12% rate of discount, received at the end of 5 years is 0.567

19. P. Ltd. has a machine having an additional life of 5 years, which cost Rs. 10, 00,000 and has a book value of Rs. 4, 00,000. A new machine costing Rs. 20, 00,000 is available. Though its capacity is the same as that of the old machine, it will mean a saving in variable cost to the extent of Rs. 7,00,000 per annum. The life of the machine will be 5 years at the end of which it will have a scrap value of Rs. 2, 00,000. The rate of income tax is 46% and P Ltd's policy is not to make an investment if the yield is less than 12% per annum. The old machine, if sold today, will realize Rs. 1, 00,000; it will have no salvage value if sold at the end of 5<sup>th</sup> year. Advise P Ltd. whether or not the old machine should be replaced. (present value of Rs. 1 receivable annually for 5 years at 12% = 3.605, present value of Rs. 1 receivable at the end of 5 years at 12% per annum = 0.567). Capital gain is tax free. Ignore income tax savings on depreciation as well as on loss due to sale of existing machine.

20. A firm has an investment proposal, requiring an outlay of Rs. 40,000. The investment proposal is expected to have 2 years economic life with no salvage value. In year-1, there is a 0.4 probability that cash flow after tax (CFAT) will be Rs. 25,000 and 0.6 probability that CFAT will be Rs. 30,000. The probabilities assigned to CFAT for the year-2 are as follows:

If CFAT = Rs. 25,000		If CFAT = Rs. 30,000	
Amount (Rs)	Probability	Amount (Rs)	Probability
12,000	0.2	20,000	0.4

16,000	0.3	25,000	0.5
22,000	0.5	30,000	0.1

The firm uses a 10% discount rate for this type of investment.

You are required to –

- i) Present the above information in the form of a decision tree.
- ii) Find out the NPV under (a) the worst outcome; and (b) under the best outcome
- iii) Find out the probability or otherwise of the above investment proposal.

21. A product is currently manufactured on a machine that is not fully depreciated for tax purposes and has book value of Rs. 80,000. It was purchased for Rs. 2,40,000 twenty years ago. The costs of the product are as follows:

Particulars	Unit Cost (Rs.)
Direct Labour	28
Indirect Labour	14
Other Variable Overhead	10.50
Fixed Overhead	17.50
<b>Total</b>	<b>70</b>

In the past year 10,000 units were produced. It is expected that with suitable repairs the old machine can be used indefinitely in future. The repairs are expected to average Rs. 75,000 per year.

An equipment manufacturer has offered to accept the old machine as trade-in for new equipment. The new machine would cost Rs. 5, 20,000 before allowing for Rs. 1, 00,000 for the old equipment. The projects costs associated with the new machine are follows:

Particulars	Unit Cost (Rs.)
Direct Labour	14
Indirect Labour	21
Other Variable Overhead	7

Fixed Overhead	22.75
<b>Total</b>	<b>64.75</b>

The fixed overhead costs are allocation for other departments plus the depreciation of the equipment.

The old machine can be sold now for Rs. 60,000 in the open market. The new machine has an expected life of 10 year and salvage value of Rs. 20,000 at that time. The current corporate income tax rate is assumed to be 50%. For tax purpose cost of the new machine and the block value of the old machine may be depreciated in 10 years. The minimum required rate is 10%. It is expected that the future demand of the product will stay at 10,000 units per year. The present value of an annuity of an annuity of Rs. 1 for 9 years @ 10% discount factor is = 5.759. The present value of Rs. 1 received at the end of 10<sup>th</sup> year @ 10% discount factor is = 0.386

Should the new equipment be purchased? (Assume no capital gain taxes).

22. Ash Enterprises Ltd. generated the following forecast in real terms for a capital budgeting project:

Particulars	Year-0 (Rs. in '000)	Year-1 (Rs. in '000)	Year- <sup>o</sup> (Rs. in '000)
Capital expenditure	1,210	-	-
Revenue	-	1,900	2,000
Cash expenses	-	950	1,000
Depreciation	-	605	605

Ash, the President estimates the inflation to be 10% per year over the next two years. In addition, Ash believes that the cash flows of the project should be discounted at the nominal rate of 15.50%.

Required (Apply tax rate of 30%) –

- Workout NPV based on normal cash flow technique.
- Workout NPV based on real cash flow technique.
- Alfa Ltd. is in the business of manufacturing bearings. Some more product lines are being planned to be added to the existing system. To manufacture the planned product lines, the firm needs a machine which if purchased outright will cost Rs. 10,00,000. Modern Hire-Purchase and Leasing Co. has offered two proposals as below:

**Proposal – I (Hire-Purchase)**

Rs. 2,50,000 will be payable on signing of the agreement. Three annual instalments of Rs. 4,00,000 will be payable at the end of each year starting from year first. The ownership of the machine will be transferred automatically at the end of third year. The company will be able to claim depreciation on straight line basis with zero salvage value.

**Proposal-II (Lease)**

Rs. 20,000 will be payable towards initial service fee upon signing of the agreement which is tax-deductible expense. Annual lease rental of Rs. 4,32,000 is payable at the end of each year starting from the first year for a period of three years.

Evaluate the above two proposals and advise the company as to which proposal implies lesser cost given that tax-rate is 35% and discount rate is 20%. (Calculations may be rounded off to Rupee).

- 23.** An iron ore company is considering investing in a new processing facility. The company extracts ore from an open pit mine. During a year, 1,00,000 tons of ore is extracted. If the output from the extraction process is sold immediately upon removal of dirt, rocks and other impurities, a price of Rs. 1,000 per ton of ore can be obtained. The company has estimated that its extraction costs amount to 70% of the net realizable value of the ore.

As an alternative to selling all the ore at Rs. 1,000 per ton, it is possible to process further 25% of the output. The additional cash cost of further processing would be Rs. 100 per ton. The processed ore would yield 80% final output and can be sold at Rs. 1,350 per ton.

For additional processing the company would have to install equipment's costing Rs. 100 lakhs. The equipment is expected to have a useful life of 5 years with no salvage value. The company follows the straight-line method of depreciation. Additional working capital requirement is estimated at Rs. 10 lakhs. The company's cut-off rate for such investments is 15%. Assume corporate tax rate 30% (including surcharge and education cess).

Should the company install the equipment for further processing of the iron ore?

- 24.** Electro fast Ltd. is a manufacturing organization. It is manufacturing electronic equipment's in which a Component – X is used which is purchased from a local supplier at a cost of Rs. 40 each. In order to bring down the cost and improve its competitiveness, the company has a proposal to install a machine for the manufacture of Component-X. it has the following two options:

**Option-1:** Installation of semi-automatic machine involving an annual fixed expense of Rs. 22 lakh and a variable cost of Rs. 18 per component manufactured.

**Option-2:** Installation of automatic machine involving an annual fixed cost of Rs. 40 lakh and a variable cost of Rs. 15 per component manufactured.

You are required to:

- (i) Find the annual requirement of Component –X to justify a switch over from purchase of components to manufacture of the same by installing (i) Semi-automatic machine; and (ii) automatic machine.
- (ii) If the annual requirements of the Component-X is 8,00,000 units, which machine would you advise the company to install?

**25.** EEC Ltd. is considering the purchase of a machine. Two machines LM and PM are available each costing Rs. 1,00,000. Both machines will last for five years with no residual value. In comparing the profitability of machines, a discount rate of 10% is to be used. Earnings after taxation @ 40% and charging depreciation on straight line are expected to be as follows:

Year	LM (Rs.)	PM (Rs.)
1.	10,000	(10,000) Loss
2.	20,000	10,000
3.	30,000	20,000
4.	10,000	40,000
5.	Nil	20,000

Indicate which machine would be a more profitable investment under the various methods of ranking investment proposals, viz. ARR, Pay Back, NPV and Profitability Index (PI).

**26.** Your company is considering to acquire an additional computer to supplement its time share computer services to its clients. It has two options:

- i) To purchase the computer for Rs. 22 lakhs.
- ii) To lease the computer for 3 years from a leasing company for Rs. 5 lakhs as annual lease rent plus 10% of gross time-share service revenue. The agreement also requires an additional payment of Rs. 6 lakhs at the end of the third year. Lease rents are payable at the year-end, and the computer reverts to the lessor after the contract period.

The company estimates that the computer under review will be worth Rs. 10 lakhs at the end of the third year. Forecast revenues are:

Year	1	2	3
Amount (Rs. In Lakhs)	22.5	25	27.5

Annual operating costs excluding depreciation / lease rent of computer are estimated at Rs. 9 lakhs with an additional Rs. 1 lakh for start-up and training costs at the beginning of the first year. These costs are to be borne by the lessee. Your company will borrow at 16% interest to finance the acquisition of the computer. Repayments are to be made according to the following schedule:

Year - end	1	2	3
Principal (Rs. 000)	500	850	850
Interest (Rs. 000)	352	272	136

The company uses straight line method (SLM) to depreciate its assets and pays 40% tax on its income. The management approaches the company secretary for advice. Which alternative would he recommend and why?

27. The FFM Ltd. is in the tax bracket of 35% and discounts its cash flows at 16%. In the acquisition of an asset worth Rs. 10,00,000, it is given two offers – either to acquire the asset by taking a bank loan @ 15% per annum repayable in five yearly instalments of Rs. 2,00,000 each plus interest or to lease-in the asset at yearly rentals of Rs. 3,24,000 for five years. In both cases, the instalment is payable at the end of the year. Applicable rate of depreciation is 15% using written down value (WDV) method.

You are required to suggest the better alternative.

NOTE: P.V. factor at 16% - Year 1: 0.862, Year 2: 0.743; Year 3: 0.641; Year 4: 0.552 and Year 5: 0.476.

28. (a) Project X involves an initial outlay of Rs. 16.2 million, its life span is expected to be three years. The cash streams generated by it are expected to be as follows:

Year	1	2	3
Cashflow (Rs. In Millions)	8	7	6

You are required to calculate the internal rate of return (IRR)



(b) The initial outlay of the project is Rs. 1,00,000 and it generates cash inflow of Rs. 50,000, Rs. 40,000, Rs. 30,000 and Rs. 20,000 in the four years of its life span.

You are required to calculate:

- i) net present value (NPV),
- ii) profitability index (PI); and
- iii) Pay-back period of the project assuming 10% rate of discount.

NOTE : Present value of Rs. 1 due at the end of n periods at d rates:

Year/Rate	5%	10%	15%	20%
1	0.9524	0.9091	0.8696	0.8333
2	0.9070	0.8264	0.7561	0.6944
3	0.8638	0.7513	0.6575	0.5787
4	0.8227	0.6830	0.5718	0.4823
5	0.7835	0.6209	0.4972	0.4019

29. JKG ELECTRONICS is considering a proposal to replace one of its machines. In this connection, the following information is available:

The existing machine was bought 3 years ago for Rs.10 lakhs. It was depreciated at 25% p.a. on reducing balance basis. It has remaining life of 5 years, but its maintenance cost is expected to increase by Rs. 50,000 p.a. from 6 year of its installation. Its present realizable value is Rs.6 lakhs.

The new machine costs Rs. 15 lakhs and is subject to the same rate of depreciation. On sale after 5 years. It is expected to net Rs.9 lakhs with the new machine, operating costs excluding depreciation) are expected to decrease by Rs. 1.5 lakh p.a.

In addition, the speed of the new machine would increase productivity on account of which net revenues would increase by Rs. 1.5 lakhs p.a.

The tax rate applicable is 35% and the cost of capital 10% The present value factors at 10% rate of discount for years 1 to 5 are respectively 0.909, 0.826, 0.751, 0.683 and 0.620.

Is the proposal financially viable? Please advise the firm on the basis of Net Present Value of the proposal.

- 30.** A company is presently using a crane for a major irrigation project. This crane was brought 2 years ago for Rs. 10 lakhs and has been depreciated at the rate of 20% pa. as per WDV method. The company requires such a crane for 3 more years. An improved version of this crane is available now for Rs 42.50 lakhs. Determine the cash flows associated with the replacement of the existing crane by the improved crane, given the following:
- The salvage value of the existing crane is equal to its book value
  - The improved crane can be sold after 3 years for Rs. 12 lakhs. The existing crane, if used for 3 years will have nil salvage value.
  - The annual savings in operating expenses with improved crane will be Rs.3 lakhs.
  - The depreciation rate for improved crane is  $33\frac{1}{3}\%$  p.a. per WDV method
  - The effective tax rate replaces the old crane? Assume cost of capital = 10%. Ignore capital given tax.



- Since dividend decision relates to the amount and timing of any cash payments made to the company's stakeholders, the decision is an important one for the firm as it may *influence its capital structure and stock price.*

## DIVIDEND POLICY AND VALUE OF THE FIRM

**Meaning:** *Dividend policy is basically concerned with deciding whether to pay dividend in cash now, or to pay increased dividends at a later stage or distribution of profits in the form of bonus shares.* The current dividend provides liquidity to the investors, but the bonus share will bring capital gains to the shareholders. Different models have been proposed to evaluate the dividend policy decision in relation to value of the firm. While agreement is not found among the models as to the precise relationship, it is still worthwhile to examine some of these models to gain insight into the effect which the dividend policy might have on the market price of the share and hence on the wealth of the shareholders. Two schools of thoughts have emerged on the relationship between the dividend policy and value of the firm.

One school associated with *Walter, Gordon, etc., holds that the future capital gains (expected to result from lower current dividend pay-out) are riskier and the investors have preference for current dividends.* The investors do have a tilt towards those firms which pay regular dividend. So, the dividend payment affects the market value of the share and as a result the dividend policy is relevant for the overall value of the firm.

On the other hand, the other school of thought associated with *Modigliani and Miller holds that the investors are basically indifferent between current cash dividends and future capital gains.* Both these schools of thought on the relationship between dividend policy and value of the firm have been discussed as follows.

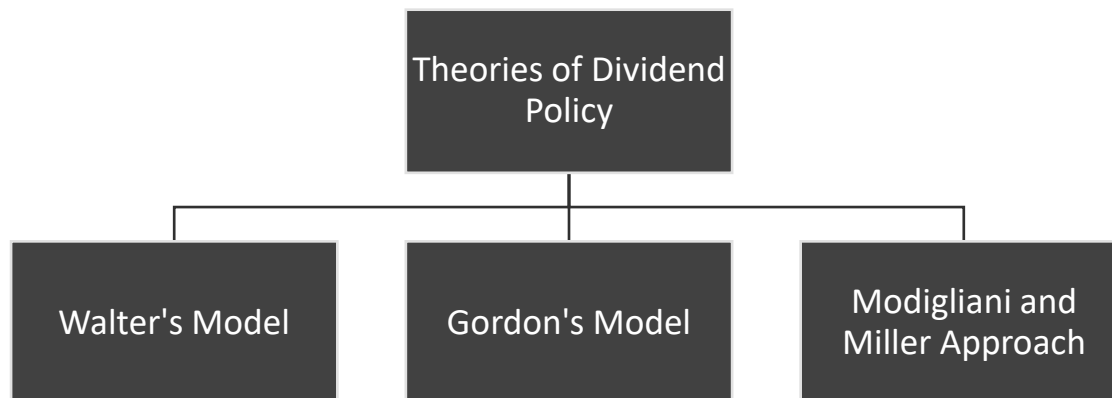
**Definition:** *Firm's dividend policy divides net earnings into retained earnings and dividends.* Retained earnings provide necessary funds to finance long term growth while dividends are paid in cash generally. Dividend policy of the firm is governed by

**i) Long Term Financing Decision:** When dividend decision is treated as a financing decision, net earnings are viewed as a source of long-term financing. *When the firm does not have profitable investment opportunities, dividend will be paid. Payment of cash dividend reduces the amount of funds necessary to finance profitable investment opportunities thereby restricting it to find other avenues of finance.* Thus, earnings may be retained as part of long-term financing decision while dividends paid are distribution of earnings that cannot be profitably re-invested.

**ii) Wealth Maximization Decision:** *Because of market imperfections and uncertainty, shareholders give higher value to near dividends than future dividends and capital gains. Payment of dividends influences*

*the market price of the share. Higher dividends increase value of shares and low dividends decrease it.* Thus, management should develop a dividend policy which divides net earnings into dividends and retained earnings in an optimum way so as to achieve the objective of wealth maximization for shareholders.

## THEORIES OF DIVIDEND POLICY



### 1) WALTER'S MODEL:

**Meaning:** The formula given by Prof. James E. Walter shows *how dividend can be used to maximise the wealth position of equity holders.* In the long run, *share prices reflect only the present value of expected dividends.* It can predict different possible market prices in different situations and considers internal rate of return, market capitalization rate and dividend payout ratio in the determination of market value of shares.

Professor Walter emphasizes *two factors which influence the market price of a share.* The first is the *dividend per share* and the second is the relationship between internal return on retained earnings and the market expectation from that company as reflected in the *capitalisation rate.* *If the internal return of retained earnings is higher than market capitalisation rate, the value of ordinary shares would be high even if dividends are low.* However, if the internal return within the business is lower than what the market expects, the value of the share would be low. In such a case, shareholders would prefer a higher dividend so that they can utilize the funds so obtained elsewhere in more profitable opportunities.

Retention of profits depends upon whether it is cheaper and more profitable for shareholders of the company to have corporate earnings retained in the business or get the same in the form of cash dividend. This involves a comparison between the cost of retained earnings and the cost of distributing them. The cost of retained earnings, therefore, involves an opportunity cost, i.e., the benefits which shareholders forego in terms of leaving the funds in the business.

### **Walter's Model Assumption:**

- 1) All investment proposals of the firm are to be financed through retained earnings only and no external finance is available to the firm.
- 2) The business-risk complexion of the firm remains same even after fresh investment decisions are taken. In other words, the rate of return on investment i.e., 'r' and the cost of capital of the firm i.e.,  $k_e$ , are constant.
- 3) The firm has an infinite life.

This model considers that the investment decision and dividend decision of a firm are inter-related. A firm should or should not pay dividends depends upon whether it has got the suitable investment opportunities to invest the retained earnings or not.

**Thus, a firm can maximize the market value of its share and the value of the firm by adopting policy as follows:**

- i) If  $r > k_e$ , the pay-out ratio should be zero (i.e., retention of 100% profit).
- ii) If  $r < k_e$ , the pay-out ratio should be 100% and the firm should not retain any profit.
- iii) If  $r = k_e$ , the dividend is irrelevant, and the dividend policy is not expected to affect the market value of the share.

In order to testify the above. Walter has suggested a mathematical valuation model i.e.

**Market price of Equity share :**

$$P_0 = \frac{D + \frac{R}{K_e}(E - D)}{K_e}$$

Where,

$P_0$  = Market price of Equity share.

$D$  = Dividend per share paid by the Firm.

$R$  = Rate of return on investment of the Firm.

$K_e$  = Cost of Equity share capital

$E$  = Earnings per share of the Firm.

*Thus, the Walter's formula shows that the market value of a share is the present value of the expected stream of dividends and capital gains.*

### **Walter's Model Limitations:**

The limitation of this model is that these underlying assumptions are unrealistic. The financing of investment proposals only by retained earnings and no external financing is seldom found in real life. The assumption of constant 'r' and constant 'k' is also unrealistic and does not hold good. As more and more investment is made, the risk complexion of the firm will change and consequently the  $k_e$  may not remain constant.

## **2) GORDON'S MODEL:**

**Meaning:** Myron Gordon has also proposed a model suggesting that the dividend policy is relevant and can affect the value of the share and that of the firm. In this model, *the current ex-dividend at the amount which shareholders expected date of return exceeds the constant growth rate of dividends.*

### **Gordon's Model Assumption:**

This model is also based on the assumptions similar to that made in Walter's model. However, two additional assumptions made by this model:

- 1) The firm is an all equity firm, and it has no debt.
- 2) No external financing is used, and investment programs are financed exclusively by retained earnings.
- 3) The internal rate of return,  $r$ , of the firm is constant.
- 4) The appropriate discount rate,  $k_e$ , for the firm remains constant.
- 5) The firm has perpetual life.

- 6) The retention ratio,  $b$ , once decided upon, is constant. Thus, the growth rate,  $g = br$ , is also constant.
- 7) The discount rate is greater than the growth rate,  $k_e > br$ .

**Explanation:** Gordon argues that the investor does have a preference for current dividends and there is a direct relationship between the dividend policy and the market value of the share. He has built the model on the basic premise that the investors are basically risk averse and they evaluate the future dividends/capital gains a risky and uncertain proposition. Dividends are more predictable than capital gains. Management can control dividends, but it cannot dictate the market price of the share. Investors are certain of receiving incomes from dividends than from future capital gains. So, the “bird-in-the-hand” argument of this model suggests that the dividend policy is relevant as the investors prefer current dividends as against the future uncertain capital gains. When the investors are certain about their returns, they discount the firm’s earnings at a lower rate and therefore, placing a higher value for the share and that of the firm. So, the investors require a higher rate of return as retention rate increases and this would adversely affect the share price. Thus, Gordon’s model is a share valuation model. Under this model, the market price of a share can be calculated as follows:

**Market price of Equity share:**

$$P_0 = \frac{E(1 - b)}{K_e - g}$$

Where,

$P_0$  = Market price of Equity share.

$E$  = Earnings per share of the Firm.

$B$  = Retention Ration (1 – Payout ratio),

$R$  = Rate of return on Investment of the Firm.

$K_e$  = Cost of Equity share capital, and

$Br = g$  i.e., Growth rate of the firm.

This model shows that there is a relationship between pay-out ratio (i.e.,  $1 - b$ ), cost of capital  $K_e$ , rate of return  $r$ , and the market value of the share.



### 3) MODIGLIANI AND MILLER APPROACH:

**Meaning:** The irrelevance of dividend policy for valuation of the firm has been most comprehensively presented by Modigliani and Miller (MM). They have argued that the market price of a share is affected by the earnings of the firm and is not influenced by the pattern of income distribution. The dividend policy is immaterial and is of no consequence to the value of the firm.

**MM Approach Assumptions:** MM approach to irrelevance of dividend is based on the following assumptions:

- 1) The capital markets are perfect, and the investors behave rationally.
- 2) All information is freely available to all the investors.
- 3) There is no transaction cost and no time lag.
- 4) Securities are divisible and can be split into any fraction.
- 5) There are no taxes and no flotation cost.
- 6) The firm has a defined investment policy and the future profits are known with certainty. The implication is that the investment decisions are unaffected by the dividend decision and operating cash flows are same no matter which dividend policy is adopted.

**The Model:** Under the assumptions stated above, MM argue that neither the firm paying dividends nor the shareholders receiving the dividends will be adversely affected by firms paying either too little or too much dividends. They have used the arbitrage process to show that the division of profits between dividends and retained earnings is irrelevant from the point of view of the shareholders. They have shown that given the investment opportunities, a firm will finance these either by ploughing back profits or if pays dividends, then will raise an equal amount of new share capital externally by selling new shares. The amount of dividends paid to existing shareholders will be replaced by new share capital raised externally. The benefit of increase in market value as a result of dividend payment will be offset completely by the decrease in terminal value of the share. The shareholders therefore, would be indifferent between the dividend payments or retaining the profits.

**Market price of Equity share:**

$$P_1 = P_0 (1 + K_e) - D$$

Where,

$P_0$  = Market price of Equity share today/now.

$D$  = Dividend per share

$P_1$  = Market price of Equity share at end of year 1

$K_e$  = Cost of Equity share capital

## IRRELEVANCE OF DIVIDEND POLICY

The underlying intuition for the dividend irrelevance proposition is simple. Firms that pay more dividends offer less price appreciation but provide the same total return to shareholders, given the risk characteristics of the firm. The investors should be indifferent of receiving their returns in the form of current dividends or in the form of increase in the market price of the share. The dividends irrelevance argument is based on two pre-conditions:

- 1) That investment and financing decisions have already been made and that these decisions will not be altered by the amount of dividends payment, and
- 2) That the perfect capital market is there in which an investor can buy and sell the shares without any transaction cost and that the companies can issue shares without any flotation cost.

## RESIDUALS THEORY OF DIVIDENDS

A firm does not decide as to how much dividends be paid rather it decides as to how much profits should be retained. The profits not required to be retained may be distributed as dividends. Therefore, dividend decision is a passive decision. *The dividends are a distribution of residual profits after retaining sufficient profit for financing the available opportunities.* Under the Residuals Theory, the firm would treat the dividend decision in three steps:

- 1) *Determining the level of capital expenditures* which is determined by the investment opportunities.
- 2) Using the *optimal financing mix*, find out the amount of equity financing needed to support the capital expenditure in step (i) above.
- 3) As the cost of retained earnings,  $k_r$  is less than the cost of new equity capital, the retained earnings would be used to meet the equity portions financing in step (ii) above. If the available profits are more than this need, then the surplus may be distributed as dividends to shareholders. As far as the required equity financing is in excess of the amount of profits available, no dividends would be paid to the shareholders.

## DETERMINANTS OF DIVIDEND POLICY

In the company organization, dividend policy is determined by the Board of directors having taken into consideration a number of factors which include legal restrictions imposed by the Government to safeguard the interests of various parties or the constituents of the company.

The main considerations are as follows:

- 1) Legal:** Under Section 205(1) of the Companies Act 1956, dividend is to be paid out of current profits or past profits after depreciation. The Central Government can allow a company to pay dividend for any financial year out of profits of the company without providing for depreciation if it is in the public interest. Dividend is to be paid in cash, but a company is allowed to capitalize profits or reserves (retained earnings) for issuing fully paid bonus shares.
- 2) Financial needs of the company:** Retained earnings can be a source of finance for creating profitable investment opportunities. When internal rate of return of a company is greater than return required by shareholders, it would be advantageous for the shareholders to re-invest their earnings. There are financial constraints to Dividend Policy. A firm can pay dividend only to the extent that it has cash to disburse.
- 3) Economic Constraints:** Besides, there are economic constraints also. The question arise, does the value of dividend affects the value of the firm. If the answer to it is yes then there must be some optimum level of dividend, which maximizes the market price of the firm's stock.
- 4) Nature of Business Conducted by a Company:** A company having a business of the nature which gives regular earnings may like to have a stable and consistent dividend policy.
- 5) Existence of the Company:** The length of existence of the company affects dividend policy.
- 6) Type of Company Organization:** The type of company organization whether a private limited company or a public limited company affects dividend decisions.
- 7) Market Conditions:** Business cycles, boom and depression, affects dividend decisions. In a depressed market, higher dividend declarations are used to market securities for creating a better image of the company.
- 8) Financial Arrangement:** In case of financial arrangements being entered into or being planned like merger or amalgamation with another company, liberal policy of dividend distribution is followed to make the share stock more attractive.

**9) Change in Government Policies:** Changes in Government Policies particularly those affecting earnings of the company are also taken into consideration in setting dividend decision.

## STABILITY OF DIVIDENDS

Another important dimension of a dividend policy is the stability of dividends that is how stable, regular or steady should the dividends stream be over time? It is generally said that the shareholders favour stable dividends and those dividends which have prospects of steady upward growth. If a firm develops such a pattern of paying stable and steady dividends, then the investors / shareholders may be willing to pay a higher price for the shares.

**1) Constant Dividend Pay-out Ratio:** *Irrespective of the fluctuation in earnings, companies may follow the policy of paying a fixed amount per share as dividend every year.* If the company reaches new level of earnings and expects to maintain it, the annual dividend per share may be increased. A firm may have a policy of distributing a fixed percentage of earnings as dividends to its shareholders. The higher profits will result in higher absolute dividends while lower earnings will result in lower absolute amount of dividends.

**Example-** A firm having a DP ratio of 60% will distribute ₹ 6,00,000 as dividends if the profits are ₹ 10,00,000; and it will distribute ₹ 2,40,000 only if the profits are ₹ 4,00,000, and so on.

**2) Steady Dividend Per Share:** Some firms may prefer to pay a *steady and fixed dividend per share to the shareholders irrespective of the earnings.* Under this policy, the firm pays a fixed amount per share as dividends to its shareholders.

**3) Steady Dividends plus Extra:** A firm may also adopt a policy of *paying steady dividends together with paying some extra whenever supported by the earnings of the firms.* The extra dividend may be considered as a bonus paid to the shareholders as a result of a usually good year for the firm.

## Advantages of Stability of Dividends:

- a) Many individual investors are not interested in future capital gains, rather they *want a regular dividend income from the firms.*
- b) Dividend in itself is an implied source of information about the present and expected profitability of the firm. *The firm can convey lot of information about the prospects of the firm in the form of dividend announcement.*

- c) Stable dividend policy also helps a firm in establishing itself in the capital market and raising required funds externally. *Both the institutional and the individual investors prefer investing funds in firm which has or is expected to have a stable dividend policy.*

#### **A stable dividend policy helps in**

- i) stabilizing the market value of the share,
- ii) maintaining the firm's credit rating,
- iii) Creating the confidence of investors/shareholders in the firm. All these things tend not only to enlarge the number of potential investors but *also enhance the shareholders loyalty to the firm and reduces the management's need for concern over the control of the firm.*

### **CONSEQUENCES OF LOW PAY OUT**

If a firm pay much less than what is available as cash profits, it may give rise to following consequences:

- 1) When a firm pays out less than it can afford, *it accumulates cash.*
- 2) As the cash accumulates, the financial manager may be tempted to take on projects that do not meet the minimum rate of return requirements. These actions will clearly *lower the value of the firm.*
- 3) Another possibility is that the management may decide to use the cash to finance *an acquisition which may result in the transfer of wealth of shareholders to the shareholders of the acquired firm.*

### **CONSEQUENCES OF HIGH PAY OUT**

If a firm pays more than what is available as cash profits, it may give rise to different consequences as follows:

- 1) It is creating a *cash deficit* which has to be funded by drawing on the firm's own cash balance or borrowing money or issuing securities.
- 2) The cash that is paid out as dividends could have been used to invest in some of the good projects, leading to much higher return and much higher value to the shareholders. *The cash the firm is paying out as dividend would earn better returns if it is left to accumulate and invested in the firm.*

## Summary of Dividend Policy

1) **Dividend Policy-** The term 'dividend' refers to that portion of profit (after tax) which is distributed among the owners/shareholders of the firm. Dividend decision relates to the amount and timing of any cash payments made to the company's stakeholders. The decision is an important one for the firm as it may influence its capital structure and stock price. In addition, the decision may determine the amount of taxation that shareholders have to pay.

### 2) Theories on Dividend Policies

a) **Walter Approach:** This approach shows how dividend can be used to maximize the share price. The relationship between dividend and share price on the basis of Walter's formula is shown below:

$$P_0 = \frac{D + \frac{R}{K_e}(E - D)}{K_e}$$

Where,

$P_0$  = Market price of Equity share.

D = Dividend per share paid by the Firm.

R = Rate of return on investment of the Firm.

$K_e$  = Cost of Equity share capital

E = Earnings per share of the Firm.

**Explanation:** The formula explains why market prices of shares of growth companies are high even though the dividend paid out is low. It also explains why the market price of shares of certain companies which pay higher dividends and retain very low profits is also high.

b) **Gordon Growth Model:** This model explicitly relates the market value of the firm to dividend policy.

$$P_0 = \frac{E(1 - b)}{K_e - g}$$

Where,

$P_0$  = Market price of Equity share.

E = Earnings per share of the Firm.

B = Retention Ratio (1 – Pay-out ratio),

R = Rate of return on Investment of the Firm.

Ke = Cost of Equity share capital, and

Br = g i.e., Growth rate of the firm

**Explanation:** The formula given by Gordon shows where the rate of return is greater than the discount rate (Ke), the share price increases and vice-versa. In case the both are equal; the price remains unchanged.

**c) Modigliani and Miller (MM) Approach:** Modigliani and Miller Hypothesis is in support of the irrelevance of dividends means firm's dividend policy has no effect on value of shares.

$$P_1 = P_0 (1 + Ke) - D$$

Where,

Po = Market price of Equity share today/now.

D = Dividend per share

P<sub>1</sub> = Market price of Equity share at end of year 1

Ke = Cost of Equity share capital

**Explanation:** Due to reduction in the price of a share when it goes 'ex-dividend', the value of a shareholder's wealth is always the same irrespective of the amount of dividend declared. A shareholder can always sell his portion of equity to realize the dividend income.

### 3) Determinants of Dividend Policy

- i) Legal
- ii) Financial needs of the company
- iii) Economic Constraints
- iv) Nature of Business Conducted by a Company
- v) Existence of the Company
- vi) Type of Company Organization
- vii) Market Conditions
- viii) Financial Arrangement
- ix) Change in Government Policies

### 4) Stability of Dividend

- a) Constant Dividend Pay-out Ratio
- b) Steady Dividend Per Share

c) Steady Dividends plus Extra

# PRACTICAL QUESTIONS





- 1) The earnings per share of a company are ₹ 8 and the rate of capitalization applicable to the company is 10%. The company has before it an option of adopting a pay-out ratio of 25% or 50% or 75%. Using Walter's formula of dividend payment.

Compute the market value of the company's shares if the productivity of retained earnings is:

- i. 15%
- ii. 10%
- iii. 5%

Explain fully what inference can be drawn from the above exercise.

- 2) A Ltd. which earns ₹ 5 per share, is capitalized at 10% and has a return on investment of 12%. Using Walter's dividend policy model, determine
- i. the optimum pay-out,
  - ii. the price of share at this pay-out.

- 3) Following are the details regarding three companies:

A Ltd.	B Ltd.	C Ltd.
$r = 15\%$	$r = 15\%$	$r = 8\%$
$K = 10\%$	$K = 10\%$	$K = 10\%$
$E = ₹ 10$	$E = ₹ 10$	$E = ₹ 10$

You are required to calculate the effect of dividend payment on the value of shares of each of the above companies under the following different situations:

- 1) When no dividend is paid
- 2) When dividend is paid at ₹ 4 per share

- 3) When dividend is paid at ₹ 8 per share
- 4) When Dividend is paid at ₹ 10 per share

Use Walter's Model.

- 4) From the following information, determine the theoretical market value of equity shares as per walter's model.

Earnings - ₹ 15,00,000;

Dividends paid = ₹ 5,00,000;

No. of shares outstanding = 1,00,000;

Price earning ratio = 10;

Rate of return on investment = 12%

Are you satisfied with current dividend policy of the firm? What should be optimal Dividend pay-out ratio.

- 5) The following figures are collected from the annual report of XYZ Ltd.

Particulars	
Net Profit	₹ 30 lakhs
Outstanding 12% preference Shares	₹ 100 lakhs
No. of equity shares	₹ 3 lakhs
Return on investment	20%

What should be the approximate dividend pay-out ratio so as to keep the share price at ₹ 42 by using Walter model?

- 6) From the given details regarding three companies, you are required to:
- i. Calculate the value of an equity share of each of these companies when dividend pay-out ratio is
    - (a) 20%
    - (b) 50%
    - (c) 0%
    - (d) 100%
  - ii. Comment on the result drawn

A Ltd	B Ltd	C Ltd
R = 15%	R = 10%	R = 8%
$K_e = 10\%$	$K_e = 10\%$	$K_e = 10\%$
E = ₹ 10	E = ₹ 10	E = ₹ 10

7) Bajaj Auto Ltd. has outstanding 1,20,000 shares selling at ₹ 20 per share. The company hopes to make a net income of ₹ 3,50,000 during the year ending on March 2003. The company is thinking of paying a dividend of ₹ 2 per share at the end of current year. The capitalization rate of risk class of this firm has been estimated to be 15%. Assuming no taxes, answer question listed below on the basis of the Modigliani dividend Valuation Model:

A) What will be the price of share at the end of March 31<sup>st</sup>, 2003?

- i) If the dividend is paid and
- ii) If the dividend is not paid.

B) How many new shares must the company issue if the dividend is paid and company needs ₹ 7,40,000 for an approved investment expenditure during the year.

8) From the given information for Alpha & Company you are required to:

- i) Find out whether the firm dividend pay-out ratio is optimal according to Walters formula. The firm was starting a year before with equity capital of ₹ 40 lakhs

Particulars	
Earning of Firm	₹ 4,00,000
Dividend Paid	₹ 3,20,000
Price Earning Ratio	12.5
Number of Share Earning	40,000 @ ₹ 100 each

- ii) Will the change its dividend policy if P/E ratio is 8 instead of 12.5?

- 9) Consider a common stock whose dividend are expected to grow at a 25 percent rate for 2 years, after which the growth rate is expected to fall to 5 percent. The dividend paid last period was ₹ 2. The investor desires a 12 per cent return. You are required to find the value of this stock.
- 10) Harish Engineering company has a cost of equity capital 15%. The current market value of the firm is ₹ 60,00,000 @ ₹ 30 per share.

Assume value for:

I (new investment) ₹ 18,00,000,

E (earning) ₹ 10,00,000 and

Total dividends (D) ₹ 6,00,000.

You are required to show that under the MM assumptions the payment of dividend does not affect the value of the firm

- 11) The share of XYZ is presently at ₹ 50 and the company is currently paying dividend of ₹ 4 per share with a growth rate expected at 8 per cent per annum. It plans to raise fresh equity share capital. The merchant banker has suggested that an under price of Rupee 1 is necessary, in pricing the new issue besides involving a cost of 50 paise per share on miscellaneous expenses. You are required to find out the cost of existing equity shares as well as the new equity given that the dividend rate and growth rate are not expected to change.
- 12) Best buy Auto Ltd has outstanding 1,20,000 shares selling at ₹ 20 per share. The company hopes to make a net income of ₹ 3,50,000 during the year ended 31<sup>st</sup> March 2003. The company is considering to pay a dividend of ₹ 2 per share at the end of the current year. The capitalization rate for risk class of this company has been estimated to be 15%.

Assuming no taxes, answer the questions below based on MM model.

i) What will be the price of a share at the end of 31<sup>st</sup> March 2003?

a) if dividend is paid

b) If dividend is not paid

ii) How many new shares must the company issue if the dividend is paid and company needs ₹ 7,40,000 for an approved investment expenditure during the year?

- 13) The earning per share of a company is ₹ 10. It has an internal rate of return of 15 percent and the capitalization rate of risk class is 12.5 percent. If Walter's model is used

- i) What should be the optimum pay-out ratio of the firm?
- ii) What should be the price of shares at this pay-out?
- iii) How shall the price of share be affected if different pay-out were employed?

- 14) A large sized chemical company has been expected to grow at 14% per year for the next 4 years and then to grow indefinitely at the rate of 5%. The required rate of return on the equity shares is 12%. Assume that the company paid a dividend of ₹ 2 per share last year. Determine market price of the shares today.
- 15) A closely-held toys manufacturing company has been following a dividend policy, which can maximize the market value of the company as per Walter's Model. Accordingly, each year at dividend time, the capital budget is reviewed in conjunction with the earning for the period and alternative investment opportunities for the shareholder in the current year, the company report Net such profits of ₹ 10,00,000. It is estimated that the company can earn ₹ 2,50,000 if that will yield them 12%. The company has 1,00,000 shares outstanding. What would be the dividend pay-out ratio of the company, if it wishes to maximize the wealth of the shareholders?
- 16) D Ltd has 10 lakhs equity shares outstanding at the beginning of the accounting year 1997. The current market price of the share is ₹ 150. The BOD has recommended ₹ 8 per share as dividend. The rate of capitalization, appropriate to the risk class to which belongs is 12%.
- a) Based on M-M approach, calculate the market price of the share of the company when the recommended dividend is – (i) declared; (ii) not declared.
  - b) How many new shares are to be issued by the company at the end of the accounting year on the assumption that the net income for the year is ₹ 2 Crores and the investment budget is ₹ 4 Crores when (i) the above dividends are distributed; and (b) dividends are not declared
  - c) Show that the market value of the shares at the end of the accounting year will remain the same whether dividends are declared or not.
- 17) RST Ltd has a capital of ₹ 10,00,000 in equity shares of ₹ 100 each. The shares are currently quoted at par. The company proposes declaration of a dividend of ₹ 10 per share. The capitalization rate for the risk class to which the company belongs is 12%. What will be the market price of the share at the end of the year, if
- (a) no dividend is declared; and
  - (b) 10% dividend is declared?

Assuming that the company pays the dividend and has net profits of ₹ 5,00,000 and makes new investments of ₹ 10,00,000 during the period, how many new shares must be issued? Use the MM Model.

18) ABC Ltd was started a year back with a paid-up equity capital of ₹ 40,00,000. The other details are as under:

Particulars	
Earning of company	₹ 4,00,000
Dividend Paid	₹ 3,20,000
Price Earning Ratio	12.5
Number of Share Earning	40,000

You are required to find out whether the dividend pay-out ratio is optimal, using Walter's formula.

19) The EPS of a company is ₹ 16. The market capitalization rate applicable to the company is 12.5%. Retained earnings can be employed to yield a return of 10%. The company is considering a pay-out of 25%, 50% and 75%. Which of these, if any, would maximize the wealth of shareholders as per the Walter's model?

20) Exponent Ltd has 50,000 equity shares of ₹ 10 each outstanding on 1<sup>st</sup> April. The shares are being quoted at par in the market. The company intends to pay a dividend of ₹ 2 per share for the current financial year. It belongs to a risk class whose appropriate capitalization rate is 15%. Using MM model and assuming no taxes.

Ascertain the price of company's share as it is likely to prevail at the end of the year when

- (i) Dividend is declared
- (ii) No dividend is declared.

Also find out the number of new equity shares that the company must issue to meet its investment needs of ₹ 2,00,000 assuming net income of ₹ 1,10,000 and assuming that dividend is paid.

21) The required rate of return of investors is 15%. ABC Ltd declared and paid annual dividend of ₹ 4 per share. It is expected to grow @ 20% for the next 2 years and 10% thereafter. Compute the price at which the shares should sell.

22) The EPS of a company is ₹ 10. It has an internal rate of return of 15% and the capitalization rate of its risk class is 12.5%. If Walter's model is used:

- (i) What should be the optimum pay out of the company?
- (ii) What would be the price of the share at this pay-out?
- (iii) How shall the price of the share be affected, if a different pay-out were employed?

23) Following information is available in respect of DPS and EPS of Intelligent Ltd for the last 5 years:

Year	2004	2003	2002	2001	2000
EPS	14.1	13.60	13.1	12.70	12.2
DPS	8.2	8.1	7.9	7.8	7.7

Dividends for a particular year are paid in the same calendar year. If the same dividend policy is maintained, it is expected that the annual growth rate of earnings will no better than the average of last 4 years. The risk-free rate is 6 % and market risk premium is 4%. With reference to the market rate of return, the equity share of the company has a Beta of 1.5 and is not expected to change in the near future.

The company has received a proposal from Smart Ltd to acquire its operations paying the value of shares.

You are required to value the equity shares of the company using

- (i) Dividend growth model
- (ii) Earning growth model
- (iii) CAPM model

24) A closely held toys manufacturing company has been following a dividend policy, which can maximize the market value of the company as per Walter's model. Accordingly, each year at dividend time, the capital budget is reviewed in conjunction with the earnings for the period and alternative investment opportunities for the shareholders. In the current year, the company reports net profits of ₹ 10,00,000. It is estimated that the company can earn ₹ 2,50,000 if such profits are retained. The investors have alternative investment opportunities that will yield them 12%. The company has 1,00,000 shares outstanding. What would be the dividend pay-out ratio of the company, if it wishes to maximize the wealth of the shareholders?

25) From the following information, ascertain whether the firm is following an optimal dividend policy as per Walter's model:

Particulars	
Total Earning	₹ 6,00,000
No. of Equity shares of ₹ 100 each	40,000
Dividend Paid	₹ 1,60,000

Price Earning Ratio	10
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The firm is expected to maintain its rate of return on fresh investment. What should be the PE ratio at which dividend policy will have no effect on the value of the share? Will your decision change if the PE is 5 instead of 10?

26) The following financial data relates to XYZ Ltd:

Year	EPS	DPS	Share price
2004	42	17	252
2005	46	18	184
2006	51	20	255
2007	55	22	275
2008	62	25	372

A firm of market analysts which specializes in the industry has re-evaluated the company's future prospects. It is estimated that earnings and dividend will grow at 25% for the next 3 years. Thereafter, earnings are likely to increase at a lower rate of 10%. If this reduction in earnings growth occurs, the analysts consider that the dividend pay-out ratio will be increased to 50%.

XYZ Ltd is all equity financed and has 10 lakh ordinary shares in issue. The tax rate of 33% is not expected to change in the foreseeable future. Calculate the estimated share price; and the PE ratio by using dividend valuation model. For this purpose, you can assume a constant post tax capital of 18%.

27) Rosa Ltd has outstanding 1,20,000 shares selling at ₹ 20 per share. The company hopes to make a net income of ₹ 3,50,000 during the year ending 31<sup>st</sup> March 2009. The company is thinking of paying a dividend of ₹ 2 per share at the end of the current year. The capitalization rate for risk class of this firm has been estimated to be 15%. Assuming no taxes, answer the following based on MM model:

- i) What will be the price of share at the end of 31<sup>st</sup> March 2009 if?
  - a) Dividend is paid
  - b) Dividend is not paid
- ii) How many new shares the company must issue if the dividend is paid and company needs ₹ 9,50,000 for an approved investment expenditure during the year?



28) From the following information, determine the market value of equity shares of the company:

Particulars	
Earning of company	₹ 5,00,000
Dividend Paid	₹ 3,00,000
Price Earning Ratio	8
Number of Shared Outstanding	1,00,000
ROI	15%

Are you satisfied with the current dividend policy of the company? If not, what should be the optimal dividend payment ratio? Use Walter model.

29) Following details are available to you for two companies, beauty Ltd. And Pretty Ltd:

	Beauty Ltd.	Pretty Ltd.
Internal rate of return (%)	15	10
Capitalization rate (%)	15	10
Earnings per share (₹)	12	10
Cash dividend per share (₹)	5	2

Calculate the value of an equity share for the companies. **June-2016 (4 marks)**

30) Priyanka Ltd. Has 25,000 shares outstanding at current market price of ₹ 100 per share. It belongs to a risk class with capitalization rate of 20%. The company expects to earn a net profit of ₹ 5,00,000 during the year. What will be the price per shares if dividend is not paid? **June-2016 (4 marks)**

31) The following information pertains to M/s Kanagana Limited:

Particulars	
Earning of the company	₹ 5 lakh

Dividend pay-out ratio	60%
No. of shares outstanding	1,00,000
Equity capitalization	12%
Rate of return on investment	15%

What would be the market value per share as per Walter's model? **June-2017 (4 marks)**



- i) Inventory (raw material, work in process and finished goods)
- ii) Receivables (trade receivables and bills receivables)
- iii) Cash or cash equivalents (short-term marketable securities)
- iv) Prepaid expenses

**Current Liabilities:** A liability is classified as current when:

- i) It is expected to be *settled in normal operating cycle of the entity*.
- ii) The liability is held *primarily for the purpose of trading*
- iii) It is expected to be *settled within twelve months* after the reporting period

Generally current liabilities of an entity, for the purpose of working capital management can be grouped into the following *main heads*:

- i) Payable (trade payables and bills receivables)
- ii) Outstanding payments (wages & salary etc.)

The concept of working capital can also be explained through two angles.

### NATURE OF WORKING CAPITAL:

The term working capital refers to current assets which may be defined as

- i) Those which are convertible into cash or equivalents within the normal operating cycle of the firm, and**
- ii) Those which are required to meet day to day operations.**

Managing current assets may require more attention than managing fixed assets. The financial manager cannot simply decide the level of the current assets and stop there. The level of investment in each of the current assets varies from day to day, and the financial manager must therefore, continuously monitor these assets to ensure that the desired levels are being maintained. On the other hand, too little investment also can be expensive.

**Example:** Insufficient inventory may mean that sales are lost as the goods which a customer wants are not available.

The term working capital may be used in two different ways:

- 1. Gross Working Capital (or Total Working Capital):** The gross working capital refers to the firm's investment in all the current assets taken together. *The total of investments in all the individual current assets is the gross working capital.*

2. **Net Working Capital:** *The term net working capital may be defined as the excess of total current assets over total current liabilities.* It may be noted that the current liabilities refer to those liabilities which are payable within the normal operating cycle of the firm.

The net working capital may either be positive or negative. If the total current assets are more than total current liabilities, then the difference is known as positive net working capital, otherwise the difference is known as negative net working capital. The net working capital measures the firm's liquidity.

## FACTORS DETERMINING WORKING CAPITAL REQUIREMENT



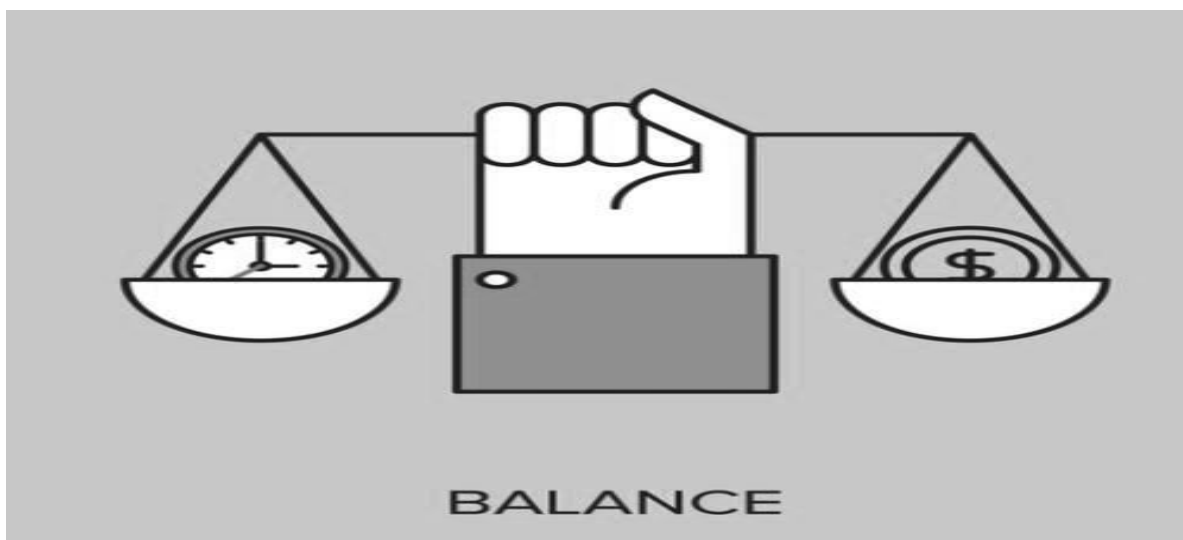
The working capital need of a firm are determined and influenced by various factors. Following are some of the factors which are relevant in determining the working capital needs of the firm:

1. **Basic Nature of Business:** The working capital requirement is closely related to the nature of the business of the firm. *In case of a retail shop or a trading firm, the amount of working capital required is small enough.*
2. **Business Cycle Fluctuations:** Different phases of business cycle i.e., *boom, recession, recovery* etc. also affect the working capital requirement.
3. **Seasonal Operations:** *If a firm is operating in goods and services having seasonal fluctuations in demand, then the working capital requirement will also fluctuate with every change.* On the other hand, if the operations are smooth and even throughout the year then the working capital requirement will be constant and will not be affected by the seasonal factors.
4. **Market Competitiveness:** *In view of the competitive conditions prevailing in the market, the firm may have to offer liberal credit terms to the customers resulting in high debtors.* Even larger inventories may be maintained to serve an order as and when received; otherwise the customer may go to some other

supplier. Thus, the working capital tends to be high as a result of greater investment in inventories and receivable.

5. **Credit Policy:** *The credit policy means the totality of terms and conditions on which goods are sold and purchased.* A firm has to interact with two types of credit policies at a time. One, the credit policy of the supplier of raw materials, goods etc. and two, the credit policy relating to credit which it extends to its customers. In both the cases, however, the firm while deciding its credit policy, has to take care of the credit policy of the market.
6. **Supply Conditions:** The time taken by a supplier of raw materials, goods etc. after placing an order, also determines the working capital requirement. *If goods are received as soon as or in a short period after placing an order, then the purchaser will not like to maintain a high level of inventory of that good. Otherwise, larger inventories should be kept.*

### NEED FOR ADEQUATE WORKING CAPITAL



**Meaning:** The need and importance of adequate working capital for day to day operations can hardly be underestimated. Every firm must maintain a sound working capital position otherwise its business activities may be adversely affected.

**Explanation:** Management of working capital is an essential task of the finance manager. He has to ensure that the amount of working capital available with his concern is neither too large nor too small for its requirements. *A large amount of working capital would mean that the company has idle funds. Since funds have a cost, the company has to pay huge amount as interest on such funds. If the firm has inadequate working capital, such firm runs the risk of insolvency.*

One of the reasons for the poor performance of public sector undertakings in our country has been *the large amount of funds locked up in working capital*. This results in over capitalization. Over capitalization implies that a company has too large funds for its requirements, resulting in a low rate of return, a situation which implies a less than optimal use of resources. A firm, therefore, has to be very careful in estimating its working capital requirements.

The *excessive working capital*, when the investment in working capital is more than the required level, may result in

- i) *Unnecessary accumulation of inventories resulting in waste, theft, damage etc.*
- ii) *Delays in collection of receivables resulting in more liberal credit terms to customers than warranted by the market conditions.*

On the other hand, *inadequate working capital situation*, when the firm does not have sufficient working capital to support its operations, is also not good for the firm. Such a situation may have following consequences:

- i) The fixed assets may not be optimally used.
- ii) Firms growth may stagnate.
- iii) Interruptions in production schedule may occur ultimately resulting in lowering of the profit of the firm.
- iv) The firm may not be able to take benefit of an opportunity.
- v) Firm's goodwill in the market is affected if it is not in a position to meet its liabilities on time.

**Example:**

- Increased production leads to holding of additional stocks of raw materials and work-in-progress.
- An increased sale usually means that the level of debtors will increase.
- A general increase in the firm's scale of operations tends to imply a need for greater levels of working capital.

*A question then arises what is an optimum amount of working capital for a firm? We can say that a firm should neither have too high an amount of working capital nor should the same be too low. It is the job of the finance manager to estimate the requirements of working capital carefully and determine the optimum level of investment in working capital.*

### **WORKING CAPITAL: POLICY AND MANAGEMENT**

The *working capital management includes and refers to the procedures and policies required to manage the working capital*. The importance of working capital management can be expressed in terms of the following points.

- i. The level of current assets changes constantly and regularly depending upon the level of actual and forecasted sales.
- ii. The changing levels of current assets may also required review of the financing pattern.
- iii. Inefficient working capital management may result in loss of sales and consequently decline in profits of the firm.
- iv. Inefficient working capital management may also lead to insolvency of the firm if it is not in a position to meet its liabilities and commitments.
- v. Current assets usually represent a substantial portion of the total assets of the firm, resulting in investment of a larger chunk of funds in the current assets.

**Explanation:** In other words, the level of a firm's Net Working Capital (Current Assets – Current Liabilities) has a bearing on its profitability as well as risk. The *term profitability here means profits after expenses*. The *term risk is defined as the probability that a firm will become technically insolvent so that it will not be able to meet its obligations when they become due for payment*. The risk of becoming technically insolvent is measured using net working capital. It is assumed that the *greater the amount of Net Working Capital, the less risky the firm is, and vice-versa*. The relationship between liquidity, Net Working Capital and risk is such that if either net working capital or liquidity increases, the firm's risk decreases. What proportion of current assets should be financed by current liabilities and how much by long term sources will depend, apart from liquidity – profitability trade off, on the risk perception of the management. Two broad policy alternatives, in this respect, are:

- a) **A conservative current Asset financing policy:** *It relies less on short term bank financing and more on long term sources*. No doubt it *reduces the risk* that the firm will be unable to repay its short-term debt periodically, but enhances the cost of financing.
- b) **An aggressive current Asset Financing Policy:** *It relies heavily on short term bank finance and seeks to reduce dependence on long term financing*. It exposes the firm to a *higher degree of risk* but reduces the average cost of financing thereby resulting in higher profits.

Thus, the efficient working capital management is important from the point of view of both the liquidity and the profitability. Poor and inefficient working capital management means that funds are unnecessarily tied up in idle assets. This reduces the liquidity as well as the ability to invest funds in productive assets, so affecting the profitability.

### LIQUIDITY VERSUS PROFITABILITY – A RISK-RETURN TRADE-OFF:

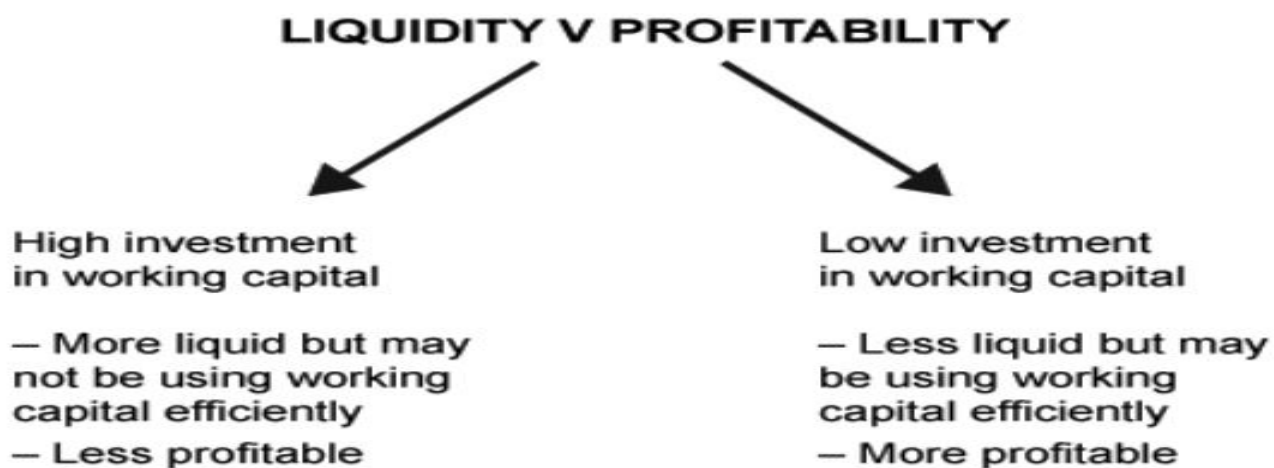
Another important aspect of a working capital policy is to *maintain and provide sufficient liquidity* to the firm.



By maintaining a large investment in current assets like cash, inventory, etc. the firm reduces the chances of:

- Production stoppages and the lost sales from the inventory shortages and
- The inability to pay the creditors on time.

**Explanation:** For uninterrupted and smooth functioning of the day to day business of an entity it is *important to maintain liquidity of funds evenly*. So, while maintaining liquidity the cost aspect needs to be borne in mind. *Unnecessary tying up of funds in idle assets not only reduces the liquidity but also reducing the opportunity to earn better return from a productive asset*. Hence, a trade-off is required between the liquidity and profitability which increases the profitability without disturbing the day to day functioning.



This requires 3Es as discussed above i.e. economy in financing, efficiency in utilization and effectiveness in achieving the intended objectives.

Component of Working Capital	Advantages of higher side (Profitability)	Trade-off (between Profitability and Liquidity)	Advantages of lower side (Liquidity)
<b>Inventory</b>	Fewer stock-outs increase the profitability.	Use techniques like EOQ, JIT etc. to carry optimum level of inventory.	Lower inventory requires less capital but endangered stock-out and loss of goodwill.
<b>Receivables</b>	Higher Credit period attract customers and increase revenue.	Evaluate the credit policy; use the services of debt management (factoring) agencies.	Cash sales provide liquidity but fails to boost sales and revenue.

<b>Pre-payment of expenses</b>	Reduces uncertainty and profitable in inflationary environment.	Cost-benefit analysis required.	Improves or maintains liquidity.
<b>Cash and Cash equivalents</b>	Payables are honored in time, improves the goodwill and helpful in getting future discounts.	Cash budgets and other cash management techniques can be used.	Cash can be invested in some other investment avenues.
<b>Payables and Expenses</b>	Capital can be used in some other investment avenues.	Evaluate the credit policy and related cost.	Payables are honored in time, improves the goodwill and helpful in getting future discounts.

### TYPES OF WORKING CAPITAL NEEDS

Another important aspect of working capital management is to analyse the total working capital needs of the firm in order to find out the permanent and temporary working capital.

The need for current assets tends to shift over time. The working capital need therefore, can be bifurcated into permanent working capital and temporary working capital as follows:

- 1) Initial working capital:** The capital, *which is required at the time of the commencement of business*, is called initial working capital. These are the promotion expenses incurred at the earliest stage of formation of the enterprise which include the incorporation fees, attorney's fees, office expenses and other preliminary expenses.
- 2) Regular working capital:** This type of *working capital remains always in the enterprise for the successful operation*. It supplies the funds necessary to meet the current working expenses i.e. for purchasing raw material and supplies, payment of wages, salaries and other sundry expenses.
- 3) Fluctuating working capital:** This capital is needed to *meet the seasonal requirements of the business*. It is used to raise the volume of production by *improvement or extension of machinery*.

- 4) **Reserve margin working capital:** It represents the *amount utilized at the time of contingencies*. These unpleasant events may occur at any time in the running life of the business such as *inflation, depression, slump, flood, fire, earthquakes, strike, lay off and unavoidable competition* etc.
- 5) **Permanent and Temporary Working Capital:** To carry on a business, a certain minimum level of working capital is necessary on a continuous and uninterrupted basis. *For all practical purposes, this requirement has to be met permanently as with other fixed assets. This requirement is referred to as permanent or fixed working capital. Any amount over and above the permanent level of working capital is temporary, fluctuating or variable working capital. The position of the required working capital is needed to meet fluctuations in demand consequent upon changes in production and sales as a result of seasonal changes. Both kinds of working capital are necessary to facilitate the sales proceeds through the Operating Cycle.*
- 6) **Long Term working capital:** The long-term working capital represents *the amount of funds needed to keep a company running in order to satisfy demand at lowest point*. There may be many situations where demand may fluctuate considerably. In other words, it consists of the minimum current assets to be maintained at all times. The size of the permanent working capital varies directly with the size of Operation of a firm.
- 7) **Short term working capital:** *Short-term capital varies directly with the level of activity achieved by a company.* The Volume of Operation decides the quantum of Short-term working capital. It also changes from one form to another; from cash to inventory, from inventory to debtors and from debtors back to cash. It may not always be gainfully employed. Temporary Working capital should be obtained from such sources, which will allow its return when it is not in use.
- 8) **Gross Working Capital:** Gross working capital refers to the *firm's investment in current assets*. Current assets are those *assets which can be converted in to cash with in an accounting year and includes cash, short term securities, debtors bill receivable and stock*.
- 9) **Net Working Capital:** Net working capital refers to the *difference between current asset and Current liabilities*. Current liabilities are those claims of outsiders, which are expected to mature for payment within accounting year and include creditors, bills payable and outstanding expenses. Net Working capital can be positive or negative. A positive net working capital will arise when current assets exceed current liabilities. The Gross working capital concept focuses attention on two aspect of current assets management.
- How to optimize investment in current assets?
  - How should current assets be financed?

Both the question is the most decision-making action of the management. It should be given due consideration before taking decision. Both Net and Gross working capital is important, and they have equal significance from management point of view.

## OPERATING CYCLE CONCEPT AND APPLICATION OF QUANTITATIVE TECHNIQUES

A useful tool for managing working capital is the operating cycle.

The operating cycle analyzes the accounts receivable, inventory and accounts payable cycles in terms of number of days.

### Example:

- 1) Accounts receivables are analyzed by the average number of days it takes to collect an account.
- 2) Inventory is analyzed by the average number of days it takes to turn over the sale of a product (from the point it comes in the store to the point it is converted to cash or an account receivable).
- 3) Accounts payables are analyzed by the average number of days it takes to pay a supplier invoice.

### Operating/Working Capital Cycle Definition:

*Working Capital cycle indicates the length of time between a company's paying for materials, entering into stock and receiving the cash from sales of finished goods. It can be determined by adding the number of days required for each stage in the cycle.*



**Example:** A company holds raw materials on an average for 60 days, it gets credit from the supplier for 15 days, production process needs 15 days, finished goods are held for 30 days and 30 days credit is extended to debtors. The total of all these, 120 days, i.e.,  $60 - 15 + 15 + 30 + 30$  days is the total working capital cycle.

The length of operating cycle of an enterprise is the sum of these four individual stages i.e. components of time. The operating cycle can be calculated for a period as under:

1)	<b>Raw Materials Days</b> Period of raw material stock Less: Period of credit Granted by supplier	$\frac{\text{Average value of Raw material stock}}{\text{Average level of creditors}}$ $\frac{\text{Average level of creditors}}{\text{Purchase of raw materials per day}}$
2)	<b>Period of Production</b>	$\frac{\text{Average value of work in progress}}{\text{Average cost of production per day}}$
3)	<b>Period of turnover of Finished goods stock</b>	$\frac{\text{Stock of finished goods}}{\text{Average cost of goods sold per day}}$
4)	<b>Period of credit taken by customers</b>	$\frac{\text{Average value of debtors}}{\text{Average value of sales per day}}$

### ESTIMATION AND CALCULATION OF WORKING CAPITAL:

A firm must estimate in advance as to how much net working capital will be required for the smooth operations of the business. Only then, it can bifurcate this requirement into permanent working capital and temporary working capital. This bifurcation will help in deciding the financing pattern i.e., *how much working capital should be financed from long term sources and how much be financed from short term sources.*

There are different approaches available to estimate the working capital requirements of a firm as follows:

- 1) **Working Capital as a Percentage of Net Sales:** This approach to estimate the working capital requirement is based on the fact that the *working capital for any firm is directly related to the sales volume of that firm.* So, the working capital requirement is expressed as a percentage of expected sales for a particular period. The working capital estimation is thus, solely dependent on the sales forecast. This approach is based on the assumption that higher the sales level, the greater would be the need for working capital. There are three steps involved in the estimation of working capital.
  - a) To estimate total current assets as a % of estimated net sales.
  - b) To estimate current liabilities as a % of estimated net sales, and
  - c) The difference between the two above, is the net working capital as a % of net sales.
  
- 2) **Working Capital as a Percentage of Total Assets or Fixed Assets:** This approach of estimation of working capital requirement is based on the fact that the *total assets of the firm are consisting of fixed assets and current assets.* On the basis of past experience, a relationship between
  - i) Total current assets i.e., gross working capital; or net working capital i.e., Current assets – Current Liabilities, and
  - ii) Total fixed assets or total assets of the firm is established.

**Example:**

A firm is maintaining 20% of its total assets in the form of current assets and expects to have total assets of ₹ 50,00,000 next year. Thus, the current assets of the firm would be ₹ 10,00,000 (i.e., 20% of ₹ 50,00,000). In this approach, the working capital may also be estimated as a % of fixed assets.

- 3) Working Capital based on Operating Cycle:** The concept of operating cycle, as discussed, helps determining the time scale over which the current assets are maintained. The operating cycle for different components of working capital gives the time for which an asset is maintained, once it is acquired. However, the concept of operating cycle does not talk of the funds invested in maintaining these current assets. *The concept of operating cycle can definitely be used to estimate the working capital requirements for any firm. In this approach, the working capital estimate depends upon the operating cycle of the firm.* A detailed analysis is made for each component of working capital and estimation is made for each of these components.

### BANKING NORMS AND MACRO ASPECT OF WORKING CAPITAL MANAGEMENT:

Commercial banks grant working capital advances by way of cash credit limits and are the major suppliers of working capital to trade and industry. RBI appointed study group under the chairmanship of Shri. P.L. Tandon in August 1975. Tandon committee made certain recommendations inter alia comprising of recommendations on norms for inventory and receivables for 15 major industries, new approach to bank lending, style of lending credit, information system and follow up, supervision and control and norms of capital structure.

- 1) **Norms for inventory and receivables** recommended by Tandon Committee for 15 major industries, cover about 50 per cent of industrial advances of banks. These norms were arrived at after examining the trends reflected in the company finance studies conducted by the Reserve Bank of India and detailed discussion with representatives and experts of the industries concerned.
- 2) **Bank lending:** The Committee introduced and concept of working capital gap. This gap arised due to the non-coverage of the current assets by the current liabilities other than bank borrowings. A certain portion of this gap will be filed up by the borrower's own funds and long-term borrowings. The Committee developed three alternatives for working out the maximum permissible level of bank borrowings:
  - a) **Working Capital Gap:**
    - 75% of the working capital gap will be financed by the bank i.e. Total Current Assets
    - Less: Current Liabilities other than Bank Borrowings.
    - Less: 25% of Working Capital gap from long-term sources.

- b) Alternatively, the borrower has to provide for a minimum of 25% of the total current assets out of long-term funds and the bank will provide the balance. The total current liabilities inclusive of bank borrowings will not exceed 75% of the current assets:

**Maximum Bank Borrowing permissible:**

Total Current Assets

Less: 25% of current assets from long-term sources.

Less: Current liabilities other than Bank borrowings

- c) The third alternative is also the same as the second one noted above except that it excludes the permanent portion of current assets from the total current assets to be financed out of the long-term funds, viz.

**Maximum Bank Borrowing permissible=**

Total Current Assets

Less: Permanent portion of current assets

Real Current Assets

Less: 25% of Real Current Assets

Less: Current Liabilities other than Bank Borrowings.

Thus, by following the above measures, the excessive borrowings from banks will be gradually eliminated and the funds could be put to more productive purposes.

The above methods may be reduced to equation as under :

$$1^{\text{st}} \text{ Method : PBC} = 75/100 \text{ WCG}$$

$$2^{\text{nd}} \text{ Method : PBC} = \text{TCA} - [(25/100 \text{ TCA}) + \text{OCL}]$$

$$3^{\text{rd}} \text{ Method : PBC} = \text{TCA} - [\text{CRA} + 25/100 (\text{TCA} - \text{CRA}) + \text{OCL}]$$

Where,

PBC stands for Working Capital Gap

TCA stands for Total Current Assets

OCL Stands for Other Current Liabilities.

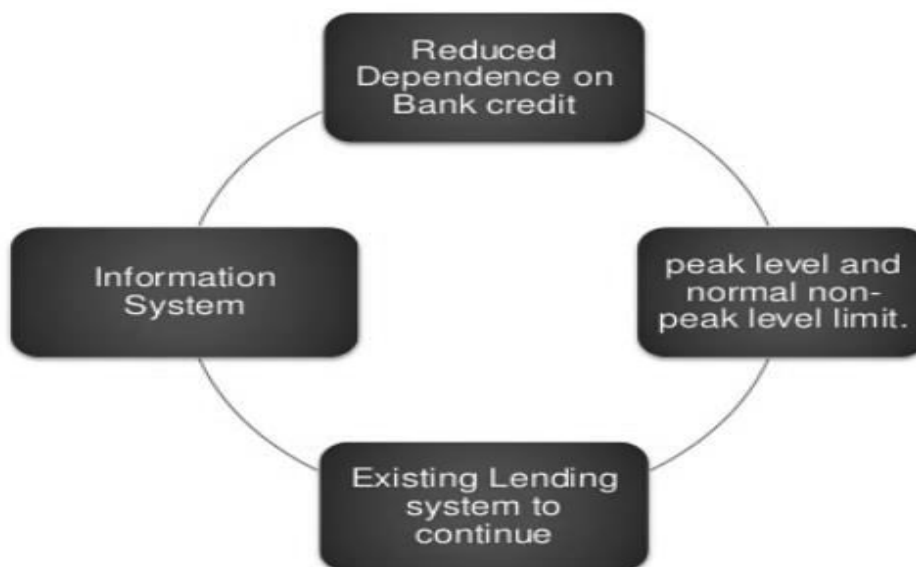
(i.e. Current Liabilities other than Bank Borrowings)

CRA stands for Amount required to finance Core Assets.

- 3) **Style of credit:** A change in the style of lending has also been suggested by the Committee so as to bifurcate the cash credit into a loan account and demand cash credit instead of treating the entire credit limit as cash credit for a year. This will make the credit less expensive to borrowers.

- 4) **Information system:** To monitor better credit information system in the banking industry, the committee suggested for the borrower to submit quarterly statements in the prescribed format about its operations, current assets and current liabilities and funds flow statements with monthly stock statements and projected balance sheets and profit and loss account at the end of financial year.
- 5) **Follow up:** The Committee also suggested a close follow up for supervision and control of the use of credit by the banks and change in attitude of the banks from security-oriented lending to production oriented lending's /credit.
- 6) **Norms of Capital Structure:** For examining the capital structure of the company the norms have also been suggested by the committee for monitoring a better equity : debt relationship.

### CHORE COMMITTEE:



Reserve Bank of India in 1979 appointed Working Group under the Chairmanship of Shri K.B. Chore to review the operation of the cash credit system with reference to the gap between sanctioned credit limits and the extent of their utilization.

The Group in its final report supported the existing system of extending credit, a combination of the three types of lending, viz., cash credit, loan and bill should be retained.

### MARATHE COMMITTEE:

In 1982, it was felt that an independent review of the Credit Authorisation Scheme (CAS) which had been in operation for several years would be useful and accordingly the Reserve Bank of India appointed a Committee



referred as “Marathe Committee” in November 1982 to review the working of the Credit Authorization Scheme. The Committee submitted its report in July 1983.

### OBJECTIVE OF CASH MANAGEMENT:

The financial manager must know as to why the cash management is a necessity.

1. **Meeting the cash outflows:** the primary objective of cash management is to ensure the cash outflows as and when required. Enough cash must be on hand to meet the disbursement needs that arise in the normal course of business. The firm should be able to make the payments at different point of time without any liquidity problem.
2. **Optimizing the Cash Balance:** Investment in idle cash balance must be reduced to a minimum. This objective of cash management is based on the idea that unused asset earns no income for the firm. The funds locked up in cash balance is a dead investment and has no earning. Therefore, whatever cash balance is maintained, the firm is foregoing interest income on that balance.

### FACTORS AFFECTING THE CASH NEEDS:

It has already been said that the financial manager has to achieve a trade-off between liquidity and profitability and in doing so he should note that there are various factor which will determine the amount of cash balance to be kept by the firm. Some of these factors are as follows:

- a. **Cash Cycle:** the term cash cycle refers to the length of the time between the payment for purchase of raw material and the receipt of sales revenue.
- b. **Cash Inflows and Cash Outflows:** Every firm has to maintain cash balance because its expected inflows and outflows are not always synchronized. The timings of the cash inflows may not always match with the timing of the outflows. Therefore, a cash balance is required to fill up the gap arising out of difference in timings and quantum of inflows and outflows.
- c. **Cost of Cash Balance:** Another factor to be considered while determining the minimum cash balance is the cost of maintaining excess cash or of meeting shortages of cash. There is always an opportunity cost of maintaining excessive cash balance. If a firm is maintaining excess cash then it is missing the opportunities of investing these funds in a profitable way.
- d. **Other Considerations:** In addition to the above factors, there may be some other considerations also affecting the need for cash balance. There may be several subjective considerations such as uncertainties of a particular trade, staff required for cash management etc., which will have a bearing on determining the cash balance required by a firm.

## INVENTORY MANAGEMENT:

Inventories are assets of the firm and require investment and hence involve the commitment of firm's resources. Managing the level of inventories is like maintaining the level of water in a bath tub with an open drain. The water is flowing out continuously. If water is let in too slowly, the tub is soon empty. If water is let in too fast, the tub over flows. Like the water in the tub, the particular item in the inventory keeps changing, but the level may remain the same.

## TYPES OF INVENTORIES

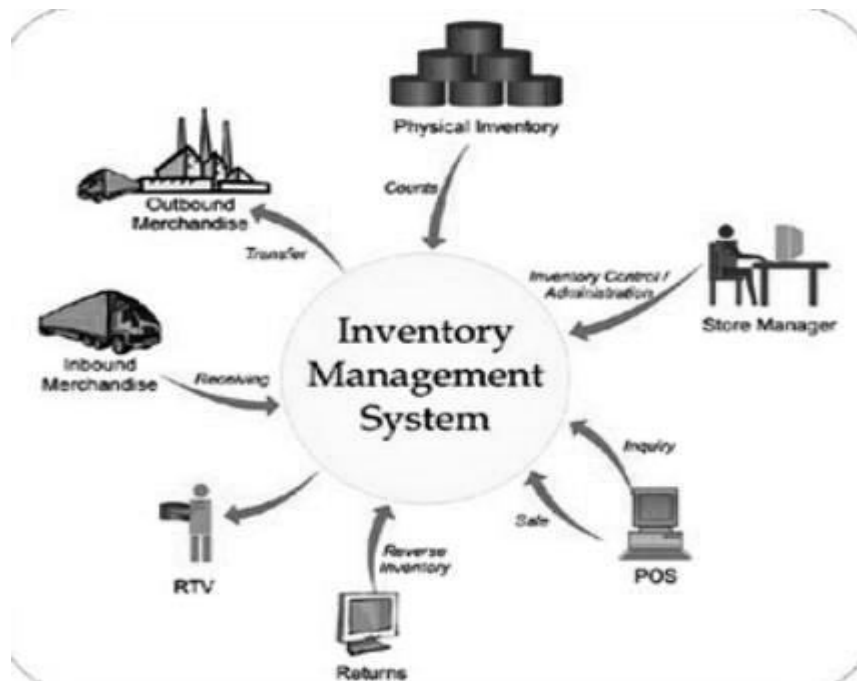
### Types of Inventory



The common types of inventories for most of the business firms may be classified as finished goods, work-in-progress and raw materials.

- 1) **Finished Goods:** These are the goods which are either being purchased by the firm or are being produced or processed in the firm. These are just ready for sale to customers. Inventories of finished goods arise because of the time involved in production process and the need to meet customer's demand promptly.
- 2) **Work-in-Progress:** It refers to the raw materials engaged in various phases of production schedule. The degree of completion may be varying for different units. Some units might have been just introduced, while some others may be 40% complete or others may be 90% complete. The work-in-progress refers to partially produced goods. The value of work-in-progress includes the raw material costs, the direct wages and expenses already incurred and the overheads, if any. So, the work-in-progress inventory contains partially produced / completed goods.
- 3) **Raw Materials:** The raw materials include the materials which are used in the production process and every manufacturing firm has to carry certain stock of raw materials in stores. These units of raw materials are regularly issued/transferred to production department. Inventories of raw materials are held to ensure that the production process is not interrupted by a shortage of these materials.

## INVENTORY MANAGEMENT:

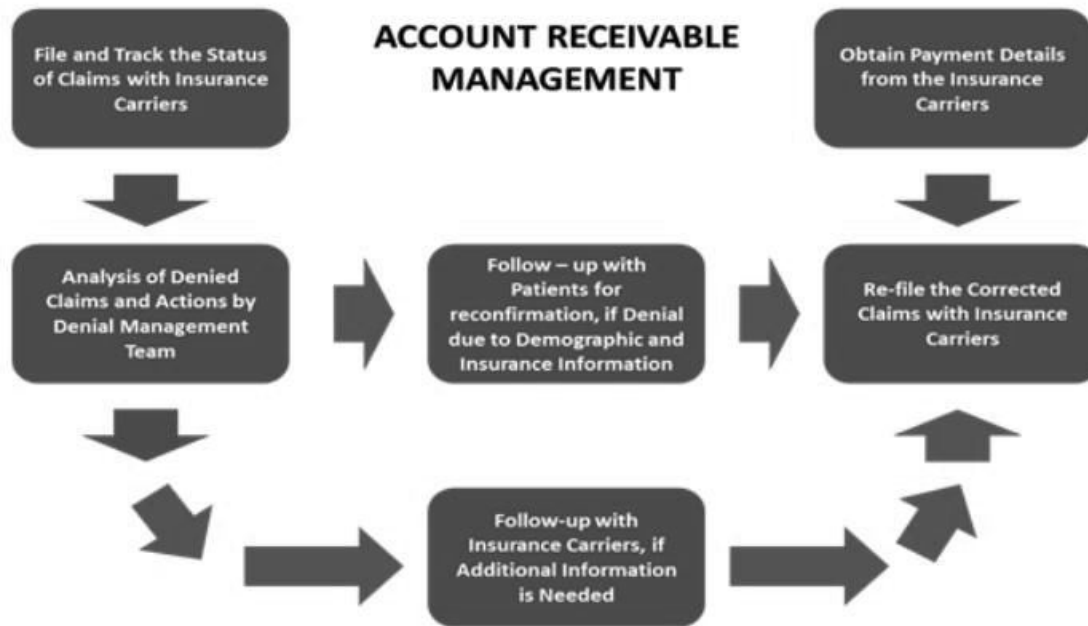


The objective of inventory management is to determine the optimum level of inventory i.e., the level at which the interest of all the departments are taken care of. The inventory management seeks to maximize the wealth of the shareholders by designing and implementing such policies which attempt to minimize the cost of procuring and maintaining the inventories.

Business firms keep inventories for different purposes. The motives for holding inventory may be enumerated as follows:

1. **Transactional Motive:** Every firm has to maintain some level of inventory to meet the day to day requirements of sales, production process, customer demand etc.
2. **Precautionary Motive:** A firm should keep some inventory for unforeseen circumstances also. For example, the fresh supply of raw material may not reach the factory due to strike by the transporters or due to natural calamities in a particular area.
3. **Speculative Motive:** The firm may be tempted to keep some inventory in order to capitalize an opportunity to make profit e.g. sufficient level of inventory may help the firm to earn extra profit in case of expected shortage in the market.

## RECEIVABLES MANAGEMENT



Receivables are almost certain and inevitable to arise in the ordinary course of business. They represent extension of credit and must be carefully managed. The receivable is an assets as it represents a claim of the firm against its customers, expected to be realized in near future. Since credit sales assume a sizable proportion of total sales in any firm, the receivable management becomes an area of attention.

The receivables represent credit allowed to customer and thereby allowing them to delay the payment. In a competitive environment, sometimes the firms are compelled and sometimes the firms desire to adopt liberal credit policies for pushing up the sales. Higher credit sales at more liberal terms will no doubt increase the profit of the firm, but simultaneously also increases the risk of bad debts as well as result in more and more funds blocking in the receivables. So, a careful analysis of various aspects of the credit policy is required. This is what is known as Receivables Management (RM). The term RM may be defined as collection of steps and procedure required to properly weight costs and benefits attached with the credit policies. The RM consists of matching the cost of increasing sales (particularly credit sales) with the benefits arising out of increased sales with the objective of maximizing the return on investment of the firm. There are various costs and benefits attached with a credit policy. These may be enumerated as follows:

#### **COSTS OF RECEIVABLES:**

1. **Cost of Financing:** The credit sales delays the time of sales realization and therefore the time gap between incurring the cost and the sales realization is extended. This results in blocking of funds for a longer period.
2. **Administrative Cost:** A firm will also be required to incur various costs in order to maintain the record of credit customers both before the credit sales as well as after the credit sales.

- 3. Delinquency Costs:** Over and above the normal administrative cost of maintaining and collection of receivables, the firm may have to incur additional costs known as delinquency costs, if there is delay in payment by a customer. The firm may have to incur cost on reminders, phone calls, postage, legal notices, etc. Moreover, there is always an opportunity cost of the funds tied up in the receivables due to delay in payment.
- 4. Cost of Default by Customers:** If there is a default by a customer and the receivable becomes, partly or wholly, unrealizable, then this amount, known as bad debt, also becomes a cost to the firms.

### BENEFITS OF RECEIVABLES

- 1. Increase in Sales:** Except a few monopolistic firms, most of the firms are required to sell goods on credit, either because of trade customs or other conditions. The sales can further be increased by liberalizing the credit terms. This will attract more customers to the firm resulting in higher sales and growth of the firm.
- 2. Increase in Profits:** Increase in sales will help the firm (i) to easily recover the fixed expenses and attaining the break-even level, and (ii) increase the operating profit of the firm.
- 3. Extra Profit:** Sometimes, the firms make the credit sales at a price which is higher than the usual cash selling price. This brings an opportunity to the firm to make extra profit over and above the normal profit.

### CREDIT POLICY

A firm makes significant investment by extending credit to its customers and thus requires a suitable and effective credit policy to control the level of total investment in the receivables. The basic decision to be made regarding receivables is to decide how much credit be extended to a customer and on what terms. This is what is known as the credit policy. The credit policy may be defined as the set of parameters and principles that govern the extension of credit to the customers.

### CREDIT EVALUATION:

Credit evaluation involves determination of the type of customers who are going to qualify for the trade credit. Several costs are associated with extending credit to less credit-worthy customers. As the probability of default increases, it becomes more important to identify which of the possible new customers would be risky. When more time is spent investigating the less credit-worthy customers, the cost of credit investigation increases. Default costs also vary directly with the quality of the customers. As the customer's credit rating declines, the chance that the amount will not be paid on time increases.

Collection costs also increase as the quality of the customers declines. More delinquent customers force the firm to spend more time and money collecting them. In nutshell, the decline in customers quality results in increased cost of default, collection and credit investigation.

## SUMMARY

### 1) Meaning and Concept of Working Capital

In accounting term *working capital is the difference between the current assets and current liabilities*. If we break down the components of working capital, we will found working capital as follows:

$$\text{Working Capital} = \text{Current Assets} - \text{Current Liabilities}$$

### 2) Nature of working capital

The term working capital refers to current assets which may be defined as

- i) **Those which are convertible into cash or equivalents within the normal operating cycle of the firm, and**
- ii) **Those which are required to meet day to day operations.**

The term working capital may be used in two different ways:

1. Gross Working Capital (or Total Working Capital)
2. Net Working Capital

### 3) Factors determining working capital requirement

1. Basic Nature of Business
2. Business Cycle Fluctuations
3. Seasonal Operations
4. Market Competitiveness
5. Credit Policy
6. Supply Conditions

### 4) Need for adequate working capital

The need and importance of adequate working capital for day to day operations can hardly be underestimated. Every firm must maintain a sound working capital position otherwise its business activities may be adversely affected.

### 5) Working capital Policy and management

Two broad policy alternatives, in this respect, are:

- a) A conservative current Asset financing policy
- b) An aggressive current Asset Financing Policy

## 6) Types of working capital needs

- 1) Initial working capital
- 2) Regular working capital
- 3) Fluctuating working capital
- 4) Reserve margin working capital
- 5) Permanent and Temporary Working Capital
- 6) Long Term working capital
- 7) Short term working capital
- 8) Gross Working Capital
- 9) Net Working Capital

## 7) Estimation and calculation of working capital

A firm must estimate in advance as to how much net working capital will be required for the smooth operations of the business. Only then, it can bifurcate this requirement into permanent working capital and temporary working capital. This bifurcation will help in deciding the financing pattern i.e., *how much working capital should be financed from long term sources and how much be financed from short term sources.*

There are different approaches available to estimate the working capital requirements of a firm as follows:

- 1) Working Capital as a Percentage of Net Sales
  - a) To estimate total current assets as a % of estimated net sales.
  - b) To estimate current liabilities as a % of estimated net sales, and
  - c) The difference between the two above, is the net working capital as a % of net sales.
- 2) Working Capital as a Percentage of Total Assets or Fixed Assets
- 3) Working Capital based on Operating Cycle

## 8) Banking norms and macro aspect of working capital management

- 1) **Norms for inventory and receivables**
- 2) **Bank lending**
  - a) **Working Capital Gap:**
    - 75% of the working capital gap will be financed by the bank i.e. Total Current Assets
    - Less: Current Liabilities other than Bank Borrowings.
    - Less: 25% of Working Capital gap from long-term sources.



- b) Alternatively, the borrower has to provide for a minimum of 25% of the total current assets out of long-term funds and the bank will provide the balance. The total current liabilities inclusive of bank borrowings will not exceed 75% of the current assets:

**Maximum Bank Borrowing permissible:**

Total Current Assets

Less: 25% of current assets from long-term sources.

Less: Current liabilities other than Bank borrowings

- c) The third alternative is also the same as the second one noted above except that it excludes the permanent portion of current assets from the total current assets to be financed out of the long-term funds, viz.

**Maximum Bank Borrowing permissible=**

Total Current Assets

Less: Permanent portion of current assets

Real Current Assets

Less: 25% of Real Current Assets

Less: Current Liabilities other than Bank Borrowings.

Thus, by following the above measures, the excessive borrowings from banks will be gradually eliminated and the funds could be put to more productive purposes.

The above methods may be reduced to equation as under :

$$1^{\text{st}} \text{ Method : PBC} = 75/100 \text{ WCG}$$

$$2^{\text{nd}} \text{ Method : PBC} = \text{TCA} - [(25/100 \text{ TCA}) + \text{OCL}]$$

$$3^{\text{rd}} \text{ Method : PBC} = \text{TCA} - [\text{CRA} + 25/100 (\text{TCA} - \text{CRA}) + \text{OCL}]$$

Where,

PBC stands for Working Capital Gap

TCA stands for Total Current Assets

OCL Stands for Other Current Liabilities.

(i.e. Current Liabilities other than Bank Borrowings)

CRA stands for Amount required to finance Core Assets.

- 3) Style of credit
- 4) Information system
- 5) Follow up
- 6) Norms of Capital Structure

## 9) Factors affecting the cash needs

It has already been said that the financial manager has to achieve a trade-off between liquidity and profitability and in doing so he should note that there are various factor which will determine the amount of cash balance to be kept by the firm. Some of these factors are as follows:

- a. Cash Cycle
- b. Cash Inflows and Cash Outflows
- c. Cost of Cash Balance
- d. Other Considerations

## 10) Types of inventories

- i) Finished Goods
- ii) Work-in-Progress
- iii) Raw Materials

## 11) Inventory management

- 1) Transactionary Motive
- 2) Precautionary Motive
- 3) Speculative Motive

## 12) Costs of receivables

1. Cost of Financing
2. Administrative Cost
3. Delinquency Costs
4. Cost of Default by Customers

## 13) Benefits of receivables

1. Increase in Sales
2. Increase in Profit
3. Extra Profit

# PRACTICAL QUESTIONS



1) From the following information of XYZ Ltd., you are required to calculate:

- a. Net operating cycle period
- b. Number of operating cycles in a year:

Sr. No.	Particulars	
1)	Raw materials inventory consumed during the year	₹6,00,000
2)	Average stock of raw material	₹50,000
3)	Work-in-progress inventory consumed during the year	₹5,00,000
4)	Average work-in-progress inventory	₹30,000
5)	Finished goods inventory consumed during the year	₹8,00,000

6)	Average finished goods stock held	₹30,000
7)	Average collection period from debtors	40 days
8)	Average credit period availed	45 days
9)	No of days in a year	360 days

2) Following information is forecasted by CS limited for the year ending 31<sup>st</sup> March (1 year = 365 days)

Particulars	Opening Balance (₹)	Closing Balance (₹)
Raw Materials	45,000	65,356
Work-in-Progress	35,000	51,300
Finished goods	60,181	70,175
Debtors	1,12,123	1,35,000
Creditors	50,079	70,469

Other information's are as follows:

Particulars	
Annual purchase of raw material	₹, 4,00,000
Annual cost of production	7,50,000
Annual cost of goods sold	₹ 9,15,000
Annual operating cost	₹ 9,50,000
Annual Sales (all credit)	₹ 11,00,000

3) From the following details, prepare an estimate of the requirement working capital:

Particulars	
Production	60,000 Units p.a.
Selling price per unit	₹ 5

Raw materials	60% of selling price
Direct wages	10% of selling price
Overheads	20% of selling price
Materials in hand	2 months requirements
Production Time	1 month
Finished goods in stores	3 months
Credit for materials	2 months
Credit allowed to customers	3 months
Average Cash Balance	₹ 20,000

Wages and overheads are paid at the beginning of the month following .In production all the required materials are charged in the initial stage and wages and overheads accrue evenly.

- 4) From the given information for Ajanta manufacturing company, prepare an estimate of the requirement of working capital.

Particulars	
Production	90,000 Units p.a.
Selling price per unit	₹ 5
Raw materials	60% of selling price
Direct wages	10% of selling price
Overheads	20% of selling price
Materials in hand	2 months requirements
Production Time	1 month
Finished goods in stores	3 months
Credit for materials	2 months

Credit allowed to customers	3 months
Average Cash Balance	₹ 30,000

Wages and overheads are paid at the beginning of the month following. In production all the required materials are charged in the initial stage and wages and overhead accrue evenly.

- 5) Y Ltd. sells goods at a gross profit of 20%. It includes depreciation as part of production. The following figures for the 12 months period ending 31<sup>st</sup> December 2012 are given to enable you to ascertain the requirements of working capital of the company on a cash cost basis.

In your working, you are required to assume that:

- A safety margin of 15% will be maintained
- Cash is to be held to the extent of 50% of current liabilities
- There will be no work-in-progress
- Tax is to be ignored

Stock of raw material and finished goods are kept at one month's requirements.

Particulars	(₹)
Sales at 2 months credit	27,00,000
Materials consumed (suppliers' credit is for 2 months)	6,75,000
Wages (paid at the beginning of the next month)	5,40,000
Manufacturing expenses outstanding at the end of the year (cash expenses are paid one month in arrear)	50,000
Total administrative expenses (paid as above)	1,80,000
Sales promotion expenses - paid quarterly and in advance	90,000

- 6) The management of Rajesh Limited has called for a statement showing the working capital needed to finance a level of activity of 3,00,000 units of output for the year. The cost structure for the Company's product, for the above-mentioned activity level, is detailed below:

Particulars	Cost per unit (₹%)
Raw materials	20

Direct labour	5
Overheads	15
Total cost	40
Profit	10
Selling Price	50

Past trends indicate that raw materials are held in stock, on an average for two months.

Work-in-progress will approximate to half- a-months production. Finished goods remain in warehouse, on an average for a month. Suppliers of material extend a month's credit.

Two months credit is normally allowed to debtors. A minimum cash balance of ₹25000 is expected to be maintained. The production pattern is assumed to be even during the year.

Prepare the statement of working capital determination

- 7) B limited has an annual turnover of ₹ 84 crores and the same is spread is spread over evenly each of the 50 weeks of the working year. However, the pattern within each week is that the daily rate of receipts on Mondays and Tuesdays is twice that experienced on the other three days of the week. The cost of banking per day is estimated at ₹ 2,500. It is suggested that banking should be done daily or twice a week Tuesdays and Fridays as compared to the current practice of banking only on Fridays. B limited always operates on bank overdraft and the current rate of interest is 15% per annum. This interest charge is applied by the bank on a simple daily basis.

“Ignoring taxation, advice B limited the best course of banking. For your exercise use 360 days a year for computational purposes

- 8) A proforma cost sheet of a company provides the following particulars

Elements of cost	Amount per unit (₹)
Raw materials	80
Direct labour	30
Overheads	60
Total cost	170



Profit	30
Selling Price	200

The following further particular are available:

- i) Raw materials are in stock in average one month . Materials are in process on average half a month. Finished goods are in stock on average one month.
- ii) Credit allowed by suppliers is one month. Credit allowed to debtors is 2 months. Lag in payment of wages is 1.5 weeks. Lag in payment of overhead expenses is one month.
- iii) One –fourth of the output is sold against cash. Cash on hand and at bank expected to ₹ 25,000.

You are required to prepare a statement showing the working the working capital needed to finance a level of activity of 1,04,000 units of production

You may assume that production is carried on evenly throughout the year ,wages and overheads accrue similarly and a time period of 4 weeks is equivalent to a month.

- 9) A newly formed company has applied to the commercial bank for the first for financing its working capital requirements. The following information is available about the projections for the current year:

Elements of cost	Amount per unit (₹)
Raw materials	₹ 40 per unit
Direct labour	₹ 15 per unit
Overheads	₹ 30 per unit
Total cost	₹ 85 per unit
Profit	₹15 per unit
Selling Price	₹ 100 per unit

Other information:

- Raw material in stock – average 4 weeks consumption, work-in-progress (completion stage 50%), on an average half a month, Finished goods in stock on an average – one month
- Credit allowed by suppliers is one month

- Credit allowed to debtors is two months
- Average time lag in payment of wages is 1.5 weeks and 4 weeks in overheads expenses.
- Cash in hand and at bank is desired to be maintained at ₹ 50,000.
- All sales are on credit basis only.

Required:

- (a) Prepare statement showing estimate of working capital needed to finance an activity level of 96,000 units of production. Assume that production is carried on evenly throughout the year, and wages and overheads accrue similarly. For the calculation purpose 4 weeks may be taken as equivalent to a month, and 52 weeks in a year.
- (b) From the above information calculate the maximum permissible bank finance, by all the three methods for working capital as per Tondon Committee norms. Assume core current assets constitute 25% of the current assets.
- 10) The Board of Directors of Rajesh Limited, request you to prepare a statement showing the working capital requirements Forecast for activity of 1,56,000 units of production .

A)

Elements of cost	Amount per unit (₹)
Raw materials	90
Direct labour	40
Overheads	75
Total cost	205
Profit	60
Selling Price	265

B)

- Raw materials are in stock on average one month
- Materials are in process, on an average 2 weeks
- Finished goods are in stock on average one month
- Credit allowed by suppliers one month
- Time lag in payment from debtors 2 months
- Lag in payment of wages 1.5 weeks

vii) Lag in payment of overheads is one month.

20 % of the output is sold against cash. Cash in hand and at Bank is expected to be ₹ 60,000. It is to be assumed that production is carried on evenly throughout the year, wages and overheads accrue similarly and a time period of 4 weeks is equivalent to a month.

- 11) ABC Ltd. is desirous to purchase a business and consulted you and one point on which you are asked to advise them is the average amount of working capital which will be required in the first years working.

You are given the following estimate and instructed to add 10% to your computed figure to allow for contingencies:

Sr. No.	Particulars	Figures for the year (₹)
a)	Average amount locked up in stock:	
	Stock of finished product	5,000
	Stock of stores, material etc.	8,000
b)	Average credit given:	
	Inland sales-6 weeks credit	3,12,000
	Exports sales- 1.5 weeks credit	78,000
c)	Lag in payment of wages and other outgoings:	
	Wages - 1.5 weeks	2,60,000
	Rent, Royalties etc. - 6 months	10,000
	Clerical staff - 0.5 months	62,400
	Manager - 0.5 months	4,800
	Misc. Expenses - 1.5 months	48,000
d)	Payment in advance	
	Sundry expenses (paid quarterly in advances)	8,000

Set up your calculation for the average amount of working capital required.

- 12) M/s Kataria & Co. have approached their banker for their working capital requirement who have agreed to section the same by retaining the machine as under:

Elements of cost	
Raw materials	15%
Stock in progress	30%
Finished goods	20%
Debtors	10%

From the following projection for 2001-02 you are required to work out:

- (a) The working capital required by the company; and  
 (b) The working capital limits likely to be approved by bankers.

Estimated for 2001-02	
Annual sales	₹ 16,80,000
Cost of production	₹ 14,40,000
Raw material purchase	₹ 8,15,000
Monthly expenditure	₹ 45,000
Anticipated opening stock of raw materials	₹ 1,80,000
Anticipated closing stock of raw materials	₹ 1,55,000
Inventory Norms:	
Raw material	2 months
Work in progress	15 days
Finished goods	1 month

The firm enjoy a credit of a 15 days on its purchase and allows 1-month credit on its supplies. On sale orders, the company has received an advance of ₹ 25,000. State your assumption in any.

13) JK Ltd. a company **newly** commencing business in 2012 has the under mentioned projected Profit and Loss Account

Particulars	
Sales	₹ 2,10,000
Cost of goods sold	₹ 1,53,000
Gross Profit	₹ 57,000
Administrative Expenses	₹ 14,000
Selling Expenses	₹ 13,000
Profit before tax	₹ 30,000
Provision for taxation	₹ 10,000
Profit after tax	₹ 20,000
<b>The cost of goods sold has been arrived at as under:</b>	
Materials used	₹ 84,000
Wages and manufacturing expenses	₹ 62,500
Depreciation	₹ 23,500
Less: Stock of finished goods	₹ 17,000
(10% of goods produced not yet sold)	
<b>Total</b>	<b>₹ 1,53,000</b>

The figures given above relate only to finished and not to work-in-progress. Goods equal to 15% of the year's production ( in terms of physical units) will be in process on the average requiring full materials but only 40% of the other expenses. The company believes in keeping materials equal to two months consumption in stock.

All expense will be paid one month in arrears. Suppliers of materials will extend one and a half months credit . 70% of the Income tax will be paid in advance in quarterly installments. The company wishes to keep ₹ 8000 in cash , credit sales constitute 80 % of total sales. Credit allowed to debtors is two months.

Prepare an estimate of:

- i. Working capital and
- ii. Cash cost of working capital

14) From the following projections of XYZ & Ltd for the next year, you are required to determine the working capital required by the company.

Estimated for 2001-02	
Annual sales	₹ 14,40,000
Cost of production (including depreciation of ₹ 1,20,000)	₹ 12,00,000
Raw material purchase	₹ 7,05,000
Monthly expenditure	₹ 30,000
Estimated opening stock of raw materials	₹ 1,40,000
Estimated closing stock of raw materials	₹ 1,25,000
Inventory Norms:	
Raw material	2 months
Work in progress	½ month
Finished goods	1 month

The firm enjoys a credit of half-a-month on its purchase and allows one month credit on its supplies. On sales orders, the company receives in advance of ₹ 15,000. You may assume that production is carried out evenly throughout the year and minimum cash balance desired to be maintained is ₹ 35,000.

15) A pro-forma cost sheet provides the following data:

Particulars	Amount (₹)
Raw Material cost per unit	117
Direct labour cost per unit	49
Factory overheads cost per unit (includes depreciation of ₹ 18 per unit at budget level of activity)	98
Total cost per unit	264

Add: Profit	36
Selling price per unit	300

Following additional information is available:

Average raw material in stock = 4 weeks, average WIP stock (material 80%, Labour 60%) = 2 weeks

Finished goods in stock = 3 weeks, Credit period allowed to debtors = 6 weeks,

Credit period availed from suppliers = 8 weeks, Time lag in payment of wages = 1 week,

Time lag in payments of overheads = 2 weeks.

The company sells one-fifth of the output against cash and minimum cash balance of ₹ 2,50,000.

Prepare a statement showing estimate of working capital needed to finance a budgeted activity level of 78,000 units of production. Assume that production is carried on evenly throughout the year and wages and OH accrue similarly.

16) The following annual figures relate to Katrina Co.

Elements of cost	(₹)
Sales (at two months credit)	36,00,000
Materials consumed (suppliers extend two months credit )	9,00,000
Wages paid ( monthly in arrears)	7,20,000
Manufacturing expenses outstanding at the end of the year(cash expenses are paid one month in arrear)	80,000
Total administrative expenses , paid as above	2,40,000
Sales promotion expenses, paid quarterly in advance	1,20,000

The company sells its products on a gross profit of 25% counting depreciation as part of the cost of production) it keeps one months stock each of raw materials and finished goods , and a cash balance of ₹ 1,00,000

Assuming a 20% safety margin. Workout the working capital requirement of the company on cash cost basis. Ignore work-in-progress

- 17) A newly formed company has applied to the commercial bank for the first time for financing its working capital requirements. The following information is available about the projections for the current year:

Estimated level of activity : 104000 completed units of production plus 4000 units of work-in-progress  
Based on the above activity , estimated cost per unit is:

Particulars	Cost per unit (₹)
Raw Material	80
Direct Wages	30
Overheads (exclusive of depreciation)	60
Total cost per unit	170
Selling price	200

Raw materials in stock : average 4 weeks consumption , work –in-progress (assume 50% completion stage in respect of conversion cost ) ( materials issued at the start of the processing)

Particulars	
Finished goods in stock	8000 units
Credit allowed by suppliers	Average 4 weeks
Credit allowed to debtors/ receivables	Average 8 weeks
Lag in payments of wages	Average 1 ½ weeks

Current working capital (for smooth operation) is expected to be ₹ 25,000. Assume that production is carried on evenly throughout the year ( 52 weeks ) and wages and overheads accrue similarly. All sales are on credit basis only.

Find out the net working capital structure



- 18) Compute “Maximum Bank Borrowings” permissible under method , I,II and III of Tondon Committee norms from the following figures and comment on each method.

Liabilities	₹ (Lakhs)	Assets	₹ (Lakhs)
Creditors for purchases	200	Raw materials	400
Other current liabilities	100	Work-in-progress	40
Bank borrowings	440	Finished goods Receivable including bills	180
		Discounted with bankers	100
		Other Current Assets	20
<b>Total</b>	<b>740</b>	<b>Total</b>	<b>740</b>

Assume core current assets are ₹ 190 lakhs

- 19) Z co. ltd is a pipe manufacturing company its production cycle indicates that materials are introduced in the beginning of the production cycle , ; wages and overhead accure evenly through out the period of the cycle wages are paid in the next month following the month of accrual work in progress includes full units of raw materials used in the beginning of the production process and 50% of wages and overheads are supposed to be conversation costs , Details of production process and 50% of wages and overdrafts are supposed to be conversation costs . details of production process and the components of working capital are as follows:

Particulars	
Production of pipes	12,00,000 Units
Duration of the production cycle	1 month
Raw materials inventory held	1-month consumption
Finished goods inventory held for	2 months
Credit given to creditors	one months
Credit given debtors	two months

Cost price of raw materials	₹ 60 per unit
Direct wages	₹ 10 per unit
Overheads	₹ 20 per unit
Selling price of finished pipes	₹ 100 per unit

Required to calculate :

- The amount of working capital required for the company
  - Its maximum permissible bank finance under all the three methods of lending norms as suggested by the Tondon Committee, assuming the value of core Current Assets ₹ 1,00,00,000
- 20) PQR Ltd has been having some difficulty with the collection of debts from export customer. At present the company makes no special arrangement for export sales. As a result the company, is considering either employee service of non-resources export factoring company, or is insuring its export against non payment through insurer. The two alternative also provide possible ways of finance of 80% of export credit sales at an interest rate of 2% above bank base rate ( the base rate is 8%) The service fee for debt collection is 3% of credit sales. If the factor is used, administrative saving of ₹ 35000 a year should be possible. A comprehensive insurance policy costs 35 paise per ₹ 100 insured debts, at a cost of 1.5% above base rate PQR annual export total ₹ 10,00,000 export sales are on terms of 90 days credit sales 0.5 % results in bad debt which have to be written off. The company is able to borrow a overdraft from its bank, unsecured at 2.5% above base rate. Assume a 360 days a year. Recommend which combination of export administration and financing PQR Ltd should use.
- 21) H Ltd. Has been operating its manufacturing facilities till 31.3.2013 on a single shift working with the following cost structure :

Particulars	Cost per unit (₹)
Cost of materials	6.00
Wages (40% fixed)	5.00
Overheads (80%)	5.00
Profit	2.00
Selling Price	18.00

Sales during 2012-2013- ₹ 4,32,000 As at 31.3.2013 the company held:

Particulars	₹
Stock of raw materials (at cost)	36,000
Work-in-progress (valued at prime cost)	22,000
Finished goods (valued at total cost)	72,000
Sundry debtors	1,08,000

In view of increased market demand, it is proposed to double production by working an extra shift. It is expected that a 10% discount will be available from suppliers of raw materials in view of increased volume of business selling price will remain the same the credit period allowed to customers will remain unaltered Credit availed of from suppliers will continue to remain at the present level. i.e. 2 months Lag in opayment of wages and expenses will continue to remain half a month.

You are required to assess the additional working capital requirement if the policy to increase output is implemented

- 22) The S Ltd. Sells goods on credit Its current annual credit sales amount to ₹ 840 lakhs. the variables cost ratio is 80 percent . the credit terms are 2/10 net 30 .On the current level of sales the bad debts are 0.70 percent. The past experience ahs been that 50 per cent of the customer avails of cash discount, the remaining customer pay on an average 50 days after the date of sale . The book debts (receivable) of the firm are presentally being financed in the ratio of 2:1 by amix of bank borrowings and owned funds which cost per annum 25 percent and 28 percent resp. .as an alternative to the in house management of receivable S Ltd. Is contemplating use of full advance non-recourse factoring deal with the Ind bank factors Ltd. The main elements of such a deal structured by the factors are.
- Factor reserve , 15 percent
  - Guaranteed payments date 24, days after the date of sale
  - Discount charge , 22 percent and
  - Commission for other services (payable up-front) 5 percent of the value of receivables .the finance manager of S Ltd. Seeks your advise would you give ? you can advice would you give ? you can make your own assumption where necessary .
- 23) A manufacturing firm has credit sales of ₹ 360 lakh and its average collection period is 30 days. The financial controller estimates bad-debt losses at around 2% of credit sales. The firm spends ₹ 1,40,000 annually on debtor's administration. This cost comprises of telephone and internet bills along with salaries of staff members.

A factoring firm has offered to buy the firms receivable. The factor will charge 1% commission and will pay an advance against receivables on an interest @ 15% p.a. after withholding 10% as reserve.

What should the firm do? Assume 360 days in a year.

**June-2016 (8 marks)**



- 1) **Transaction need:** Cash facilitates the *meeting of the day-to-day expenses and other debt payments*. Normally, inflows of cash from operations should be sufficient for this purpose. But sometimes this inflow may be temporarily blocked. In such cases, it is only the reserve cash balance that can enable the firm to make its payments in time.
- 2) **Speculative needs:** *Cash may be held in order to take advantage of profitable opportunities that may present themselves and which may be lost for want of ready cash/settlement.*
- 3) **Precautionary needs:** Cash may be held to act as for *providing safety against unexpected events.*

### Cash Planning

Cash Planning is a technique to plan and control the use of cash. This protects the financial conditions of the firm by developing a projected cash statement from a forecast of expected cash inflows and outflows for a given period. This may be done periodically either on daily, weekly or monthly basis. The period and frequency of cash planning generally depends upon the size of the firm and philosophy of management. As firms grows and business operations become complex, cash planning becomes inevitable for continuing success. The very first step in this direction is to estimate the requirement of cash. For this purpose cash flow statements and cash budget are required to be prepared. The technique of preparing cash flow and funds flow statements have already been discussed in this book. The preparation of cash budget has however, been demonstrated here.

### Cash Budget

Cash Budget is the most significant device to plan for and control cash receipts and payments. This represents cash requirements of business during the budget period.

The various purposes of cash budgets are:

- i) Coordinate the timings of cash needs.
- ii) It also helps to pinpoint period(s) when there is likely to be excess cash;
- iii) It enables firm which has sufficient cash to take advantage like cash discounts on its accounts payable; and
- iv) Lastly it helps to plan/arrange adequately needed funds on favorable terms.

### Main Components of Cash Budget

***Preparation of cash budget involves the following steps:***

- a) Selection of the period of time to be covered by the budget.

- b) Selection of factors that have a bearing on cash flows. The factors that generate cash flows are generally divided into following two categories:
- i) Operating (cash flows generated by operations of the firm); and
  - ii) Financial (cash flows generated by financial activities of the firm).

### Methods of Cash Flow Budgeting

A cash budget can be prepared in the following ways.

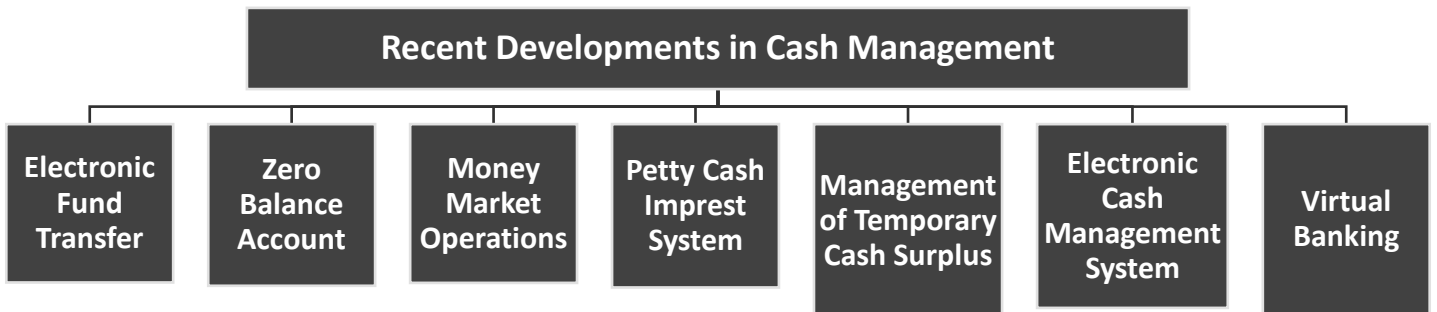
- 1) Receipts and Payments Method:** In this method *all the expected receipts and payments for budget period are considered*. All the cash inflow and outflow of all functional budgets including capital expenditure budgets are considered. *Accruals and adjustments in accounts will not affect the cash flow budget*. Anticipated cash inflow is added to the opening balance of cash and all cash payments are deducted from this to arrive at the closing balance of cash.
- 2) Adjusted Income Method:** In this method the *annual cash flows are calculated by adjusting the sales revenues and cost figures for delays in receipts and payments (change in debtors and creditors) and eliminating non-cash items such as depreciation*.
- 3) Adjusted Balance Sheet Method:** In this method, *the budgeted balance sheet is predicted by expressing each type of asset and short-term liabilities as percentage of the expected sales*. The profit is also calculated as a percentage of sales, so that the increase in owner's equity can be forecasted.

#### Format of Cash Budget

	Month1	Month2	Month3 and so on...
<b>Receipts:</b>			
1. Opening Balance			
2. Collection from Debtors			
3. Cash Sales			
4. Loan from Banks			
5. Share Capital			

6. Miscellaneous Receipts			
7. Other Items			
<b>Total</b>			
<b>Payments:</b>			
1. Payments to creditors			
2. Wages			
3. Overheads			
4. Interest			
5. Dividend			
6. Corporate tax			
7. Capital expenditure			
8. Other items			
<b>Total</b>			
Closing balance			
<b>[Surplus (+)/Shortfall (-)]</b>			

**Recent Developments in Cash Management**



It is important to understand the latest developments in the field of cash management, since it has a great impact on how we manage our cash. Both technological advancement and desire to reduce cost of operations has led to some innovative techniques in managing cash. Some of them are:



- 1) Electronic Fund Transfer:** *With the developments which took place in the Information technology, the present banking system is switching over to the computerization of banks branches to offer efficient banking services and cash management services to their customers. The network will be linked to the different branches, banks. This will help the customers in the following ways:*
- Instant updating of accounts.
  - The quick transfer of funds.
  - Instant information about foreign exchange rates.
- 2) Zero Balance Account:** *For efficient cash management some firms employ an extensive policy of substituting marketable securities for cash by the use of zero balance accounts. Every day the firm totals the cheques presented for payment against the account. The firm transfers the balance amount of cash in the account if any, for buying marketable securities. In case of shortage of cash, the firm sells the marketable securities.*
- 3) Money Market Operations:** *One of the tasks of 'treasury function' of larger companies is the investment of surplus funds in the money market. The chief characteristic of money market banking is one of size. Banks obtain funds by competing in the money market for the deposits by the companies, public authorities, High Net worth Investors (HNI), and other banks. Deposits are made for specific periods ranging from overnight to one year; highly competitive rates which reflect supply and demand on a daily, even hourly basis are quoted.*
- 4) Petty Cash Imprest System:** *For better control on cash, generally the companies use petty cash imprest system wherein the day-to-day petty expenses are estimated taking into account past experience and future needs and generally a week's requirement of cash will be kept separate for making petty expenses. Again, the next week will commence with the predetermined balance. This will reduce the strain of the management in managing petty cash expenses and help in the managing cash efficiently.*
- 5) Management of Temporary Cash Surplus:** *Temporary cash surpluses can be profitably invested in the following:*
- Short-term deposits in Banks and financial institutions.
  - Short-term debt market instruments.
  - Long-term debt instruments.
  - Shares of Blue chip listed companies.
- 6) Electronic Cash Management System:** *Most of the cash management systems now-a-days are electronically based, since 'speed' is the essence of any cash management system. Electronically, transfer of data as well as funds play a key role in any cash management system. Electronic-scientific cash management results in:*
- Significant saving in time.
  - Decrease in interest costs.
  - Less paper works.
  - Greater accounting accuracy.
  - More control over time and funds.

- Supports electronic payments.
- Faster transfer of funds from one location to another, where required.
- Reduction in the amount of 'idle float' to the maximum possible extent.
- It makes inter-bank balancing of funds much easier.
- It is a true form of centralized 'Cash Management'.
- Produces faster electronic reconciliation.
- Allows for detection of book-keeping errors.
- Reduces the number of cheques issued.
- Earns interest income or reduce interest expense.

**7) Virtual Banking:** With the broad spectrum of electronic banking the virtual banking has gained prominence. The origin of virtual banking in the developed countries can be traced back to the seventies with the installation of Automated Teller Machines (ATMs). Subsequently, driven by the competitive market environment as well as various technological and customer pressures, other types of virtual banking services have grown in prominence throughout the world. The Reserve Bank of India has been taking a number of initiatives, which will facilitate the active involvement of commercial banks in the sophisticated cash management system. One of the pre-requisites to ensure faster and reliable mobility of funds in a country is to have an efficient payment system. Considering the importance of speed in payment system to the economy, the RBI has taken numerous measures since mid-Eighties to strengthen the payments mechanism in the country. Introduction of computerized settlement of clearing transactions, use of Magnetic Ink Character Recognition (MICR) technology, provision of inter-city clearing facilities and high value clearing facilities, Electronic Clearing Service Scheme (ECSS), Electronic Funds Transfer (EFT) scheme, Delivery vs. Payment (DVP) for Government securities transactions, setting up of Indian Financial Network (INFINET) are some of the significant developments. Introduction of Centralised Funds Management System (CFMS), Securities Services System (SSS), Real Time Gross Settlement System (RTGS) and Structured Financial Messaging System (SFMS) are the other top priority items on the agenda to transform the existing system into a state-of-the art payment infrastructure in India. *The current vision envisaged for the payment systems reforms is one, which contemplates linking up of at least all-important bank branches with the domestic payment systems network thereby facilitating cross border connectivity. With the help of the systems already put in place in India and which are coming into being, both banks and corporates can exercise effective control over the cash management.*

## Advantages

The advantages of virtual banking services are as follows:

- Lower cost of handling a transaction.
- The increased speed of response to customer requirements.
- The lower cost of operating branch network along with reduced staff costs leads to cost efficiency.
- Virtual banking allows the possibility of improved and a range of services being made available to the customer rapidly, accurately and at his convenience.
- The popularity which virtual banking services have won among customers is due to the speed, convenience and round the clock access they offer.



# PRACTICAL QUESTIONS



1. Prepare a cash budget for April-June 2013 from the information:

a) Actual and Budgeted sales:

Year	Actual (₹)	Year	Budgeted (₹)
January	80,000	April	90,000
February	80,000	May	85,000
March	75,000	June	80,000

b) Actual and Budgeted purchases:

Year	Actual (₹)	Year	Budgeted Expenses (₹)
January	40,000	April	50,000
February	40,000	May	45,000
March	42,000	June	35,000

c) Actual and Budgeted Wages and expenses:

Year	Actual Wages (₹)	Actual Expenses (₹)	Year	Budgeted Wages (₹)	Budgeted Expenses (₹)
January	20,000	5,000	April	24,000	7,000
February	18,000	6,000	May	20,000	6,000
March	22,000	6,000	June	18,000	5,000

d) Special - Advance Income Tax in May ₹ 4,000, Plant in April ₹ 10,000

e) Rent ₹ 3000/- payable each month not included in expenses

f) 10% of purchase and sales are on cash terms

- g) Credit purchases are paid after one month and sales are collected after two months. Time lag in wages and expenses  $\frac{1}{2}$  month.
- h) Cash and Bank Balances on April 1<sup>st</sup> ₹ 13,000

2) The following particulars have been obtained in respect of the retail business of Sona Limited for the three months, ending March 2013:

a) Working capital as on 1<sup>st</sup> January 2013 has been estimated as follows:

Particulars	(₹)
Cash and bank balances	10,900
Debtors	51,400
Creditors	42,200
Outstanding Expenses	4,000
Dividend due	9,700
Tax due	6,400
Stock	26,000

b) Budget profit statement at the end of each month:

	2013		
	January (₹)	February (₹)	March (₹)
Sales	42,000	36,000	34,000
Cost of Sales	32,700	28,100	26,600
Gross profit	9,300	7,900	7,400
Administrative, selling and distribution expenses	6,300	5,400	5,100
Net profit before tax	3,000	2,500	2,300

c) Budget balance at the end of each month

	2013		
	January (₹)	February (₹)	March (₹)
Stock	24,000	22,000	20,000
Debtors	52,000	50,100	47,000
Creditors	40,000	39,000	38,000
Outstanding expenses	4,000	4,000	4,000
Dividend Due	9,700	-	-
Tax due	6,400	6,400	6,400

**Note:** Depreciation amounting to ₹ 1700 has been included in the budget expenditure of each month you are required to prepare a cash budget on receipts and payments basis by months up to march 2013.

- 3) From the following information relating to a departmental store. You are required to prepare the cash budget for the three months ending 31<sup>st</sup> January 2013
- a) Month wise cash budget on receipts and payments basis. It is anticipated that the working capital as at 1<sup>st</sup> November will be as follows:

	(₹ In 000's)
Cash in hand and at bank	5,545
Short term investments	300
Debtors	2,570
Stock	1,300
Trade Creditors	2,110
Other Creditors	200
Dividend Payable	485
Tax due	320

Plant	800
-------	-----

**Budget profit statement:**

	₹ In 000's		
	November (₹)	December (₹)	January (₹)
Sales	2,100	1,800	1,700
Cost of Sales	1,635	1,405	1,330
Administrative, selling and distribution expenses	465	395	370
Net profit before tax	315	270	255
	<b>150</b>	<b>125</b>	<b>155</b>

Depreciation amounting to ₹ 60,000 is included in the budgeted expenditure for each month.

4) As the finance executive of Ajay Limited you are required to develop the cash budget and proforma profit and loss account and Balance sheet of the company. The following information has been collected for the purpose.

a) Balance sheet as on December 31<sup>st</sup>2012.

Liabilities	(₹)	Assets	(₹)
Share Capital	10,000	Fixed Assets	3,00,000
		Less: Depreciation	50,000
Reserves and Surplus	9,00,000	Inventory	4,90,000
		Accounts receivables	1,00,000
		Cash	1,60,000
<b>Total</b>	<b>10,00,000</b>	<b>Total</b>	<b>10,00,000</b>

b) Sales forecast:



Year	(₹)	Year	(₹)
January	2,00,000	April	6,00,000
February	4,00,000	May	9,00,000
March	5,00,000	June	5,00,000
		July	1,00,000

c) Estimated monthly salary:

Year	(₹)	Year	(₹)
January	30,000	April	90,000
February	50,000	May	1,10,000
March	70,000	June	60,000

d) Monthly selling and administrative expenses are to be 10% of sales, depreciation charges are 1 % per month.

e) Terms of business:

- i. Sales are on a net 30 basis. Collection materialises only after the passage of a month from the sale of sale.
- ii. Purchases are on cash basis
- iii. The company purchases goods to meet the next month's sales requirements also
- iv. The cost of goods sold is 70% of sales
- v. A minimum inventory of ₹ 3,70,000 is maintained at all times to given customers prompt services
- vi. A minimum cash balance of ₹ 1,00,000 is maintained

f) Additional information:

- a) The company will invest ₹ 50,000 in fixed assets on March 1<sup>st</sup>. The payments will be affected immediately

- b) The deficit shown by the cash budget is made up by borrowing from the bank at the beginning of month repayment is made at the end of the month. The bank charges 1% interest per month on borrowings. The interest is payable at the end of June. Borrowing is made in round figures of ₹ 1,000.
- c) The income tax rate applicable to the company is 35% is payable in July on the profit earned during January 1<sup>st</sup> to June 30<sup>th</sup> provide for accrued tax in the financial statements.

# CHAPTER 10

## PORTFOLIO MANAGEMENT

### SECURITIES

Securities may be defined as instruments issued by seekers of funds in the investment market to the providers of funds in lieu of funds. These instruments prima facie provide evidence of ownership to the holder of the Instrument. Securities can broadly be divided into two categories – Debt Securities and Equity Securities.

- They carry a pre-determined rate or return denoted by the rate of interest or the coupon rate.
- They carry a pre-determined rate or return denoted by the rate of interest or the coupon rate.
- They have either a specified tenure after which these are redeemed.
- The rate of return on debt instruments is determined by the following :- Market structure of interest rate and Credit worthiness of the issuer.
- Debt securities normally involve creation of charge upon the fixed and/or movable assets of the issuer.
- Debt instruments create an ascertainable liability for the issuer. Interest payable on the debt is a tax-deductible expenses.
- The debt instruments may be issued at pay value or at a premium or discount to the par value.
- Debt instruments are usually transferable. I.e. the ownership of the instrument can change hands before the maturity of the debt instrument.

**The second class of securities, i.e. equity securities have the following features :**

- Equity Securities do not carry a specified pre-determined or assured rate of return. Return on these securities is obtained in two ways. It can be either by way of dividend declared by the issuer or it can be in the shape of capital gains.
- Since, equity capital is considered to be owners' contribution, equity instruments do not have a specified tenure and the instruments are not expected to be redeemed in the normal course.
- The rate of return on equity instruments is determined by the policy of the issuer and general economic conditions.
- Holders of equity instruments do not have a charge or claim on the assets of the company.

- The cost of equity capital is more to the issuer since dividend pay-out is not tax deductible.
- The equity instruments can be issued at par value or at a premium or discount to the par value.
- Equity instruments represent part ownership of the company and their redemption under normal circumstances is ruled out.

## CONCEPT OF RISK AND RETURN

Investors have many motives for investing. The most important of all, as it is often called, is to earn a return on their investments. However, selecting investments on the basis of maximization of return is not enough. The fact that most investors invest their funds in more than one security suggests that other factors, besides return, must be considered. The investors not only like return but also dislike risk.

### RETURN :

The return is the motivating force and the principal reward in the investment process. The return may be defined in terms of (i) realized return i.e., return which was earned or could have been earned, and (ii) expected return i.e. return which the investor anticipate to earn over some future period. The expected return is a predicted return and may or may not occur.

### RISK :

Risk in investment means that the future returns from that investment are unpredictable. The concept of risk may be defined as the possibilities that the actual return may not be same as expected. With reference to a firm, risk may be defined as the possibility that the actual outcome of a financial decision may not be same as estimated. In other words, the actual results / outcomes/returns may vary from the estimates. So, the risk may also be considered as a chance of variation or chance of a loss. Investment having greater chances of variations or chances of loss is considered as more risky than those with lesser chances of variations. There may be different types of risk involved in a financial decision. Some of these are :

#### 1) Capital risk:

The risk of incurring a capital loss due to downward changes in the market price of a security is defined as the capital risk of that security.

#### 2) Income risk:

There is a risk of variation in return available from the security.

#### 3) Default risk:

There may be a default in payment of interest or repayment of principal amount by the company and chances of this default is called the default risk.

The different types of securities offer different degrees of risk. Government Bonds are considered as a risk-less securities. There is no risk of a default of any type on these bonds.

#### ❖ MEASUREMENT OF RISK :

Risk refers to the variability or dispersion of expected returns. In order to analyze the risk, one must be able to measure the risk. It now remains to choose a specific measure of the variability of returns. A simple way to measure risk is to find out the range of possible returns, which is simply the difference between the highest and the lowest value of return. However, the most common, convenient and reliable measure is the degree of spread of possible returns away from the expected return. In other words, this is the standard deviation,  $\sigma$ , of possible outcomes.

#### ❖ GROUPS / TYPES OF INVESTORS :

From the point of view of risk return perception the investors may be classified as :

##### 1) Risk Averse:

These investors avoid risk, however, may be ready to take risk if the return available for taking extra risk is commensurate.

##### 2) Risk Seekers:

These investors are ready to take risk even if the return for taking that risk is not sufficient enough.

##### 3) Risk Neutrals:

These investors require just a sufficient return for taking risk. They want neither extra return for a given risk, nor are ready to take extra risk for a given return.

#### ❖ PORTFOLIO MANGEMENT :

Investment in the securities such as bonds, debentures and shares etc. is lucrative as well as exiting for the investors. Though investment in these securities is rewarding one but also risky. Therefore investment in these securities requires scientific and analytical knowledge as well as artistic skills. In investment decision both rational as well as emotional responses are involved investment in financial securities have become very important now a day. As per the famous English idiom 'Do not put all the eggs in basket' it is rarely found that the investor invest their entire investible funds in one investment rather they tend to invest in a group

or bundle of securities. Such a group of securities is called a portfolio. Investment in portfolio reduces risk without diluting the returns. The investor who is expert in understanding the fundamentals and principles of portfolio analysis normally beat the market and gets the super normal returns. The portfolio management deals with the selection of optimal portfolios by rational risk-averse investors i.e., by investors who attempt to maximize their expected return consistent with individually acceptable portfolio risk. The portfolio management is the investment of funds in such combinations of different securities in which the total risk of the portfolio is minimized while expecting maximum return from it. The total risk emanating from a portfolio of an investor can be further classified into diversifiable and non-diversifiable risk (as discussed later). It is only the diversifiable risk element that can be minimized by holding a portfolio. Since, every investor is predominantly a risk averse, so, in order to minimize the risk, every investor attempts to hold a well diversified portfolio.

Portfolio management thus, takes the ingredients of risk and return for individual securities and considers the mixing of these securities. It entails choosing the one best portfolio to suit the risk-return preferences of the investors.

#### ❖ OBJECTIVES OF PORTFOLIO MANAGEMENT :

Some of the important objectives of portfolio management are :

- (i) **Security / Safety of Principal:**  
Security not only involves keeping the principal sum intact but also keeping intact its purchasing power.
- (ii) **Stability of Income:**  
to facilitate planning more accurately and systematically the reinvestment or consumption of income.
- (iii) **Capital Growth:**  
It can be attained by reinvesting in growth securities or through purchase of growth securities.
- (iv) **Marketability i.e. the ease with which a security can be bought or sold :**  
This is essential for providing flexibility to investment portfolio.
- (v) **Liquidity i.e. nearness to money:**  
It is desirable for the investor so as to take advantage of attractive opportunities upcoming in the market.
- (vi) **Diversification:**  
The basic objective of building a portfolio is to reduce the risk of loss of capital and/or income by investing in various types of securities and over a wide range of industries.
- (vii) **Favourable Tax Status:**

The effective yield an investor gets from his investment depends on tax to which it is subject. By minimizing the tax burden, yield can be effectively improved.

#### ❖ TWO-SECURITY PORTFOLIO :

The risk in case of two security portfolio can be summarized as follows :

1. The lower the coefficient of correlation between two securities, the lower will be the risk of the portfolio.
2. The portfolio risk can be minimized or at least reduced by diversification into negatively correlated securities.
3. The diversification into positively correlated securities does not reduce the portfolio risk.
4. Uncorrelated securities can reduce the risk only if there are number of securities in the portfolio.

#### ❖ MULTI-SECURITY PORTFOLIO :

The total risk of a portfolio can be bifurcated into two parts as follows :

##### 1) **Systematic or Market Risk:**

It is that part of total risk which cannot be eliminated by diversification. This part of the systematic risk refers to the fluctuations in return due to general factors in the market such as money supply, inflations, economic recession, industrial policy, interest rate policy of the Government, credit policy, tax policies etc. These are the factors which affect almost every firm. It is also called the non-diversifiable risk, or the market risk. Systematic Risk is measured in terms of  $\beta$  factor.

##### 2) **Unsystematic Risk:**

The unsystematic risk is one which can be eliminated by diversification. This risk represents the fluctuations in returns of a security due to factors specific to the particular firm only and not the market as a whole. These factors may be such as worker's unrest strike, change in market demand, change in competitive environment, change in consumer preferences etc., Since these factors affect one firm/industry at a time, they must be examined separately for each security. This risk is also called diversifiable risk and can be reduced by diversification.

#### ❖ THEORY OF PORTFOLIO SELECTION [OR SELECTION OF AN EFFICIENT PORTFOLIO] HARRY MARKOWITZ MODEL [HM MODEL] :

This model was developed by Harry Markowitz in 1952. It analyses the various possible portfolios of the given number of securities and helps in selection of the best or the most efficient portfolio. The HM Model shows as to how an investor can reduce the risk i.e., the standard deviation of the portfolio returns by choosing those securities which do not move exactly together. As the HM model is based on the expected returns (mean), and the standard deviation (Variance) of different portfolios, it is also called as the Mean-Variance Model. This model is based on the following assumptions :

1. An investor is basically risk averse and the risk of a portfolio is estimated on the basis of variability of returns there from.
2. The decision of the investor regarding selection of the portfolio is made on the basis of returns and risk of the portfolio.
3. An investor attempts to get maximum return from the investment with minimum risk. For a given level of risk, he attempts to earn a higher return.

#### **Determining the Efficient Set :**

Efficient portfolio is one which provides the maximum expected return for any particular degree of risk, or the lowest possible degree of risk for any given rate of return. In other words, a portfolio is called an efficient, if there is no other portfolio available which gives a higher return at the same risk; or a lower risk for the same expected return. Thus, the selection of portfolios will be as follows :

- a) Out of the portfolios with same expected return, investor would prefer one that has lower risk, and
- b) Out of the portfolios that have same risk, the investor would prefer, the one with higher return.

Limitations of the HM Model : The HM model makes a systematic and rational attempt to establish a relationship between risk and return. It helps in determining the efficient portfolio. However, it also suffers from several weaknesses as follows :

- 1) It requires large amount of input data.
- 2) In the HM Model, complex and numerous computations are required.

#### **❖ CAPITAL ASSET PRICING MODEL [CAPM] :**

The Capital Asset Pricing Model [CAPM] attempts to measure the risk of a security in the portfolio sense. It considers the required rate of return of a security on the basis of its contribution to total portfolio risk. The core idea of the CAPM is that only undiversifiable risk is relevant to the determination of required return on any asset. Since the diversifiable risk can be eliminated, there is no reward for it.

Assumptions of CAPM : the CAPM is based upon several assumptions as follows :



1. The investors are basically risk averse and diversification is needed to reduce the risk.
2. All investors want to maximize the wealth and therefore choose a portfolio solely on the basis of risk and return assessment.
3. All investors can borrow or lend an unlimited amount of funds at risk-free rate of interest.
4. All investors have identical estimates of risk and return of all securities.
5. All securities are perfectly divisible and liquid and there is no transaction cost or tax.
6. The security market is efficient and purchases and sales by a single investor cannot affect the prices. This also means that there is a perfect competition in the market.
7. All investors are efficiently diversified and have eliminated the unsystematic risk. Thus, only the systematic risk is relevant in determining the estimated return.

#### The Model :

As the securities available to an investor do not have same level of systematic risk. The factors contributing to systematic risk do not affect all the securities in the same way. The magnitude of the influence of these factors varies from one security to another depending upon the sensitivity of the security to the market fluctuations. The investor will pay premium only for the systematic risk as it is non-diversifiable. The systematic risk differs from one security to another and its measurement is important in selecting the securities of desired risk-return characteristics. It is already stated that systematic risk can be measured in terms of  $\beta$  factor. The CAPM can be expressed as follows :

$$R_s = R_f + \beta (R_m - R_f)$$

What the CAPM shows is that the required return for a particular security depends on three things :

- 1) The pure time value of money : As measured by the  $R_f$ , this is the reward for merely waiting for your money, without taking any risk.
- 2) The reward for bearing systematic risk : As measured by the market risk premium,  $(R_m - R_f)$ , this component is the reward, the market offers for bearing an average amount of systematic risk in addition to waiting.
- 3) The amount of systematic risk : As measured by  $\beta$  this is the amount of systematic risk present in a particular security, in relation to that in an average security.

#### ❖ $\beta$ FACTOR AND ITS CALCULATION :

William Sharpe has suggested that the systematic risk can be measured by  $\beta$ , the beta factor. The  $\beta$  can be viewed as an index of the degree of the responsiveness of the security's return with the market return. The beta coefficient is the relative measure of sensitivity of an asset's return to change in the return on the market portfolio. The beta coefficient,  $\beta$ , is calculated by relating the returns of a security with the returns for the market.

It may be noted that both the  $\sigma$  and the  $\beta$  are the measures of risk. However, the two measures are different. While  $\sigma$  is a measure of total risk, the  $\beta$  is a relative index of systematic risk. The beta measure,  $\beta$ , is more relevant for the pricing of securities and other assets.

#### ❖ BETA OF A PORTFOLIO :

Under the risk and return analysis of a portfolio it has been discussed that the variance of a portfolio can be found with the help of standard deviation of each of the security and the correlation coefficient of the portfolio. However, in case of CAPM, the risk is measured in-terms of  $\beta$ . The  $\beta$  of a portfolio is the weighted average of the  $\beta$  of individual securities in the portfolio.

#### ❖ UNDER VALUED AND OVER VALUED STOCKS :

The CAPM model can be practically used to buy, sell or hold stocks. CAPM provides the required rate of return on a stock after considering the risk involved in an investment. Based on current market price or any other judgemental factors (benchmark) one can identify as to what would be the expected return over a period of time. By comparing the required return with the expected return the following investment decisions are available :

- a) When CAPM < Expected Return – Buy : This is due to the stock being undervalued i.e. the stock gives more return than what it should give.
- b) When CAPM > Expected Return – Sell : This is due to the stock being overvalued i.e. the stock gives less return than what it should give.
- c) When CAPM = Expected Return – Hold : This is due to the stock being correctly valued i.e. the stock gives same return than what it should give.

From another angle, if the current market price is considered as a basis of CAPM then :

- i. Actual Market Price < CAPM, stock is undervalued
- ii. Actual market Price > CAPM, stock is overvalued.

Actual market Price = CAPM, stock is correctly valued.

❖ **CAPITAL MARKET LINE :**

When risk and return are plotted in a graph, X-axis represents standard deviation (risk) and y-axis represents the expected return. Capital market line is a linear efficient frontier passing from  $R_f$  (risk free return) through market portfolio M. All portfolios lying along the CML will dominate. CML expresses the equilibrium pricing relationship between Expected Return and standard deviation for all efficient portfolios lying along the line.

$$\text{Expected Return} = R_f + [E(R_m) - R_f] \frac{x \text{ Standard Deviation of Portfolio}}{\text{Standard Deviation of Market}}$$

The slope of CML is the market price of risk and this component is same for all portfolios lying along CML. Thus the factor that distinguishes the expected return among CML portfolios is the magnitude of risk.

It is important to recognize that CML, their total risk represents their systematic risk, since all unsystematic risk has been diversified. The CML is important in describing the equilibrium relationship between expected return and risk for efficient portfolios that contain no unsystematic risk.

**CML VS. CAPM/SML :**

CML depicts linear relationship between expected return and total risk of all efficient portfolios, while SML depicts linear relationship between expected return and systematic risk of all securities. Since CML assumes well-diversified portfolios, its measure of risk, systematic risk, is the total risk of a portfolio as there is no unsystematic risk present in well-diversified portfolios. CAPM uses Beta as its measure of systematic risk. For portfolios lying along the CML, their returns are perfectly positively correlated with the market i.e. correlation coefficient with the market is + 1. Therefore, CML is a special case of CAPM. It represents an equilibrium pricing relationship that holds good only for widely diversified, efficient portfolios.

$$\text{Expected return under CAPM} = R_f + \beta [E(R_m) - R_f].$$

Some of the major points of distinction between the two are as under :

- In CML, the risk is defined by total risk, standard deviation, while in SML the risk is defined by undiversifiable market related risk.
- CML is valid only for fully diversified (efficient) portfolios while SML is valued for all portfolios and for individual securities as well.



## PROBLEMS

1. Find expected return.

Possible return (%)	probability
20	0.20
30	0.20
40	0.40
50	0.10
60	0.10

2. Find expected return.

Possible return (%)	probability
10	0.15
25	0.25
45	0.30
56	0.20
75	0.10

3. Find variance & standard deviation.

Possible return (%)	probability
20	0.20
30	0.20
40	0.40
50	0.10

<b>60</b>	<b>0.10</b>
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4. Find variance & standard deviation.

<b>Possible return (%)</b>	<b>probability</b>
<b>10</b>	<b>0.10</b>
<b>40</b>	<b>0.25</b>
<b>65</b>	<b>0.15</b>
<b>75</b>	<b>0.30</b>
<b>15</b>	<b>0.20</b>

5. From the following data calculate value of beta by correlation method.

Standard deviation of returns of particular stock = 7.5

Standard deviation of returns of market index = 6.7

Coefficient of correlation = 0.65

6. From the following data calculate value of beta by correlation method.

Standard deviation of returns of particular stock = 8.5

Standard deviation of returns of market index = 9.7

Coefficient of correlation = 0.34

7. Hilt Ltd is quoted at Rs. 60 . Nitin expects the company to pay a dividend of Rs. 3 per share, one year from now. The expected price one year from now is Rs. 78.5

a) What is expected dividend yield, rate of Price change & holding period yield (HPY)

b) If the beta of the share is 1.5 , the risk free rate is 6% and market risk premium is 10 %, what is the required rate of return

c) What is the intrinsic value of share.

8. From the following information calculate the expected return of a portfolio:

Risk free rate of return = 8%

Expected return of market portfolio = 18%

Standard deviation of an asset = 2.8%

Market standard deviation= 2.3%

Co-relation coefficient of portfolio and market = 0.8

9. Security A offers an expected return of 14% with a standard deviation of 8%. Security B offers an expected return of 11% with a standard deviation of 6%. If an investor wishes to construct a portfolio with a 12.8% expected return, what percentage of the portfolio will consist of security A?
10. Mohan has a portfolio of 6 securities, each with market value of Rs. 10,000. The current beta of the portfolio is 1.3 and beta of the riskiest security is 1.8. Mohan wishes to reduce his portfolio beta to 1.15 by selling riskiest security and replacing it with another security with a lower beta. What must be the beta of the replacement security?
11. Mr. X is presently concerned with the investment of Rs. 1, 00,000. He has two securities,  $S_1$  and  $S_2$  for this purpose. The relevant information in respect of these two securities is as follows:

	$S_1$	$S_2$
<b>Expected return</b>	<b>12%</b>	<b>20%</b>
<b><math>\sigma</math> of return</b>	<b>10%</b>	<b>18%</b>

Coefficient of correlation,  $r$ , between  $S_1$  and  $S_2 = .15$

He has decided to consider only five portfolios of  $S_1$  and  $S_2$  as follows:

- All funds invested in  $S_1$
- 50% of funds in each of  $S_1$  and 25% in  $S_2$
- 75% of funds in  $S_1$  and 25% in  $S_2$
- 25% of funds in  $S_1$  and 75% in  $S_2$
- All funds invested in  $S_2$

Find out

- Expected return under different portfolios.
- Risk factor associated with these portfolios.
- Which portfolio is best for him from the point of risk, and,
- Which portfolio is best for him from the point of view of return.

12. The risk-free interest rate is 8 per cent and the expected return on the market portfolio is 16 per cent. Calculate the expected return on the following securities:

<b>Security</b>	<b>Beta</b>
<b>A</b>	<b>0.4</b>
<b>B</b>	<b>1.0</b>
<b>C</b>	<b>2.6</b>
<b>D</b>	<b>2.0</b>

13. Suppose required rate of return on a portfolio with beta of 1.2 is 18% and risk free rate is 6%. According to CAPM:
- What is the expected rate of return of market portfolio ?
  - What is the expected return of zero beta security.
  - Suppose you choose to buy a stock Z for Rs. 50. The stock is expected to pay Rs. 2 as dividend next year and is hoped to sell at Rs. 53. Beta = -0.5 Is the stock fairly priced.

- d) A stock of delta , with beta of 1.5 sells for Rs. 50. One year from now, it is expected to yield a dividend income of Rs. 6. What price do investors expect after one year ?
14. An investor is seeking the price to pay for a security. Whose standard deviation is 4%. The correlation coefficient for the security with the market is 0.9 and the market standard deviation is 3.2%. The return from government securities is 6.2% and from the market portfolio is 10.8%. The investor knows that, by calculating the required return, he can then determine the price to pay for the security. What is the required return on the security?
15. An investor with risk aversion coefficient  $A = 3$  desires utility level ( $u$ ) of 5 %. If standard deviation of return for a portfolio is 10%. What is the required rate of return.
16. An investor is seeking the price to pay for a security, whose standard deviation is 3.00 per cent. The correlation coefficient for the security with the market is 0.8 and the market standard deviation is 2.2 per cent. The return from Government Securities is 5.2 per cent and from the market portfolio is 9.8 per cent. The investor knows that, by calculating the required return, he can then determine the price to pay for the security. What is the required return on the security?
17. Calculate the beta factor of the following investments. Is acceptance of the investment worthwhile, based upon its level of risk? The risk-free rate,  $r_{RF}$  , may be taken at 6%.

Probability	Returns on	
	Market (M)	Investment (S)
1/3	9%	6%
1/3	12%	30%
1/3	18%	18%

18. Calculate the market sensitivity index and the expected return on the investment from the following data.
- |  |       |
|--|-------|
| Standard deviation of an asset                   | 2.5%  |
| Market standard deviation                        | 2.0%  |
| Risk-free rate of return                         | 13.0% |
| Expected return on market portfolio              | 15.0% |
| Correlation coefficient of portfolio with market | 0.8   |
- What will be the expected return on the portfolio if portfolio beta is 0.5 and the risk-free return is 10%?
19. The following information is given:  
The risk free rate,  $r_{RF}$  = 8%



Expected return on market portfolio =16%  
 $\beta$  of the security =0.7

- i) Find out the expected return of the security, and
- ii) If the other security has an expected return of 20%, what must be its beta?

20. Consider following information

	Share moon	share mars
Expected return (%)	15	20
Standard deviation	10	15
Covariance (%)	120	

- a) What is the correlation between two shares
- b) What is the expected return and risk of portion in which moon & mars have been combined in equal proportion

21. The Risk free rate  $r_{RF}$ , is 4% and the market risk premium is 8.6% and  $\beta$  of the security is 1.3. What is the expected return of the security under CAPM? What would be the expected return if the  $\beta$  were to double?

22. An investment manager has chanced upon couple of securities with identical variance of 25 % but zero covariance between their returns.

- a) Calculate portfolio risk when two securities are combined in equal proportion

23. The following information is available in respect of the return from security X under different economic conditions:

Economic Condition	Return	Probability
Good	20%	.1
Average	16%	.4
Bad	10%	.3
Poor	3%	.2

Find out the expected return of the security and the risk associated with that.

24. You are presented with the following information concerning the returns on the shares of C Ltd. and on the market portfolio, according to the various conditions of the economy.

Condition of economy	Probability of Condition occurring	Return on C	Return on the Market
(1)	0.2	15%	10%
(2)	0.4	14%	16%
(3)	0.4	26%	24%

The current risk-free interest rate is 9 per cent. You are required to:

- a) Calculate the coefficient of correlation between the returns on C Ltd. and the Market portfolio.
- b) Calculate the total risk (i.e., standard deviation) of C Ltd. and discuss why this is not the most appropriate measure of risk to be used in making investment decisions.
- c) Calculate the beta factor for C Ltd. and briefly discuss its significance. Is C Ltd. efficiently priced according to the CAPM and the information given above?
25. The following are the different state of economy, the probability of occurrence of that state and the expected rate of return from security A and B in these different states.

State	Probability	Rate of return	
		Security A	Security B
Recession	.20	-.15	.20
Normal	.50	.20	.30
Boom	.30	.60	.40

Find out the expected returns and the standard deviations for these two securities. Suppose, an investor has Rs. 20,000 to invest, he invests Rs. 15,000 in security A and balance in security B, What will be the expected return and the standard deviation of the portfolio?

26. Ranbaxy Ltd is a well-known company in the pharmaceutical industry. Based on the monthly data for the last 4 years from 1 January, 1999 to December 31, 2002, its beta appears equal to 1.75. During this period, the company has deployed an average debt-equity ratio of around 40 percent in its capital structure. Looking at the challenges being post by the new patent regime, the company has realized the need for making more investment in research and development activities. For meeting its funding requirements, the company is planning to raise additional funds from the market. The chief finance manager, CFO of the company, is exploring the option of raising the debt level to 60 percent. However, he is concerned that a rising additional debt may increase the risk proposition of the company, as measured by beta.

Calculate the beta of the firm at 50 percent and 60 percent debt level and comment upon the increase in the risk level

27. RR Ltd. is diversified conglomerate that has major interest in agro based business, food processing and cement. Currently, the beta of this company, based on past two year weekly market price, is 1.45. The company is currently planning to hive of its cement division and get out of this business. Based on the trends prevailing in the industry, a comparable cement company would have a beta of around 1.86 with an average debt-equity ratio of 30 percent.

What would the beta be for the cement division of RR Ltd, which employs a debt-equity ratio of 70 percent?

28. During 5 year period, the relevant results for the aggregate market are that the rf (risk free rate) is 8 percent and the rm (return on market) is 14 percent. For that period, the results of four portfolio managers are as follows:

Portfolio manager	Average return (%)	Beta
A	13	0.80
B	14	1.05
C	17	1.25
D	13	0.90

Using CAPM model you are required to (a) Calculate the expected rate of return for each portfolio manager and compare that actual return with the expected return. (b) Based upon your calculation, select the manager with the best performance.

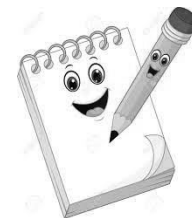
29. From the following information, calculate the expected rate of return of a portfolio

Risk free rate of interest	12%
Expected return of market portfolio	18%
Standard deviation of an asset	2.8%
Market standard deviation	2.3%
Co-relation co-efficient of portfolio with market	0.8%

30. The following information is available in respect of security X and Y.

Security	$\beta$	Expected return
X	1.8	22.00%
Y	1.6	20.40%

If risk free-rate is 7% and  $R_m = 15.3\%$ , are these securities correctly priced? What would the risk free rate have to be if they are correctly priced?



# RECEIVABLES MANAGEMENT

*“Any fool can lend money, but it takes a lot of skill to get it back”*

## Receivables Management

**Meaning:** *Receivables are near the terminating point of the operating cycle. When raw material has been converted into finished goods, the final product is sold by the firm. Some of the sales are done on spot basis while the remaining sales are made on credit. The extent of credit sales varies from industry to industry and within an industry. Period of credit depends upon the position of the firm in the industry. If the firm has a monopoly position, period of credit would be very low. If the industry consists of a large number of players in keen competition with each other, the period of credit would tend to be fairly long. Also, during periods of demand recession, even a firm in monopoly situation might be forced to extend credit in order to promote sales.*

**Explanation:** *Receivables are generally referred to by the name of “Sundry Debtors” in the books of account. Strictly speaking, Sundry Debtors refer to receivables created in the course of operation of the working capital cycle, i.e. those persons which owe payment to the firm for goods supplied or services rendered. Thus, sundry debtors represent an intermediate stage between reconversion of finished goods into cash. So long as the sundry debtors persist, the firm is strained of cash. So, logically the firm seeks to minimize the level of sundry debtors.*

## How do firms ensure realizations?

Timely realization of receivables is an important element of working capital management. *While giving credit, some firms obtain post-dated cheques from their clients. In other cases, firms have special staff earmarked for recovery efforts.*

The key elements here are the *opportunity cost of funds blocked in receivables and the net expenses of maintaining recovery infrastructure*. Expenses of maintaining recovery infrastructure include the costs associated with recovering the amount from debtors. If the funds realized from receivables can yield better return than the interest recovered from debtors, then the firm would be better off by promoting cash sales.

## FACTORS DETERMINING CREDIT POLICY

The credit policy is an important factor determining both the quantity and the quality of accounts receivables. Various factors determine the size of the investment a company makes in accounts receivables. They are, for instance:

- i) The effect of credit on the volume of sales;
- ii) Credit terms;
- iii) Cash discount;
- iv) Policies and practices of the firm for selecting credit customers;
- v) Paying practices and habits of the customers;
- vi) The firm’s policy and practice of collection; and
- vii) The degree of operating efficiency in the billing, record keeping and adjustment function, other costs such as interest, collection costs and bad debts etc., would also have an impact on the size of the investment in receivables.

The rising trend in these costs would depress the size of investment in receivables. The firm may follow a lenient or a stringent credit policy. The firm which follows a lenient credit policy sells on credit to customers on very liberal terms and standards. On the contrary a firm following a stringent credit policy sells on credit on a highly selective basis only to those customers who have proper credit worthiness and who are financially sound. Any increase in accounts receivables that is, additional extension of trade credit not only results in higher sales but also requires additional financing to support the increased investment in accounts receivables. The costs of credit investigations and collection efforts and the chances of bad debts are also increased.

### Evaluation of Credit Policies (FORMAT)

Sr. No.	Particulars	Existing Policy	Option 1	Option 2	Option 3
A)	Expected Profit:				
a)	Credit Sales	xxx	xxx	xxx	xxx

b)	Total Cost other than Bad Debts				
i)	Variable Costs	xxx	xxx	xxx	xxx
ii)	Fixed Costs	xxx	xxx	xxx	xxx
c)	Bad Debts	xxx	xxx	xxx	xxx
d)	Cash discount	xxx	xxx	xxx	xxx
e)	Expected Net Profit before Tax (a-b-c-d)	xxx	xxx	xxx	xxx
f)	Less: Tax	xxx	xxx	xxx	xxx
g)	Expected Profit after Tax	xxx	xxx	xxx	xxx
B)	<b>Opportunity Cost of Investments in Receivables locked up in Collection Period</b>	xxx	xxx	xxx	xxx
C)	<b>Net Benefits (A – B)</b>	xxx	xxx	xxx	xxx

Here:

- i) **Total Fixed Cost** = [Average Cost per unit – Variable Cost per unit] x No. of units sold on credit under Present Policy
- ii) **Opportunity Cost** = Total Cost of Credit Sales × Collection period (Days)/ 365 (or 360) x Required Rate of Return/100

**FACTORING SERVICES**

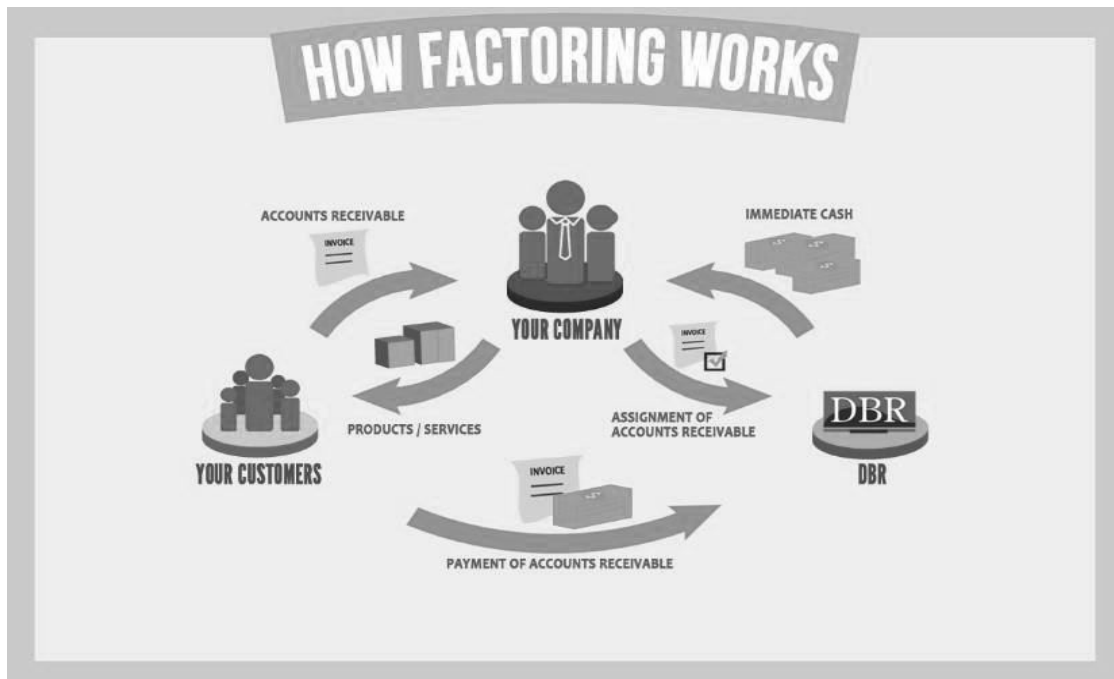


**Explanation:** Factoring is a *type of financial service which involves an outright sale of the receivables of a firm to a financial institution called the factor which specializes in the management of trade credit.* Under a typical factoring arrangement, a factor collects the accounts on the due dates, effects payments to the firm on these dates (*irrespective of whether the customers have paid or not*) and also assumes the credit risks associated with the collection of the accounts. As such factoring is nothing but a substitute for in-house management of receivables. A factor not only enables a firm to get rid of the work involved in handling the credit and collection of receivables, but also in placing its sales *in effect* on cash basis.

**Definition:** “Factoring may be defined as a relationship between the financial institution or banker (‘factor’) and a business concern (the ‘supplier’) selling goods or providing services to trade customers (the customer) whereby the factor purchases book debts with or without recourse (‘with a *recourse*’ means that in the event of bad debts factor can approach the ‘supplier’) to the supplier and in relationship thereto controls the credit extended to the customers and administers the sales ledger of the supplier.” Though the purchase of book debts is fundamental to the functioning of factoring, there are a number of functions associated with this unique financial service. A proper appreciation of these functions would enable one to distinguish it from the other sources of finance against receivables. They are:

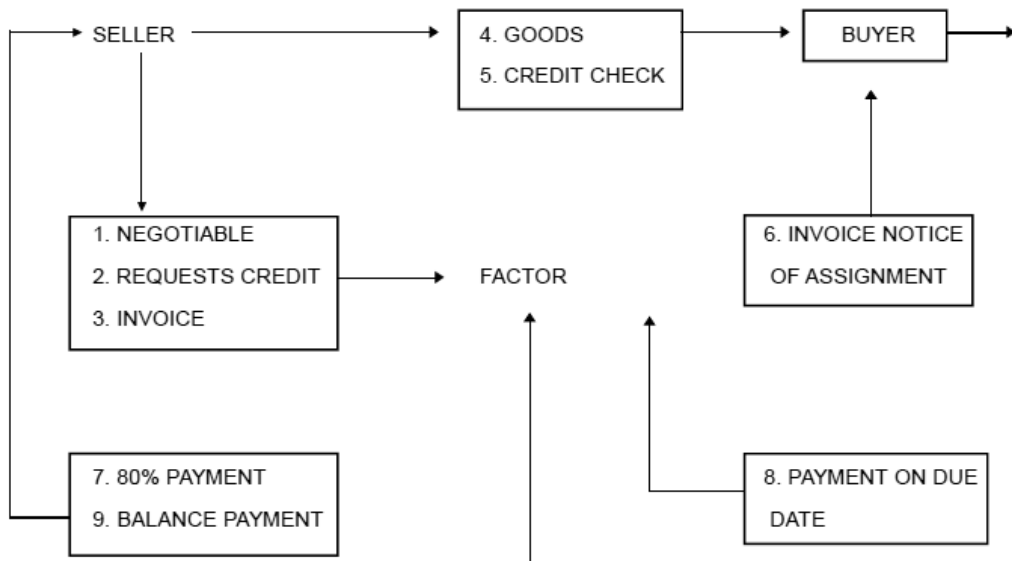
- assumption of credit and collection function;
- credit protection;
- encashing of receivables;
- collateral functions such as:
  - a) loans on inventory,
  - b) loans on fixed assets, other security and on open credit,
  - c) advisory services to clients.

### **Mechanics of Factoring:**



Factoring offers a very flexible mode of cash generation against receivables. Once a line of credit is established, availability of cash is directly geared to sales so that as sales increase so does the availability of finance. The dynamics of factoring comprises of the sequence of events outlined in figure.

- 1) Seller (client) negotiates with the factor for establishing factoring relationship.
- 2) Seller requests credit check on buyer (client).
- 3) Factor checks credit credentials and approves buyer. For each approved buyer a credit limit and period of credit are fixed.
- 4) Seller sells goods to buyer.
- 5) Seller sends invoice to factor. The invoice is accounted in the buyers account in the factor’s sales ledger.

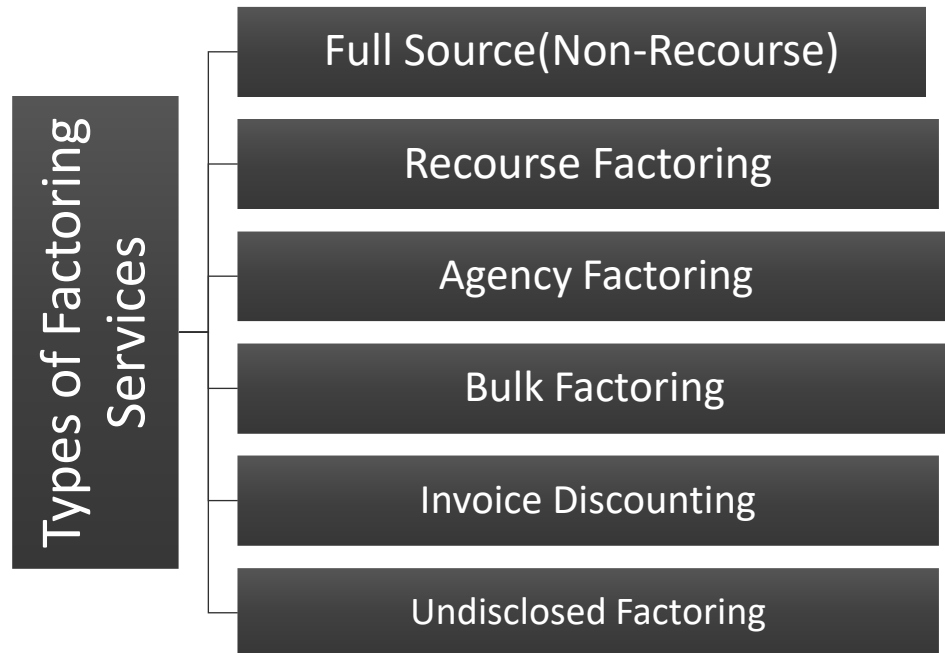


- 6) Factor sends copy of the invoice to buyer.



- 7) Factor advances the amount to which seller is entitled after retaining a margin, say 20%, the residual amount paid later.
- 8) On expiry of the agreed credit period, buyer makes payment of invoice to the factor.
- 9) Factor pays the residual amount to seller.

## Types of Factoring Services



Type of Factoring	Type of Functions					
	Availability of Finance Bad debts	Protection against	Credit Advice	Sales Ledger Administration	Collection	Disclosure Customers
<b>Full Source (Non-Recourse)</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Recourse Factoring</b>	Yes	¾	Yes	Yes	Yes	Yes
<b>Agency Factoring</b>	Yes	Possible	¾	No	No	Yes
<b>Bulk Factoring</b>	Yes	Possible	¾	No	No	Yes
<b>Invoice Discounting</b>	Yes	Possible	No	No	No	No

<b>Undisclosed Factoring</b>	Yes	Possible	No	No	No	No
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# PRACTICAL QUESTIONS



## PROBLEMS OF SELECTION OF CREDIT POLICY

- 1) A firm sells 40,000 units of its product per annum @ ₹ 35 per unit. The average cost per unit is ₹ 31 and the variable cost per unit is ₹ 28. The average collection period is 60 days. Bad debts losses are 3 % of sales and the collection charges amount to ₹ 15,000

The firm is considering proposal to follow a stricter collection policy which would reduce debts losses to 2 % of sales and the average collection period to 45 days. It would, however reduce sales volume, by 1,000 units and increase the collection expenses to ₹ 25,000.

The firm's required rate of return is 20 % would you recommend the adoption of the new collection policy? Assume 360 days in a year for the purpose of your calculation.

- 2) A company is now extending one month's credit to its selected customers. It sells its product at ₹ 100 each and has an annual sales volume of 60,000 units. At current level of production, which matches with sales, the product has a total cost of ₹ 90 per unit and a variable cost of ₹ 80 per unit the company is considering a plan to grant more liberal terms by extending the duration of credit from one month to two month and expects the sales to the customers group to go up by 25 %. In the background of a normal expectation of a 20% return on investment, will this relaxation in credit standard justify itself?
- 3) The credit manager of XYZ Company has to decide a proposal for liberal extension of credit which will result in slowing process of the average collection period from one to two months. The company's product was sold for ₹ 20 per unit on which ₹ 15 represented variable cost (including credit department cost). The current actual sale amounted to ₹ 24 lakhs, represented entirely by credit sales. The average total cost per unit was ₹ 18. The relaxation in credit policy was expected to result in a 25% increase in sales, i.e. ₹ 30 lakhs annually. The corporate management aimed at a return of 25% in additional investment. You are required to make relevant calculations to help the credit manager in examining the financial implications of liberalizing the credit policy.
- 4) A firm's product sells for ₹ 10 unit out of which ₹ 7 represents variable costs before taxes. Credit sales is ₹ 12 lakhs, represented entirely by credit sales, and the average total cost per unit is ₹ 9 before taxes. The firm is considering a more liberal from one to two months. This relaxation in credit standards is expected to produce a 25% increase in sales, i.e., ₹ 15 lakh annually. Advise the management on the policy of liberal extension of credit, assuming the required return on investment is 20%
- 5) The present credit terms of P Company are 1/10 net 30. Its annual sales are ₹ 80 lakhs, its average collection period is 20 days. Its variable costs and average total cost are 0.85. and 0.95 respectively and its cost of capital is 10 per cent. The proportion of sales on which customer's currently take discount is 0.5. P Company is considering relaxing its discount terms to 2/10 net 30. Such relaxation is expected to increase sales by ₹

5 lakhs, reduce the average collection period to 14 days and increase the proportion of discount sales to 0.8. what will be the effect relaxing the discount policy on company's profit? Take year as 360 days.

- 6) A company currently has an annual turnover of ₹ 50 lakhs and an average collection period of 30 days. The company wants to experiment with a more liberal credit policy on the ground that increase in collection period will generate additional sales. From the following information, kindly indicate which policy the company should adopt:

Credit policy	Average collection period	Annual sales (₹ In lakhs)
A	45 days	56
B	60 days	60
C	75 days	62
D	90 days	63

Variable cost is 80% of sales. Fixed Cost is ₹ 6 lakhs per annum. Required pre-tax return on investment = 20%. 1 year = 360 days.

- 7) Salman Co. dealing in sports goods have an annual sale of ₹ 50 lakhs and are current extending 30 days credit to the dealers. It is felt that sales can pick up considerable if the dealers are willing to carry Increased stocks, but the dealers have difficulty in financing their inventory. Salman Co. is therefore considering shift in credit policy. The following information as available:

The average collection period now is 30 days

Cost	Variable Costs	80% on sales
	Fixed Costs	₹ 6 lakhs per annum

Required (Pre-tax return on investment) 20%

Credit policy	Average collection period	Annual sales (₹ In lakhs)
A	45 days	56
B	60 days	60
C	75 days	62
D	90 days	63

- a) Determine which policy the company should adopt?

b) What are the assumptions you have made in your approach to your decision?

### PROBLEMS OF INCREMENTAL APPROACH

8) In order to increase sales from their present annual level of ₹ 2,40,000, AGNI Associates is considering a more liberal credit policy. Currently, the firm has an average collection period of 30 days. However, it is believed that as the collection period is lengthened, the sales will increase by the following amounts:

Credit policy	Increase in Average collection period	Increase in Sales (₹)
A	15 days	10,000
B	30 days	15,000
C	45 days	17,000
D	60 days	18,000

The Selling Price of the only product manufactured is Re. 1 and its variable cost is ₹ 0.60. If the firm has a pre-tax opportunity cost of 20%, which credit policy should be pursued? (Assume a 360-day year).

9) In order increase sales from the normal level of ₹ 2.4 lakhs per annum, the marketing manager submits a proposal for liberalizing credit policy as under:

Normal sales                      ₹ 2.4 lakhs

Normal Credit period      30 days

PROPOSED INCREASE IN CREDIT Period beyond normal 30 days	Relevant increase over Normal sale
15 days	12,000
30 days	18,000
45 days	21,000
60 days	24,000

The P.V. Ratios of the company is 33 1/3%. The company expects a pre-tax return of 20% on investment. Evaluate the above four alternatives and advise the management (assume 360 days a year).

## OTHER PROBLEMS

- 10) Esha Ltd. which sells on credit basis has ranked its customers 1 to 5 in order of credit risk

Category	Percentage bad debts	Average collection period
1)	0.0	30 days
2)	1.0	45 days
3)	2.0	60 days
4)	5.0	90 days
5)	10.0	120 days

The company's current policy is to allow unlimited credit to firms in categories 1 to 3 limited credit to firms in category 4 and no additional credit to firms in category 5.

As a result, orders amounting to ₹ 25,00,000 from category 4 and ₹ 75,00,000 from category 5 customers are rejected every year. If the Esha Ltd. Makes a 10% gross profit on sales and has opportunity cost on investment in receivables of 12% what would be the effect on profits of allowing full credit to all categories of customers? (Assume 360 days)

- 11) Ratan Corporation is considering relaxing its present credit policy and is in the process of evaluating two proposed policies. Currently the firm has annual credit sales of ₹ 50 lakhs and accounts receivable turnover ratio of 4 times a year. The current level of loss dud debts is ₹ 1,50,000. The firm is required to give a return of 25 % on the investment in new accounts receivables. The company's variable costs are 70% of the selling price.

Given the following information, which is better option:

Particulars	Existing Policy	Policy - Option 1	Policy - Option 2
Annual Credit Sales	₹ 50,00,000	₹ 60,00,000	₹ 67,50,000
Accounts Receivables Turnover Ratio	4 times	3 times	2.4 times

Bad Debts losses	₹ 1,50,000	₹ 3,00,000	₹ 4,50,000
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- 12) A trader whose current sales are in the range of ₹ 6 lakhs per annual and an average collection period of 30 days wants to pursue a more liberal policy to improve sales. A study by a management consultant reveals the following information:

Credit policy	Increase in collection period	Increase in Sales (₹)	Default Anticipated
A	10 days	30,000	1.5%
B	20 days	48,000	2%
C	30 days	75,000	3%
D	45 days	90,000	4%

The selling price per unit is ₹ 3. Average cost per unit is ₹ 2.25 and variable costs per unit are ₹ 2.

The current bad debts loss is 1 %. Required return on additional investment is 20%. Assume 360 days year.

Which of the above policies would you recommend for adoption?

- 13) A group of customers want to enter into a contract with you to buy goods worth ₹ 20 lakhs during 2012, the deliveries to be made for four equal quarterly instalments. The price of commodity is ₹ 20 per unit on which you expect a profit of ₹ 2. the acceptance of this proposal would mean an additional recurring expenditure of ₹ 10,000 p. a. on your part.

The aging schedule of accounts receivables in respect of this group of customers in the past was as follows:

Period	Percentage of bills for which payment received
At the end of 30 days	15%
At the end of 60 days	25%
At the end of 90 days	40%
At the end of 100 days	20%



Assuming an opportunity cost of 20% of the fund locked up in accounts receivables, will it be desirable to accept this proposal?

- 14) Slow Payers are regular customers of Goods Dealers Ltd. Calcutta and have approached the sellers for extension of a credit facility for enabling them to purchase goods from Goods Dealers Ltd. On an analysis of past performance and on the basis of information supplied, the following pattern of payment schedule emerges in regard to Slow Payers:

Schedule	Patterns
At the end of 30 days	15% of the bill
At the end of 60 days	34% of the bill
At the end of 90 days	30% of the bill
At the end of 100 days	20% of the bill
Non-Recovery	1% of the bill

Slow Payers want to enter in to a firm commitment for purchase of goods of ₹ 15 lakhs in 2013, deliveries to be made in equal quantities on the first day of each quarter in the calendar year. The price per unit of commodity is ₹ 150 on which a profit of ₹ 5 per unit is expected to be made. It is anticipated by Goods Dealers Limited, that taking up of this contract would mean an extra recurring expenditure of ₹ 5,000 p. a., if the opportunity cost of funds in the hands of Goods Dealers is 24 % p. a., would you as the finance manager of the seller recommend the grant of credit to Slow Payers?

- 15) A group of new customers with 10% risk of non-payment desires to establish business connection with you. This group would require one and half month of credit and is likely to increase your sales by ₹ 60,000 per-annum. Production, administrative and selling expenses amount to 80% of sales.

You are required to pay income tax @ 35%. Should you accept the required rate of return is 52% (after tax)?

Also state degree of risk of non-payment that you would be willing to assume if the required rate of return (after tax) were:

- i) 39% and
- ii) 26%

- 16) Preity Limited is a company having an annual credit sale of ₹ 30 lakhs. It deals in only one product. Currently it has an average collection period of 30 days. It is anticipated that liberation of credit terms can lead to increased sales as indicated below:

Increase in Collection period	Increase in Sales (₹)
15 days	2,00,000
30 days	3,00,000
45 days	3,50,000
60 days	3,75,000

The unit selling price for the product is ₹ 50 and its unit variable cost is ₹ 30. At current volume it has a unit total cost of ₹ 35. It is also noted that liberalization of credit will lead to following incidence of bad debts losses.

Increase in Collection period	Bad Debts % on Sales
15 days	0.5
30 days	1.0
45 days	1.5
60 days	2.0

Currently the company is free from bad debts losses. What will be the most rewarding credit policy under these circumstances? The company expects a return of 18% on investment. Tabulate your presentation.

- 17) As a part of the strategy to increase sales and profits, the sales manager of a company proposes to sell goods to a group of new customers with 10% risk of non-payment. This group would require one and a half months credit and is likely to, increase sales by ₹ 1,00,000 p. a. production and selling expenses amount to 80% of sales and the income tax rate is 35%. The company's minimum required of return (after tax) is 32.5%

Should the sales manager's proposal be accepted?

Also find the degree of risk of non-payment that the company should be willing to assume if the required rate of return (after tax) were:

- i) 39%
- ii) 52% and
- iii) 78%.

- 18) Sanyog Limited manufacturers of Colour TV sets are considering the liberalization of existing credit terms to three of their large customers A, B and C. the credit period and likely quantity of TV sets that will be lifted by the customers are as following:

Credit Period (days)	A	B	C
0	1000	1000	-
30	1000	1500	-
60	1000	2000	1000
90	1000	2500	1500

The selling price per TV set is ₹ 9000. The expected contribution is 20% of the selling price. The cost of carrying debtors' averages 20% per annum.

You are required to:

- Determine the credit period to be allowed to each customer. (assume 360 days in a year for calculation purposes).
- What other problems the company might face in allowing the credit period as determined in (a) above?

- 19) S Limited is manufacture of various electronic gadgets. The annual turnover for the year 2012 was ₹ 730 lakhs. The company has a wide network of sales outlets all over the country. The turnover is spread evenly for each of the 50 weeks of the working year. All sales are for credit and sales within the week are also spread evenly over each of the five working days.

All invoicing of credit sales is carried out at the Head Office in Mumbai. Sales documentation is sent by post daily from each location to the Head Office for the past two years. Delays in preparing and dispatching invoices were noticed. As a result, only some of the invoices were dispatched in the same week and the remainder the following week.

An analysis of the delay in invoicing (Being the interval between the date of sale and the date of dispatch of the invoice) indicated the following pattern:

No. of days of delay in invoicing	3	4	5	6
% of weeks sales	20	10	40	30

A further analysis indicated that the debtors take on an average 36 days of credit before paying. This period is measured from the days of dispatch of the invoice rather than the date of sale.

It is proposed to hire an agency for undertaking the invoicing work at various locations. The agency has assured that the maximum delay would be reduced to three days under the following pattern:

No. of days of delay in invoicing	0	1	3
% of weeks sales	40	40	20

The agency has also offered additionally to monitor the collections which will reduce the credit period to 30 days. S Limited expects to save ₹ 4000 per month in postage costs. All working funds are borrowed from a local bank at simple interest rate of 20% p.a.

The agency has quoted a fee of ₹ 2,00,000 p.a. for the invoicing work and ₹ 2,50,000 p.a. for monitoring collection and is willing to offer a discount of ₹ 50,000 provided the works are given. You are required to advise S Limited about the acceptance of agency's proposal.

- 20) X Ltd. Has annual sales of ₹ 12,50,000, out of which cash sales are 20%. At present 60 days credit is granted to customers without any cash discount facility. The company is considering to offer a discount of 3%, which is expected to bring down the total credit period from 60 days to 45 days and 50 % of the customers (in value) are likely to avail the discount facility. The selling price of the product is ₹ 10, while the average cost per unit is ₹ 8.

Advise the company whether. To resort to discount facility if the rate of return is 20% and month is equal to 30 days.

- 21) A company wants to use a factor. The following information is relevant. Should the company enter into a factoring agreement?
- The current average collection period for the company's debts is 80 days & 0.5% of debtors default. The factor will pay over money due after 60 days, & it will suffer the loss of bad debts.
  - The annual charge for factoring is 2% of turnover, payable annually in arrears. Administration cost savings will total ₹ 1 lakh per annum.
  - Annual sales all on credit are ₹ 100 lakh. Variable cost total 80% of sales price. The company's cost of borrowing is 15% p.a.
- 22) A manufacturing firm has a total sale of ₹ 160 Lakhs & its average collection period is 90 days. The past experience indicates that bad debt losses are around 1.50% of credits. The firm spends ₹ 2,50,000 on administering its sale which includes salaries of one officer & three clerical personnel who handle credit checking, collection etc. telephone % telex charging which are unavoidable costs. A factor is prepared to forward to buy the firms receivables by charging 2% commission. A factor will pay advance receivables to concern at an interest rate of 18% after with-holding 10% as reserve. Should the factoring proposal be accepted?
- 23) A bank is analyzing the receivables of Jackson Company in order to identify acceptable collateral for a short-term loan. The company's credit policy is 2/10 net 30 the bank lends 80 percent on accounts where customers are not currently overdue and where the average payment period does not exceed 10 days past

the net period. A schedule of Jackson's receivables has been prepared. How much will bank lend on pledge of receivables, if the bank uses a 10 percent allowance for cash discount and returns?

Account	Amount (₹)	Day Outstanding (in days)	Average Payment Period Historically
74	25,000	15	20
91	9,000	45	60
107	11,500	22	24
108	2,300	9	10
114	18,000	50	45
116	29,000	16	10
123	14,000	27	48
	<b>1,08,800</b>		

- 24) A firm is considering offering 30-days credit to its firm likes to charge them an annualized rate of 24%. The firm wants to structure the credit in terms of a cash for immediate payment. How much would the discount rate have to be?
- 25) The Disa corporation has just acquired a large account, as a result, it needs an additional ₹ 75,000 in working capital immediately. It has been determined that three feasible sources of funds:
- Trade Credit: the company buys about ₹ 50,000 of materials per month on terms of 3/30, net 90 discount are taken.
  - Bank Loan: the firm's bank will lend ₹ 1,00,000 at 13 per cent. A 10 per cent compensating balance will be required, which otherwise would not be maintained by the company.
  - A factor will buy the company's receivables (₹ 1,00,000 per month), which have collection period of 60 days. The factor will advance up to 75 per cent of the face value of the receivables at 12 per cent on an annual basis. The factor will also charge 2 per cent fee on all receivables purchased. It has been estimated that the factor's services will save company a credit department expense & bad debt expenses of ₹ 1,500 per month.

On the basis of annual percentage cost, which alternative should the company select?

- 26) Easy Limited specializes in the manufacture of a computer component. The component is current sold for ₹ 1,000 and its variable cost is ₹ 800. For the ended 31.03.2013, the company on an average 400 components per month.

At present the company granted one-month credit to its customers. The company is extending the same to two months on accounts of which the following is expected:

Increase in Sales	25%
Increase in Stock	₹ 2,00,000
Increase in Creditors	₹ 1,00,000

You are required to advise the company on whether or not to extend the credit items if:

- All customers avail the extended credit period of two months and
- Existing customers do not avail the credit terms but only the new customers avail the same. Assume in the cash that the entire increase in sales is attributable to the new customers.

The company expects a minimum return of 40% on the investment.

- 27) S Ltd. Has a present annual sales level of 10,000 units at ₹ 300 per unit. The variable cost is ₹ 200 per unit and the fixed costs account to ₹ 3,00,000 per annum. The present credit period allowed by the company is 1 month. The company is considering a proposal to increase the credit period to 2 months and 3 months and has made the following estimates:

Credit Policy	Existing Policy	Proposed	
		2 months	3 months
Increased in Sales	1 month	2 months	3 months
% of Bad Debts		15%	30%
	1%	3%	5%

There will be increase in fixed cost by ₹ 50,000 on account of increase in sales beyond 25% of present level.

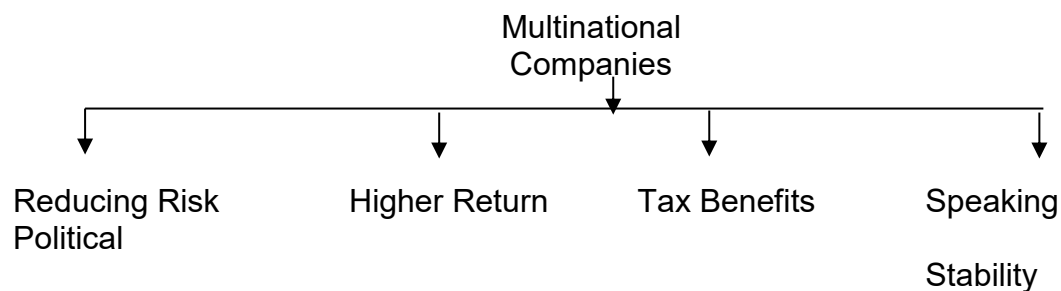
The company plans on a pre-tax return of 20% on investment in receivables.

You are required to calculate the most paying credit policy for the co.

# CHAPTER 12

## FOREIGN EXCHANGE MANAGEMENT

### WHY DO MULTINATIONAL COMPANIES OPERATE IN MANY COUNTRIES ?



1. **Reducing Risk** : A multinational company (MNC) has to operate in different environments. The degree of risk is different in different countries. It is observed that international diversification is often more effective than domestic diversification in reducing company's risk in relation to its expected return because economic cycle of different countries do not tend to be completely synchronized.
2. **Higher Return** : Another major reason for investing abroad is the expectation of higher returns for a given level of risk. There may be gaps (demand and supply gaps) in the international market within the scope of the firm's line of specification. Tapping of these gaps can yield higher returns to the firm. The other reason may be that the firm can efficiently produce that product in another country.
3. **Tax – Benefits** : An MNC is exposed to various tax laws due to its operations in different countries. The type of tax and rates of tax vary from country. An MNC can get the best tax benefits by diversifying its investment in different countries.
4. **Seeking Political Stability** : The Government policy provides the biggest threat to the existence of an MNC. The very existence of an MNC can be endangered because of whims and fancies of the Government. Political risk may range from regular interference to complete confiscation of company's assets. Some extra controls may be imposed any time. The political instability or an unfavourable attitude by the Government can seriously impair the functioning of these organizations. It is therefore important that political risk is assessed realistically. This can be done by assessing degree of stability of existing government, its attitude towards foreign investment,

incentives and efficiency of government in processing the investment even if very high returns are expected.

#### ❖ BASIC PROBLEMS IN INTERNATIONAL FINANCIAL MANAGEMENT :

- 1) Foreign Exchange Fluctuations : It is the risk due to relative rise or fall of value of one currency with respect to another. The fall in value or devaluation of a currency may affect future sales, costs and remittance.

Thus, the international trade involves foreign exchange rate risk i.e. the risk relating to the uncertainty attached to the exchange rates between two countries.

- 2) Raising International Finance : Another major area of concern for the finance manager is raising funds on as favourable terms as possible. Funds can be raised from domestic or from international sources. Normally, both sources are tapped. There are a number of leading international agencies which provide finance at reasonable rates to MNCs.

#### TYPES OF RISKS IN INTERNATIONAL TRANSACTIONS :

##### 1) Foreign Exchange Rate Risk :

It is the variance of the real domestic currency value of assets, liabilities or operating income attributed to unanticipated changes in exchange rates. The risk relates to uncertainty attached to the exchange rates between the two currencies.

Globalization of business has made it necessary to undertake international transactions of purchasing / selling, import – export of machinery and equipment, settlement of balance of payments and import-export transactions. The payment for such transactions could be in

- a) Seller's currency or
- b) Buyer's currency, or
- c) A currency which is internationally accepted, e.g. US dollar.

If the seller is not interested in getting payment in the currency of the buyer, then the buyer has to purchase the necessary foreign exchange from the market. The rates of exchange between the buyer's currency and the foreign currency is not fixed and is determined by the market forces. Thus, the buyer is subject to exchange rate fluctuation risks.

#### EXAMPLE

If an Indian businessmen borrows some amount viz. dollars and has to repay the loan in dollar over a period of time, then he is exposed to foreign exchange rate risk during the currency of the loan. If the dollar becomes costlier vis-à-vis rupee during the currency of loan, he has to repay the loan in terms of more rupees than the rupees he obtained by way of loan.



Foreign exchange risk can be categorized into the following :-

- a. **Transaction Exposure** : A transaction exposure occurs when a value of future transaction, though known with certainty, is denominated in some currency other than the domestic currency. In such cases, the monetary value is fixed in terms of foreign currency at the time of agreement which is completed at a later date. All fixed value transactions such as receivables, payable, fixed price sale and purchase contracts etc. are subject to transaction exposure. The transaction exposure looks at the effects of fluctuations in exchange rates on the transactions that have already been entered into and have been denominated in foreign currency.

**EXAMPLE**

**Amount to be received : \$ 1,00,000, Exchange rate changes from 1 \$ = Rs. 50 to 1 \$ = Rs. 45.**

**Loss due to transaction exposure = \$ 1,00,000 x (50 – 45) = Rs. 5,00,000.**

**2) Interest Rate Risk :**

Interest rate uncertainty exposes a firm to the following types of risks.

- a. Borrowing on floating rate entails uncertainty as to future payments as interest rate changes at each reset date.
  - b. As a result of floating rate, borrowing cost of capital is unknown.
  - c. Borrowings on fixed rate basis results in exposure to a situation wherein in future periods, interest rate may come down and the company is saddled with a heavy burden on debt-servicing.
  - d. The reinvestment assumption can not be realized; reducing the rate of return on investment.
- 3) **Credit Risk** : The credit risks are very important in foreign exchange and derivative transactions. These can arise when a counter party, whether a customer or a bank, falls to meet his obligations and the resulting open position has to be covered at the going rate of exchange.
- 4) **Legal Risk** : This risk arises from legal enforceability of contract.
- 5) **Liquidity Risk** : This risk arises when, for whatever reason, markets turn illiquid and positions can not be liquidated except at a huge price concession.

**FOREIGN CURRENCY MANAGEMENT :**

Foreign exchange market comprises of buyers and sellers of foreign currency. The operations in the foreign exchange market originate in the requirements of customers for making remittances to and receiving them from other countries. The most important players in the foreign exchange market are the

banks (Authorised Dealers) who undertake large and frequent deals in foreign exchange.

All transactions of the foreign exchange market may be divided into following categories :

- a. Transactions between banks and their customers.
- b. Transaction between different banks in the same centre.
- c. Dealing between banks in a country and their correspondents and overseas branches.
- d. Transactions of the central bank of one country with central bank of other countries.

#### ❖ FOREIGN EXCHANGE MARKET IN INDIA AND ITS NATURE :

The important features of foreign exchange market in India are :

- a. The Indian foreign exchange market is a controlled market in which the RBI plays a key role in setting the day to day rates.
- b. In India, dealings in foreign exchange take place in a manner where foreign exchange dealers never meet each other but transact business through a network of telephone lines linking the banks, with exchange brokers who act as intermediaries.
- c. Foreign Exchange Market in India is regulated by RBI and Foreign Exchange Dealers Association of India (FEDAI).
- d. The organizations which have been granted license by the RBI are called "Authorised Dealers". They may exercise powers within the parameters laid down by the "Exchange Control Manual" and circulars issued by RBI from time to time. They are also governed by rules of FEDAI.
- e. RBI has also granted license to certain established firms hotels and other organizations, permitting them to deal in foreign currency notes, coins and traveller's cheques. These entitles are called "Authorised Money Changers."
- f. All entitles including importers, exporters and foreign currency borrowers who need to buy or sell foreign exchange, have to compulsorily deal with "Authorised Dealers" or "Authorised Money Changers" only.

#### ❖ KEY PARTICIPANTS IN FOREX MARKET :

- RBI
- Banks (Authorised Dealers)
- Corporates
- Other business undertakings.
- Individuals.

#### ❖ MAJOR TRADING CURRENCIES :

- US Dollar (USD) (\$)
- Pound (GBP) (Pound)
- Yen (JPY) (Yen)
- Euro (EUR) (Euro)

**EXCHANGE RATE :**

- The rate at which one currency is exchanged for other.
- E.g. Rs. 53 per dollar is the exchange rate between Rupee and Dollar.

**HOME CURRENCY / DOMESTIC CURRENCY :**

A country's own currency is known as home currency or domestic currency.

<b>Example</b>	
<b>INDIA</b>	
<b>USA</b>	
<b>UK</b>	
<b>AUSTRALIA</b>	
<b>CANADA</b>	
<b>HONG KONG</b>	
<b>JAPAN</b>	
<b>SOUTH AFRICA</b>	
<b>SWITZERLAND</b>	
<b>UAE</b>	
<b>SAUDI ARABIA</b>	
<b>KUWAIT</b>	

❖ **SPOT EXCHANGE RATES :**

A spot exchange rate is a rate of which the currencies are being traded for delivery on the same day.

The normal period required for final settlement of a spot transaction is two working days.

Where the agreement to buy and sell is agreed upon and executed on the same date, the transaction is known as cash or ready transaction. It is also known as value today.

**EXAMPLE :**

**An Indian importer may need US dollar to pay for the shipment that has just arrived. He will have to purchase the dollar in the market to make payment for the import. The rate at which he will buy the dollar in the market is known as the spot exchange rate.**

❖ **FORWARD RATE :**

A forward exchange rate occurs when buyers and sellers of currencies agree to deliver the currency at some future date. They agree to transact a specific amount of currency at a specific rate at a specified future date. The forward exchange rate is set and agreed by the parties and remains fixed for the contract period regardless of the fluctuations in the spot rates in future. The actual spot rate on that day may be lower or higher than the forward rate agreed today.

The Forward rate quoted normally includes the margin of profit / arbitrage of supplier.

**EXAMPLE :**

**An Indian firm buys electronics from a British firm with payment of 10,00,000 pounds in 90 days. Suppose, the present price of pound is Rs. 68. Over the next 90 days, the pound may rise or decline against the Indian Rupee. The importer can undertake an agreement to buy 10,00,000 pounds at a rate, say Rs. 68.10, after 90 days. According to forward contract, the seller will give 10,00,000 pounds to the Indian importer, who in turn will pay Rs. 68.10 x 10,00,000 = Rs. 6,80,00,000. In this way, the importer has made certain his payment obligation in terms of Rupee. Thus, the importer has covered his risk by buying pound in the forward market.**

**DIRECT QUOTE :**

A direct quote denotes the number of units of the domestic currency required to buy one unit of foreign currency.

Example - \$ 1 = Rs. 49.00 (August, 2012), means that one dollar can be exchanged for Rs. 49.00. The quote \$ 1 = Rs. 49.00 is a direct quote for an Indian.

In case of direct quote, the number of units of foreign currency is kept constant and any change in exchange rate will be made by changing the value in terms of domestic currency.

### INDIRECT QUOTE :

An indirect quote indicates the number of units of foreign currency that can be exchanged for one rupee of the domestic currency. In indirect quote, the units of home currency is kept constant and any change in exchange rate is effected by changing the number of units of foreign currency.

Example – The quote Rs. 1 = \$ 0.0204 is an indirect quote for an Indian. Direct and indirect quotes are reciprocals of each other.

$$\text{Direct Quote} = \frac{1}{\text{Indirect Quote}}$$

OR

$$\text{Indirect quote} = \frac{1}{\text{Direct Quote}}$$

Indirect quotation is used in London Foreign exchange market. In New York and other Foreign exchange market, mostly the direct method is in vough. In India Direct Quotation is used.

### BID PRICE (BUYING RATE) :

It is the rate at which the dealer is ready to buy the foreign currency in exchange for the domestic currency. Therefore, it is the buying rate.

### OFFER PRICE (ASK PRICE) (SELLING RATE) :

It is the rate at which the foreign dealer 'asks' its customers to pay in local currency in exchange of the foreign currency. Therefore, it is the selling rate or offer rate at which foreign currency can be purchased from the dealer.

**ONE WAY EXCHANGE RATE QUOTATION :**

When bid rate and ask rate are same, then such quotation is known as “one way quote”.

**EXAMPLE**

**1 \$ = Rs. 50**

**Interpretation : It means bank buys 1 \$ at Rs. 50 and bank sells 1 \$ at Rs. 50.**

**TWO WAY EXCHANGE RATE QUOTATION :**

- In such type of questions, bid rate and ask rate are separately given. In a two way quote, BID precedes ASK rate.

**EXAMPLE**

- **If the exchange rate is Rs. 45-47 per USD.**
- **It indicates Rs. 45 is bid (buy) rate and Rs. 47 is ask (sell) rate.**

**SPREAD :**

The difference between the bid price and offer price is called spread. The offer price is always greater than the bid price as the dealers make money by buying at bid price and selling at offer price.

Example – A dealer quotes Indian rupees as Rs. 43.80 – 43.90 vis-à-vis dollar. The bid price is Rs. 43.80, the offer price is Rs. 43.90 and the spread is Rs. 0.10 (i.e. 43.90 – 43.80)

In a direct quotation, the quoting bank will apply the rule; “Buy Low; Sell High”. In an indirect quotation, the quoting bank will apply the rule. “Buy High; Sell Low”. For example a bank quote the rate for dollar as :

Rs. 100 = USD 2.0762 / 0767

In this case, the quoting bank will receive USD 2.0767 per Rs. 100 while buying dollars and give away USD 2.0762 per Rs. 100 while selling dollars.

**❖ PURCHASE AND SALE TRANSACTIONS :**

Any trading has two aspects – (i) purchase, and (ii) sale. A trader has to purchase goods from his suppliers which he sells to his customers. Likewise, the bank (which is authorized to deal in foreign exchange) purchases as well as sells its commodity – the foreign currency.

Two points need be constantly kept in mind while talking of a foreign exchange transaction :

- a. The transaction is always talked of from the bank's point of view and
- b. The item referred to is the foreign currency,

**Therefore, when we say a purchase, we imply that**

- a. **The bank has purchased; and**
- b. **It has purchased foreign currency.**

**Similarly, when we say a sale, we imply that**

- a. **The bank has sold; and**
- b. **It has sold foreign currency.**

In a purchase transaction the bank acquires foreign currency and parts home currency.

In a sale transaction the bank parts with foreign currency and acquires home currency.

#### ❖ STRAIGHT RATE VS CROSS RATES :

- Straight rate refers to the exchange rate which has Dollar in it.
- The term cross rates refers to the exchange rate which does not have dollar in it.

#### **CROSS RATES :**

In India all buy and sell transactions are routed through US dollars. All deals other than a dollar purchase or a dollar sale with respect to rupee would necessary involve transactions involving dollar. Thus if an Indian importer wishes to purchase Yen then he would have to buy dollars first and then sell dollars to buy Yen. The banker would obtain Yen/\$ rate from the Tokyo or Singapore Market and then apply the Rs./\$ rate obtained from the local Indian market to arrive at the exact rupees to be given for purchase of Yen. Since this transaction involves more than two currencies, we call such a rate as cross rate.

Thus a cross rate by definition involves transaction of any three currencies or more.

#### ❖ EXCHANGE MARGIN (EXTRA CHARGES) :

If the bank quotes the base rate to the customer, it makes no profit. On the other hand, there are administrative costs involved. Further, the deal with the

customer takes place first. Only after acquiring or selling the foreign exchange from / to the customer, the bank goes to the interbank market to sell or acquire the foreign exchange required to cover the deal with the customer. An hour or two might have lapsed by this time. The exchange rates are fluctuating constantly and by the time the deal with the market is concluded, the exchange rate might have turned adverse to the bank. Therefore, sufficient margin should be built into the rate to cover the administrative cost, cover the exchange fluctuation and provide some profit on the transaction to the bank. This is done by loading exchange margin to the base rate. The quantum of margin that is built into the rate is determined by the bank concerned, keeping with the market trend.

**Exchange margin is added to inter-bank selling rate**

**Bank's actual selling rate to customer = inter-bank ask rate + Exchange Margin**

**Exchange margin is deducted from inter-bank buying rate.**

**Bank's actual buying rate from customer = inter-bank bid rate – Exchange Margin**

❖ **APPRECIATION AND DEPRECIATION OF CURRENCY :**

**APPRECIATION :** A currency is said to have appreciated if one is able to purchase more of other currency against it after appreciation. Thus \$ 1 = Rs. 45 -> changes to \$ 1 = Rs. 46, it means that one is able to get more of rupees (here Re. 1 more) for same value of dollar (i.e. \$ 1) after appreciation. Here Dollar has appreciated.

**DEPRECIATION :** A currency is said to have depreciated if one is able to purchase less of other currency against it after depreciation. Thus \$ 1 = Rs. 45 changes to \$ 1 = Rs. 44, it means that one is able to get less of Rupees (here Re. 1 less) for same value of dollar (i.e. \$ 1) after depreciation. Here Dollar has depreciated.

In a direct quote, if forward rate is greater than spot rate (  $F > S$  ), the foreign currency is appreciating and home currency is depreciating.

- For example.
- Spot rate : Rs. 45 / \$, Forward rate : Rs. 47 / \$.

In a direct quote, if forward rate is less than spot rate (  $F < S$  ), the foreign currency is depreciating and home currency is appreciating.

- For example;
- Spot rate : Rs. 45/\$. Forward rate : Rs. 43/\$.



❖ **EXPECTATIONS OF EXPORTER OR PARTY RECEIVING FOREIGN CURRENCY :**

An exporter exports goods to another country. Normally, he will receive payment in foreign currency.

**Gain / Loss to Exporter :**

<b>When foreign currency appreciates or home currency depreciates</b>	<b>Gain</b>
<b>When foreign currency depreciates or home currency appreciates.</b>	<b>Loss</b>

❖ **EXPECTATIONS OF IMPORTER OR PARTY PAYING FOREIGN CURRENCY :**

An importer imports goods from another country. Normally, he will make payment in foreign currency.

**Gain / Loss to Importer :**

<b>When foreign currency appreciates or home currency depreciates</b>	<b>Gain</b>
<b>When foreign currency depreciates or home currency appreciates.</b>	<b>Loss</b>

❖ **FORMULAE TO CALCULATE PREMIUM / DISCOUNT (APPRECIATION AND DEPRECIATION) :**

- In case of Direct Quotations : Premium / Discount =  $\frac{F-S}{S} \times \frac{12}{n} \times 100$
- In case of Indirect Quotations : Premium / Discount =  $\frac{S-F}{F} \times \frac{12}{n} \times 100$

Where. F = Forward Exchange Rate  
S = Spot Exchange Rate  
N = Number of months of forward contract.

❖ **FORWARD CONTRACTS :**

A forward transaction (also outright forward) is a transaction requiring delivery at a future date of a specified amount of one currency for a specified amount of another currency. The exchange rate is determined at the time of entering into the contract, but the payment and delivery taken on maturity.

Depending upon whether the forward rate is greater than the spot rate, given the currency in consideration, the forward may be either at par or discount or at a premium.

Forward at par : When the forward rate is same as the spot rate for the currency, then it is said to be at par ( $F = S$ ).

Forward Premium : When a currency is costlier in forward or say, for a future value date, it is said to be at a premium. In case of a direct quote, the premium is added to both the selling and buying rates. ( $F > S$ ).

Forward Discount : If the currency is cheaper in forward or for a future date, it is said to be at a discount. In case of direct quotation, the discount is deducted from both the selling and buying rate ( $F < S$ )

<b>PROBLEMS</b>
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1. The following spot rates are observed in the foreign currency market.

Currency	Foreign Currency per U.S.\$
Britain pound	00.62
Netherlands Guilder	01.90
Sweden Kroner	06.40
Switzerland Franc	01.50
Italy Lira	1,300.00
Japan Yen	140.00

On the basis of this information, compute to the nearest second decimal the number of

S.No.	Particulars	Calculation	Answer
<b>A.</b>	<b>British pounds that can be acquired for \$ 100</b>		
<b>B</b>	<b>\$ that 50 Dutch guilders will buy</b>		
<b>C</b>	<b>Swedish Kroner that can be acquired for \$ 40</b>		
<b>D</b>	<b>Dollars that 200 Swiss francs can buy</b>		
<b>E</b>	<b>Italian Lira that can be acquired for \$ 10</b>		
<b>F</b>	<b>Dollars that 1000 Japanese yen will buy</b>		

2. On 1<sup>st</sup> March, following rates were provided :

Spot rate : 1 \$ = Rs. 50

3 month Forward rate : 1 \$ = Rs. 55

- 1) Mr. Anil Ambani had to attend an urgent meeting on 1<sup>st</sup> March in USA. He needs \$ 2,000 for the meeting. Find out the applicable rate. How much Mr. Ambani will pay in Rupees to acquire \$ 2,000.
- 2) Suppose, Mr. Ambani postpones his meeting for 3 months. Find out the applicable rate and amount to be paid after 3 months ?

3.

- Consider the following quotes and derive the cross rates :
  - Rs / Pound : 73.38
  - Rs / \$ : 47.10
  - Required - \$ / Pound.
4. Consider the following quotes and derive the cross rates :
- Rs/GBP : 73.89
  - SGD / CA\$ = 1:2143
  - Required – Rs/CA\$
5. Determine \$ / Pound bid and ask rate for one unit of Pound.
- Rs/\$ : 47.50 – 47.62
  - Rs / Pound : 75.50 – 75.60
6. Following are the quotes available in the currency market :
- 1 \$ = Rs. 45.1520 – 45.1725  
 1 Pound = \$ 1.6520 – 1.6538  
 1 = Pound 1.0125  
 Determine Rs/ bid and ask rate.
7. Following are the quotes available in the currency market :
- 1 \$ = Rs. 45.1520 – 45.1725  
 1 \$ = DEM 1.8235 – 1.8245  
 1 Pound = DEM 2.0125 – 2.1205  
 1 = Pound 1.0115 – 1.1015. Determine Rs/ bid rate.
8. Suppose the exchange rate between US dollars and the French francs was FF 5.9 = \$1, and the exchange rate between the dollar and the British pound was 1 pound = \$ 1.50. What was the exchange rate between francs and pounds.
9. On December 27, 2012 a customer requested a bank to remit DG 250.000 to Holland in payment of import of diamonds under an irrevocable LC. However due to bank strikes, the bank could effect the remittance only on January 3, 2013. The interbank market rates were as follows :

	December 27	January 3
Bombay	\$/Rs. 100 : 3.10 – 3.15	3.07. – 3.12
London	\$ / Pound : 1.7250/60	1.7175/85
DG/Pound	3.9575/90	3.9380/90

The bank wishes to retain an exchange margin of 0.125%. How much does the customer stand to gain or loss due to the delay ?

**10.** On January 28, 2012 an importer customer requested a bank to remit Singapore Dollar (SGD) 25,00,000 under an irrevocable LC. However, due to bank strikes, the bank could effect the remittance only on February 4, 2012. The inter-bank market rates were as follows :

	January, 28	February, 4
Bombay US \$ 1 =	Rs. 45.85/45.90	45.91/45.97
London Pound 1 =	US \$ 1.7840/1.7850	1.7765/1.7775
Pound 1 =	SGD 3.1575/3.1590	3.1380/3.1390

The bank wishes to retain an exchange margin of 0.125%. How much does the customer stand to gain or lose due to the delay? (Calculate rate in multiples of 0.0001)

**11.** You (bank) sold Hong Kong Dollar 1,00,00,000 value spot to your customer at Rs. 5.70 & covered yourself in London market on the same day, when the exchange rates were.

US \$ 1 = H. K. \$	7.5880	7.5920
Local inter bank market rates for US \$ were		
Spot US \$ 1 = Rs./	42.70	42.85

Calculate cover rate and ascertain the profit or loss in the transaction.

**12.** Suppose that 1 French Franc could be purchased in the foreign exchange market for 20 US cents today if the franc appreciated 10 percent tomorrow against the dollar, how many francs would a dollar buy tomorrow ?

**13.** Fleur du lac, a French co., has shipped goods to an American importer under a letter of credit arrangement, which calls for payment at the end of 90 days. The invoice is for \$ 124,000. Presently the exchange rate is 5.70 French francs to the \$. If the French franc were to strengthen by 5% by the end of 90 days what would be the transactions gain or loss in French francs ? If it were to weaken by 5%, what would happen? (Note : make calculation in francs per \$)

**14.** As exports are holding an export bill in United States Dollar (USD) 1,00,000, due 60 days hence. They are worried about the falling USD value which is currently at Rs. 45.60 per USD. The concerned export consignment has been priced on an exchange rate of Rs. 45.50 per USD. The firm's bankers have quoted a 60 day forward rate of Rs. 45.20. Calculate

- i. The rate of discount quoted by the bank.
- ii. The probable loss of operating profit if the forward sale is agreed to.

**15.** A company operating in a country has dollar as its unit of currency has today invoiced sales to an Indian Co. the payment being due in 3 months from the date of invoice. The invoice amount is \$ 7,500 and today spot rate is \$ 0.025 = Re. 1.

It is anticipated that exchange rate will decline by 10% over the 3 months period and in order to protect the dollar proceeds the importer proposes to take appropriate action through foreign exchange market. The 3 months forward exchange rate is quoted as \$ 0.0244 = Re. 1.

You are required to calculate the expected loss and show to what extent it can be hedged by the forward contract.

**16.** AB Ltd. Operating in Japan has today effected sales to an Indian company, the payment being due 3 months from the date of invoice. The invoice amount is 108 lakhs yen. At today's spot rate, it is equivalent to Rs. 30 lakhs. It is anticipated that the exchange rate will decline by 10% over the 3 months period and in order to protect the yen payments, the importer proposes to take appropriate action in the foreign exchange market. The 3 months forward rate is presently quoted as 3.3 yen per Rupee. You are required to calculate the expected loss and to show how it can be hedged by a forward contract.

**17.** An Indian company wants Rs. 10,00,000 for a period of 3 months. The following information is available in respect of exchange rate :

Exchange Rate	Spot	3 months forward
<b>Rs. / Pound</b>	<b>Rs. 53.25</b>	<b>Rs. 54.80</b>
<b>Rs. / \$</b>	<b>Rs. 34.70</b>	<b>Rs. 35.95</b>
<b>Rs. /DM</b>	<b>Rs. 24.20</b>	<b>Rs. 25.15</b>
<b>Rs./FF</b>	<b>Rs. 7.10</b>	<b>Rs. 7.35</b>

The interest rate for 3 months borrowings are :

Re.	:	18.00%
Pound	:	7.50%
\$	:	6.25%
DM	:	5.50%
FF	:	7.00%

What is the best option for the company?

**18.** A Thai company is expecting to receive US \$ 5 million from its customer in the US after three months. The current spot exchange rate is Baht 43.75 \$ and 90 day forward rate is Baht 45.35/\$. What will be the consequences if the Thai firm.

- Does not cover its exposure
- Covers 60% and keeps 40% uncovered.
- Covers 100% exposure by entering into a forward contract.

Suppose the spot exchange rate at the time Thai company receives payment is Baht 44.10 / \$, what is the amount receivable in Baht.

**19.** US \$ is quoted as under

Inter Bank Market as on 25.01.2013

	Exchange Rate
Spot US \$ 1 =	42.4000/4200
Spot February	2000/2100
Spot March	3500/3600

Calculate the forward buying and selling rate :

**20.** US \$ is quoted as under :

Inter Bank Market as on 25.01.2013

	Exchange Rate
Spot US \$ 1 =	42.4000/4200
Spot February	3800/3600
Spot March	5700/5400

Calculate the forward buying and selling rate :

**21.** The six month interest rate (annualized) in Italy and France is 13% and 11% respectively. The current exchange rate is Lira 296.10/FF. The six months forward rate is Lira 297.80/FF.

1. Where should a French investor invest ?
2. Where should he borrow from ?
3. Is there any arbitrage opportunity for the investor ?
4. What should be the forward exchange rate so that there is no arbitrage opportunity?

**22.** The exchange rate between Us dollars and the French franc was FF 5.9 = \$1, and the exchange rate between the dollar and the British pound was £ 1 = \$ 1.50. What was the exchange rate between francs and pounds?

**23.** In New York, the sport rate for currency X is \$ 0.9968 and the 1 month and 6 months forward rates are \$ 0.9984 and \$ 0.9998 respectively. Which currency is at premium and what is the % annualized premium?

**24.** A company operating in a country having the \$ as its unit of currency, has today invoiced sales to an Indian company, the payment being due 3 months from the date of invoice. The invoice amount is \$13,750 and at today's spot rate of \$0.0275 is equivalent to Rs. 5,00,000.

It is anticipated that the exchange rate will decline by 5% over the 3 month period and in order to protect the \$ payments, the importer proposes to take appropriate action in the foreign exchange market. The 3 month forward rate is presently quoted as \$0.0273. You are required to calculate the expected loss and to show how it can be hedged by a forward contract.

- 25.** Calculate the arbitrage gains possible on Rs. 10, 00,000 from the middle rates given below. Assume there are no transaction costs:

Rs. 76.200=£1 in London

Rs. 46.600= \$1 in Delhi

\$1.5820=£ 1 in New York

- 26.** The following rates appear in the foreign exchange market:

	Spot Rate	2-Month Forward
Re./US\$	Rs. 45.80/46.05	Rs. 46.58/47.00

- a) How many dollars should a firm sell to get Rs. 5 Crore after 2 months?  
 b) How many rupees is the firm required to pay to obtain US\$ 2,00,000 in the spot market?  
 c) Assume that the firm has US\$ 50,000, how many rupees does the firm obtain in exchange of US\$?
- 27.** X Ltd., an Indian Company has an export exposure of 10 million yen, payable September end. Yen is not directly quoted against Rupee. The current spot rates are INR/USD =Rs. 41.79 and JPY/USD = 129.75. It is estimated that yen will depreciate to 144 level and Re. to depreciate against \$ to Rs. 43. Forward rates for September 1998 are INR/USD= Rs. 42.89 and JPY/USD= 137.35  
 You are required to:
- a) Calculate the expected loss if hedging is not done. How the position will change if the firm takes forward cover?  
 b) If the spot rate on 30<sup>th</sup> September 1998 was eventually INR/USD = Rs. 42.78 and JPY/USD= 137.85, is the decision to take forward cover justified?

- 28.** Sunshine Ltd. is engaged in the production of synthetic yarn and planning to expand its operations. In this context, the company is planning to import a multi-purpose machine from Japan at a cost of ¥ 2460 lakhs. The company is in a position to borrow funds to finance import at 12% interest per annum with quarterly rests. Tokyo based branch of an Indian bank has also offered to extend credit of 90 days at 2% per annum against opening of an irrevocable letter of credit.

Other informations are as under:

Present exchange rate: Rs. 100 = ¥246

90 Days forward rate: Rs. 100 = ¥250.

Commission charges for letter of **credit** at 4% per 12 months. Advise whether the offer from the foreign branch should be accepted.





\$	7%	9%
£	5%	8%

Compute and show how a money-market hedge can be put in place. Compare and contrast the outcome with a forward contract.

33. On the same date that the DM spot rate was quoted at \$ 0.4 in Newyork, The price of the Pound Sterling was quoted at \$1.8.

(i) What would you expect the price of the Pound to be in Germany?

(ii) If the Pound was quoted in Frankfurt at DM 4.4/ Pound, what would you do to profit from the situation?

34. Indigo Ltd is planning to import a multipurpose machine from Japan at a cost of 7200 Lakh Yen. The company can avail loans at 15% interest p.a. with quarterly rests with which it can import the machine. However, there is an offer from Tokyo branch of an India based bank extending credit of 180 days at 2% per annum against opening of an irrevocable letter of credit.

Other Information:

Present exchange rate Rs. 100 = 360 Yen

180 days Forward rate Rs. 100 = 365 Yen

Commission charges for LC at 2% per 12 months.

Will you accept the bank's offer and why?

35. During a year, the price of British Gilts (face value Pound 100) rose from Pound 103 to Pound 105 while paying a coupon of Pound 8. At the same time, the exchange rate moved from \$/Pound 1.7 to \$/Pound 1.58. What is the total return to an investor in US who invested in the above security?

# CHAPTER 13

## TREASURY MANAGEMENT

### INTRODUCTION

Treasury management is the science of managing treasury operations of a firm. Today when we speak of treasury management, we refer to all activities involving the management of revenues. Inflows and outflows of government, banks and corporate etc. It is a general concept applicable to overall fund management. Funds means cash, currency, cheques, liquid government securities and other liquid investments – In short all products which can be converted into cash safely and quickly.

The terms treasury management and fund management are used almost synonymously. Conceptually, the latter is a general term, applicable to the business sector, while treasury management refers to the management of cash, currency and credit of sovereign power of the country. The term currency here includes both national currency and the foreign currencies dealt with by the government.

Reserve Bank of India manages the macro treasury management of the country. This is done through :

- Issue of Currency notes
- Distribution of small coins, one, two and five rupee coins and rupee notes on behalf of the government.
- Maintenance of currency chests.

Treasury function is a part of the total managerial functions. Managerial function set-up can be classified into three broad units, viz. production function, marketing function and finance function. Production function pertains to the building up of capacities and generation of output. Marketing function is concerned with the marketing of the output through establishment of the sales and marketing network. In the finance function, the manager is concerned with financing of inputs and outputs and management of funds during the entire production cycle.

The finance function comes into play when the company is incorporated. With capital restructuring, efforts are made for arriving at least cost combinations of capital for financing of a project and forecasting for working capital. In this function, one has to coordinate with the production and operations manager, sales or marketing manager and they together constitute the marketing team.

The inflows and outflows of funds, their coordination and synchronization and making arrangements for meeting any gap between them is only one end of the spectrum of finance function. The other end of the spectrum is the management of the surpluses and maximization of returns from short term funds. These two ends of

the spectrum form the core of activities of the finance function. The finance manager can be termed as an arranger of funds, whereas the treasury manager can be viewed as a manager of funds.

Treasury management has both macro and micro aspects. At the macro level, the inflows and outflows of cash, credit and other financial instruments are the functions of the government and the business sectors. These inflows are arranged by them as borrowing from the public. In these sectors, the ratio of savings to investments is less than one, i.e., the savings are inadequate to fund the investments. Hence the need for borrowing. They accordingly issue securities or promissory notes which are part of the financial system. These borrowings for financial needs are met by surplus savings and funds of the household and the foreign sector, where the ratio of savings to investments is positive. The micro units utilize these inflows and build up their capacities for production of output. This leads to establishment of a production system which logically leads us to the natural consequence, i.e. the establishment of distribution and consumption systems. Once the production, distribution and consumption systems are in place at the micro level, the generation of surpluses at the units begins. These system. The inflows are the taxes paid to the government and repayment of loans made to the banks and financial institutions. These inflows into the macro level have to be managed by the treasury managers at the macro level.

While arranging funds for the micro unit, the finance manager aims at optimizing the value of his assets or wealth and minimizing the burden of his liabilities. He may seek to maximize his operational profits and seek to maximize the wealth of stakeholders of the micro unit. The basic objectives are economy, efficiency and productivity of assets. These objectives can not be achieved at the one end of the finance spectrum unless the management of funds at the other end of the spectrum, i.e., the treasury segment is equally triggered by the dictums of economy, efficiency and productivity.

### **LIQUIDITY MANAGEMENT AND TREASURY MANAGEMENT:**

Liquidity management ensures that the right amount of cash is available, at the right time and in the right place, is firmly positioned as a pivotal task for every treasurer. Liquidity management is in fact a part of the treasury management. Over the past few years, many treasurers have made substantial progress towards increasing the Visibility of their cash flow and centralizing cash within countries or regions. However liquidity management and particularly cash flow forecasting remain the greatest challenges facing treasurers. With credit more expensive and elusive for many companies, it is now imperative to tackle these challenges effectively. Liquidity management of a financial institution or bank or company is some how different to that of other trading units. The process starts with tapping of funds at lower rate in shape of deposits/borrowing and ends with investing the same in higher

rate to earn profit out of business with a margin of small portion of cash-in-hand kept to meet day to day operation.

## OBJECTIVES OF TREASURY MANAGEMENT

We have noted above that the main function of a treasury manager is the management of funds. While managing these funds, the treasury manager seeks to fulfill the undernoted objectives :

### **Availability in right quantity :**

The finance manager arranges funds for the unit. It is the duty of the treasury manager to ensure that after the funds have been arranged, these should be available in required quantity. The term quantity refers to the amount of funds required for day to day functioning of the unit. This quantity is available to the firm either as external loans or as internal generation. The loans quantity is arranged in the form of working capital finance.

### **Availability at right time :**

The requisite funds for day-to-day working of the firm should be available in time in addition to being available in quantity. By the term “availability in time” we mean that the funds should be available at the right moment, just in time so to say. The right time is the reasonable time taken to procure the funds. Procurement of funds is done by the firm in a number of ways and this activity is a kin to the cash inflows. Cash inflows take place on account of (i) Capital receipts like proceeds of loans or sale of assets (ii) Revenue receipts like sale proceeds of finished goods.

### **Deployment in right quantity :**

Just as procurement of funds in right quantity is important for a treasury manager, equally important is to ensure that the right quantity of funds is deployment. By deployment of funds, we mean earmarking of funds for various expense heads, parking of short-term funds and investing surplus funds. For deploying the right amount of funds, the treasury manager has to keep track of all receipts of funds. Simultaneously, the time table of deployment of funds is to be drawn up. In this time table, the payees are prioritized according to the urgency of their payments. Deployment of the right quantity of funds cannot be achieved in case the procurement of funds has not been done in right quantity in the first place.

### **Deployment at right time :**

A logical corollary of sourcing funds at the right time is that the funds should be deployed at the right time. The description of the right time is a relative term and what amount of time is appropriate varies from firm to firm. The treasury manager

has to honour the outstanding commitments on working capital account within this short span of time. Payment for wages and utilities etc. has to be made in time to avoid any defaults. Similarly, payment to trade creditors, domestic and overseas, has to be made within a stipulated short period of time for avoiding interest payments etc.

### **Profiting from availability and deployment :**

One of the prime objectives of a treasury manager is to ensure timely procurement of right amount of funds and timely deployment of right amount of funds. This objective results in administrative smoothening and paves way for easier achievement of performance targets of the firm. Modern day treasury manager has another objective, which is to profit from such sourcing and deployment. Sourcing of funds at the right time and in right quantity is a result of realization of debtors and financing of borrowings. Correct deployment ensures that there is no unnecessary accumulation of funds in the firm at any point in time. Needs of every department are met as per schedule. This action results in avoidance of special and extraordinary costs.

## **FUNCTIONS AND SCOPE OF TREASURY MANAGEMENT:**

The function of treasury management is concerned with both macro and micro facets of the economy. At the macro level, the pumping in and out of cash, credit and other financial instruments are the functions of the government and business sectors, which borrow from the public. These two sectors spend more than their means and have to borrow in order to finance their ever-growing operations. They accordingly issue securities in the form of equity or debt instruments. The latter are securities including promissory notes and treasury bills which are redeemable after a stipulated time period. Such borrowings for financing the needs of the government and the business sector are met by surplus funds and savings of the household sector and the external sector. These two sectors have a surplus of incomes over expenditure. The company's treasury manager is the pivot around which day to day operations of the company revolve. His operations and performance have an impact on the company itself and the financial system and the economy in the broad sense. An analysis of the sources of funds of business units reveals that broadly there are three categories of resources – internal accruals of the unit, external sources from the capital and the money market and the external sources.

Scope of treasury management can be broadly classified at the following levels as under :

- Unit level
- Domestic level
- International level.

**Unit level :**

At the unit level, the treasury manager's activities encompass all other management functions. The performance of production, marketing and HRD functions is dependent upon the performance of the treasury department. The lubricant for day-to-day functioning of a unit is money or funds and these funds are arranged by the treasury manager. The treasury is involved in all the budgeting activities of the unit, whether these are financial budget, costing budget, the marketing budget or the HRD budget. Treasury manager also monitors the cash flows of the unit on a continual basis. It is ensured by him that adequate funds are made available for day-to-day working of the unit. In case there is genuine shortfall in cash flows, the outflows are made in an order of priority with the more urgent payments being made first.

**Domestic level :**

At the domestic or national level, the scope of treasury management function is to channelize the savings of the community into profitable investment avenues. This job is performed by the commercial banks. Treasury management is a crucial activity in banks and financial institutions as they deal with the funds, borrowing and lending and investments. By nature of their activity, they earn their profits through operations in money or near money claims.

**International level :**

At the international level, the function of treasury management is concerned with management of funds in the foreign currencies. Foreign exchange as a subject refers to the means and methods by which the rights to income and wealth in one currency are converted into similar rights in terms of another country's currency. Such exchanges may be in the form of one currency to another or of conversion of credit instruments denominated in different currencies such as cheques, drafts, telegraphic transfers, bills of exchange, trade bills or promissory notes.

Every foreign exchange transaction involves a two-way conversion – a purchase and sale. Conversion of domestic currency into foreign currency involves purchase of the latter and sale of the former and vice versa. These transactions are routed through the banks. For effecting payment, following instruments are generally used :

**Telegraphic transfers (TT) :**

A TT is a transfer of money by telegram or cable or telex or fax from one center to another in a foreign currency. It is a method used by banks with their own codes and correspondent relations with banks and abroad for transmission of funds. It involves payment of funds on the same day, it is the quickest means of transmission of funds.

**Mail Transfers (MT) :**

It is an order to pay cash to a third party sent by mail by a bank to its correspondent or branch abroad. It is issued in duplicate, one to the party buying it and the other to the correspondent bank.

**Drafts and cheques :**

Draft is a pay order issued by a bank on its own branch or correspondent bank abroad. It is payable on sight but there is always a time lapse in the transit or in post between the payment by the purchaser of the draft to his bank and the receipt of the money by the seller in the foreign center.

### **Bills of exchange :**

It is an unconditional order in writing addressed by one person to another, requiring the person to whom the order is addressed, to pay certain sum on demand or within a specified time period.

## **RELATIONSHIP BETWEEN TREASURY MANAGEMENT AND FINANCIAL MANAGEMENT :**

Finance function is a key element in the corporate activity. Its main objective is to keep the firm in good financial health. To secure financial health, the finance manager has to perform the following functions :

- Investment functions and decisions.
- Financing function and decisions.

Investment function relates to the efficient use of funds in alternate activities. The aim is to allocate funds to each activity so as to obtain optimal returns from such allocation. The short-term and long-term investment strategy has to be planned in line with the objective of maximization of wealth of shareholders. The utilization of funds, as and when they accrue, should take care of two prime considerations. The first consideration is that there should not be any idle funds and second consideration is that there should be no threat of liquidity crisis.

In line with the twin objectives of investment and financing, the finance manager has to take responsibility for all decisions pertaining to these areas. In the finance function, a macro view of the requirements and uses of funds is to be taken. The finance manager has to arrange the funds within the approved capital structure of the firm. The funds may be debt or equity. Once the funds have been arranged, it is left to the treasury function to utilize these funds according to the approved parameters. Financial management is also concerned with the overall solvency and profitability of the firm. By overall solvency, we mean that the funds should be able at all times to meet its liabilities. The liabilities can be short-term or long-term. Profitability means that the firm should run its affairs profitably.

The treasury function is concerned with management of funds at the micro level. It means that once the funds have been arranged and investments identified, handling of the funds generated from the activities of the firm should be monitored with a view to carry out the operations smoothly. Since funds or cash is the lubricant of all business activity, availability of funds on day to day basis is to be ensured by the treasury manager. The role of treasury management is to manage funds in an efficient manner. The treasury function is thus supplemental and complementary to the finance function. As a supplemental function, it reinforces the activities of the finance function by taking care of the finer points while the latter delineates the broad



contours. As a complementary function, the treasury manager takes care of even those areas which the finance function does not touch.

Following differences can be observed between financial management and treasury management.

### **1. Control Aspects :**

The objective of financial management is to establish, coordinate and administer as an integral part of the management, an adequate plan for control of operations. The objective of treasury management is to execute the plan of finance function.

### **2. Reporting Aspects :**

Financial management is concerned with the preparation of overall financial reports of the firm such as Profit and Loss account and the Balance Sheet. Treasury management is concerned with monitoring the income and expense budgets on a periodic basis vis-à-vis the budgets.

### **3. Strategic Aspects :**

The finance function is involved in formulating overall financial strategy for the firm. The top management chooses the line of activity for the firm. The finance function firms up the investment and financing plans for the activity. Strategy for treasury management is more short-term in nature. The treasury manager has to decide about the tools of accounting and development of systems for generation of controlling reports.

### **4. Nature of assets :**

The finance manager is concerned with creation of fixed assets for the firm. Fixed assets are those assets which yield benefit to the firm over a longer period of time. The treasury manager is concerned with the net current assets of the firm. Net current assets are the difference between the current assets and current liabilities of the firm, both normally realizable within a period of one year. To ensure a healthy level of net current assets, the treasury manager is to ensure that the quality of the assets does not deteriorate.

As regards investments, the finance manager is concerned with long-term and strategic investments. The treasury manager is concerned with short-term investments. The tenor and quality of these investments has to be constantly monitored by the treasury manager for ensuring safety and profitability.

## **ROLE AND RESPONSIBILITIES OF TREASURY MANAGER :**

The treasury manager has the following roles :

### **(a) Originating roles :**

The treasury manager inducts and originates system of accounting for the firm. Routine accounting of the firm is then carried out along these established systems. These systems are the pivot around which the functioning of the unit revolves.

**(b) Supportive Roles :**

The second role expected from a treasury manager is a supportive role. In this role, the treasury manager supports the activities of other departments like manufacturing, marketing and HRD.

**(c) Leadership Roles :**

The treasury manager also has a leadership role to play. This role comes into play during times of exigency. An exigency could occur during times of systems break-down. During such periods the treasury manager has to make alternative arrangements for transaction processing. While doing this, he has to act like a leader and carry the team along with him.

**(d) Watchdog Roles :**

The treasury department is the eyes and ears of the management. Every financial transaction passes through his accounting system. As a processor of all the financial transactions, he keeps a watch on suspected bungling and frauds in the firm.

**(e) Learning Roles :**

The accounting practices all over the world are in a state of constant flux due to evolution of new accounting concepts and technological changes. The treasury manager accepts these changes with an open mind and adopts the changes best suited to the organization.

**(f) Informative Roles :**

The treasury manager is the source of information for the top management regarding performance of the firm vis-à-vis the budgets.

Apart from the above roles, the treasury manager has the under-mentioned responsibilities which he is expected to shoulder along with his roles :

**1. Compliance with Statutory Guidelines :**

While establishing operational systems for the firm, the treasury manager has a duty to ensure that the systems comply with all statutory and regulatory guidelines. Particularly, he has to take care of provision regarding taxation and other government dues.

**2. Equal treatment to all departments :**

While playing the supportive role, the treasury manager has a responsibility of professionalism and impartiality.

### 3. Ability to network :

While playing the leadership role in case of systems break-down or during periods of cash crunch, the treasury manager should be able to exhibit traits of public relationship and networking.

### 4. Integrity and impartial dealings :

Since the treasury manager is the watchdog of the management regarding honest and straight dealings, he has to be impartial in his dealings. He must highlight the true state of affairs of the finances to the management.

### 5. Willingness to learn and to teach :

The treasury manager is required to keep himself of all the developments in the field. He should be able to pick out the latest developments that are likely to help his organization.

## TOOLS OF TREASURY MANAGEMENT :

The tools are :

### 1. Analytic and planning tools

In treasury function, planning and budgeting are essential to achieve targets and to keep effective control on costs. Analysis of the data and information is necessary for planning and budgeting.

### 2. Zero Based Budgeting (ZBB)

Another tool of analysis and performance is ZBB wherein each manager establishes objectives for his function and gain agreement on them with top management. Then alternate ways for achieving these targets are defined and most practical way for achieving the targets is selected.

### 3. Financial Statement Analysis :

Financial analysis of a company is necessary to help the treasury manager to decide whether to invest in the company. Such analysis also helps the company in internal controls. The soundness and intrinsic worth of a company is known only by such analysis.

## INTERNAL TREASURY CONTROL

All economic units have the goal of profit maximization or wealth maximization. This objective is achieved by short-term and long-term planning for funds. The plans are incorporated in the budget in the form of activities and corresponding targets are fixed accordingly. The next step in the process is the control function

to see that the budgets are being implemented as per plans. Control is thus part of planning and budgeting in any organization.

Internal treasury control is a process of self improvement. It is concerned with all flows of funds, cash and credit and all financial aspects of operations. From time to time and on regular basis, the internal treasury control is exercised on financial targets.

The control aims at operational efficiency and removal of wastages and inefficiencies and promotion of cost effectiveness in the firm.

### **ENVIRONMENT FOR TREASURY MANAGEMENT**

Treasury management is carried out in the real corporate world and the corporate functioning is carried out in the overall corporate environment. Environment for treasury operations can broadly be classified as under :

#### **(a) Legal environment :**

By legal environment we refer to the legislations which govern corporate functioning. These legislations are the one pertaining to company law, taxation industrial regulation etc.

#### **(b) Regulatory environment :**

The regulatory environment encompasses regulations regarding employment wages, land laws, promotion of units and closure of units etc.

#### **(c) Financial environment**

Financial environment pertains to policies regarding monetary and fiscal control, financial supervision, exchange control ETC.

### **PRESENT STATUS OF TREASURY MANAGEMNT IN INDIA:**

Treasury management is still in its infancy in India. It is still considered as a sub-function of the financial management. In most of the companies. It is the finance manager which is also taking care of the treasury function. Treasury operations are carried out professionally and systematically by some banks and financial institutions. The first stage of evolution in treasury management is the establishment of a treasury function. The second stage is running it as a profit center. In India, treasury operations at the micro level are expected to grow at a fast pace with increasing integration of the Indian economy with the world economy.

# CHAPTER 14

## DERIVATIVE

### INTRODUCTION

- Derivative is a mathematical term and is a variable which derives its value from another variable.
- In Financial terms a derivative derives its value from an underlying asset.
- The underlying asset may be equity, commodity or currency.
- E.g. the derivative of ICICI Bank shares (underlying asset) will derive its value from the share price of ICICI Bank.
- Similarly a derivative contract on commodity like cotton will depend on the price of cotton.

### UNDERLYING ASSETS:

CASH MARKET	DERIVATIVES
Equities	Stock Options, Stock Futures, Index Options, Index Futures.
Fixed Income Securities	Interest Rate Futures, Interest Rate swaps, Interest Rate Options, Currency Swaps, Forward Rate Agreements etc.
Foreign Exchange	Currency Futures, Currency Options, Currency Swaps.
Commodities	Commodity future,

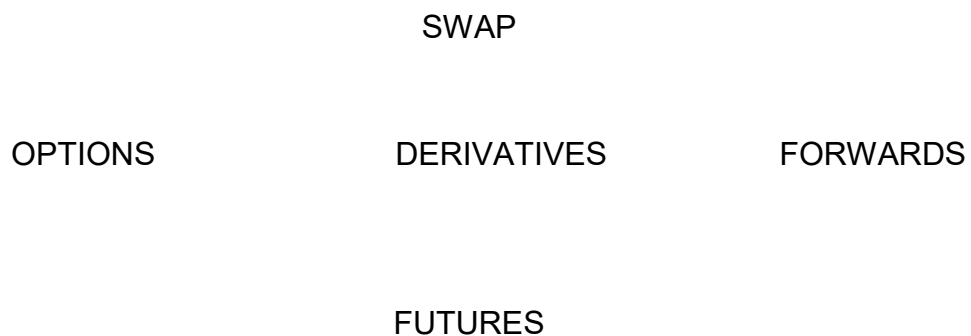
### DERIVATIVES : A USEFUL INNOVATION :

- Tool for hedging
- Risk management
- Price discovery
- Speculation
- Arbitrage.

Hedging	Speculation	Arbitrage
<ul style="list-style-type: none"> <li>➤ In hedging, you are always trying to</li> <li>➤ Minimize risks or losses, not maximize profits.</li> <li>➤ You need to be contented not restless.</li> </ul>	<ul style="list-style-type: none"> <li>➤ You want to make profit if you expect the price to go up or go down.</li> <li>➤ If price moves as per your expectation, you make profit or else you make losses.</li> </ul>	<ul style="list-style-type: none"> <li>➤ You want to make profit due to price differential in two market e.g. spot market and forward market.</li> <li>➤ It is a riskless profit.</li> </ul>

**Example on Arbitrage :**

- Suppose the spot price of sugar is Rs. 20 per kg. 3 month storage and interest cost is Rs. 3 per kg. (total Rs. 23 per kg.)
- 3 month forward contract is available at Rs. 25.
- You can buy sugar in the spot market at Rs. 20, spend Rs. 3 on storage and sell forward sugar at Rs. 25.
- You make an arbitrage profit of Rs. 2 (i.e. Rs. 25 – Rs. 23).

**TYPES OF DERIVATIVES :**

**1. FORWARDS :**

A forward contract is

- An agreement made today
- Between a buyer and seller
- To exchange the commodity or instrument for cash
- At a predetermined future date
- At a price
- Agreed upon today.

The agreed upon price is called the futures price.

**Agreement entered today where one party agrees to buy and the other agrees to sell an asset on a specified future date at an agreed price.**

- The agreed upon price is called the forward price.
- The delivery of the commodity or instrument does not occur until some future date.
- No money changes at the time the deal is signed.

**EXAMPLES ON FORWARDS CONTRACT :**

Example 1 :

You are an exporter. You will be receiving dollars after 3 months Present dollar rate Rs. 45 per \$ What is the risk you carry ?

- Rate after 3 months may change ?
- You will lose if rate goes down.
- Therefore you enter into a forward contract to sell dollars at Rs. 43.
- You have locked in the dollar rate at Rs. 43.

Example 2 :

I am a farmer, I am growing wheat now. The crop will be ready after 4 months. What is the risk I carry ?

- Wheat prices may fall due to bumper production.
- So, I sell forward wheat @ Rs. 10 per kg.
- In Nov. I am assured of a price of Rs. 10
- I am hedged – I know that I will receive Rs. 10 in any case.
- If it goes up to Rs. 16, I will feel sad – but I am still okay.
- If it goes down to Rs. 6, I will feel elated.

**FEATURES OF A FORWARD CONTRACT :**

- A tailor-made contract (customized contract).
- Both right as well as obligation.
- The terms and conditions are negotiated between buyer and seller.
- Usually no collateral is required.
- Generally end with deliveries i.e. one party pays the price and other party delivers the underlying.
- Risk of default exists. The other party may fail to fulfill its obligations.
- Liquid – there is no secondary market. There is no transferability of forward contract. If a party wishes to reverse the contract, it has to compulsorily go to the same counterparty.

**2. FUTURES :**

A futures contract is a

- Financial security.
- Issued by an organized exchange.
- To buy or sell a commodity, security or currency
- At a predetermined future date
- At a price agreed upon today.

The agreed upon price is called the futures price.

**FEATURES OF FUTURE :**

- Traded on organized exchanges.
- Standardized form of a forward contract. Most of the terms and conditions are fixed by the exchange.
- Future are traded in lots.
- Margin is required.
- Contracts are highly liquid.
- There is no counter party risk. The counterparty is the exchange.
- Both a right and an obligation to buy or sell a standard amount of a commodity, security or currency on a specified future date at a specified price.



**PRE-REQUISITES OF FUTURE CONTRACT :**

S.No.	Particulars	Explanation
1	Underlying asset	The underlying asset can be share, index, commodity, currency etc.
2	Buyer	Anybody competent to contract can become buyer
3	Seller	Anybody competent to contract whether or not he holds the underlying asset.
4	Contract price or contract value	It is the price at which a contract is entered into.
5	Expiry of the contract.	It is the date on or before which the transaction must be settled.

**Illustration :**

<b>Satyam Futures</b>	
<b>Lot Size</b>	<b>600 shares</b>
<b>Share Price</b>	<b>Rs. 200</b>
<b>Future Contract Price</b>	<b>Rs. 120000 (Rs. 200* 600)</b>
<b>Margin</b>	<b>(say 15%)</b>
<b>Margin amount to be paid</b>	<b>Rs. 18000</b>

**❖ FORWARD VS FUTURE :**

S.No.	Particulars	Forward	Future
1	Nature of the contract	Customized	Standardized
2	Counter party	Any entity	Exchange
3	Liquidity	Poor	Very High
4	Margins	Not Required	Margins required

5	Settlement	Usually end with deliveries	Settled with difference
6	Market	No secondary market	Traded on organized exchanges
7	Default risk	Exists	No default risk
8	Valuation	Not Done	Done on daily basis (marked to market)

## GAIN OR LOSS ON FUTURE TRANSACTION :

Situation	Position	Price Goes	Gain / Loss
We have bought future	Long position	Up	Gain
We have bought future	Long position	Down	Loss
We have sold future	Short position	Up	Loss
We have sold future	Short position	Down	Gain

## Example 1 : Index Future :

Underlying	NIFTY	
Contracted price	1700	
Period	3 months	
Buyer	Mr. A	
Seller	Mr. B	
Market price after 3 months	Gain/Loss to Mr. A	Gain / Loss to Mr. B
Situation 1	2,000	
Situation 2	1,700	
Situation 3	1,600	

**Example 2 : Stock Future :**

<b>Underlying</b>	<b>ITC Shares</b>	
<b>Contracted price</b>	<b>200</b>	
<b>Period</b>	<b>3 months</b>	
<b>Buyer</b>	<b>Mr. A</b>	
<b>Seller</b>	<b>Mr. B</b>	
<b>Market price after 3 months</b>	<b>Gain/Loss to Mr. A</b>	<b>Gain / Loss to Mr. B</b>
<b>Situation 1      220</b>		
<b>Situation 2      200</b>		
<b>Situation 3      160</b>		

❖ **FUTURE PRICING (COST OF CARRY MODEL) :****Determination of futures Price :**

The futures price is determined as follows :

- **Future price = Spot Price + Costs of carrying**

Cost of carry Model in Financial Futures.

- **Future Price = Spot Price + carrying cost – Returns (dividends, etc.)**

**Cost of carrying is storage, insurance, transport costs, interest etc.**

The spot price is the current price of the commodity. The cost of carrying is aggregate of storage, insurance, transport costs involved in delivery of commodity.

Price, exclusive of commission, are determined by supply and demand. The future price is the market's expectation of what the spot price will be on the delivery date of the particular contract. Therefore, there is a close relationship between the spot and future prices, particularly as the delivery date becomes due.

**Example :**

If John is certain that the demand supply position of wheat is such that three months from now, the price of wheat is likely to go up, he should be tempted to buy wheat now and sell the stock after three months at a higher price. For this purpose he will hire a godown, stock the inventory, pay interest on the money invested in the stock as well as pay incidental charges in holding the inventory, like handling charges, insurance charges, etc. collectively called the carrying costs. Let us assume that he buys a unit of wheat at Rs. 100 and the carrying costs aggregate Rs. 6 per unit. Logically, to earn profit, have the same information that the wheat price is likely to go up beyond the carrying costs, the number of buyers would increase. As the current demand for wheat increases because of this information, the current spot price also starts climbing. The current spot price would keep on increasing till the anticipated future spot price become equal to the current spot price plus the carrying costs.

### SUMMARY

**Future Price = Spot Price + Costs of carrying**

**OR**

**Future Price = Cost + Carrying Cost – Return (Dividends/Interest)**

**Cost of carrying is storage insurance, transport costs, interest etc.**

**If the future price is more than spot price, future is said to be at premium.**

**If future price is less than cash price, then future is said to be at discount.**

### ❖ VALUATION OF FORWARD / FUTURE CONTRACTS :

#### 1. In case of a non-dividend paying stock :

$$A = P e^{\epsilon m}$$

Where,  $\epsilon$  = epsilon, a mathematical constant having a value of 2.7183.

#### 2. In case, there is cash income accruing to security like dividends :

the following formula is used.

$$A = (P-I) e^{\epsilon m}$$

Where,  $I$  = present value of the income flow during the tenure of the contract.

#### 3. In case the income accretion to the securities is in the form of percentage yield, $y$ , as in the case of stock indices :

the formula is

$$A = P \cdot e^{n(r-y)}$$

Where, Y = Yield%

❖ **Purpose of Future Market :**

1. Hedging – Future contracts provide a hedging facility to counter the adverse movement in prices, interest rate, foreign exchange rate, etc.
2. Speculation – Future contracts provide arbitrage opportunity to the speculators.
3. Price Discovery – Price discovery is the use of future price to predict spot price that will prevail in the future. These predictions are useful for production decisions involving the various commodities.
4. Quick and low cost transactions –
  - Futures contract can be created quickly at low cost.
  - The cost involved is insignificant as compared to the value of the underlying asset.

❖ **STOCK INDEX FUTURES (SIFs) :**

A future contract on a stock market index gives its owner the right and obligation to buy or sell the portfolio of stocks represented by that index. SIFs have revolutionized the equity trading all over the world.

SIFs have been introduced in the Indian stock markets on S & P CNX Nifty (Nifty) of NSE and on BSE sensex of BSE. The SIF contracts involve the payment of cash on the delivery date of an amount as indicated below –

$$\text{Cash Payment} = (I - P) \times M$$

Where,

I = The value of the index at the close of the last delivery date of the contract.

P = The purchase price of the Futures Contract.

M = The Multiplier.

Example – A Nifty future contract at 1,700 is worth Rs. 3,40,000, i.e. 1700 x 200. In case, on expiry of the contract, the Nifty index is at 1,750, an amount of Rs. 10,000 (i.e. (1750 – 1700) x 200) would be needed for cash settlement. In the above case, as the index was above the futures price, those who have gone short (seller), pay those who have long (buyer) positions. Correspondingly, in the event of the index being below the futures price, the long pay the shorts.

❖ **HEDGING USING FUTURES :**

- In order to hedge, i.e. to protect against price risk, we must take position in future market, which is opposite to the position in the spot market.
- If we have long (bought) position in spot market, we must go short (Sell) in the future market.
- If we have short (Sell) position in spot market, we must go long (bought) in the future market.
- Partial Hedge.

If we don't want to be fully protected against risk, but seek only partial protection, the value of position to be taken in future market is as under.

Value of spot position x percentage of protection required.

- If the particular stock for which a particular position is taken in the spot market is not traded in future market, hedge can be achieved by taking a position in the Index to the extent of following value.
- Value of spot position x percentage of protection required x Beta.

## OPTIONS

❖ **MEANING OF OPTION :**

- An option is the right but not the obligation to enter into a transaction. An option is the right, but not the obligation, to buy or sell something at a stated date at a stated price.
- The holder of the option can exercise the option at his discretion or may allow the option to lapse.
- The option buyer acquires a right, while the option seller takes an obligation. It is the buyer's privilege to exercise the acquired right and when exercised, the option seller has to honour it.

❖ **KEY TERMS AND PHRASES USED IN DISCUSSION OF OPTIONS :**

1. Call Option – A call option provides to the holder a right to buy specified assets at specified price on or before a specified date.
2. Put Option – A put option provides to the holder a right to sell specified assets at specified price on or before a specified date.
3. Parties to an option Transaction :
  - a. Buyer or holder of an option (call or put)
  - b. Seller or writer of an option (call or put)
  - c. The Clearing House.

Option holder has right but not the obligation.  
Option writer has obligation but not the right.

Rights and obligation of call buyer.

- He has a right to buy the underlying at the exercise price.
- He has an obligation to pay premium to option writer at the beginning.
- His risk is limited to the extent of premium paid.
- His profit potential is very high (unlimited).

Rights and obligation of call writer

- He has a right to receive premium at the beginning.
- He has an obligation to deliver the underlying at the exercise price.
- His profit is limited to the extent of premium received.
- His loss potential is very high (unlimited)

Rights and obligation of Put buyer :

- He has a right to sell the underlying at the exercise price
- He has an obligation to pay premium to option writer at the beginning
- His risk is limited to the extent or premium paid.
- His profit potential is very high (unlimited)

Rights and obligation of Put writer :

- He has a right to receive premium at the beginning.
- He has an obligation to accept delivery of the underlying at the exercise price.
- His profit is limited to the extent of premium received.
- His loss potential is very high (unlimited)

### Type of option flow chart

Options

Call Option		Put Option	
Buyer	Sellers	Buyer	Sellers
<b>Right to Buy</b>	Obligation to Sell	Right to Sell	Obligation to Buy
<b>Pays premium</b>	Receives Premium	Pays premium	Receives premium

Covered option – When the writer of an option owns the stock he is obliged to deliver upon exercise of the option he has written he is called a covered writer and the option is called covered option.

Uncovered (naked) option – On the other hand, if he does not own the stock he has written the option for, he is called an uncovered or naked Writer and the option is called an uncovered (naked) option.

Exercise price or striking price – The price at which the option holder can buy and / or sell the underlying asset is called the exercise price or striking price.

Expiration date or maturity date – The date when the option is exercised or matures is referred to as expiration date or maturity date. After the expiration date, the option is worthless.

Exercising the option – The act of buying or selling the underlying asset as per the option contract.

European and American Option – A European option can be exercised only on the expiration date. An American option can be exercised on or before the expiration date.

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**Illustration 1 : Call Options – Stock Option :**

<b>Call holder (buyer)</b>	<b>Mr. A</b>	
<b>Call writer (seller)</b>	<b>Mr. B</b>	
<b>Underlying share</b>	<b>Infosys</b>	
<b>Option premium.</b>	<b>20</b>	
<b>Expiry date</b>	<b>3 months</b>	
<b>Exercise price</b>	<b>1750</b>	

<b>Market price after 3 months</b>	<b>Gain/(Loss) to A (Gross)</b>	<b>Gain (Loss) to A (Net)</b>
<b>Situation 1      1800</b>		
<b>Situation 1      1750</b>		
<b>Situation 1      1700</b>		

**Illustration 2 : Call Options – Stock Option :**



<b>Call holder (buyer)</b>	<b>Mr. A</b>	
<b>Call writer (seller)</b>	<b>Mr. B</b>	
<b>Underlying share</b>	<b>Infosys</b>	
<b>Option premium.</b>	<b>20</b>	
<b>Expiry date</b>	<b>3 months</b>	
<b>Exercise price</b>	<b>1750</b>	

<b>Market price after 3 months</b>	<b>Gain/(Loss) to B (Gross)</b>	<b>Gain (Loss) to B (Net)</b>
<b>Situation 1      1800</b>		
<b>Situation 1      1750</b>		
<b>Situation 1      1700</b>		

**Illustration 3 : Call Options – Index Option :**

<b>Call holder (buyer)</b>	<b>Mr. A</b>	
<b>Call writer (seller)</b>	<b>Mr. B</b>	
<b>Underlying share</b>	<b>NIFTY</b>	
<b>Option premium.</b>	<b>20</b>	
<b>Expiry date</b>	<b>3 months</b>	
<b>Exercise price</b>	<b>3750</b>	

<b>Market price after 3 months</b>	<b>Gain/(Loss) to A (Gross)</b>	<b>Gain (Loss) to A (Net)</b>
<b>Situation 1      4000</b>		
<b>Situation 1      3750</b>		
<b>Situation 1      3700</b>		

**Illustration 4** : Call Options – Index Option :

Call holder (buyer)	Mr. A	
Call writer (seller)	Mr. B	
Underlying share	NIFTY	
Option premium.	20	
Expiry date	3 months	
Exercise price	3750	

Market price after 3 months	Gain/(Loss) to B (Gross)	Gain (Loss) to B (Net)
Situation 1      4000		
Situation 1      3750		
Situation 1      3700		

When should we exercise PUT option ?

When market price (MP is \_\_\_\_\_ exercise price (EP) i.e.  $MP < EP$

**Illustration 5** : PUT Options – Stock Option :

PUT holder (buyer)	Mr. A	
PUT writer (seller)	Mr. B	
Underlying share	ITC	
Option premium	20	
Expiry date	3 months	
Exercise price	200	

Market price after 3 months	Gain/(Loss) to A (Gross)	Gain (Loss) to A (Net)
Situation 1      300		
Situation 1      200		

<b>Situation 1</b>	<b>100</b>		
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**Illustration 6 : PUT Options – Stock Option :**

<b>PUT holder (buyer)</b>	<b>Mr. A</b>	
<b>PUT writer (seller)</b>	<b>Mr. B</b>	
<b>Underlying share</b>	<b>ITC</b>	
<b>Option premium</b>	<b>20</b>	
<b>Expiry date</b>	<b>3 months</b>	
<b>Exercise price</b>	<b>200</b>	

<b>Market price after 3 months</b>	<b>Gain/(Loss) to B (Gross)</b>	<b>Gain (Loss) to B (Net)</b>
<b>Situation 1 300</b>		
<b>Situation 1 200</b>		
<b>Situation 1 100</b>		

**Illustration 7 : PUT Options – Stock Option :**

<b>PUT holder (buyer)</b>	<b>Mr. A</b>	
<b>PUT writer (seller)</b>	<b>Mr. B</b>	
<b>Underlying share</b>	<b>NIFTY</b>	
<b>Option premium</b>	<b>100</b>	
<b>Expiry date</b>	<b>3 months</b>	
<b>Exercise price</b>	<b>4,000</b>	

<b>Market price after 3 months</b>	<b>Gain/(Loss) to A (Gross)</b>	<b>Gain (Loss) to A (Net)</b>
<b>Situation 1 4300</b>		
<b>Situation 1 4000</b>		
<b>Situation 1 3500</b>		

**Illustration 9 :**

The Infosys stock is selling at Rs. 5000. Mr. X has a negative view about the stock. He decides to go through the option route to take advantage of the situation. He buys an option from Mr. A which will entitle him to sell 100 shares on or before 30<sup>th</sup> December at Rs. 4500 per share for which has to pay Rs. 20 per share today. Identify.

<b>Type of option</b>	
<b>Exercise price</b>	
<b>Expiry date</b>	
<b>Option premium</b>	
<b>Buyer of the option</b>	
<b>Writer of the option</b>	
<b>Underlying asset</b>	
<b>Current market price.</b>	

<b>In-the-Money</b>	<b>At-the-Money</b>	<b>Out-of-the-Money</b>
<p><b>Call option – If the actual price of the underlying asset is more than the Strike / exercise price, then the call option is said to be in the money.</b></p> <p><b>Put option is said to be in-the-money if actual price of the underlying asset is less than the strike price.</b></p> <p><b>If the buyer of the option is making a profit, he is said to be in-the-money.</b></p>	<p><b>If the actual price of the underlying asset is same as the strike / exercise price.</b></p>	<p><b>Call option – If the actual price is less than the strike price, the call option is said to be out-of-the-money.</b></p> <p><b>Put option is said to be out of money if the actual price is more than the strike price.</b></p> <p><b>If the buyer of the option is making a loss, then he is said to be out of money.</b></p>

<b>IF</b>	<b>Call Buyer</b>	<b>Call writer</b>	<b>Put Buyer</b>	<b>Put writer</b>
<b>Exercise Price</b>	<b>Out of the</b>	<b>In the money</b>	<b>In the money</b>	<b>Out of the</b>

<b>&gt; Market Price</b>	<b>money</b>			<b>money</b>
<b>Exercise Price = Market Price</b>	<b>At the money</b>	<b>At the money</b>	<b>At the money</b>	<b>At the money</b>
<b>Exercise Price &lt; Market Price</b>	<b>In the money</b>	<b>Out of the money</b>	<b>Out of the money</b>	<b>In the money</b>

**Illustration 10 :**

State whether each one of the following is in the money, at the money or out of the money.

<b>Option</b>	<b>Exercise Price</b>	<b>Stock Price</b>	<b>Option Holder</b>	<b>Option Writer</b>
<b>Call</b>	<b>60</b>	<b>55</b>		
<b>Call</b>	<b>50</b>	<b>50</b>		
<b>Call</b>	<b>110</b>	<b>105</b>		
<b>Call</b>	<b>40</b>	<b>35</b>		
<b>Put</b>	<b>110</b>	<b>100</b>		
<b>Put</b>	<b>105</b>	<b>115</b>		
<b>Put</b>	<b>12</b>	<b>15</b>		
<b>Put</b>	<b>25</b>	<b>20</b>		

**Illustration 11 :**

You bought a one-month call option at an exercise price of Rs. 40. What is the position if the current market price (CMP) is (a) Rs. 45/- (b) Rs. 40 or (c) Rs. 35. Will the position change if you had been a put buyer? What is the corresponding position for the call seller and the put seller ?

<b>Stock Price</b>	<b>Exercise Price</b>	<b>Call Holder</b>	<b>Call Writer</b>	<b>Put Holder</b>	<b>Put Writer</b>

**DIFFERENCE BETWEEN FUTURES AND OPTIONS**

S.No.	Future	Option
1	Futures involve obligations while the options involve right. In futures, the obligations must be fulfilled by both the parties.	In case of options, the option holder has the right to exercise or not to exercise his option.
2	There is no premium payable to buy the futures. However, some margin is required to be deposited with the exchange.	In case of options, the option holder has to pay a premium to buy the option.
3	The profit or loss of both the parties depend upon the specified price and the actual price on the settlement day. Both parties are exposed to unlimited profit or loss.	The loss of the option holder is restricted to the premium paid but his gains are unlimited. Similarly, the profit of the option writer is limited to the premium received, but he is exposed to unlimited risk.

### STRATEGIES USING HYBRID OPTION COMBINATIONS :

#### 1. STRADDLE :

It is a strategy which involves buying or selling (writing) both a call and a put on the same stock with both the options having same exercise price.

**Example** – Let us assume that Peter bought 100 XYZ 250 call and put options at premium of Rs. 10 and Rs. 8 respectively. In the event of XYZ's share price moving up to Rs. 280, let us see how it affects Peter –

Premium paid for 100 XYZ 250 call options =  $100 \times 10 = \text{Rs. } 1000$

Premium paid for 100 XYZ 250 put options =  $100 \times 8 = \text{Rs. } 800$ .

Total premium paid = Rs. 1800.

Peter lets the put option (opposite option) lapse and exercises the call option at Rs. 280 and realizes the appreciation @ Rs. 30 (i.e. 280-250) per share, i.e. Rs. 3000.

Peter's net profit – 3000 – 1800 = Rs. 1200.

Now, assume that XYZ share goes down to Rs. 210, how does it affect Peter?

Peter lets the call option (opposite option) lapse and exercises the put option at Rs. 210. He realizes Rs. 40 (i.e. 250-210) per share i.e. Rs. 4000 (i.e. 100 x 40)

Net Profit for Peter in this case = 4000 – 1800 = Rs. 2200.

Thus buying the opposite option. Peter has obviated a possible loss, i.e. he hedged against a probable loss by buying a call and put of same stock simultaneously at the same exercise price and for the same period. This is called buying a straddle.

## 2. STRANGLE –

A strangle involves the simultaneous purchase or sell of options (call or put) with same expiry date but with different exercise price.

There are 2 types of strangles – Long and Short.

**Long Strangle** – In a long strangle, you buy a call and buy a put (i.e. same number of calls and same number of puts) at the different exercise price but same expiry date. Between the two exercise prices, neither option will be exercised and there will be a loss equal to the amount of premium paid.

**Short Strangle** – In short strangle, you write a call and write a put (same number of calls and same number of puts) at different exercise price but same expiry date.

## 3. STRIP :

It is the strategy of buying two put options and one call option of the same stock at the same exercise price and for the same period. This strategy is used when the possibility of a particular stock moving downwards is very high as compared to the possibility of it moving up.

## 4. STRAP

A strap is buying two calls and one put where the buyer feels that the stock is more likely to rise steeply than the fall, it is opposite to strip.

## 5. SPREAD :

A spread involves the purchase of one option and sale of another (i.e. writing) on the stock. It is important to note that spreads comprise either all calls or all puts and not a combination of two, as in a straddle, strip or strap.

**Vertical spreads** – Option spreads having different exercise prices but the same expiration date. These are listed in a separate block in the quotation lists.

**Horizontal Spreads** – Here, the exercise prices are same and the expiration date different. These are listed in horizontal rows in the quotation lists. Time spreads and calendar spreads are forms of horizontal spreads.

**Diagonal Spreads** – Mixtures of vertical and horizontal spreads with different expiration dates and exercise prices are called diagonal spreads.



## PROBLEMS

1. (Value of Future – Non – Dividend Stock). Consider a three month maturity forward contract on a non-dividend paying stock. The stock is available for Rs. 200 with compounded continuously risk free rate of interest (CCRRI) of 10% p.a. what would be the price of forward contract?
2. (Dividend Paying Stock) Consider a 4 months forward contract on 500 shares with each share priced at Rs. 75. Dividend @ Rs. 2.50 per share is expected to accrue to the shares in a period of 3 months. The CCRRI is 10% p.a. Calculate the value of the forward contract.
3. (Non-Dividend Paying Stock) The market price of equity shares of A Ltd. Is Rs. 40. It has not been paying any dividend. The risk free rate for the investor is 5%. The 3 months forward rate for the share is Rs 42. Should the investor enter into the 3 months futures contract?
4. The price of equity shares of XYZ Ltd. (a non- divided paying) Company is Rs. 40. The risk-free rate is 10% p.a. with yearly compounding. An investor wants to enter into a 1 year forward contract. Find out the forward price.
5. (Non Interest Paying Debentures) The debentures of S Ltd. Are currently setting at Rs. 930 per debenture. The 4 months futures contract on this debenture is available at Rs. 945. There is no interest due during this 4 months period. Should the investor buy this future if the risk free rate of interest is 6% ?
6. The current market price of A Ltd. Share is Rs. 140 and is expected to declare dividend of Rs. 10 after 10 days, what should be the price of two months futures, if the risk free rate is 15% ?
7. The market price of equity shares of Brahma Ltd. is Rs. 50. It has not been paying any dividend. The risk-free rate for the investor is 6% p.a. The 3 months forward rate for the share is Rs. 55. Calculate the fair value of forward contract. What should be the right strategy (buy or sell)?
8. (Returns are expressed in Yield) Consider the following :
 

Current value of Index	1400
Dividend Yield	6%
CCRRI	10%

Find the value of a 3 months forward contract.

9. The stock index is currently 450 and the risk-free rate is 9%. Find out the futures price for a 3 months contract if the dividend yield is 5%
  
10. The NIFTY is 1800 at present. The stock underlying this index provides a yield of 3% p.a. The continuously compounding rate of interest is 8%. What should be the futures value of 3 Months NIFTY?
  
11. An investor buys a Sensex Futures at 5500 in market lot of 100. On the settlement date, the Sensex and the futures, both would converge to the same level. As the Sensex on the settlement date is 5600, the futures will also be 5600. Find out his profit or loss for one lot of futures. What would be his position, if the Sensex is 5450 on the settlement date?
  
12. The shares of XYZ Ltd. are being traded at Rs. 250 on the BSE. Its futures for 1 month, 2 months and 3 months are also available on the BSE. If the risk-free rate is 12% p.a. and no dividends are expected during this period, what should be equilibrium price of these futures?
  
13. The current market price of XYZ Ltd. share is Rs. 150 and is expected to declare dividend of Rs. 12 after 25 days. What should be the price of three months futures, if the risk-free rate is 12%?
  
14. The current market price of XYZ Ltd. share is Rs. 160 and is expected to declare dividend of Rs. 10 after 45 days. What should be the price of three months futures, if the risk-free rate is 10%?
  
15. An investor buys 500 shares of X Ltd. @ Rs. 200 per share in the cash market. In order to hedge, he sells 300 futures of X Ltd. @ Rs. 190 each. Next day, the share price and futures decline by 5% and 3% respectively. He closes his positions next day by counter transactions. Find out his profit or loss.
  
16. The market lot of NIFTY futures is 200 and the two months NIFTY futures are available at 1700. An investor creates a long position and buys 5 lots. On the settlement, the NIFTY is 1730. Find out the profit or loss of the investor.
  
17. The following data relate to ABC Ltd. share prices:  
 Current market price per share Rs. 200  
 Price in futures market -6 month Rs. 215  
 It is possible to borrow money for securities transactions at the rate of 10% p.a.

**Required:**

- i) Calculate the theoretical minimum Price of a 6 month future contract.
- ii) Explain, if any, arbitrage opportunities exist.

18. The following data relate to ABC Ltd. share prices:

Current market price per share Rs. 215

Price in futures market -6 month Rs. 190

It is possible to borrow money for securities transactions at the rate of 10% p.a.

**Required:**

- i) Calculate the theoretical minimum Price of a 6 month future contract.
- ii) Explain, if any, arbitrage opportunities exist.

19. The following information is related to stock of Kumar Ltd. Kumar Ltd has a Beta of 0.6 with Nifty. Each Nifty contract is equal to 100 units. Kumar Ltd now quotes at Rs. 200 and the Nifty Future is 3,000 index points. An investor is long on 1,000 shares of kumar Ltd in the spot market.

(a) How many future contracts will you have to take?

(b) Suppose the price in the spot market drops by 20%, how are you protected?

20. The following information is related to stock of Kumar Ltd. Kumar Ltd has a Beta of 0.6 with Nifty. Each Nifty contract is equal to 100 units. Kumar Ltd now quotes at Rs. 200 and the Nifty Future is 3,000 index points. An investor is short on 1,000 shares of kumar Ltd in the spot market.

(a) How many future contracts will the investor have to take?

(b) Suppose the price in the spot market drops by 20%, how he is protected?

21. The settlement price of a Nifty futures contract, on a particular day on NSE was 900. The multiple associated with the contract is 200. The initial margin for the contract is Rs. 10,000 and the maintenance margin is set at Rs. 7,500. The settlement prices on the following 5 days were as follows:

Days	Settlement price (Rs.)
1	860
2	895
3	920
4	880
5	845

You are required to calculate the mark-to-market cash flows, the daily closing balances and net profit/loss in the account of an investor who has gone: (a) Long at 900 and (b) short on 900.

22. In November, a wheat farmer is planning to sow wheat, which will be ready for harvesting by late March and delivery in April. The farmer expects to harvest 500 tonnes of wheat, and the prevailing spot price is Rs. 11,800 per tonne, which he wishes to lock in, since he fears prices may fall below this level by the time his wheat is ready for sale in April. At that time, April wheat futures are trading at Rs. 12,000 per tonne.

However, the price of wheat has fallen since last November to Rs. 11,500 per tonne. Correspondingly, prices of April wheat futures have also fallen, and are now trading at Rs. 11,700 tonne. Show how the hedging can be done? And also calculate the net profit/loss to the farmer (i) when hedged and (ii) Not hedged.

23. On March 1, the Pound/\$ spot rate is 1.6750 while June futures are trading at 1.6680. The basis is 0.0070 or 70 ticks. Suppose an American firm has a three months Sterling receivables of Pound 1,00,000. By June 1, the spot price 1.6620 while June futures are trading at 1.6590. Calculate the probable loss if (i) hedged (ii) Not hedged.

24. A futures contract is available on a company that pays an annual dividend of Rs. 5 and whose stock is currently priced at Rs. 200. Each futures contract calls for delivery of 1000 shares of stock in one year, daily marking to market, an initial margin of 10% and a maintenance margin of 5%. The corporate Treasury bill rate is 8%.

(a) Given the following information, what should the price of one future contract be?

(b) If the company stock price decreases by 7%, what will be the change, if any, in future price?

(c) As a result of the company stock price decreases, will an investor that has a long position in one futures contract of this company realise a gain or loss? Why? What will be the amount of gain or loss?

25. R buys a Sensex Futures at 500 in market lot of 200 futures. On the settlement date, the Sensex is 5600. Find out his profit or loss for one lot of futures. What would be his position, if the Sensex is 5450 on the settlement date ?

26. R buys a NIFTY futures contract for Rs. 2,80,000 (lot size 200 futures). On the settlement date, the NIFTY closes at 1,378. Find out his profit or loss, if he pays Rs. 1,000 as brokerage. What would be position, if he has sold the futures contract?

27. The market lot of NIFTY futures is 200 and the two months NIFTY futures are available at 1700. An investor creates a long position and buys 5 lots. On the settlement, the NIFTY is 1730. Find out the profit or loss of the investor.

28. An investor buys a put option at a strike price of Rs. 30 for a premium of Rs. 6. The current market price of the share is Rs. 28. Find out the profit/loss profile of the investor if the market price of the share is Rs. 18, Rs. 26, Rs. 28, Rs. 31 or Rs. 39, on the expiration date. What will be his position if he buys the call option?
29. The equity shares of Salman Ltd. are being sold at Rs. 210. A 3 month call option is available for a premium of Rs. 6 per share and a 3 month put option is available for a premium of Rs. 5 per share. Find out the net pay off of the option holder of the call option and put option given that (i) the strike price in both cases is Rs. 220, and (ii) the share price on the exercise day is Rs. 200 or Rs. 210 or Rs. 220 or Rs. 230 or Rs. 240.
30. A hopes that the price of B Ltd. Will fall after three months. Therefore, she purchases a put option on share with a maturity of three months at a premium of Rs. 5. The exercise price is Rs. 30 the current market price of B Ltd. Share is Rs. 28. How much is profit or loss of A (the put buyer) and the put seller if the price of the share at the time of the maturity of the option turns out to be Rs. 18, of Rs. 25, or Rs. 28, or Rs. 30 or Rs. 40? What is the pay-off of the seller of put option?
31. The share of XYZ Ltd. Is selling for Rs. 104, ABC buys a 3-months call option at a premium of Rs. 5. The exercise price is Rs. 105. What is ABC's pay-off if the share price is Rs. 100, or Rs. 105, or Rs. 110 or Rs. 115 or Rs. 120 at the time the option is exercised? What is the pay-off of the seller of the call option? Kindly draw the payoff diagram.
32. Equity shares of XYZ Ltd. are being currently sold for Rs. 90 per share. Both the call option and the put option for a 3 month period are available for a strike price of Rs. 97 at a premium of Rs. 3 per share and Rs. 2 per share respectively. An investor wants to create a straddle position in this share. Find out his net payoff at the expiration of the option period, if the share price on that day happens to be Rs. 90 or Rs. 105.
33. The shares of PQR Chemicals Ltd. are currently traded at Rs. 42. An investor buys a put option for Rs. 3 at the strike price of Rs. 40. Under what situation, the investor would be able to make profit? When he would exercise the option? Show the profit/loss profile of the investor with the help of diagram.
34. The current market price of the equity shares of P Ltd. is Rs. 70 per share. It may be either Rs. 90 or Rs. 50 after a year. A call option with a strike price of Rs.

66 (time 1 year) is available. The rate of interest applicable to the investor is 10%. He wants to create a replicating portfolio in order to maintain his payoff on the call option for 100 shares.

Find out the Hedge rate, Amount of borrowing, Fair value of the call.

35. The current market price of P Ltd is Rs. 290 per share. It may be either Rs. 350 or Rs. 220 after a year. A call option with a strike price of Rs. 280 (time 1 year) is available. The rate of interest applicable to the investor is 8%. An investor wants to create a replicating portfolio in order to maintain his pay off on the call option for 100 shares.

Find out:

(a) Hedge Ratio (b) amount of borrowing (c) fair value of the call

36. The current market price of P Ltd is Rs. 290 per share. It may be either Rs. 350 or Rs. 220 after a year. A Put option with a strike price of Rs. 280 (time 1 year) is available. The rate of interest applicable to the investor is 8%. An investor wants to create a replicating portfolio in order to maintain his pay off on the call option for 100 shares.

Find out:

(a) Hedge Ratio (b) amount of borrowing (c) fair value of the call

37. The following quotes are available for 3 months options in respect of a share currently traded at Rs. 50:

Strike price = Rs. 48;

Call option Rs. 5; Put option Rs. 3;

An investor devises a strategy of buying a call and selling the share and a put option. Draw his profit/loss profile if it is given that the rate of interest is 10% per annum. What would be the position if the strategy adopted is selling a call and buying the put and a share?

38. Identify the profit or loss in each of the following cases:

(a) A call option with an exercise price of Rs. 100 is bought for a premium of Rs. 40. The price of underlying shares is Rs. 176 at the expiry date.

(b) A put option with an exercise price of Rs. 450 is bought for a premium of Rs. 60. The price of underlying share is Rs. 289 at the expiry date.

(c) A put option with an exercise price of Rs. 400 is written for a premium of Rs. 55. The price of the underlying share is Rs. 456 at the expiry date.

(d) A call option with an exercise price of Rs. 100 is written for a premium of Rs. 40. The price of underlying shares is Rs. 176 at the expiry date.

(e) A call option with an exercise price of Rs. 100 is bought for a premium of Rs. 40. Simultaneously, a put option with exercise price of 110 is bought for a premium of 35. The price of underlying shares is Rs. 176 at the expiry date.

39. A share of S Ltd is currently selling for Rs. 150. There are two possible prices of the share after one year- Rs. 170 or Rs. 130. Assume that risk free rate of return is 8% per annum. What is the value of a one-year call option (European) with an exercise price of Rs. 155?