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UNIVERSITY**

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Financial Management

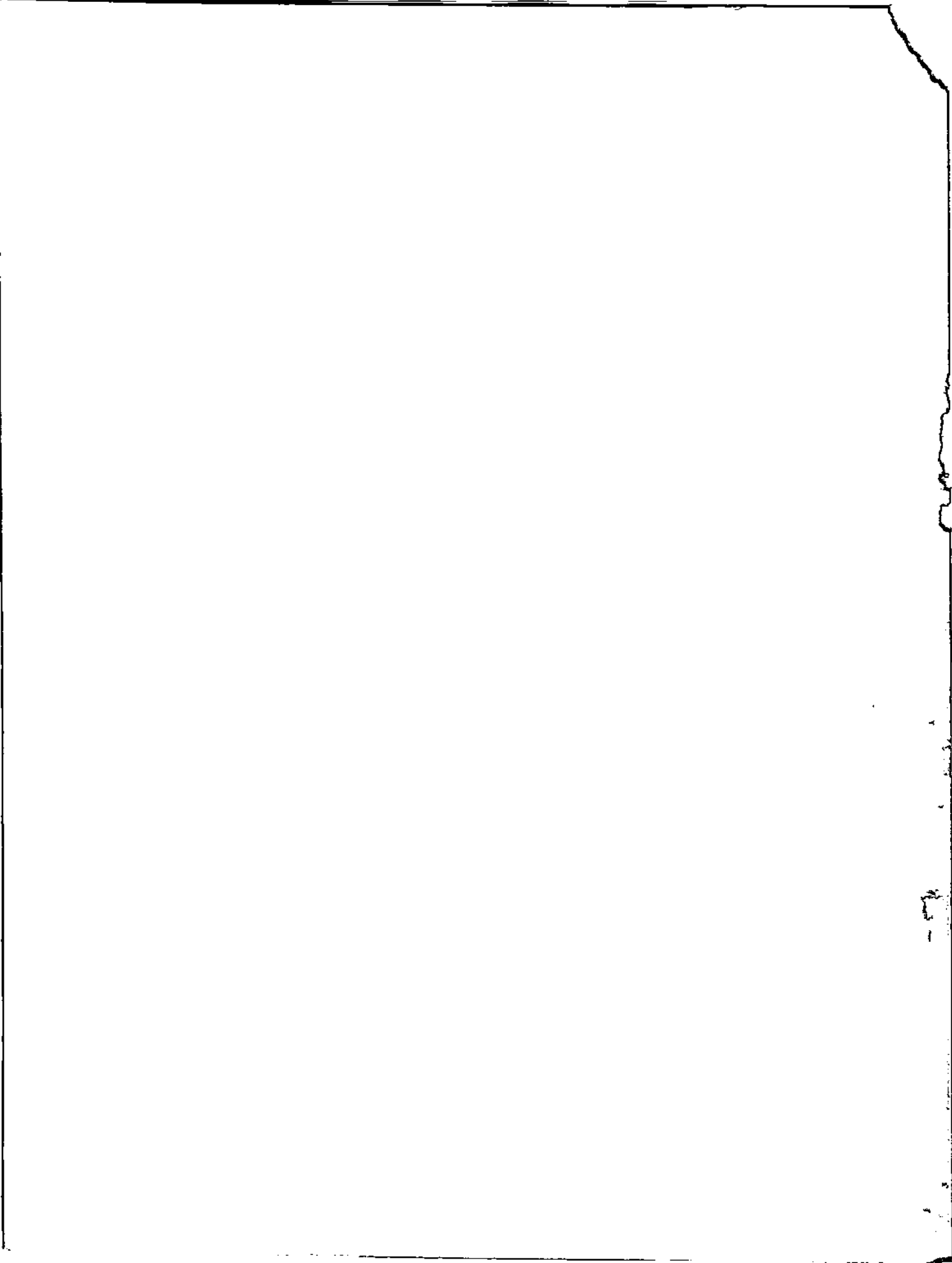
MGO-2202

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**MANGALAYATAN
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UNIT 1: INTRODUCTION

Structure

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- 1.1. Concept and Evolution of Finance
- 1.2. Meaning and Definitions of Financial Management
- 1.3. Objectives of Financial Management
- 1.4. Importance of Financial Management
- 1.5. Scope and Responsibilities of Financial Management
- 1.6. Objectives of the Firm
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- 1.10. Review Exercise

1.1 CONCEPT AND EVOLUTION OF FINANCE

Finance is very essential for the smooth running of the business. Without finance neither any business can be started nor successfully run. Finance is the oil of wheels, the marrow of the bones, the blood in the veins and the spirit of all trade, commerce and industry. Without adequate finance no business can survive and without efficient financial management no business can prosper and grow. Evolution of finance can be classified into three broad phases *i.e.*, Traditional Phase, Transitional Phase and Modern Phase.

Traditional Phase (up to 1940)

1. Finance was a part of economics; no separate attention was paid to finance.
2. Record keeping, preparing different reports and managing cash were the main functions of finance manager.
3. Finance manager called only when firm need to locate new sources of funds.
4. Focus of attention was no long term resources concept of working capital was virtually non-existent.
5. Descriptive in nature rather than analytical.
6. Procuring of funds for expansion activities.

Transitional Phase (1940-1950)

1. Firms realize that the function of finance was more than procuring funds.
2. Funds analysis and control on a regular basis was required.

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Two important theories were developed during this phase and these theories provide a platform to break the tradition that finance functions are the work of accountant. For finance decision making an expert person is required who has an analytical knowledge and skill i.e., finance manager. These theories are (i) Theory of Portfolio Management in 1950 by **Harry Markowitz**, (ii) Theory of Leverage and Valuation of firm in 1958 by **Modigliani and Miller**.

1.2 MEANING AND DEFINITIONS OF FINANCIAL MANAGEMENT

Financial Management is that area of general management which is concerned with the timely procurement of adequate finance from various sources and its utmost effective utilization for the attainment of business objectives. It encompasses within its purview all aspects of financial activity in an enterprise.

Financial Management has been defined differently by different authors. According to modern finance experts, Financial Management is concerned with the procurement and effective utilization of finance. This approach gives equal weightage to both procurement and utilization aspects of finance. Thus, it is a managerial of problem centred approach to Financial Management. Some definitions of Financial Management are as follows:

J.F. Bradley, "*Financial Management is the area of business management devoted to a judicious use of capital and careful selection of sources of capital in order to enable a business firm to move in the direction of reaching its goals.*"

J.L. Massie, "*Financial Management is the operational activity of a business that is responsible for obtaining and actively utilizing the funds necessary for efficient operations.*"

It is clear from the above definitions that Financial Management is that specialized function of general management, which is concerned, with the timely procurement of adequate funds and their effective utilization for the efficient functioning of the business enterprise. Financial Management therefore, includes financial planning, procurement of finance, investment of funds and financial control. The study of financial management corporations includes all financial aspects like issue of shares and debentures, internal financial control, procurement of additional capital, Elimination of financial crisis, determination of policies relating to reserves, surpluses, dividends, depreciation, investments, etc.

1.3 OBJECTIVES OF FINANCIAL MANAGEMENT

One of the basic and most important objectives of a business enterprise is to earn maximum profit by maximizing the output at the minimum cost. Financial Management is also an important area of General Management. The main objective of Financial Management is, therefore, to earn maximum profits out of the available resources. However, some scholars on the subject have objected on the use of the term 'profit maximization'. According to them, the objective of Financial Management should be to earn reasonable profit in place of profit maximization. Theoretically it is right, because if the management earns reasonable profits, this would avoid the exploitation of any section of society. But in practice, the objective of Financial Management is not to make 'reasonable profit' but to earn 'maximum profit'. In fact, the modern investors are also inclined to invest their funds in those enterprises, which earn profits at a higher rate.

Solomon Ezra, an expert on Financial Management, has also expressed his views by saying that "the proper goal of Financial Management is wealth maximization". Other objectives of Financial Management are also centered on the objective of wealth maximization. In sum, the main objective of Financial Management is to maximize profits and wealth. The rest of its objectives depend on the objective of wealth maximization.

1.4 IMPORTANCE OF FINANCIAL MANAGEMENT

The importance of financial management may be discussed under the following points:

1. **Importance to Business Executive:** Financial Management is one of the most significant functional areas of management. The subject is of prime importance to the business executives for the efficient functioning of their enterprises. Financial management helps the business executives in making all the strategic managerial decision. It assists the managers in determining the financial needs of the enterprise and allocation of funds to specific capital projects. Financial Management also plays an important role in the determination of dividend policy, merger and acquisition decisions, credit policy, etc., the modern tools and techniques of financial management enable business managers to effectively manage the working capital of the firm. Budgets serve as chief instruments of financial planning and control in the hands of business executive. Manager are the trustees of shareholder's funds. They provide capital to a company with the expectation of shareholders by distributing reasonable dividends to them. This is only possible when business executives have full knowledge of the every business enterprise is to maximize the profits by maximizing the production at the least cost. Financial management leads the managers in achieving this objective, and helps them in discharging their obligations to different parties. Financial management is, therefore, of pivotal significance to the business executives not only in coordinating various functional activities and smooth functioning of an enterprise but also in effective decision making for the successful and efficient functioning of the undertaking.
2. **Importance to Potential Investors:** The subject of financial management also benefits investors of different classes. Investors generally arrange to invest their savings through security dealers and financial brokers. But it is not expected that they would always take rational decisions regarding the selection of company as well as securities. Thus, the investors having knowledge of the principles of financial management can themselves take a satisfactory decision on this subject, and can safely earn regular income on their accumulated capital. Speculator investors can also avail the advantage of the knowledge of financial management. Besides this, corporations are also able to earn maximum profits with the help of efficient financial management. Consequently, the investors get maximum rate of return on their investment.
3. **Importance to Shareholders:** The knowledge of financial management is equally useful to shareholders. Although shareholders are the owners of a company, but the management of corporations is left on the elected board of directors. It is, therefore, necessary for the shareholders to appraise that to what extent the managers/directors are discharging their duties in the interest of shareholders. If shareholders are well

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acquainted with the principles of financial management, they can safeguard their interest in the company by suitably appraising its financial position. If the managers/directors of the corporation do anything against their interest, the shareholders can make them to follow a suitable financial policy. Thus, the knowledge of financial management is inevitable for the shareholders in order to preserve and protect their inherent interest in the company. The shareholders can lead the company to earn more profits by persuading and forcing the managers/directors of the company to follow a suitable financial policy, and consequently they can receive higher dividends on their investments.

4. **Importance to Financial Institutions:** The existence of financial institutions absolutely depends on effective financial management. Thus, it is indispensable for them to be well versed with every aspect of financial management for the profitable employment of their funds. Investment banks, underwriters, trustee companies, commercial banks and other financial institutions must have full knowledge of financial management; otherwise, they would remain unsuccessful in achieving their goals and in providing guidance to their customers willing to invest their savings.
5. **Importance to Employees:** The main objective of employees is to maximize their financial and non-financial benefits. On the basis of sound financial management, managers of an enterprise can protect their interests by the productivity and efficiency of the employees. Sound financial management also benefits the employees.
6. **Importance to Government:** It is also essential for the government to have full knowledge of every aspect of financial management. Government attempts to effectively utilise the funds collected from the public in the form of taxes. In absence of full knowledge of financial management, it becomes impossible for the government to attain maximum social welfare out of the public expenditure. Thus, the economic and social revolution of any country largely hinges upon sound financial management by its government.
7. **Importance to Other Parties:** All such parties as economists, students of commerce and management, politicians, sociologists etc., having interest in the economic problems of the country, are also benefited by the knowledge of the principles of financial management, it is difficult to undertake reliable studies on economic problems of a country.

1.5 SCOPE AND RESPONSIBILITIES OF FINANCIAL MANAGEMENT

The scope of finance function is not so narrow as conceived by some of the thinkers on the subject. If we confine its scope to the raising of funds for the business, it would fail to provide answers to various problems, which arise after the funds, have been procured. These problems include: (i) whether the investment made is likely to cover the risks involved? (ii) Whether the purpose of investment to be made is socially desirable?, (iii) How does the cost of capital is affected by the mixture of financial resources? Thus, the scope of finance function covers not only the acquisition of funds from different sources but also their effective utilization as well.

Thus, the scope of Financial Management is quite wide and includes the following Points:

1. **Financial Planning:** This relates to the assessment of financial requirements for different projects undertaken by an enterprise and the selection of sources for the procurement of the estimated finance. Financial planning includes the determination of objectives, policies and procedures pertinent to finance, estimating the size for capitalization, construction of capital structure, advance planning for the possible changes in future etc.
2. **Procurement of Finance:** Activities relating to the procurement of required capital in accordance with the estimated capitalization and proposed capital structure for the efficient functioning of the business also fall within the scope of Financial Management.
3. **Organization of Finance Function:** Organization of finance department and sub-departments, determination of functions, powers and responsibilities of treasurer and controller as well as the activities concerning the maintenance of account books also fall within the scope of Financial Management.
4. **Effective Management of Assets:** Deliberations on financial aspects relating to purchase of fixed and floating assets as well as the arrangement of their timely supply fall within the purview of Financial Management. Active assistance and advice to top management with regard to different financial aspects of effective management of assets such as policies regarding management of fixed assets, inventory policy, sales and collection policies, policies regarding cash, personnel management policy and policies regarding determination of sales price etc., are also included within the scope of Financial Management.
5. **Financial Control:** Financial control is inevitable to ensure that the available funds are being utilized effectively and efficiently to the achievement of organizational goals. Control on financial system is observed by modern financial control measures like – capital budgeting, cash budgeting, flexible budgeting etc.
6. **Management of Income:** Effective management of income of an enterprise also falls within the scope of Financial Management. It involves the preparation of various statements like balance sheet, income statement, profit and loss account etc., in accordance with the existing law and the prevailing business practices. It also involves the determination of net profit and its allocation as dividends to shareholders and retained earnings for future investments.
7. **Analysis and Appraisal of Financial Performance:** With a view to bring necessary changes in future policies and procedures, an appraisal of financial performance of the enterprise is made as against the previous year with the help of modern techniques of financial analysis. These techniques include ratio analysis, trend analysis, funds flow analysis, cost-volume-profit analysis, variance analysis, return on investment etc. Thus, the appraisal of financial performance of an enterprise also falls within the scope of Financial Management.
8. **Miscellaneous Functions:** In addition to the above function, receipt and disbursement of cash, payment of various taxes, arrangements of insurance of assets, maintenance of financial records, negotiations with banks and financing corporations, development of financial data for decision making, arrangement of financial reporting for the management etc., are the major routine functions included in the scope of Financial Management.

1.6 OBJECTIVES OF THE FIRM

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The objectives of financial management derive from the corporate objectives. Financial goals of a firm are a pre-requisite to financial planning, strategic and tactical decisions and procedures. Financial theory is based on the fundamental assumption that a firm's primary loyalty is towards its owner. Other interest groups who are closely connected with the operations and results of the financial performance of the enterprise include employees, creditors, suppliers, community, government etc., a business enterprise balance its objectives in such a manner that all these groups gain optimal satisfaction, but it is well accepted that its primary responsibility is towards its owners.

In case of owner-managed undertakings, the objectives of the firm and the owner coincide. In case of a joint stock company, the ordinary shareholders are its owners. They are the residual claimants of its profits and assets in case of its dissolution. They are also responsible for its losses to the extent of their shareholders. The dominant objective of a joint stock company is, therefore, to maximize the wealth of its ordinary shareholders. Thus, the supreme objective of financial management is to maximize the wealth of its owners.

A shareholder's wealth in a company is the multiple of the number of shares held by him and the current market price of the share. (Shareholders wealth in the company = Number of shares owned x Market price per share). While operating with the objective of wealth maximization, the company plans its activities in such a manner that the shareholders get the highest combination of dividends (*i.e.*, payment out of profit) and capital gains accruing from increase in the market price of shares.

1.6.1 Profit Maximization

Profit maximization is often regarded as the desirable objective of a business undertaking. It means that the company should increase its rupee earnings in the shortest period. It is argued that if a firm makes maximum profit, it will automatically result in wealth maximization. Moreover, it is more concrete and verifiable objective than that of maximization of shareholder's wealth. However, profit maximization objective suffers from following serious limitations:

1. It does not take into account the risk factor, and would justify a management decision which maximizes profits irrespective of the risk involved in it.
2. Profit maximization objective also ignores the risk associate with the alternate methods of financing investments. It is likely to encourage management to depend on borrowed funds as long as its cost is less than the projected profits. Obviously, this may lead to excessive debt in its capital structure, and result in high financial risk. On the contrary, another management may use too little debt and issue shares whenever need for capital funds arise. This course will, of course, dilute the wealth as well as control of the existing shareholders.
3. The profit maximization objective is not as inclusive as the wealth maximization objective. Profits as an absolute amount are not so important as earnings per share. Even the concept of earning per share does not consider the time factor.
4. The objective of profit maximization also ignores the effect of dividend policy on the market price of shares. If a management were to pursue the objective of maximizing earnings per share, it might never pay any dividends to its shareholders, and seek to increase earnings per share through re-investment of retained profits. This is likely to affect adversely the market price of shares as shareholders want a regular stream of income from their investments in shares as well as capital gains through increase in the market price of their shares.

1.6.2 Wealth Maximization

The wealth maximization objective is based on the assumption that the net result of all the operations of a company is reflected in the current market price of its shares. This objective has several merits. **First**, it is quantifiable, *i.e.*, it can be expressed in numerical terms and the company's performance can be measured against it. **Second**, this objective is operational as it is tied with variables which the firm is able to control through its policies and operations. **Third**, it is fully consistent with the concept of the perpetual life of the firm. **Finally**, capital markets allocate investment funds among competing enterprises on the basis of market evaluation or their expected return and risk. The wealth maximization objective embodies this risk-return trade of the market, and it is the dominant criterion of allocation of funds between and within business enterprises. Any other criterion will result in sub-optimal allocation of funds and adversely affect the performance of the economy.

The wealth maximization objective is subject to criticism mainly on two counts:

1. It is prescriptive and normative as it indicates what the firm should be striving to achieve. It is not descriptive as it does not indicate what it actually does; and
2. It may not necessarily be a socially desirable goal. It is also argued that managements of corporate undertakings, separated from ownership as they are, tend to satisfy rather than maximize. In other words, they aim at earning as much profit for the company as will satisfy its owners, rather than maximize it.

It is, therefore, obvious that profit maximization or maximization of earnings per share is less satisfactory than wealth maximization. The objective of shareholders' wealth maximization results in financing policies and practices which would maximize the market value of the company's ordinary shares. It also reflects the market valuation of its prospective earnings and financial health over time. Moreover, it also takes into account the turning and risk of earnings, dividend policy of the company, and performance of its management. Thus, the proper goal of financial management is wealth maximization.

1.7 FUNCTIONS OF MODERN FINANCE MANAGER

The functions of a financial executive can broadly be classified as follows:

1.7.1 Executive Finance Functions

Executive finance functions include all such financial decisions which involve administrative skill in planning and execution. Some of the basic executive functions are as follows:

1. **Financial Forecasting:** The financial manager is concerned with the determination of the need for capital funds for the efficient operation of the company. He has to forecast the cash inflows and outflows from the proposed investment projects and existing operations relative to the current availability of cash resources. This forecasting and analysis provides the basis for estimating the need for additional financial resources. However, this function makes the financial executive to perform a tight-rope dance, maintaining a nice balance between the objectives of liquidity and profitability. The financial manager attempts to match the inflows and outflows of cash to eliminate the idle cash balance earning nothing to the corporate enterprise. Since cash inflows originate in sales which are uncertain, it is quite difficult to precisely predict the cash inflows to meet the time-bound obligations as the payment of bills etc., thus, the dilemma relating to this function is of liquidity vs. profitability.

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2. **Allocation of Fund:** One of the most important functions of the financial manager is the allocation of funds to specific capital projects. The most important aspect of this function is capital budgeting. The financial manager is responsible for collecting the relevant information pertaining to investment proposals competing for capital allocation, forecasting incremental cash inflows during the future period, comparing the projects against one another and against the criteria of profitability and risk, and identifying the most profitable projects. Funds are finally allocated in terms of the optimum discounted net cash inflows and acceptability of the incremental risk level. Capital investment decisions are the most crucial decisions in determining the future size and composition of fixed assets, and also effect the working capital requirements. Decisions regarding allocation of funds also influence the risk complexion of the company, and affect the investors' and creditors' decisions to commit their financial resources to the undertaking.
3. **Raising Financial Resources:** The financial manager is responsible for the procurement of funds from various sources including suppliers' credit, lease financing, notes payable, loans from banks and other financial institutions, issue of shares and debentures, public deposits, retained earnings and foreign collaborations. Each of these sources of finance has certain unique characteristics associated with it pertaining to cost, maturity, managerial control, burden to assets, and other terms and conditions imposed by the lenders. Keeping this in view, the financial manager determines the mix of various financial resources in the financial structure of the company. Financing decisions, therefore, determine the financial structure of the enterprise. While making the financing decisions, the financial executive has to estimate the financial risk resulting from its influence on the composition of financial structure. Too much of debt-capital increases the financial risk, and too little debt may prevent opportunities to minimize the composite cost of capital and maximize profitability.
4. **Establishing Assets-Management Policies:** Management of fixed and current assets is yet another important function of the financial manager. The investment policy in fixed and current assets is popularly known as assets-management policy. The investment decisions regarding fixed assets are referred to as capital budgeting, while the financial decisions regarding current assets are known as working capital management. The establishment of sound and consistent assets-management policies is an indispensable pre-requisite for the effective financial management. The financial manager spends more time with the management of current assets rather than fixed (non-cash) assets. Current assets including cash, marketable securities, bills receivables and inventories comprise the working capital of the company. Management of cash involves cash forecasting so that an adequate amount of cash is available at all times for meeting the firm's obligations. At the same time, there should be no idle cash funds resulting in loss of interest. The financial manager faces the dilemma of Liquidity vs. Profitability as it is never possible to forecast cash inflows accurately. The more he tries to protect the company against the risk associated with the non-payment of bills on time, the more he runs the risk of losing interest on idle funds.

It may be noted that the financial manager is not directly involved in the determination of the volume of inventories, which lies in the domain of production and marketing

executives. The financial manager, however, develops data relating to the cost of ordering and carrying inventories which lies at the base of determination of the economic order quantity of inventories. The financial executive is more concerned with providing the requisite funds for purchasing and carrying inventories, as well as their performance. With regard to bills receivables, the financial manager is responsible for the formulation of the company's credit policy as well as for supervising the collection of receivables. He attempts to keep the bills receivable to the lowest limit which is consistent with need for credit sales as part of marketing strategy.

5. **Dividend Policy Decisions and Allocation of Net Profits:** The financial manager also plays an important role in the determination of dividend policy of the company. It involves the determination of divided payout ratio, *i.e.*, the proportion of net profit that should be paid in cash to shareholders. Dividend policy decisions result in the determination of retained earnings available for future investments. The optimal dividend policy is that which maximizes the shareholders' wealth.
- 6: **Financial Planning and Control:** Chief instruments of financial planning are budgets, cash flow statement, Performa profit and loss account and balance sheet. The financial manager exercises control on financial performance by comparing the actual performance against the above plans. He also employs ratio analysis to measure financial performance in such areas as debt-equity relationship, inventory turnover, contribution margin, liquidity, etc.

1.7.2 Routine Finance Functions

Routine functions mainly comprise the work of routine nature which is necessary for the execution of financial decisions at the executive level. Some of the important routine finance functions are as follows:

1. Receipt and disbursement of cash.
2. Maintenance of financial records.
3. Preparation of financial statements.
4. Negotiations with banks and financing corporations.
5. Custody and safeguarding of securities, insurance policies and other valuable documents.
6. Development of financial data for decision-making.

1.7.3 Episodic or Incidental Finance Functions

Episodic or incidental finance functions include:

1. Preparation of financial plan on promotion of company.
2. Financial re-adjustment at the time of financial crisis.
3. Valuation of firm at the time of merger or re-organization.
4. All other incidental functions.

1.8 FINANCIAL DECISION AREAS

It is very difficult to determine the functions or areas of financial decision. In this field there are a great number of decisions. Decisions regarding finance may be in the following areas:

1. **Determining Financial Needs:** It is one of the most important decision area for any finance expert. One has to ensure availability of adequate financing. Financial needs have to be checked from different purposes. Funds are required for initial expenses, fixed capital and working capital. Initial or promotional expenses include expenditure incurred in the process of company formation. Fixed assets depend upon the nature of business. Working capital need depend upon the current assets and current liabilities required by organization.
2. **Determining Sources of Funds:** In this respect sources of funds are decided. Different types of securities and debentures are issued. For borrowing purposes banks, public and other financial institutions may be approached. When a firm is new, at that time the sources of funds should be decided.
3. **Optimal Capital Structure:** In this respect optimum capital structure should be ensured and maximum rate of return on investment should be there. The ratio of debt and equity must be carefully defined. For this purpose operating and financial leverages may be calculated. The operating leverage exists due to the operating expenses and financial leverage exists due to amount of debt involved in firm's capital structure.
4. **Fixed Asset Management:** Fixed assets of a firm are land building, machinery furniture and intangible assets are like goodwill, patents and so on. Whenever fixed assets are purchased, it contains long term commitment of funds so whenever they are purchased, they must be justified to the extent of their utility and productive capacity. Mostly the fixed assets are purchased by issuing shares, debentures long term borrowings and deposits from public and any time whenever they are free, they should not be kept idle and should be given on lease. Besides it proper depreciation policy must be formulated.
5. **Project Planning and Evaluation:** At the time of starting of any project, decision should be taken on the basis of feasibility and project reports which contain analysis of economic, technical, commercial and financial feasibility. Technical analysis involves essentiality of project, economic and commercial analysis involves marketability and demand position for the product. In all, financial analysis is the most important and includes forecast of cash-in-flow and total outflow. Organizational analysis involves the requisite manpower required to run the project. So on the basis of risk and all the projects are undertaken. Sometimes even if the project is profitable it is rejected because it may involve high amount of risk.
6. **Working Capital Management:** Working capital is a financial lubricant which keeps the business as operative. The main components of working capital are bank, cash, debtors, Accounts receivables and stock. Cash is the central reservoir of a firm and ensures liquidity. Inventory should always be matched with sales level.
7. **Corporate Taxation:** It is an important area of decision. As company is a separate legal entity so its taxation structure is changed from personal taxation.
8. **Acquisitions and Mergers:** Firms may expand their business by co-operative arrangements, by acquiring other concerns or by the process of merger. Acquisition means purchase of a smaller firm by a big organization. The process of valuation of a firm and its securities is quite a difficult task. So the valuation process should be done very carefully.

1.9 SUMMARY

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- Finance is very essential for the smooth running of the business. Without finance neither any business can be started nor successfully run.
- Evolution of finance can be classified into three broad phases *i.e.*, Traditional Phase, Transitional Phase and Modern Phase.
- Financial Management is that area of general management which is concerned with the timely procurement of adequate finance from various sources and its utmost effective utilization for the attainment of business objectives.
- One of the basic and most important objectives of a business enterprise is to earn maximum profit by maximizing the output at the minimum cost.
- The scope of finance function is not so narrow as conceived by some of the thinkers on the subject.
- The objectives of financial management derive from the corporate objectives. Financial goals of a firm are a pre-requisite to financial planning, strategic and tactical decisions and procedures.
- Profit maximization is often regarded as the desirable objective of a business undertaking. It means that the company should increase its rupee earnings in the shortest period.
- The wealth maximization objective is based on the assumption that the net result of all the operations of a company is reflected in the current market price of its shares.
- It is very difficult to determine the functions or areas of financial decision. In this field there are a great number of decisions.

1.10 REVIEW EXERCISE

1. What do you mean by financial management? Discuss its objectives.
2. Discuss the importance of financial management.
3. Explain the scope and responsibility of financial management.
4. Discuss the objectives of a firm.
5. Write the functions of modern finance manager.

UNIT 2: CAPITAL BUDGETING AND COST OF CAPITAL

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Structure

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 - 2.12.2 Average Rate of Return Method (ARR)
 - 2.12.3 Discounted Cash Flow Method
 - 2.12.4 Profitability Index (PI)
 - 2.12.5 Internal Rate of Return (IRR) Method
 - 2.12.6 Terminal Value (TV) Method
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- 2.19 Components of Cost of Capital
- 2.20 Base of Cost of Capital
- 2.21 Approach of Cost of Capital
- 2.22 Measurement of Cost of Capital
 - 2.22.1 Cost of Debt Capital
 - 2.22.2 Cost of Preference Share Capital
 - 2.22.3 Cost of Equity Share Capital
 - 2.22.4 Cost of Retained Earnings
 - 2.22.5 Weighted Average Cost of Capital
- 2.23 Summary
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2.1 INTRODUCTION

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Investment decision is concerned with allocation of funds. As financial management deals with mobilization and deployment of funds, equal importance must be given to both the functions. Funds are mobilized through long-term, medium-term and short-term sources. Long term and medium term finance must be deployed on long term investment. The main aim of such investment is to get proper yield from the project, so that it can recover the cost associated with each source of funds. Finance decision is very risky in nature which is taken by managers and it is based on several uncertainties the finance manger has to evaluate the investment proposals in relation of their expected returns and risk to determine whether the investment feasible or not. The process through which different projects are evaluated is known as 'Capital Budgeting'.

Capital expenditure decisions relate to fixed assets or long-term investments which yield a return over a period of time. Capital budgeting is one of the most important areas of financial decision-making. It involves the selection of that assortment of investment opportunities which will maximize the shareholders' wealth by maximizing the long-term profitability of the firm. Since capital investment decisions commit the firm's resources far into the future, the future growth and profitability of the firm is vitally dependent upon prudent capital investment decisions.

The term 'Capital Budgeting' refers to long-term planning for making and financing proposed capital outlays. Capital Budgeting, thus, includes both raising of long-term funds and their optimum utilization. Thus, Capital Budgeting is the firm's formal process for the acquisition and investment of capital. Some important definitions of Capital Budgeting are as follows:

Charles T. Horngren, "*Capital Budgeting is the long-term planning for making and financing proposed capital outlays.*"

R.M.Lynch, "*Capital Budgeting consists in planning the development of available capital for the purpose of maximising the long-term profitability (return on investment) of the firm.*"

Robert N. Anthony, "*The Capital Budget is essentially a list of what management believes to be worthwhile projects for the acquisition of new capital assets together with the estimated cost of each project.*"

Capital Budgeting is, thus, a broader term and includes not only investment decisions but also the exploration of profitable investment opportunities, marketing and engineering investigation of these opportunities and financial analysis as to their future profitability. However, the terms 'Investment Decisions', 'Capital Expenditure Decisions', 'Capital Expenditure Management', 'Long-term investment Decisions' and 'Management of Fixed Assets' are generally used interchangeably.

Basic Features of Capital Budgeting

The basic features of capital budgeting is as follows:

- (i) It has the potentiality of large anticipated profits.
- (ii) It involves a relatively high degree of risk.
- (iii) It involves a longer gestation period between the initial outlay and the anticipated returns.

2.2 NEED FOR CAPITAL BUDGETING

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The necessity of capital budgeting arises due to the following reasons:

1. **Analysis of Capital Expenditure:** It provides adequate opportunity to the management to take the right decision by analysis the various capital investment proposals.
2. **Selection of the Best Alternative:** Capital budgeting helps the management in selecting the best investment proposals in order of their desirability.
3. **Co-ordination among Various Capital Outlays:** The management of a firm has to invest capital in different projects of areas simultaneously. The manager can establish co-ordination among different capital investments with the help of capital budgeting.
4. **Control on Capital Expenditure:** Control of capital expenditures is difficult without capital budgeting. A comparison of budgeted outlay and actual expenditure enables the management to identify and remove the cause of deviation, if any.
5. **Avoidance of Losses:** Capital expenditures involve huge amounts for a fairly long period of time. An ill-advised and incorrect investment decision cannot be reversed without sustaining a considerable financial loss, and may even affect the very survival of the firm. Capital budgeting, through prudent evaluation of investment proposals, helps a firm not only in avoiding losses but also in testing the profitability of capital expenditures.
6. **Analysis of Risk and Uncertainty:** Capital expenditure decisions have their effects over a long-time span. Capital expenditure involves relatively more risk and uncertainty of benefits. Capital budgeting is, thus, necessary for estimating and minimizing such uncertainties and risks.
7. **Arrangement of Funds:** Capital expenditure budget is a well-conceived plan of capital expenditure in future. Capital budgeting, thus, facilitates in finding out whether the necessary funds would be provided by internal or external sources. It assists the management in arranging the sizable funds for financing the capital expenditure program well in advance to ensure their availability at the right time.

2.3 KINDS OF INVESTMENT DECISIONS

Investment decisions may be classified as follows:

1. **Tactical Investment Decisions:** These decisions involve relatively small capital outlays and do not result in a major change in the firm's products, production methods, scale of operations etc. They do not make any significant change in the future profit earning capacity of the firm. Examples of such investments are outlays on parking place, reception rooms, recreation facilities, air conditioning, rearrangement of physical layout, new elevator etc.
2. **Strategic Investment Decisions:** These decisions involve substantial capital outlays and have far reaching effect on the firm's future growth and profitability. These investment decisions relate to such vital areas as product line, major product improvements, new products, marketing strategy, creation of research and development facilities, change in plant location, etc. These decisions do not only give a new shape to the operations but also provide a different profile to the firm.

3. **Conventional Investment Decisions:** Conventional investment decisions involve one or more installments of capital outlays followed by one or a series of cash inflows. For example, establishment of a new production facility may involve cash outlays over a period of one or more years.
4. **Non-conventional Investment Decisions:** These decisions involve capital outlays over a period of time followed by a series of returns or cash inflows. For instance, establishment of a new production facility may involve capital outlays over a period of one or more years followed by cash inflows over a number of years.
5. **Economically Independent Investment Decisions:** The decisions in respect of which the management has no alternative investment opportunities are called as economically independent investment decisions. Independent decisions have only a particular capital project to decide for or against it. For example, where the management of a firm have an investment proposal to create a new warehouse, it has no alternative before it except to decide whether to make the investment or not.
6. **Dependent Investment Decisions:** These decisions involve choice from among a number of alternative investment opportunities. Dependent investment decisions may be complementary, mutually exclusive or joint.

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2.4 FACTORS AFFECTING CAPITAL INVESTMENT DECISIONS

Capital expenditure decisions are of paramount significance to the firm as the future success and growth of the firm hinges heavily upon them. However, managerial decision-making in respect of investment proposals is a difficult and complicated problem. Although profitability is an important factor in capital expenditure decisions, but it cannot be relied upon completely. Over reliance on the estimated cost and revenue figures can be as dangerous as working on intuition. There may be investment proposals which cannot be evaluated by the profitability criterion alone. The following considerations other than profitability need to be made in managerial decisions about investment proposals:

Availability of Funds: Capital projects involving huge amount of investment call for the managerial consideration of internal and external sources of funds. Since most firms have limited funds, only such investment project should be taken which are within their financial capacity. For example, if a firm undertakes a high cost capital project without considering the financial capacity of the business, will suffer from financial hardships which may ultimately endanger the very survival of the firm. Thus, availability of funds, their liquidity and lesser payback period should be taken into account rather than the profitability of investment proposals. Every wise management decides to take up only such investment proposals which are in accordance with the financial ability of the firm and the availability of sources of finance. The high yielding projects are sometimes rejected simply because the required funds for them cannot be arranged. In case of non availability of adequate funds, a project having lower payback period is preferred despite of its low profitability.

Additional Funds: Investment in new project may also result in increase or decrease of working capital requirements. Generally, all capital investment proposals for increasing revenue require additional funds for meeting working capital needs. Conversely, almost all capital investment proposals for reducing cost result in saving of working capital by increasing the operating efficiency of the firm. Thus, the availability of additional funds for meeting the increased working capital requirements and contingencies in future constitutes an important factor affecting the managerial decisions about capital investment proposals.

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Utilization of Funds: Where a firm has large investable funds, the management considers to invest them even in capital projects with comparatively lower profitability in order to fully utilize the firm's funds so as to maximize the total profits of the concern. Idle funds will, of course, reduce the total profit of the firm. Thus fuller utilization of the firm's funds is an important consideration other than profitability in managerial decision regarding investment proposals.

Urgency of the Project: Certain capital projects, which are essential for the survival of the firm, are undertaken irrespective of their profitability. There are many situations in the life of a firm when adhoc decisions are taken about capital expenditure. For example, if there is a breakdown in production process, the management has to take immediate decision to buy the available components to resume production. The urgency of taking quick remedial action, therefore, constitutes an important factor other than profitability which affects the managerial decision about capital investment proposals.

Expectations of Future Earnings: Expected rate of return on future investment also affect the selection of present investment proposals. If management has plans for undertaking more profitable projects in future, it may presently choose those investment proposals whose economic life or payback period is very short, although they may be less remunerative. This is so because the funds invested in such capital projects will be shortly recorded and made available for investment in more profitable investment proposals selected earlier. Conversely, if the firm has more investible funds and the investment projects planned to be undertaken in future warrant a downward trend in the rate of return of such projects may be less than those of shorter payback period capital projects.

Intangible Factors: Statutory obligation, prestige of the firm, employees welfare, motive of power, etc., are other non-economic and intangible factors which are not at all concerned with the profitability of investment, but affect the managerial decisions about investment proposals. For example, statutory obligations such as safety measures, welfare investments such as magnificent building of head office and guest-house and strategic investments such as formulation of subsidiaries, etc., are such as intangible factors which can not be ignored. These non economic factors are duly considered by the management while taking decisions in respect of investment proposals, although the above mentioned factors have no relevance to the profitability of the investments.

Risk and Uncertainty: Different capital investment proposal have different degrees of risk and uncertainty. The involve situations in which the profitability of occurrence of a particular event are known, whereas in case of the later these probabilities are not known. Risk in capital investment decision may be due to changes in economic conditions, competition, technological developments, labour conditions, consumer preferences, etc. On account of these reasons the costs, revenues and economic life of a capital project becomes uncertain. Thus, the degree of certainty of income on investment and the risk of obsolescence are also important considerations other than profitability which affect the managerial decisions in respect of investment proposals. The management, thus, prefers the investment proposals which have regular low of income and lesser payback period.

Other Factors: In addition to the above considerations, the other factors affecting capital investment decisions are as follows:

- (i) **Minimum Rate of Return on Investment:** The management accepts only such investment proposals which are expected to yield a minimum rate of return on investment, which is determined on the basis of the cost of capital. The project giving a return below the expected one is rejected.

- (ii) **Relative Profitability of Investment Proposals:** When a number of investment proposals appear to be acceptable on the basis of their profitability, the management prefers to accept the most profitable project.

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2.5 OBJECTIVES OF CAPITAL BUDGETING

The objectives of capital budgeting are as follows:

1. Expansion in existing production capacity of the enterprise.
2. Purchase of new machinery and other facilities with a view to operate in several markets so as to reduce the firm's risk.
3. Replacement of worn-out or outdated fixed assets.
4. Quality improvement in production through acquisition of new fixed assets.
5. Benefits of technological innovations through research and development projects.
6. Investment in fixed assets for availing the benefits of contingent opportunities.
7. Fulfillment of legal requirements, e.g., installation of pollution control equipment.

2.6 SIGNIFICANCE OF CAPITAL BUDGETING

Capital budgeting decisions are among the most crucial and important business decisions. These may relate to (i) cost reduction through modernization, rationalization, automation, etc., (ii) increasing production through expansion of capacity, creation of balancing facilities, replacement of semi-automatic plants etc., (iii) product improvement, addition to the existing product line, diversification, etc., and (iv) larger mixed share through establishment of new distribution outlets, creation of new warehousing and transportation facilities, etc. The capital budgeting is necessary not only because the capital projects involve huge amounts of the firm and affect its future growth and profitability, but the following factors further increase the need of capital budgeting:

1. Capital projects involve long-term commitment of the company's sizable financial resources, and hence capital budgeting is necessary. Capital budgeting not only estimates the future expenditure on each capital project but also indicates the sources from which the requisite funds would be procured.
2. Funds invested in capital projects are irreversible without a substantial loss, hence capital budgeting is necessary to arrive at the correct decisions.
3. Capital projects affect the future earnings of the enterprise. It is, therefore, necessary to resort to capital budgeting which determines the capital projects after taking into account their urgency and future rate of return of each project.
4. Since long-term capital projects are subject to a high degree of risks and uncertainty, capital budgeting becomes necessary.
5. Capital budgeting is also necessary because it helps in exercising effective control over capital expenditure on projects within the authorized limits.

2.7 ESSENTIAL COMPONENTS OF CAPITAL BUDGETING ANALYSIS

The basic components of capital investment analysis are of three types:

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1. Net Cash Outflows or Net Capital Investment

The total net capital investment outlay or total net cash outflows refer to incremental or marginal investment in a capital expenditure project at a point of time or over a period of time. It represents the net amount of capital expenditure in executing a capital project. The net capital investment outlay of a capital project includes not only the cost of purchasing land, building and plant, but also an increase in the level of working capital required to carry out the investment proposals. If a project results in the replacement of an existing capital asset, its current book value is a sunk cost. However, its salvage value is deducted from the capital outlay. Since the payment of income tax results in cash expenditure, tax on profit on sale of an existing asset in case of a replacement decision is added to the capital outlay of the new project. Investment allowance, if any, is deducted from the capital outlay for arriving at the net investment outlay.

2. Net Operating Cash Inflows

Operating cash inflows are the estimates of future streams of cash inflows resulting from the implementation of a capital project. These estimates are based on a number of estimates. The forecasts relate to production, plant performance, market share, sales revenues, profit margin, tax laws, state of the economy etc. Cash inflows at different point of time have to be estimated on the basis of various forecasts. Though based on systematic forecasts and past experiences of the firm and industry, projections of future cash inflows based on these estimates are not absolute. Net cash inflows are estimates of cash revenues minus cash expenditures. Since depreciation is a book adjustment and does not involve any cash outflows, it is not deducted from cash inflows for estimating the net cash inflows. But tax-benefit result from depreciation or appropriation is included in cash inflows. The salvage value of an asset at the end of its operational life is another component of cash inflow. Removal expenses and capital gains taxes, if any, are deducted from the salvage value of the assets. Thus, net cash inflows are equal to cash revenues minus cash expenses plus tax benefit from depreciation or appropriation plus salvage value of asset, net of removal (expenses and capital gains tax plus value of current assets working capital) released.

3. Choice of Horizon

The choice of horizon refers to the selection of the time period to be considered in evaluating the benefits and costs of an investment proposal. However, establishing a horizon is a practical matter. The most practical way of resolving the horizon problem is to let the discount rate take care of it. The cash flow analysis is pertinent to the time period corresponding to the economic life of the proposed project. The end of this period is called the horizon for the project, beyond which the project ceases to yield the economic benefits.

2.8 RISK AND UNCERTAINTY IN CAPITAL BUDGETING

Capital investment involves a business unit's decision to invest its current funds for adoption, disposition, modification and replacement of fixed assets, whose returns would be available only after a period of time longer than one year, hence involves an element of risk and uncertainty of

returns. The basic features of capital budgeting are (a) potentiality of large anticipated profits, (b) relatively high degree of risk and uncertainty, (c) longer gestation period between the initial outlay and the anticipated returns. Generally a large part of total investment is invested in fixed assets in almost all business units. Investment in fixed assets being a complex problem; it can be controlled through capital budgeting in various segments. Analysis of capital expenditure has to be done carefully so as to arrive at an optimum level, as the capital expenditure decisions have their effects over a long-time span and involves relatively more risk and uncertainty of benefits. For minimizing such risk and uncertainties, capital expenditure budgeting should be exercised in a careful manner. The main points for considering an optimum level of capital expenditure, so as to minimize the risk and uncertainty are:

- (i) Origin, presentation and screening of investment proposal,
- (ii) Evaluation of proposal,
- (iii) Project selection and final approval,
- (iv) Formulation of capital budget,
- (v) Authorization of capital expenditure,
- (vi) Project execution and follow up.

2.9 DATA FOR CAPITAL INVESTMENT DECISIONS

Profitability is the most decisive factor in taking decision on capital expenditure proposals. Such decisions are based on future costs and revenues. The data required for capital budgeting or investment decision-making are as follows:

1. **Cash Flows versus Accounting Profit:** Capital budgeting is concerned with capital investment decisions which yield return or benefit to the enterprise over a period of time in future. It is, therefore, necessary to estimate the future benefits accruing from the investment proposals while evaluating such proposals. There are two criteria available for quantifying the future benefits of investment proposals: (a) accounting profit and (b) cash flows. The difference between these two measures of future profitability is due to the presence of certain non cash expenditures like depreciation, amortization of intangible assets, allowances for future taxation, loss on sale of fixed assets, etc., in the profit and loss account. Thus, the accounting figure of profit needs adjustment for all such non-cash expenditures to determine the actual cash inflow. The cash flow approach of estimating future benefits of the investment proposals is superior to the accounting approach on account of the following reasons:

- (i) **Determination of Economic Value:** While making capital investment decisions, the management of the firm is really interested in estimating the economic values of the projects. The economic value of a project is determined by comparing the cash outflows (costs) and cash inflows (benefits) associated with the project. Only such cash flows describe the cash transactions, and measure the future benefits of a project in cash terms. Since evaluation of investment proposals is concerned with the determination of future profitability of the proposals to warrant the initial investment, only cash flow approach is appropriate for investment decision. Conversely, the accounting profit approach allocates the

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cost of investment over the economic useful life of the asset in the form of depreciation rather than at the time when costs at the time of investment as well as the actual size of net cash inflows or outflows in later years. Thus, cash flow approach of measuring the profitability of investment proposals is more appropriate for capital budgeting decisions.

- (ii) **Accounting Ambiguities:** Accounting profit approach is full of ambiguities on account of different accounting policies and practices being followed are respect of valuation of inventory, allocation of costs, calculation of depreciation, and amortization of various other expenses. Obviously, the account of profit will differ under different accounting policies as practices. But there is no such difference in net profits under the cash flows approach as there is only one set of cash flows associated with a project. Thus, the cash flow approach is superior to the accounting project approach.
- (iii) **Time Value of Money:** The cash inflow approach takes into consideration the time value of money while the accounting approach ignores it. Under the usual accounting practice, revenue is considered to be realized at the time of sale and not when cash is received. Similarly, expenditure is considered to be made at the time when it is incurred and not when the actual payment is made. The accounting profit approach cannot be relied upon as decision criteria in respect of capital expenditure management. Thus, the cash flows approach of evaluating the profitability investment proposals is better than the accounting approach. The data required for the purpose of estimating future benefits from investment proposals would be cash revenues and cash expenses.
2. **Incremental Cash Flows:** The second aspect of the data required for capital budgeting relates to the basis of cash flows. For purposes of estimating cash outflows and cash inflows associated with capital expenditure proposals only incremental costs and revenues are considered, i.e., only those cash flows are taken into account which is directly attributable to the investment proposal. It is for this reason that fixed overhead costs, which remain constant irrespective of acceptance or rejection of the investment proposal, are not considered. However, any increase in fixed overhead costs on account of the new proposal must be considered.
 3. **Opportunity Costs:** It plays a significant role in the capital budgeting decisions. Opportunity cost represents the loss of alternative income as a result of implementation of a specific investment proposal. For example, in the expansion of a project, the economic rather than the book value of the space required for expansion must be treated against a proposed investment. Similarly, in a replacement decision, the realizable value of the existing asset should be deducted from the estimated cost of replacement.
 4. **Interest Cost:** The accounting approach gives recognition to contractual interest and ignores imputed interest on capital. Interest is often misunderstood as being the same as return on investment which includes two elements of interest and profit. The former represents the cost of capital while the latter represents the reward for risk and uncertainty. Interest cost constitutes the minimum acceptable rate of return on the capital investment. It is clear that a firm must recover at least the cost of capital before it can realize a profit on the investment. But the minimum acceptable rate of return can be considered as a reward for risk and uncertainty which varies with the nature of risk involved in a project.

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5. **Depreciation:** Depreciation is another cost whose accounting treatment has close bearing on the earnings of firm. It is because a firm can legitimately deduct depreciation from its gross profit to arrive at the before tax income. Different methods of depreciation affect tax liability and hence the cash flow differently. It is for this reason that the effect of different depreciation methods must be analyzed and compared while making capital budgeting decisions. Generally, higher the rate of depreciation, the lower will be the tax liability or the greater will be the cash inflow and greater benefits to the firm, and vice-versa.
6. **Determination of Revenue:** Capital investment decisions are made in anticipation of increased revenue in future. This necessitates the estimation of the future revenues from the investment proposals while evaluating such proposals. There are two facts of this problem—capacity of the asset and marketability of increased output. Whereas the estimation of potential output of the asset is an engineering exercise and can be determined easily, the determination of marketability of increased output of the product is not so easy. It is because the demand for the firm's product will depend upon a multitude of factors such as—consumer's reactions, economic conditions, activities of competitors, etc. This calls for a formal market survey.
7. **Income Tax:** Where the investment proposal involves the replacement of an old asset by a new asset, the sale proceeds give rise to cash inflow and tax consideration. Payment of income tax results in cash outflow. Since capital investment decisions are based on cash flows, income tax constitutes an important element in capital investment decisions. The sale proceeds of an old asset minus taxes are deductible from the cost of the new asset. However, any loss sustained in respect of the sale of an old asset is first applied against any capital gain available, and any surplus being deductible in full from ordinary taxable income. Income tax have other effects on capital investment decisions. The tax laws permit carrying losses forward to be set off against future income. A careful study of tax effects cash flows should be made in case of firms incurring losses and consequently paying no tax. Keeping in view the complexities of tax laws it is desirable for a firm to have its own tax cell or tax consultant to participate in all major capital investment decisions.

2.10 CAPITAL EXPENDITURE CONTROL

Capital expenditure is undertaken either for reducing current costs or for increasing the existing revenues. Capital expenditure may, therefore, be necessary for expansion of present production capacity, replacement of worn out or outdated assets, product diversification, discharging legal requirement of health, safety and employee welfare, research and development, etc. Effective control on capital expenditure has assumed greater significance in the contemporary industrial world. Heavy mechanization, automation, large scale production, technological advancements, tough competition have all contributed to escalated investments in fixed assets which affect the future profitability and survival of a firm, hence, the need for effective control on capital expenditure. In view of the increased significance of capital expenditure control, the management should devise and operate a system of capital expenditure control which have the following features:

1. **Search for New Methods, Processes and Products:** The main feature of a dynamic capital budgeting administration is a complete awareness on the part of all management personnel that capital expenditure constitute the basis of long-term profitability of the firm. This makes the management more vigilant in searching for new methods, processes and products.

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2. **Comprehensive Planning:** Capital expenditure should be so planned as to ensure balanced development of each department of the firm. A sound organizational set up must be established for analyzing, screening, approving and implementing the capital investment proposals. A Capital Expenditure Committee may be set up for this purpose, and may be made responsible for the soundness of each capital expenditure proposal as well as for the balanced development of the enterprise. The techniques of PERT and CPM are very useful in planning capital expenditure to meet the above objective.
3. **Use of Capital Budgeting:** An effective system of budgetary cost control provides in itself an efficient control on capital expenditures. However, companies may not follow a complete system of budgetary control. Even then, a capital budget must be prepared for ensuring capital appropriations and capital payments.
4. **Rational Evaluation:** All capital expenditure proposals should be thoroughly analyzed and judged in the light of both the short-term situations and long-term plans of the firm in respect of the availability of required funds so that the available funds are employed in the best possible way to yield the maximum profits. The objective capital investment decisions can be made by using the systematic rational methods of ranking investment proposals.
5. **Progress Record:** An effective control of progress of capital expenditure projects is essential. A proper progress report in respect of each capital project should be maintained on a 'Capital Project Sheet'. The authorized and actual capital expenditure must be compared after a certain period and the variances should be corrected. Constant watch on expenditures in respect of each operation should be kept.
6. **Post-completion Audit:** This is an important phase of capital expenditure control. Post-completion audit of capital projects determines, whether the actual value of the capital projects is in accordance with the value of the capital projects is in accordance with the value determined at the time of their authorization. A periodical audit of projects is of great importance in exercising effective control on capital expenditure.
7. **Forms and Procedures:** For effective capital expenditure control, there should be some set routine and procedure. A procedure is needed at every stage - request, authorization, progress and audit. Request for capital allocation is made periodically and they are reviewed as they pass upward through management level until they reach to Capital Investment Committee which shifts these projects and submit its recommendation to the Board of Directors. Usually big firms have a set of prescribed forms which can be completed and presented to management as and when required.

2.11 LIMITATIONS OF CAPITAL BUDGETING

Capital budgeting suffers from the following limitations:

1. **Accuracy of Estimates:** The estimates of profitability of investment proposals relate to some future period which is uncertain. Obviously, decisions involving uncertainty also involve an element of risk. Errors are likely to creep while estimating revenues, costs, economic life span of assets, etc. Inaccurate forecasts may lead to serious adverse effects on the growth and profitability of the firm, and may also endanger the very survival of the concern. Estimates of revenues from investment projects involve estimating the size of the market for a product and the expected share of the firm in

it. These estimates depend on a variety of factors such as—price, advertising, sales promotion efforts, etc., which are not easy to forecast accurately. Similarly, accurate forecasting is also affected by shift in consumer preferences, the actions of competitors, technological developments and changes in economic conditions. Future uncertainties, therefore, affect the accuracy of data pertinent to capital budgeting decisions. Although the various methods of ranking investment proposal facilities a systematic analysis of the various alternative proposals and determining the most profitable project, but these techniques by themselves cannot ensure the best possible selection among the alternative capital projects, if the data required for capital investment are not accurate. Under such conditions of uncertainty, an experienced and skillful management is indispensable.

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2. **Comparability of Costs and Benefits:** Capital investment decisions are based on estimates of future costs and benefits of the alternative investment proposals. But the costs incurred and benefits received from the capital investment proposals occur at different time periods, and hence are not logically comparable because of the time value of money.
3. **Quantification of Certain Costs and Benefits:** Capital budgeting decisions involves some considerations other than profitability such as—employees welfare, prestige of the firm, statutory obligations, etc. Although such considerations, may yield benefits or incur costs to the firm, but it is not often possible to calculate all the costs and benefits relevant to the particular project in quantitative terms. Infact, management exercises its judgment in respect of almost all the capital investment decisions. If the unquantifiable costs and benefits of a particular investment proposal are not carefully judged, the firm may suffer irreparable losses.

2.12 CAPITAL BUDGETING TECHNIQUES

There are several methods of Evaluating Ranking the capital investment Proposals. Most of these methods evaluate investment proposals on the basis of the desired rate of return. A management may have a number of other comparable capital budgeting criteria besides profitability like public image, future growth, price leadership, etc. The management has to strike a balance between the profitability criterion and other compatible criteria by using its judgment. Project evaluation on profitability criterion helps this judgment. While evaluating the relative profitability of the acceptable investment proposals, it is assumed that: (i) all the alternative investment proposals are risk less or carry and equal amount of risk; (ii) cash inflows are net of corporate income-taxes; (iii) investment outlays are made at the beginning of the year and cash inflows are received at the end of the year. The commonly used methods of evaluating and ranking investment proposals are as follows:

2.12.1 Payback Period Method

Payback period refers to the time period during which a firm fully recovers its investment on a capital project. In other words, it is the time period during which capital investment pays off its full value. This method is also known as Payout or Pay-off Period Method. This is a widely used traditional method of capital budgeting. It represents the period, normally in number of years, required to get back the original cost of the project through annual earnings before charging interest and depreciation but after payment of tax. It is based on the assumption that every capital expenditure pays itself back over a period of time. The net annual cash inflows resulting from

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the proposed capital project are calculated by deducting operating costs exclusive of interest and depreciation and income tax from the sales revenue. The income so arrived is expressed as a percentage of initial investment outlay is called as "unadjusted rate of return". However, where income tax is taken into consideration, the amount of depreciation is first deducted as an operating overhead and then added to the net income after tax.

It becomes clear from the above discussion that under this method payback period of the concerned project is computed. For this purpose, following two information's are required:

1. Initial outlay of the project. (Generally, it is given in the question)
2. Expected Annual Cash-flow (ACF): It is also known as annual operating savings or annual cash inflow. The annual cash inflow is calculated by taking into account the amount of net income on account of the project before depreciation but after taxation. Annual cash inflow can be calculated in the following format:

Sales Revenue	-----
(-) Operating Expenses including depreciation	-----

Income before taxes	-----
(-) Income-Tax	-----

Income after taxes	-----
(+) Depreciation	-----

Annual Cash Inflow	-----

Computation of the Payback Period:

The payback period can be calculated in two different situations:

1. When annual cash inflows are equal,
 2. When the annual cash inflows are unequal.
1. **When Annual Inflows are Equal:** When the cash inflows are uniform for each year of the project's life, the payback period can be computed by dividing the initial outlay of the project by the annual cash inflow. Symbolically:

$$\text{Pay-Back Period} = \frac{\text{Initial Investment}}{\text{Annual Cash Flow}} \text{ or } \frac{\text{Net Investment}}{\text{Annual Operating Savings}}$$

See the following illustration for clarification.

Example 1. Rank the following investment proposals in order of their profitability according to Pay-Back period:

Project	Initial Outlay (₹)	ACF (in ₹)	Life (in Years)
A	50,000	10,000	8
B	90,000	12,000	10
C	6,000	600	13
D	24,000	3,000	15
E	5,00,000	1,25,000	10

Solution.

Project	Initial Outlay (₹)	ACF (in ₹)	Pay-Back Period	Rank
A	50,000	10,000	$\frac{50,000}{10,000} = 5$ years	II
B	90,000	12,000	$\frac{90,000}{12,000} = 7\frac{1}{2}$ years	III
C	6,000	600	$\frac{6,000}{600} = 10$ years	V
D	24,000	3,000	$\frac{24,000}{3,000} = 8$ years	IV
E	5,00,000	1,25,000	$\frac{5,00,000}{1,25,000} = 4$ years	I

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2. **Calculation of Pay-Back Period in case of Uneven Cash Inflows:** In case the cash inflows are not equal (uniform) and vary from year to year, the payback period can be calculated by cumulating the net cash inflows until the total becomes equal to the amount of initial outlay. A measurement problem may occur when the cumulative cash inflows do not exactly equal to proposal's cash outflow. In case no cumulative cash flow is exactly equal to the initial outlay, the following formula may be applied for the purpose:

$$\text{Pay-Back Period} = E + \frac{B}{C}$$

where,

E stands for number of years immediately preceding the year of final recovery

B stands for the balance amount still to be recovered

C stands for cash flow during the year of final recovery.

See the following illustration for clarification.

Example. 2. Following information is given about two projects. Calculate the Pay-Back period and find which project is better?

	Project A	Project B
Cost of Project	1,60,000	2,00,000
Estimated residual value	16,000	24,000
Estimated Savings:		
First year	20,000	40,000
Second year	30,000	60,000
Third year	50,000	60,000
Fourth year	50,000	60,000
Fifth year	40,000	30,000
Sixth year	30,000	20,000
Seventh year	10,000	—

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Year	Project 'A'		Project 'B'	
	Cash Flow ₹	Cumulative Cash Flow ₹	Cash Flow ₹	Cumulative Cash Flow ₹
1	20,000	20,000	40,000	40,000
2	30,000	50,000	60,000	1,00,000
3	50,000	1,00,000	60,000	1,60,000
4	50,000	1,50,000	60,000	2,20,000
5	40,000	1,90,000	30,000	2,50,000
6	30,000	2,20,000	44,000	2,94,000
7	26,000*	2,46,000	-	-

*Including the estimated scrap.

Calculation of Pay-back Period

	Project 'A'	Project 'B'
Pay-Back Period	$4 + \frac{1,60,000 - 1,50,000}{40,000}$ = 4 years and 3 months	$3 + \frac{2,00,000 - 1,60,000}{60,000}$ = 3 years and 8 months

Post Pay-Back Profitability

If other things remain constant then that project is to be preferred which has highest Post Pay-back Profitability. The post pay-back profitability can be calculated in two different situations:

(a) *When Annual Cash Inflows are Even for the Entire Period:*

Post Pay-Back Profitability:

$$= [\text{ACF (Working Life - Pay-Back Period)}] + \text{Salvage Value (if any)}$$

(b) *When Annual Cash Inflows are Unequal:*

Post Pay-Back Profitability:

$$= \text{Total ACF including Salvage Value} - \text{Initial Outlay}$$

For the sake of clarity in comparison, Post Pay-back Profitability Index can be calculated for it. It can be calculated by the following formula:

Post Pay-Back Profitability Index

$$= \frac{\text{Post Pay-Back Profits}}{\text{Initial Outlay}} \times 100$$

Project having highest index is considered the best project. See the following illustration for clarification.

Example 3. Monika Ltd. is considering three projects X, Y and Z. Following are the particular in respect of them:

	Project 'X'	Project 'Y'	Project 'Z'
Cost (in ₹)	1,00,000	1,40,000	1,40,000
Economic Life (in years)	10	10	10
Annual Savings (in ₹)	16,000	25,000	20,000

Ignoring income tax recommend the best of these projects using:

(i) Pay-Back Period, (ii) Post Pay-Back Profit, (iii) Index of Post Payback profit.

Solution.

		Project 'X'	Project 'Y'	Project 'Z'
1.	Original Investment (OI)	1,00,000	1,40,000	1,40,000
2.	Annual Operating Savings (ACF)	16,000	25,000	20,000
3.	Pay-Back Period (OI/ACF)	6.25 years	5.6 years	7 years
	(i) Ranking	II	I	III
4.	Economic Life (in years)	10	10	10
5.	P.B.P. (in years)	6.25	5.6	7
6.	Surplus Life (in years)	3.75	4.4	3
7.	Post Pay-Back Profit (in ₹) (ACF × Surplus Life)	60,000	1,10,000	60,000
	(ii) Ranking	II	I	II
8.	Index of Post-Pay Back Profit	$\frac{60,000 \times 100}{1,00,000}$ = 60%	$\frac{1,10,000 \times 100}{1,40,000}$ = 78.6%	$\frac{60,000 \times 100}{1,40,000}$ = 42.9%
	(iii) Ranking	II	I	III

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Project 'Y' : I rank; Project 'X' : II rank; Project 'Z' : III rank.

Discounted Payback Period

This is an improvement over the pay back period method in the sense that it considers time value of money. Under this method, the cash inflows of the project are discounted at a given rate of interest. The discounted values of all inflows are cumulated in order of time. The time period at which the cumulated discounted value of cash inflows equals the present value of cash outflows is known as discounted pay-back period. Thus discounted pay back period indicates that period within which the discounted cash inflows equal to the discounted cash outflows equal to the discounted cash outflows involved in a project. The project which gives a shorter discounted pay-back period is accepted. The method has been explained in example given below:

Example 4. A project costs ₹ 50,000 and estimated to have a working life of 5 years. Annual cash inflows are estimated to be ₹ 16,000 and scrap value to be ₹ 5,000. Calculate discounted pay back period for the project assuming cost of capital to be 10%.

Solution. Calculation of Discounted pay-Back Period

Year	Annual Cash Flow ₹	P.V. Factor @10%	Present Values ₹	Cumulative Present Value ₹
I	16,000	0.909	14,544	14,544
II	16,000	0.826	13,216	27,760
III	16,000	0.751	12,016	39,776
IV	16,000	0.683	10,928	50,704
V	16,000	0.621	9,936	60,640
Scrap	5,000	0.621	3,105	63,745

$$= 3 \text{ years} + \left[\frac{(50,000 - 39,776)}{10,928} \right] = 3.935 \text{ years.}$$

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Suitability of Payback Period Method:

Payback period method of capital projects evaluation is suitable for firms which are subject to rapid technological changes such as pharmaceuticals, electronics and space industries, or to rapid consumer taste changes such as clothing industry. Since such firms have to make huge investments in research and development, production facilities and marketing, they are keen to recover it before their products become obsolete. Payback period is also suitable for firms when money market is tight, or when they have surplus cash resources available for a short period of time. This method recommends itself as primary criteria of evaluating capital projects for firms making investments in countries with high inflation rates, unstable governments, or other problems.

Merits of Payback Period Method:

The Payback Period Method has the following merits:

1. **Simplicity:** The most outstanding merit of the payback period method is that it is simple to understand and easy to work out.
2. **Liquidity:** This method measures the recovery period of the original investment involved in capital projects. It reflects the liquidity of a project, and hence the risk of recovering the original investment is taken into consideration. The more liquid an investment is, the less risky it is considered to be. The ranking part of this method gives priority to projects having shorter paybacks. Companies with tight cash position generally prefer quick payback projects. This method enables the management to know as how rapidly the capital investment may be recovered and when they should start paying dividends.
3. **Safety:** This method also minimizes the possibility of losses on account of obsolescence due to rapid technological changes or changes in consumer preferences. Rapid pay backs minimize the risk and increase the margin of safety from the possible loss through obsolescence.
4. **Reliability:** In case of projects with uncertain returns, this method of project evaluation is considered to be more reliable. This method merely considers the recovery of the original investment. In fact, returns beyond three or four years are so uncertain as to disregard them altogether in a planning decision. The payback period method does not take into consideration the cash inflows after the recovery of investment. Since it is possible to accurately forecast costs and sales on the short-run, more reliable conclusion may be drawn under this method.
5. **Calculations:** This method is an improvement over the urgency criterion of appraising investment proposals. It is also useful in making certain calculations. The internal rate of return can be easily computed from the payback period. This method is a good approximation of the internal rate of return which otherwise involves a trial and error exercise.

Demerits of Payback Period Method

Although this method occupies an important place as an investment criterion due to its wide usage, but it suffers from serious limitations. Its trial and drawbacks are as follows:

1. **Ignorance of Post-payback Cash Inflow:** The most obvious limitation of this method is that it completely ignores the post-payback surplus generating capacity of the alternative investment proposals. Since, projects with equal payback periods are given equal ranks irrespective of their post-payback profits, which is apparently incorrect. Thus, payback period method cannot be regarded as a measure of profitability as it fails to consider the alternative investment proposals in terms of their relative total benefits over their respective lifespan.
2. **Disregard to the Time Value of Money:** The second major limitation of the payback method is that it does not measure even the streams of cash inflows expected within the payback period. It is because this method does not take into consideration the time value of money. It does not differentiate between the alternative investments projects in terms of the timing and magnitude of cash inflows. It does not discount the future cash inflows. All streams of cash inflows whether received now or after four years are treated equally valuable.
3. **Disregard to the Entire Lifespan of Projects:** This method does not take into account the entire lifespan of the investment projects during which the streams of cash inflows continue even in higher magnitude. Consequently, projects with large cash inflows in the latter part of their economic lives may be rejected in favour of less profitable projects which yield their highest returns in the initial part of their lives.
4. **Disregard to the Productivity of Capital:** This method is not an exact measurement of productivity of capital investment projects because it fails to measure the return on investment. In fact, it is measure of liquidity of investment projects rather than its profitability. It gives undue emphasis to quick recovery of funds. Over-emphasis on the liquidity of investment cannot be justified in a number of situations.
5. **Disregard to the Cost of Capital:** This method also ignores the cost of capital which constitutes the basis for sound capital investment decisions.

Despite its limitations, the payback period method occupies an important place in any discussion of investment decision criteria, not because of its merits but due to its popularity and wide usage among businessmen. This method is very popular in American and British Industries for evaluating investment projects. A recent survey of the Machinery and Allied Products Institute of USA shows that 60% of the companies surveyed, used the payback method for evaluating the capital investment projects.

2.12.2 Average Rate of Return Method (ARR)

The Average Rate of Return (ARR) Method of evaluating investment proposals is also known as 'Accounting Rate of Return Method', or 'Unadjusted Rate of Return Method', or 'Financial Statement Method', or 'Return on Investment Method'. This method is based on accounting income instead of cash inflows. It attempts to measure the rate of return on investment on the basis of the accounting information contained in financial statements. Since there are a number of ways for calculating the ARR, there is no unanimity regarding the rate of return. The rate of return may be calculated on the basis of (i) income before taxes and depreciation, (ii) income after taxes but including depreciation, and (iii) income after taxes and after depreciation. Accordingly, the rate of return will also differ on account of the usage of original investment or average investment figures. Thus, this method provides different rates of return.

However, there are two main variants of this method - (i) original investment measure, and (ii) average investment measure. In case of original investment, the original earnings over the lifespan of the investment project are compared with the original investment. The average investment measure does not recognize that the investment gradually decreases whereas earnings.

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may differ from year to year. On the other hand, in the average investment measure the average annual income from the project is divided by the average investment. The amount of average investment can be calculated by dividing the original investment by 2, or by a figure representing the mid-point between the original capital outlay and the salvage value of the asset. When initial investment is taken into account in calculating the rate of return, it is called the rate of return on investment (ROI), and when average investment is taken for the purpose of calculation, it is called the Average Rate of Return (ARR).

Rate of Return Method

1. **Average Rate of Return on Total Investment (ROI):** Under this method average profit after tax and depreciation is calculated and then it is divided by the total capital outlay or total investment in the project. In other words, it establishes the relationship between average annual profits to total investments. Symbolically:

$$\text{ROI} = \frac{\text{Average Annual Income}}{\text{Initial Investment}} \times 100$$

The term 'Average Annual Income' is the average of the incomes (after depreciation and tax) over the whole of the economic life of the project. In other words, average annual income is determined by adding the after tax expected profits for each year of the life of the project and dividing the same by the number of years of the economic life of the project. Alternatively, it can also be calculated as follows:

$$\text{Average Annual Income} = \text{Average ACF} - \text{Annual Depreciation}$$

2. **Average Return on Average Investment (ARR):** This is the most appropriate method of rate of return on investment. Under this method, average profit after depreciation and taxes is divided by the average amount of investment. It is more rational to divide the average annual profits by the average investment rather than the total investment which goes on declining year after year due to depreciation. In brief, it may be calculated according to any of the following methods:

- (a) **If Profits or Earnings after Depreciation and Tax have been given in the Question:**

$$\text{ARR} = \frac{\text{Average Annual Income After Tax and Depreciation}}{\text{Average Investment}} \times 100$$

- (b) **If Annual Cash Inflows have been given in the Question:**

$$\text{ARR} = \frac{\text{Average Annual Cash Inflows} - \text{Annual Depreciation}}{\text{Average Investment}} \times 100$$

Workings:

- (i) Annual Depreciation (Straight-line Method)

$$= \frac{\text{Initial Investment} - \text{Scrap Value}}{\text{Economic Life of Project}}$$

- (ii) Average Annual Income

$$= \frac{\text{Total Income}}{\text{No. of years}}$$

- (iii) Average Investment = $\frac{\text{Initial Investment} + \text{Scrap Value}}{2}$

Example 5. Following are the details about two projects:

	Project 'A'	Project 'B'
Initial Investment	₹ 4,00,000	₹ 10,00,000
Economic Life	8-years	10 years
Annual Operating Savings	₹. 80,000	₹ 1,50,000

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Calculate ROI and ARR on the basis of above particulars and point out which project is better?

Solution.

$$\text{Project 'A': ROI} = \frac{80,000 - \left(\frac{4,00,000}{8}\right)}{4,00,000} \times 100 = 7.5\%$$

$$\text{ARR} = \frac{80,000 - \left(\frac{4,00,000}{8}\right)}{\frac{4,00,000}{2}} \times 100 = 15\%$$

$$\text{Project 'B': ROI} = \frac{1,50,000 - \left(\frac{10,00,000}{10}\right)}{10,00,000} \times 100 = 5\%$$

$$\text{ARR} = \frac{1,50,000 - \left(\frac{10,00,000}{10}\right)}{\frac{10,00,000}{2}} \times 100 = 10\%$$

Thus Project 'A' is better because ROI and ARR both of this project are more than that of Project 'B'.

Merits of the ARR Method

The advantages or merits of this method are as follows:

1. **Simplicity:** It is easy to understand and simple to work out.
2. **Comparability:** This method takes into account the savings of capital assets over their entire economic life, and hence provides better comparability criteria of the projects than the payback period method.
3. **Net Earnings Concept:** This method duly recognizes the concept of net earnings while appraising capital investment projects, which is absent in case of all other methods. The concept of net earnings is considered to be a significant factor in evaluating capital investment proposals.
4. **Profitability:** It gives due weightage to the profitability of the alternative projects, which is a vital factor of evaluating and selecting the most profitable investment proposals.

Demerits of the ARR Method

Limitations of ARR method are as follows:

1. **Disregard to Time Value of Money:** This method of project evaluation also does not take into account the time value of money like the payback period method. It does not differentiate between projects in terms of the timing or magnitude of cash inflows. It does not discount the future cash inflows. It treats all the streams of cash-inflow to

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have the same value whether received now or after two year or ten years. Thus, the ARR method fails to consider the pattern of cash inflows and ignores the time value of money.

2. **Fear of Over-valuation:** It does not reveal a true and fair view of long-term investment, as there is always a chance of over-valuation of assets may creep in an account of the fact that under this method no time allowance is provided for investments made at different time intervals and receipt of income at different time intervals.
3. **Accounting Income:** This method is based on accounting income rather than cash flows. It treats depreciation as a deduction before arriving at the additional net income, whereas it is only a book entry and does not involves any cash outflow. This shortcoming of the ARR method can be removed by using net cash inflows in place of additional income, *i.e.*, accounting income.
4. **Disregard as to the Size of Investment:** This method does not differentiate the alternative investment proposals in terms of their magnitude of investments. Obviously, the competing projects may have the same ARR but may differ in respects of average investments depending upon their respective magnitudes of investment. In such a situation, this method becomes useless for the firm to firmly decide upon the implementation of a particular project.
5. **Diverse Concept:** The diverse concepts of 'investments' and 'earnings' leads to different variants of the ARR, each of which produces a different rate of return for a specific investment proposal. This reduces the reliability of the method.
6. **Determination of the Minimum Rate of Return:** Determination of the minimum acceptable rate of return is another problem associated with this method. Generally, an arbitrary minimum rate of return on investment is fixed by the management as it is very difficult to determine a reasonable rate of return. Investment projects are accepted or rejected with reference to this arbitrary rate of return, which is irrational.
7. **Disregard to Incremental Cash-outflows:** The method ignores the benefits accruing to the firm from the sale or abandonment of the old equipment which is replaced by the new one. It considers only the net investment, where as an investment proposal should be evaluated in terms of incremental cash outflow, *i.e.*, new investment minus sale proceed of the old asset, in order to arrive at a correct financial decision.

2.12.3 Discounted Cash Flow Method

In view of the significance of capital budgeting decisions, it is imperative to determine and choose the most profitable investment opportunities. So far we have discussed different unsophisticated traditional methods of evaluating capital investment proposals. The Average Rate of Return (ARR) and Payback Period Methods suffer from a number of shortcomings. Recently, the Time adjusted for Discounted Cash Flow Techniques of evaluating investment proposals have come to be recognized as the most meaningful tool of financial decision-making because these methods provide a more objective basis and theoretical accuracy than the traditional method.

The Discounted Cash Flow Methods or Time-adjusted Methods of evaluating capital projects take into account the time value of money, interest factor (*i.e.*, cost of capital) and all costs and benefits occurring during the entire life period of the project. The sophisticated or time-adjusted methods of evaluating capital expenditure proposals include:

1. Present Value Method

The Present Value Method is one of the Discounted Cash Flow (DCF) or Time-Adjusted Methods. It is also known as 'Discounted Benefit-Cost Ratio Method'. This method takes into account the time value of money and all cash flows are expressed in terms of their present value. It also takes into account all the benefits and costs occurring throughout the useful life time of a project. This method is based on the assumption that the value of present investments cannot be equal to future amounts of cash inflows from this investment. Converting the future amounts of earnings to their present values can solve this problem. This will make the values of investment and earnings comparable. Thus, the present value method is based on a comparison of present value of an investment with the present value of the streams of its cash inflows. Present values of investments may be calculated at a discount rate which may be equal to the cost of capital of the firm or the rate of return desired by the firm on its investment. With the help of the discount rate, the future cash inflows and cash outflows are converted into present values. For capital budgeting purposes, the cash inflows are calculated on the basis of cash inflows after taxes, and are inclusive of depreciation. The cash inflows are assumed to occur at the end of each year. If the capital assets acquired for the capital project have any salvage value, its present value is set off against the present value of the cash outlay. The working capital released at the end of the project's life is included in cash inflow. In case of replacement decisions, an adjustment in respect of tax factor and sale proceeds of the existing asset made in the initial cash outlay. The steps involved in computing the present values of investment outlays and cash inflows are recapitulated as follows:

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- (a) Determination of the rate of discount *i.e.*, cut-off rate. This discount rate is the cost of capital of the firm or the rate of return desired by the firm on its investment.
- (b) Determination of cash outlays, both initial and subsequent, and cash inflows for different years. Computation of the present value of cash outlays of the project by discounting future cash outlays at the predetermined discount rate. In case, the capital asset has any salvage value, its present value has to be deducted for the present value of the cash outlays.
- (c) Determination of the present value of the cash inflows expected to be generated by the investment outlays. In determining the cash inflow after tax (CFAT), all direct and indirect costs including operational and maintenance costs are deducted from the total cash receipts. Depreciation is disregarded as a cost under this method. With the help of the pre-determined discount rate, present values of cash inflows after tax at different periods may be computed either by calculating the present factor as mentioned above or by taking the Present Value Factor (PAF) from the Annuity Tables.
- (d) The present values of all cash inflows and outflow for different periods are determined as under :

$$PV = \text{Actual Cash flow} \times PVF$$

Present values of all cash inflows and cash outflows are added together respectively, which serve as an accept-reject criterion. In case the present value of cash inflows is more than the present value of cash outflow, the present will be accepted, otherwise rejected. Symbolically, the accept-reject criterion can be put as follows :

$PV > C$ accept the proposal

$PV < C$ reject the proposal

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Where PV is the present value of cash inflows and C is the present value of cash outflows or outlays.

The traditional methods do not take into consideration the time value of money and give equal weight to present and future flow of income, but it is essential to consider the timing of return on investment in evaluating investment proposals. The present value method is free from this limitation and time value of money is taken into consideration in this method. Under this method future cash flow are discounted at a given rate of return and compare it with initial investment.

For computing the present value of cash flows at different periods, present value factor may be calculated by the following formula:

$$PV = \frac{C_1}{(1+r)} + \frac{C_2}{(1+r)^2} + \frac{C_3}{(1+r)^3} + \dots + \frac{C_n}{(1+r)^n}$$

where

PV = Present Value of Future Cash Inflows

C = Cash Inflows

r = Rate of Interest or Required Earning Rate or Discount Rate

n = Number of Years

However, as n becomes large, the calculation of $(1+r)^n$ becomes difficult. Present value can also be found by the use of Present Value Tables.

2. Net Present Value Method

The Net Present Value (NPV) Method is generally considered to be the best method of evaluating capital investment proposals. This method is a variant of the present value decision criterion.

It is also called the 'Excess Present Value' or 'Net Gain' Method.

The Net Present Value is the difference between the present value of the future cash inflows after tax and the present value of cash outlays.

The steps involved in computing the present values of investment outlays and cash inflows are the same as for present value method discussed above. The decision criteria for accepting or rejecting a project are as follows;

$NPV > \text{Zero}$ (Accept the Proposal)

$NPV < \text{Zero}$ (Reject the Proposal)

In other words, if the NPV is positive (*i.e.*, the present value of cash inflows is more than the present value of cash outflows or investment outlays, the project should be accepted, otherwise rejected. The accept/reject criterion under the NPV method can also be put as under:

Where,

$PV > C$ Accept the Proposal

$PV < C$ Reject the Proposal

PV = Total Present Values of Cash Inflows

C = Total Present Value of Cash Outlays.

Zero NPV implies a situation where the firm can only recover the original investments. In case of mutually exclusive projects, the project with the highest NPV is preferred and accepted. In practice, the NPV of cash flows is determined with the help of Present Value Tables, prepared for this purpose.

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When Cash Flow are Even

Example 6. A project costing ₹ 100 lakhs has a life of 10 years at the end of which its scrap value is likely to be ₹ 10 lakhs. The firm's cut-off rate is 12%. The project is expected to yield an annual profit after tax of ₹ 10 lakhs, depreciation being charged on straight line basis. At 12% per annum the present value of one rupee received annually for 10 years is ₹ 5.650 and the value of one rupee received at the end of the 10th years is ₹ 0.322.

Ascertain the net present value of the project and state whether we should go in for the project.

Solution.

Calculation of Annual Cash Inflow i.e., profit-after tax but before depreciation:

	₹
Profit after tax given in the problem is	10,00,000
Depreciation (₹ 100 lakh – ₹ 10 lakhs/10years)	9,00,000
Annual Cash Inflow	19,00,000
Present value of annual cash inflow of ₹ 19,00,000 for 10 years @ the present value factor of 5.650	₹ 1,10,57,000
Present value of the scrap value of ₹ 10 lakhs at the end of 10th year @ the present value factor of 0.322	3,22,000
Total present value	1,13,79,000
Total Cash Outflow	1,00,00,000
The present value of the future cash inflow	1,13,79,000
Net present value of inflows.	13,79,000

When Cash Flows are Uneven:

Example 7. Mehta Co. Ltd. is considering the purchase of a machine. Two machines, X and Y, are available each costing ₹ 50,000. Earnings after taxation are expected to be as follows:

Year	Cash Flow	
	Machine X (₹)	Machine Y (₹)
1	15,000	5,000
2	20,000	15,000
3	25,000	20,000
4	15,000	30,000
5	10,000	20,000

Evaluate the both alternatives according to Net Present Value Method. A discount rate of 10% is to be used.

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Year	Discount Factor at 10%	Machine 'X'		Machine 'Y'	
		Cash Flow ₹	Present Value ₹	Cash Flow ₹	Present Value ₹
1	0.909	15,000	13,635	5,000	4,545
2	0.826	20,000	16,520	15,000	12,390
3	0.751	25,000	18,775	20,000	15,020
4	0.683	15,000	10,245	30,000	20,490
5	0.621	10,000	6,210	20,000	12,420
6		85,000	65,385	90,000	64,865

Net Present Value = Present Value – Investment

Machine X = ₹ 65,385 – 50,000 = ₹ 15,385

Machine Y = ₹ 64,865 – 50,000 = ₹ 14,865

Hence, Machine X should be preferred.

Working Notes:

Present Value = Discount Factor × Cash Flow

Merits of the NPV Method

The NPV technique of evaluating investment opportunities has the following merits :

- Recognition to the Value of Money:** This method explicitly recognizes the time value of money, which is inevitable for making meaningful financial decisions.
- Consideration to Total Cash Inflows:** The NPV method considers the total cash inflows of investment opportunities over the entire life-time of the project unlike the payback period method.
- Best Decision Criteria for Mutually Exclusive Projects:** This method is particularly useful for the selection of mutually exclusive projects. It serves as the best decision criteria for mutually exclusive choice problems.
- Changing Discount Rate:** Since discounting rate changes due to time variations in cash inflows, a changing discount rate can be used for the NPV calculations by altering the denominator.
- Maximization of the Shareholders' Wealth:** Finally, the NPV method is instrumental in achieving the objective of the maximization of the shareholders wealth. This method is logically consistent with the company's objective of maximizing shareholders' wealth in terms of maximizing market price of shares, and theoretically correct for the selection of investment proposals.

Demerits of NPV Method

The NPV method suffers from the following limitations or weaknesses:

- Cumbersome Calculation:** This method is difficult to understand and use as it involves cumbersome calculation in comparison to the payback period method and the ARR method. This drawback of the NPV method is, of course, due to unfamiliarity rather than its complexity.
- Determination of Desired Rate of Return:** This Method does not indicate the expected rate of return on investment. It involves the calculation of the required rate of return of discount the cash flows.

3. **Static Method and Unrealistic Calculations:** Another drawback of the NPV method is that it is static like other methods of evaluating capital projects in so far as it freezes the situation at a point of time. In fact, business situations are dynamic, and to that extent all calculations may be unrealistic.
4. **Undependable Results:** The NPV method is an absolute measure of selecting the projects on the basis of their net present values. It prefers the project having a larger present value, although it may also involve a larger initial outlay. Since this method does not tell us the rate of return on alternative investment projects, it fails to provide a basis of comparability in terms of their profitability. This method, therefore, fails to give satisfactory and dependable results where the alternative investment projects involve different investment outlays.
5. **Determination of Economic Life Periods:** This method may also fail to give satisfactory results in case of projects involving different economic life periods. It is very difficult to forecast the economic life-periods of the projects under consideration. Moreover, the net present values of alternative investment projects may not reflect their real worth. In general, the project with a shorter economic life is preferable because short-run forecasts are more dependable and provide for risk and uncertainty. The NPV method does not take into account the life of investment projects as it favours the project with a higher present value which may also have a larger economic life. Thus, NPV method may not reflect the real worth of the alternative investment proposals.

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2.12.4 Profitability Index (PI)

PI method is also known as Benefit-Cost Ratio (B/C Ratio). This time-adjusted capital budgeting technique is a refinement of the net present value method. It is also called 'Net Present Value Index' or 'Desirability Factor'. The present value of cash inflows under the NPV method is not comparable unless the investments are of the same size. The profitability index (PI) provides a solution to this problem. Dividing the present value of future cash inflows by the present value of cash outlays does this. Profitability index approach measures the present value of earnings per rupee invested hence it is relative measure. This approach is also known as benefit-cost ratio because the numerator measures benefits and the denominator measures costs.

The accept/Reject rule under this method is as follows:

$$PI > 1 \text{ (Accept the Project)}$$

$$PI < 1 \text{ (Reject the Project)}$$

If Profitability index is equal to 1, the firm is indifferent to the project. In case of mutually exclusive projects, the project with the highest PI will be given the first rank, followed by others in the same order.

Though the profitability index is commonly defined as the ratio of PV of cash inflows divided by the PV of cash outflows, the PI may also be measured on the basis of the net present value of a project against its initial outlay. This aspect becomes more important in situations of capital rationing. In this situation, the decision rule would be to accept the project having a positive PI and reject the project if the PI is negative.

The profitability index or benefit-cost ratio is expressed either in rupee or in percentage. It may be expressed as follows:

$$\text{P.V. Index (on Re. 1)} = \frac{\text{Present Value of Cash Inflows}}{\text{Cost of Investment}}$$

It can also be expressed in percentage. In such a case, the formula used is as given below:

$$\text{P.V. Index (Percentage)} = \frac{\text{Present Value of Cash Inflows}}{\text{Cost of Investment}} \times 100$$

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This method is also known as benefit-cost ratio because the numerator measures the benefits and the denominator the costs. The proposal is accepted if the present value index is more than one and is rejected in case the present value index is less than one. The selection of the projects with the help of 'Present Value Index Method' can also be affected on the basis of ranking.

Example 8. Rank the following investment proposals in orders of their profitability according to Present Value Index Method. The cost of capital is 10%

Project	Initial Outlay (₹)	Annual Cash Flow (₹)	Life in Years
A	60,000	8,000	15
B	25,000	3,000	10
C	3,000	1,000	5
D	2,150	1,000	3
E	20,000	4,000	10
F	40,000	8,000	8

Solution. Ranking of the Project under the Present Value Index Method

Project	Initial Outlay (₹)	Life in Years	P.V. Factor at 10%	Annual Cash Flow (₹)	Present Value of Total ACF	Present Value of Index	Rank
A	60,000	15	7.606	8,000	60,848	1.014	5
B	25,000	10	6.145	3,000	18,435	0.737	Rejected
C	3,000	5	3.791	1,000	3,791	1.263	1
D	2,150	3	2.487	1,000	2,487	1.156	3
E	20,000	10	6.145	4,000	24,580	1.229	2
F	40,000	8	5.335	8,000	42,680	1.067	4

$$\text{Present Value of Total ACF} = \text{P.V. Factor} \times \text{ACF}$$

$$\text{Present Value Index} = \frac{\text{Present Value of Total ACF}}{\text{Initial outlay}}$$

Merit of Profitability Index (PI)

The merits of this method are as follows:

- Superior to the NPV Method:** The profitability index technique of appraising capital projects is superior to the NPV method as the former evaluates the worth of projects in terms of their relative rather than absolute magnitudes. However, in case of certain mutually exclusive projects, the NPV method would be superior to the PI method as it always gives a better mutually inclusive choice.
- Effective Tool of Ranking Alternative Projects:** The profitability index serves as an effective tool of ranking the alternative investment projects and provides a sound basis for selection of the most profitable project. Since benefit-cost ratio indicate the per rupee return from a project, the PI method provides the most useful tool of ranking the mutually exclusive projects in a situation of capital rationing.
- Consideration of Time Value:** It also gives due consideration to the time value of cash flows over the entire economic life-period of a project.

Demerits of Profitability Index (PI)

The PI method of evaluating investment proposals suffers from the following limitations:

1. **Difficult Method:** This method is more difficult to understand and involves more calculation than the traditional methods but less than the Internal Rate of Return Method.
2. **Mutually Exclusive Projects:** In some cases of mutually exclusive projects, the NPV method would give the best choice than the PI method.

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2.12.5 Internal Rate of Return (IRR) Method

The IRR Method of project evaluation is also known as 'Time Adjusted Rate of Return Method', 'Discounted Cash Flow Rate of Return Method', 'Yield Rate Method', 'Marginal Efficiency of Capital Method', or 'Marginal Productivity of Capital Method'. This discounted cash flow method, like the NPV method, also considers the time value of money by discounting the cash flow streams. However, the basis of discount factor is different in both the cases. In case of the present value method, the discounting rate is a predetermined rate of return which is usually the cost of capital or the desired rate of return. Thus, the determinants of the discounting rate are external to the present value method. Conversely, the discounting rate under the IRR Method is based on the basis of IRR method, the discount rate at which the present value of investment outlays and cash inflows is equal is found by trial and error. The IRR is, therefore, the rate of return which equates the aggregate present value of investment outlays with the aggregate present value of the net cash inflows (CFAT) of a project. In a nutshell, the IRR is the rate which gives the zero NPV to the project. This method is used when investment outlays and annual cash inflows are known but discount rate is unknown.

The IRR or the discount rate at which the present values of investment outlays and inflows are equal is found by trial and error. The technique of computing the IRR can be examined under two heads – (a) Conventional or Uniform Inflows, and (b) Unconventional or uneven Cash Inflows.

- (a) **When Cash Inflows are Uniform for all the Years:** When cash inflows are uniform over the entire economic life span of the project, the IRR can be easily computed by the following steps :

Internal Rate of Return Method

- (i) Calculate Present Value Factor by applying the following formula:

$$\text{Present Value Factor (P.V. Factor)} = \frac{\text{Initial Investment}}{\text{Annual Cash Inflow}}$$

- (ii) Look at Present Value Table of Re. 1 received annually for 'N' years and pick out the line representing the number of years corresponding to the estimated useful life of the project.
- (iii) Move across this line until a figure is found nearly equal to the 'P.V. Factor' calculated in (i) above. The relevant percentage of the discount indicated by this column is the IRR.

The present value factor calculated in (i) above, does not necessarily occur in the present value table. It may exist between any two present value factors of the present value table. In such a situation, the IRR is determined on the basis of the figure closest to factor ascertained in (i) above. The exact IRR can be calculated by using the interpolation method. The actual IRR can be interpolated as follows:

$$r = r_1 + \frac{V_1 - V}{V_1 - V_2} (r_2 - r_1)$$

Where,

 r = rate of return to be determined r_1 = lower rate of return r_2 = higher rate of return V_1 = P.V. Factor at lower rate of return V_2 = P.V. Factor at higher rate of return V = PV Factor for which r is to be interpolated

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- (b) **When Cash Inflows are not Uniform for all the Years:** When cash inflows are not uniform over the economic life of the project, the IRR can be calculated by the Trial and Error Method. In the process of computing the IRR which equates the PV of cash inflows with the PV of investment outlays, the cash inflows are discounted by a number of trial discount rates.

The first trial rate may be calculated on the basis of the same formula which is used for determining the internal rate of return when cash inflows are uniform, as explained above. However, in this case, initial investment is divided by 'annual average cash inflow', in place of 'annual cash inflow'. If the present value of cash inflows of several years is equal to the total present value of cash outflows then the above first trial rate is known as IRR.

$$\text{Average Annual Cash Flow} = \left(\frac{\text{Total Cash Flow} + \text{Scrap Value}}{\text{Number of years related to Working Life of Project}} \right)$$

When the total present value of the cash inflows is greater or less than the total present value of cash outflows, then the second trial rate is determined. If the calculated present value of the expected cash inflows is lower than the present value of cash outflows, a lower rate should be attempted. On the other hand, a higher rate should be attempted if the present value of cash inflows is higher than the present value of cash outflows. This process will be repeated until the net present value becomes zero. The exact IRR can be calculated by using the interpolation method.

Example 9. A project required an initial outlay of ₹ 32,500. Its estimated economic life is 3 years. The cash streams generated by it are expected to be as follows

Year	Estimated Annual Cash Flows ₹
1	17,000
2	13,000
3	12,000

Compute its IRR.

Solution.

$$\text{Total Cash Inflows of 3 years} = ₹ 42,000$$

$$\text{Average Annual Cash Inflow} = \frac{42,000}{3} = ₹ 14,000$$

$$\therefore \text{Present Value Factor} = \frac{32,500}{14,000} = 2.321$$

On the line corresponding to 3rd year in Present Value Table, the P.V. factor 2.321 falls at 14%. Hence, IRR is 14%.

The PVF thus, calculated is located in the Annuity Table across the line representing the number of years for which the cash inflows will generate. The PVF closest to the above calculated factor, will indicate the approximate RR in that column. If the total present value of cash inflows

at this rate is higher than the present value of investment outlays, a trial rate should be used. Conversely, if the total present value of cash inflows is less than the investment outlays, the second trial rate applied to cash inflows will be lower than the first trial rate.

Merit of the IRR Method

The merits of this method may be enumerated as follows:

1. **Easier to Understand:** This method is easier to understand by business executives and non-technical people because the concept of IRR is readily understandable than the concept of NPV. It will be easier to understand a project in terms of rate of return on investment. For example, business executive can easily understand a project if told that IRR of project A is 22% and cost of capital is 10% instead of saying that the NPV of project A is ₹ 39, 681.
2. **Consideration to Time Value of Money:** This method considers the time value of money like the NPV method. It is, thus, conceptually better than the 'Payback Period' and 'Average Rate of Return' techniques of project evaluation.
3. **Consideration to Total Cash Flows:** The IRR method takes into account all cash inflows and cash outflows over the entire economic life of project. Conversely, in case of other technique of project evaluation such as 'Payback Period' and 'Accounting Rate of Return', the total quantum of cash inflows is either ignored or simply their averages are taken.
4. **Objectivity:** This method is more objective because the IRR is not directly influenced by decisions regarding depreciation methods, capitalization versus expenses decisions and conservatism.
5. **Provision for Risk and Uncertainty:** This method automatically gives more weight to more value which are nearer to the present period than those which are distant from it. Conversely, in case of other methods like 'Payback Period' and 'Accounting Rate of Return', all money units are given the same weight which is unrealistic. Thus, the IRR is more realistic method of project evaluation and explicitly provides for risk and uncertainty by recognizing the time factor of cash inflows. This improves the quality of estimates reducing the uncertainty to minimum.
6. **Comparison of Projects with Different Timings and Magnitudes:** This method enables a ready comparison between projects having different lives, requiring different investment outlays and having different timings of cash inflows, because the discounting of all cash inflows allows a quick and safe comparison of projects at a particular point of time by comparing rates of return.
7. **Elimination of Pre-determined Discount Rate:** Unlike the NPV method, the IRR method eliminates the use of the concept of required rate of return which is usually a pre-determined rate of cost of capital for discounting the cash flow streams. The IRR method itself provides a rate of return which is more realistic and consistent with the cost of capital. The IRR is therefore, a more reliable measure of the profitability of investment proposals under consideration.
8. **Objective of Maximizing Shareholders' Wealth:** The IRR method is consistent with the over-all objective of the financial management, *i.e.*, objective of maximizing shareholders' wealth. If the IRR is equal to the rate expected by investors, the share prices will remain stable. Since only those projects are accepted under method which have IRR greater than the rate expected by the investors the share prices will increase. This will, of course, lead to the maximization of the shareholders' wealth.

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Demerits of the IRR Method

Notwithstanding its theoretical soundness, the IRR method suffers from serious limitations as follows:

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1. **Difficult and Complicated Method:** The IRR method is more complicated and difficult to understand and work out as compared to other methods of ranking and evaluation of investment proposals. The IRR method involves tedious and complicated calculations as it is to be computed by the trial and error method. It becomes even more complex in case of projects involving investment outlays over a period of time and the capital assets have a salvage value. However, in such cases the IRR method can be used with the help of computer.
2. **Reinvestment Rate Assumption:** Under this method, it is assumed that all intermediate cash inflows are re-invested at the internal rate of return (IRR). However, this assumption does not always hold good because investment opportunities are not always equal to the IRR taking into account the actual reinvestment opportunity rate of return. Moreover, it is not always safe to assume that intermediate cash inflows from the project will be reinvested at all. A portion of the intermediate cash inflows may be paid out as dividends or it may be tied up in inventories. Thus, the reinvestment rate assumption under the IRR Method fails to present a realistic picture of capital project to the firm.
3. **Multiple Rates:** Another drawback of this method is that it may be indeterminate and give multiple internal rates of return in case of projects involving non-conventional cash flow patterns. This unnecessarily creates confusion as to which rate should be used for decision-making purposes. This kind of problem does not arise in case the NPV method is used.
4. **Inconsistent with Accounting Concepts:** This method also does not correspond to accounting concept for recording cost and revenues. It considers only the cash inflows for purposes of capital investment decisions. However, the profitability of a project can only be judged with reference to the net income from operations rather than the cash inflows. This calls for a special analysis for capital investment decision.
5. **Problem of Ranking Projects:** In evaluating mutually exclusive proposal, this method fails to select the most profitable project which is consistent the objective of maximization of shareholders' wealth. Usually, the project with the highest IRR is selected to the exclusion of all others. However, practically it may not be the most profitable and consistent with the over all objective of the firm, *i.e.*, the maximization of shareholders' wealth.
6. **Uncertain Estimates:** Another deficiency of this method relates to a number of refined estimates about cash inflows, economic lifespan of projects, etc. Since estimates of cash inflows are based on sales forecast, they cannot be correct the realistic as sales forecasts in them suffer from lack of absolute accuracy. Moreover, it is very difficult to forecast the economic life of an investment proposal exactly. Uncertainty in estimates, thus, affects the accuracy and reliability of the results obtained under this method.

2.12.6 Terminal Value (TV) Method

The re-investment assumption under the IRR method is unrealistic as it is unlikely to reinvest all the intermediate cash inflows at the IRR or at all. In order to have a correct and reliable picture of the capital project, the reinvestment of all intermediate cash inflows should be based on reliable interest rate. The Terminal Value (TV) approach takes care of this aspect.

The terminal value method is based on the assumption that operating income or cash inflow of each year is reinvested in another asset at a certain rate of return from the moment of its receipt until the expiry of the project's economic life.

The total sum of compounded cash inflows for different years are treated to have been received at the termination of the project and hence discounted back to the present values on the basis of the given discount rate or cost of capital. The present value of the total compounded sum of cash inflows is then compared with the present value of the cash outflows. If the present value of the sum of total compounded reinvested cash inflows is greater than the present value of cash outflows or investment outlays, the proposed project is accepted otherwise rejected. The firm would be indifferent if both the values are equal. Like NPV we can also compute Net Terminal Value (NTV) by deducting the net present value of investment outlays from the present value of the sum total of the compounded reinvested cash inflows. In this case, if the NTV is positive, the project is accepted, if the NTV is negative the project is rejected.

The NTV approach is similar to the NVP method excepting that the former involves compounding of cash inflows whereas the latter they are discounted. Both the methods will give the same results if the figures and discounting rate remain the same.

Merits of Terminal Value Method

The 'Terminal Value' or 'Net Terminal Value' Method has the following advantages:

1. **Easy to understand and Calculate:** This method is mathematically easier than the IRR method and makes the process of evaluating the real worth of alternative investment projects simple. Since the 'compounding' technique is more appealing than the 'discounting' technique, this method is easier to understand for business executives who are not trained in accountancy or economics.
2. **Cash Inflows Unaffected by Cost of Capital:** This method explicitly incorporates the assumption about the way in which cash inflows are reinvested after they are received. Thus, it avoids any influence of the cost of capital on cash inflows.
3. **Suitable for Cash Budgeting:** This method is more suitable for cash budgeting requirements as it considers both net cash inflows from operations as well as cash inflows in respect of interest earnings of the intermediate reinvested cash inflows. Conversely, the NPV method does not explicitly show all cash inflows as it ignores cash inflows in respect of interest earnings.

Demerits of the Terminal Value Method

Notwithstanding its theoretical soundness, the NTV or TV method suffers from the following serious limitations:

1. **Determination of Reinvestment Rates:** The major limitation of this method lies in projecting the future rates of interest at which the intermediate cash inflows received from the operations will be reinvested.
2. **Comparison of Mutually Exclusive Projects:** This method also fails to make a realistic comparative evaluation of two or more mutually exclusive capital projects.

2.13 CAPITAL RATIONING

Normally, a firm should accept and implement all such capital projects which ensure a desired rate of return on investments. However, in practice business enterprises do not have unlimited funds,

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and cannot accept all projects which are expected to increase its present value. Depending upon the availability of funds, the top management of the firm fixes the limit of its capital expenditure budget. The constraint leading to a fixed capital budget may arise due to market conditions or may be self-imposed. Firms may limit their capital budgets for keeping their growth within a limit or they may prefer safety and control as against profit. Having a fixed capital expenditure budget, the firm must ratio the available funds. In such an event, the firm has to select the projects in a manner as to maximize its long-term return. A cut-off point is determined for this purpose. The cut-off point refers to the minimum acceptable Rate of Return or Payback Period below which a project will be rejected. It is determined in view of the number of projects, objectives of the firm and the availability of funds to finance the projects.

Thus, Capital Rationing refers to the situation in which the firm has more acceptable investment proposals requiring greater amount of finance than is available with the firm. Weston and Brigham define Capital Rationing as "a situation where a constraint is placed on the total size of capital investment during a particular period". Capital Rationing is concerned with the selection of a combination of investment proposals out of the many acceptable investment proposals that provide the highest rate of return. For this purpose, projects are ranked in accordance with their profitability or rate of return. The project with the highest rate of return is ranked first and the project with the minimum acceptable rate of return is ranked last. The acceptable projects are ranked in the descending order of the rate of return. Obviously, these projects are exclusive of those projects which are adopted because of their urgency or legal requirements.

2.14 RISK ASSOCIATED CAPITAL BUDGETING TECHNIQUES

Risk involves situations in which the probabilities of an event is due to repetitive nature of the event. Under such situation frequency distribution of the event is used to study the future probabilities. Uncertainty is a situation where probabilities of an event cannot be drawn from frequency distribution. Under such a situation, a decision-maker does not know at the time of decision what will be the exact outcomes of alternative course of action.

The quantification of risk is not an easy task. However, the following two techniques are commonly used to measure the risk in capital project:

1. Standard Deviation Method;
2. Coefficient of Variation Method.

1. Standard Deviation Method

The amount of dispersion in an action's possible outcomes can be expressed in terms of the standard deviation. This is calculated as the square root of the sum of the products of the probability of each outcome and the square deviation of each outcome from the value of the average outcome. Standard deviation measures the deviation or variance about the expected cash flow of each of the possible cash flows. The technique of standard deviation can be better used to assess the profitability of such projects that have similar cost and net present value. The higher standard deviation would indicate high risk. Thus, projects with the minimum risk would be preferred as compared to others. The following formula is used to measure the standard deviation:

$$\text{Standard deviation } (\sigma) = \sqrt{\frac{fd^2}{n}}$$

Example 10. The following are the possible cash inflow with associated probabilities for two project:

Year	Cash Inflow		Probability	
	Project A (₹)	Project B (₹)	Project A	Project B
1	4,000	5,000	.1	.2
2	6,000	7,000	.2	.1
3	10,000	8,000	.1	.2
4	5,000	7,000	.4	.2
5	5,000	8,000	.2	.3

Measure the risk of the project by using standard deviation.

Solution.

Calculation of Standard Deviation Project A

Cash Inflows (1)	Deviation From Mean $d = 6000$ (2)	Square of Deviation (d^2) (3)	Probability (f) (4)	Weighted Square ($fd^2 = (3 \times 4)$) (5)
4,000	-2,000	40,00,000	.1	4,00,000
6,000	0	0	.2	0
10,000	+4,000	160,00,000	.1	16,00,000
5,000	-1,000	10,00,000	.4	4,00,000
5,000	-1,000	10,00,000	.2	2,00,000
			<u>$n = 1$</u>	Σfd^2 26,00,000

$$\text{Standard deviation } (\sigma) = \sqrt{\Sigma fd^2 / n}$$

$$(\sigma) = \sqrt{26,00,000 / 1}$$

$$(\sigma) = \sqrt{26,00,000} = 1,612$$

Project B

Cash Inflows (1)	Deviation From Mean $d = 7000$ (2)	Square of Deviation (d^2) (3)	Probability (f) (4)	Weighted Square ($fd^2 = (3 \times 4)$) (5)
5,000	-2,000	40,00,000	.2	8,00,000
7,000	-	0	.1	0
8,000	+1,000	10,00,000	.2	2,00,000
7,000	0	0	.2	0
8,000	+1,000	10,00,000	.3	3,00,000
			<u>$n = 1$</u>	Σfd^2 13,00,000

$$\text{Standard deviation } (\sigma) = \sqrt{\Sigma fd^2 / n}$$

$$(\sigma) = \sqrt{13,00,000 / 1}$$

$$(\sigma) = \sqrt{13,00,000} = 1,140$$

The calculations of standard deviation clearly shows that project A is risky as it has a higher standard deviation.

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2. Coefficient of Variation Method.

The application of standard deviation by itself is not always a reliable basis to compare and evaluate alternative actions. However, it can prove powerful and more effective if used together with other measurements of outcomes, especially the expected value (mean). Suppose a firm is considering two proposals, each with a standard deviation of 1,300. The expected value of one proposal is ₹ 40,000 while the other has an expected value of ₹ 15,000. It is clear from above statistics of the project that the standard deviation cannot help management to form any opinion as being identical for the both projects. To deal with such a situation, it will be appropriate to measure the relative dispersion rather than the total dispersion of the outcomes of an action. This can be done by the application of the coefficient of variation.

Coefficient of variation is the standard deviation of the probability distribution divided by its expected value. It is the ratio between standard deviation and expected value or mean. This technique is appropriate method of evaluating such projects that have similar cost with varied net present values. The following formula is used to measure the risk under coefficient of variation approach.

$$\text{Coefficient of variation} = \frac{\text{Standard deviation}}{\text{Mean}} \times 100$$

$$\text{or} \quad = \frac{\sigma}{x} \times 100$$

Coefficient of variation indicates the relative risk associated with the possible outcomes of a particular action. The higher ratio of variation would mean higher degree of risk.

Example 11. Using figures of previous example 12.1 compute coefficient of variation and suggest which project should be preferred.

Solution.

Coefficient of variation:

$$\text{For product A} = \frac{1,612}{6,000} \times 100 = 27 \text{ per cent.}$$

$$\text{For product B} = \frac{1,140}{7,000} \times 100 = 16 \text{ per cent}$$

Comments

The application of coefficient of variation also reveals that project A is more risky than project B because project A has a coefficient of variation of 27 per cent while as the same is 16 per cent for project B. Hence project Y should be preferred.

2.15 TECHNIQUES OF ADJUSTING RISK

Number of techniques have been evolved to account for risk in capital investments. These techniques can be classified into following two groups:

A. Traditional methods

1. Less payback period

2. Risk-adjusted discount rate
3. Certainty-equivalent approach

B. Modern methods

1. Sensitivity analysis
2. Probability technique
3. Decision tree analysis

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A. TRADITIONAL METHODS

1. Less Payback period

Firms believe that projects with long payback period involves a high degree of risk than those with the shorter payback period. This technique can give better results if used in combination with a cut-off period. * The application of this technique is demonstrated with the help of the following example.

Example 12. There are three projects-X, Y and Z: Each project requires an investment of ₹ 40,000. You are required to advise the management as to which project is preferable under risky situation based on payback period from the below mentioned information. The standard cut-off period for the firm is five years.

Net Profit before Depreciation after Tax

Year	X	Projects Y In Rupees	Y
1st	5,000	3,000	2,000
2nd	9,000	5,000	4,000
3rd	12,000	8,000	6,000
4th	14,000	10,000	8,000
5th	16,000	14,000	10,000
6th	16,000	13,000	10,000

Solution.

$$\text{Payback period} = \frac{\text{Project X}}{4 \text{ years}} \quad \frac{\text{Project Y}}{5 \text{ years}} \quad \frac{\text{Project Z}}{6 \text{ years}}$$

Working:

Calculation of Payback Period

Project	Cash Inflows (₹)	Cost of Project ₹	Payback Period
X	5,000 + 9,000 + 12,000 + 14,000 = 40,000	40,000	4 years
Y	3,000 + 5,000 + 8,000 + 10,000 + 14,000 = 40,000	40,000	5 years
Z	2,000 + 4,000 + 6,000 + 8,000 + 10,000 + 10,000 = 40,000	40,000	6 years

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The payback period of the project X, Y and Z is 4 years, 5 years, and 6 years respectively. Out of these 3 projects, project X will be preferred because of its shorter payback period as compared to others. Since the cut-off period is 5 years, therefore, only z project will be rejected as its payback period is more than cut-off period. However, if cut-off period is used in combination with shorter payback period technique then only project X can qualify.

2. Risk-adjusted Discount Rate

The technique of risk-adjusted discount rate suggests the variation of discount rate in correspondence with change in the amount of risks. This technique aims to discount risky projects with higher rate as compared to less risky projects.

Example 13. STAR Ltd. is considering two mutually exclusive projects. The expected investment out lay of these projects is ₹ 40,000, net cash inflows information for both projects are given as under:

Year	Project A (Amount in Rupees)	Project Bs
1	4,000	20,000
2	5,000	18,000
3	8,000	15,000
4	10,000	12,000
5	12,000	10,000
6	15,000	8,000
7	20,000	5,000

The management desired to have a minimum rate of return of 10 per cent. Risk premium rates are 2 per cent and 5 per cent respectively for investment A and B. Which investment should be preferred?

Solution. Under normal conditions for economic evaluation of the projects, the cash inflows of project A and B would be discounted at 10 per cent rate. Since the projects are risky, therefore, the normal rate of discount would be increased by risk premium rate which is 2 per cent and 5 per cent for Project A and B respectively. Thus, the discounting rate for Project A and B would be 12 per cent and 15 per cent respectively. Accordingly the profitability of both the projects will be calculated as below:

Year	Cash Inflow (₹)	Project A		Project B		
		Discount Factor (10 + 2% = 12%)	Present Value (₹)	Cash Inflow (₹)	Discount Factor (10 + 5% = 15%)	Present Value (₹)
1	4,000	0.893	3,572	20,000	0.869	17,380
2	5,000	0.797	3,985	18,000	0.756	13,608
3	8,000	0.712	5,696	15,000	0.657	9,855
4	10,000	0.635	6,350	12,000	0.572	6,864
5	12,000	0.567	6,804	10,000	0.497	4,970
6	15,000	0.506	7,590	8,000	0.432	3,456
7	20,000	0.452	9,040	5,000	0.376	1,880
	Total		43,037			58,013

Net Present Value = Present Value – Cost of Project

$$\text{for A} = 43037 - 40000 = 3,037$$

$$\text{for B} = 58013 - 40000 = 18,013$$

Comments

The above analysis shows that Project B, even at a higher discount rate is with highest net present value of ₹ 18,013 and, therefore, must be preferred over project A where net present value is ₹ 3,037 only. It means that the value of the company would increase by ₹ 18,013 if it accepts projects B but only by ₹ 3,037 if it accepts project A.

Thus, the technique of adjusting discount rate, serves useful purpose by adjusting discount rates in relation to degree of risk. However, the major drawback of this technique is the difficulty to determine the risk premium rate appropriately in relation to the variation in degree of risk.

3. Certainty-equivalent Approach

Certainty equivalent approach suggests to counter the risk of the projects in terms of certainty equivalents. The certainty equivalent for an uncertain event is that certain value which a decision-maker is first willing to accept in lieu of the gamble represented by the uncertain event. It is a value acceptable to the investor in the lieu of some future uncertain value. This method reduces expected cash flows by certain amounts. This is done by employing initiative correction factor or certainty equivalent coefficient. The higher the degree of risk of a project, the lower would be the coefficient. This technique involves the following steps:

- (i) Measurement of risk inherent in the cash flows with the help of standard deviation/coefficient of variation.
- (ii) Computation of certainty equivalent coefficient of the cash flow which can be found by using the following formula:

$$\text{Certainty equivalent coefficient} = \frac{\text{Desirable (certain) cashflow}}{\text{Expected/estimated(risky) cash flows}}$$

For example; if the expected value of cash flow of a project in a period "n" was ₹ 60,000 and the desirable/certain cash flow for the same is ₹ 40,000 then certainty equivalent coefficient would be 0.67.

$$= \frac{40,000}{60,000}$$

Accordingly, the coefficient is calculated for each cash flow.

- (iii) Adjustment of cash flows in the light of certainty equivalent coefficient; and
- (iv) Compute present value of adjusted cash flow as computed in step (iii) by employing the risk free discount rate.

The below mentioned Illustration 12.5 will display the technique of certainty equivalent.

Example 14. LAXMI Ltd is considering two projects - A and B. Out of them only one project is to be selected. The initial investment cost of each of the project is ₹ 30,000. The estimated cash flows and certainty coefficient are given in the following table:

NOTES

Year	Project A		Project B	
	Estimated Cash Inflows (₹)	Certainty Coefficient	Estimated Cash Inflows (₹)	Certainty Coefficient
1	10,000	.6	12,000	.7
2	12,000	.8	18,000	.8
3	15,000	.7	20,000	.6
4	20,000	.6	10,000	.6
5	20,000	.6	12,000	.7

Evaluate the projects when risk free cut-off rate is 12 per cent.

Solution. In this problem, the evaluation of projects will be made on the basis of net present values of desirable (certain) cash inflows. Accordingly, first desirable cash inflows will be calculated and then present value of the desirable cash inflows shall be computed.

Calculation of Desirable (Certain) Cash Inflows

Year	Project A			Project B		
	Estimated Cash Inflow (₹)	Certainty Coefficient	Desirable (Certain) Cash Inflows (₹) (2 × 3)	Estimated Cash Inflows (₹)	Certainty Coefficient	Desirable Cash Inflow (₹)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	10,000	.6	6,000	12,000	.7	8,400
2	12,000	.8	9,600	18,000	.8	14,400
3	15,000	.7	10,500	20,000	.6	12,000
4	20,000	.6	12,000	10,000	.6	6,000
5	20,000	.6	12,000	12,000	.7	8,400

Calculation of Present Value of Desirable (Certain) Cash Inflows

Year	Project A			Project B		
	Discount Factor @ 12%	Desirable Cash Inflows (₹)	Present Value (2 × 3) (₹)	Desirable Cash Inflows (₹)	Present Value (₹)	
(1)	(2)	(3)	(4)	(5)	(6)	
1	0.893	6,000	5,358	8,400	7,501	
2	0.797	9,600	7,651	14,400	11,477	
3	0.712	10,500	7,475	12,000	8,544	
4	0.635	12,000	7,620	6,000	3,810	
5	0.67	12,000	6,804	8,400	4,762	
			34,908		36,094	

Net present value = Present value – Cost of project

NPV for project A = ₹ 34,908 – ₹ 30,000 = ₹ 4,908

NPV for project B = ₹ 36,094 – ₹ 30,000 = ₹ 6,094.

Comments

The net present value of Project B is more than Project A by ₹ 1,186 (6,094 - 4,908). Therefore, project B should be preferred.

B: MODERN METHODS

NOTES

1. Sensitivity Analysis

Sensitivity analysis evaluates the responsiveness of capital investment variables to changes in parameter value. It is a technique to study the changing behaviour of net present value with a change in key variable. The key variables are price, economic life, cost, competition, inflationary rates etc. The actual outcome of an investment decision depends upon what happens to these variables. The following steps are taken to compensate for risk under the sensitivity analysis.

- (i) Identification of key variables in the project;
- (ii) Selection of variables from identified variables step (i) that are uncertain as regards to their estimated value; and
- (iii) Calculation of the effect on present value of the project due to different levels of uncertainty.

The effective application of sensitivity analysis can offer the following benefits:

- (i) Improvement in managerial decisions.
- (ii) Identification of critical variables and assumptions.
- (iii) Helps management in directing its efforts towards focal areas of business.
- (iv) Encourages executives at different levels to accept the challenges of risky and uncertain business world.

Example 15. Surya Ltd. is contemplating the purchase of a machine. The Machines "X" and "Y" are available each costing ₹ 1,20,000. The company uses discount rate of 8% for comparing profitability of projects. Earning after taxation and before depreciation are expected to be as below:

Year	Machine X (₹)	Machine Y (₹)
1st	30,000	20,000
2nd	40,000	50,000
3rd	40,000	40,000
4th	30,000	40,000
5th	20,000	10,000

Ascertain the probability of the projects and calculate the effect on net present value due to 5% increase in cost variable of the project.

Solution.

Calculation of reset Value of Machine X and Y

Year	Discount Factor 8%	Machine X		Machine Y	
		Desirable Cash Inflow	Present Value	Desirable Cash Inflow	Present Value
1st	0.926	30,000	27,780	20,000	18,520
2nd	0.857	40,000	34,280	50,000	42,850

NOTES

3rd	0.794	40,000	31,760	40,000	31,760
4th	0.735	30,000	22,050	40,000	29,400
5th	0.681	20,000	13,620	10,000	6,810
		Total	1,29,490	Total	1,29,340

* Cash inflow Descanting factor

Net present value of machines under normal conditions:

$$\text{Machine X} = \text{Present value} - \text{cost of machine} = ₹ 1,29,490 - 1,20,000 \\ = ₹ 9,490$$

$$\text{Machine Y} = ₹ 1,29,340 - 1,20,000 = ₹ 9,340$$

Now by employing sensitivity analysis, we will change one key variable of the project i.e., cost (increase by 5%) and will find its effect on net present value of the project.

Net present value of machine

$$X = \text{Present value} - \text{cost of machine} = ₹ 1,29,490 - 1,26,000^* \\ = ₹ 3,490$$

Net present value of machine

$$Y = ₹ 1,29,340 - 1,26,000 = ₹ 3,340$$

Comment

The above analysis clearly reveals that machine X should be preferred as it has maximum net present value among the alternatives. At the same time, we also observed a change of 5 percent increase in cost of machines decreased the net present value of machines by ₹ 6,000. This behaviour is the application of sensitivity analysis.

2. Probability Technique

Probability is the method of establishing the predictability of events from the known occurrence of past events. In capital investment planning this concept refers to the estimation of cash flows from a given project. The technique attempts to measure the probable changes of an event (cash flows). Probability technique involves the following steps for evaluating capital investments:

- (i) Estimation of cash inflows and their respective probabilities;
- (ii) Multiplication of cash inflow with the probability assigned; and
- (iii) Calculation of net present value of monetary value of the inflows (step ii) at the given rate of discount.

Example 16. The MOON Co. Ltd. is considering the purchase of a new machine. Two mutually exclusive models are being considered, each costing ₹ 15,000. Earning after taxation and their respective probability are expected to be as follows:

Year	Model A	Cash Flows: (In Rupees)	Model B	Prob.
1st	8,000	.2	6,000	.1
2nd	10,000	.1	15,000	.2
3rd	20,000	.3	25,000	.2
4th	32,000	.2	40,000	.3
5th	48,000	.2	30,000	.2

The company has a target of return on capital of 10 per cent.

Solution.**Calculation of Net Present Value of the Two Models**

Year	Discount Factor @ 10%	Cash Inflows	Probability	Monetary Value (3 × 4)	Present Value (2 × 5)	Cash Inflows	Probability	Monetary Value (7 × 8)	Present Value (2 × 9)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1st	0.909	8,000	.2	1,600	1,454	6,000	.1	600	545
2nd	0.826	10,000	.1	1,000	826	15,000	.2	3,000	2,478
3rd	0.758	20,000	.3	6,000	4,548	25,000	.2	5,000	3,790
4th	0.683	32,000	.2	6,400	4,371	40,000	.3	12,000	8,196
5th	0.621	48,000	.2	9,600	5,961	30,000	.2	6,000	3,726
				Total	17,160			Total	18,735

NOTES

Net present value = Present value – Cost of March

for Model A = 17,160 – 15,000 = 2,160

for Model B = 18,735 – 15,000 = 3,735.

Comments

From the above analysis, it is evident that model "B" is more profitable investment as its net present value is more by ₹ 1,575 (18,735 – 17,160) as compared to model "A" even after taking into consideration the profitabilities of cash inflows.

3. Decision-Tree Analysis

"A decision-tree is a graphic display of the relationship between a present decision and future events, future decision and their consequences. The sequence of events is mapped out over time in a format similar to the branches of a tree". Decision-tree analysis is an analytical technique to handle the sequential decisions in capital expenditure planning. When decisions must be in sequence, with each decision involving independently distributed outcomes of alternative actions, such a situation can be handled by employing decision tree. Thus, a decision tree technique permits a convenient graphic representation of the possible outcomes. These possible outcomes are determined by the uncertain events and available alternatives. The power of the procedures lies in simplicity and intuitive appeal. The techniques of decision-tree involves the following major steps:

- (i) Analysis of investment decision;
- (ii) Identification of decision alternatives;
- (iii) Display of decision points, chance events and other data;
- (iv) Assigning a probability to each alternative commonly known as branching of probabilities;
- (v) Estimation of present values of cash flows;
- (vi) Computation of expected values of present values;
- (vii) Computation of profitability index of each project/decision; and
- (viii) Selection of alternative with highest profitability index.

Example 17. Projects X, Y and Z cost ROSHAN Ltd. ₹ 25,000, ₹ 12,000 and ₹ 8,000 respectively. Their cash flow and respective probabilities are given below:

NOTES

Alternatives	Cash Flows (₹)	Profitability
Project X:	20,000	0.5
High Demand (HD)	30,000	0.3
Medium Demand (MD)	40,000	0.2
Low Demand (LD)		
Project Y:	15,000	0.2
High Demand (HD)	12,000	0.2
Medium Demand (MD)	8,000	0.6
Low Demand (LD)		
Project Z:	12,000	0.5
High Demand (HD)	8,000	0.3
Medium Demand (MD)	6,000	0.2
Low Demand (LD)		

Using 10 per cent as the rate of return ascertain the probability and acceptability of the projects.

Solution.

Decision-tree

Action (1)	Demand (2)	Cash Flows (₹) (3)	Dis- count Factor @ 10% (4)	Present Values (3 × 4) (₹) (5)	Proba- bility (6)	Expected Values (EV) of Present Value (5 × 6) (₹) (7)	
	X	High	0.992	19,840	0.5	9,920	
		Medium	0.992	29,760	0.3	8,928	
		Low	0.992	39,680	0.2	7,936	
	Total						26,784
	Y	High	0.992	14,880	0.2	2,976	
		Medium	0.992	11,904	0.2	2,381	
		Low	0.992	7,936	0.6	4,762	
	Total						10,119
	Z	High	0.992	11,904	0.5	5,952	
Medium		0.992	7,936	0.3	2,381		
Low		0.992	5,952	0.2	1,190		
Total						9,523	

$$\text{Profitability Index (PI) of project} = \frac{\text{Fixed values}}{\text{Initial investments}}$$

$$\text{PI of X} = \frac{26,784}{25,000} = 1.071$$

$$\text{PI of Y} = \frac{10,119}{12,000} = 0.843$$

$$\text{PI of Z} = \frac{9,523}{8,000} = 1.190$$

Comments

The decision-tree, therefore, suggests the following priority of the projects.

- (i) Project Z
- (ii) Project X
- (iii) Project Y.

Project Z is with highest profitability index of 1.190 followed by project X and Y with a profitability index of 1.071 and 0.843 respectively. Therefore, project Z may be accepted

NOTES.

COST OF CAPITAL

2.16 CONCEPT OF COST OF CAPITAL

Cost of capital is an important in taking capital investment decisions. Accurate measurement of cost of capital is desirable on account of its serious implications on the overall objective of a firm, i.e., maximization of shareholders' wealth. Hence, the need for correct definition and measurement of cost of capital is inevitable.

The term cost of capital refers to the price paid by a firm for obtaining funds from investors through insurance of a specific type of security. It is, therefore, the minimum rate of return expected by investors through insurance of a specific type of security. It is, therefore, the minimum rate of return expected by investors. Thus, in operational terms, cost of capital refers to the minimum rate of return which a firm must earn on its investors and keep the market value of the concern unchanged. In economic terms, the term cost of capital may be defined as the cost of acquiring the requisite funds, i.e. borrowing rate. Alternately, it may refer to opportunity cost of funds, i.e., lending rate. Practically we use the borrowing rate to indicate the cost of capital. Since a firm borrows funds from different sources at different rates, the cost of capital indicates the weighted average cost of each component of capital. Some of the definitions of cost of capital are as follows:

Solomon Ezra, "The cost of capital is the minimum rate of return or cut-off rate for capital expenditures."

Hamplon John J., "Cost of Capital is the rate of return, the firm requires from investment in order to increase the value of the firm in the market rate."

Milton C. Van Horne, "The cost of capital represents a cut-off rate for the allocation of capital to investment projects. It is the rate of return on a project that will leave unchanged the market price of the stock."

In the general sense, "the cost of capital is any discount rate used to value cash streams."

Thus, cost of capital is the minimum rate of return from a project which a firm is expected to earn in order to discharge its obligations in respect of funds acquired from the investors.

2.17 IMPORTANCE OF COST OF CAPITAL

1. **Capital Investment Decisions:** The cost of capital represents the cut-off rate in investment decisions. It is often used as the discount rate for computing the present value

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- of cash inflows associated with a capital project. In case of different discounted cash flow method, e.g., NPV Method, Profitability Index Method, Terminal Value Method etc., the cost of capital is employed for discounting the future cash inflows. In case of the internal Rate of Return (IRR) Method, the computed IRR is compared with the cost of capital. Thus, cost of capital constitutes the basis for capital investment decisions. It provides a yardstick for evaluating capital expenditure proposals and thus, serves the role of accept-reject criterion. Obviously, the accept-reject rule requires the firm to select only such projects which give a rate of return higher than the cost of capital. The cost of capital, therefore, occupies a crucial significance in capital budgeting decisions in so far as it provides a rational yardstick for making the optimum investment decisions.
2. **Capital Structure Decisions:** Besides an accept-reject decision criterion for capital investment proposals, the cost of capital is also important in designing the balance and appropriate capital structure of the firm. A firm may raise its financial resources in a number of ways including loans from banks and other financial institutions, public deposits, bonds and debentures, equity shares, preference shares, retained earnings, etc. The cost of capital is influenced by changes in financial leverage or capital structure. Since the cost of capital has a direct bearing on the firm's overall objective of maximizing shareholders' wealth, the firm will logically attempt to have an optimum capital structure which will minimize cost of capital and risks associated with raising funds from various sources. Keeping in view the varied costs and risks involved in different sources of capital, it is inevitable to compute the cost of each type of capital so as to have an optimum capital structure. Thus, the cost of capital plays a vital role in designing an appropriate capital structure of a firm which is absolutely necessary for attaining the firm's overall objective of shareholders' wealth maximization by minimizing its overall cost of capital and the associated risks.
 3. **Optimum Resource Mobilization:** The concept of cost of capital is also useful in optimum mobilization of resources. A capable financial executive is always aware of the fluctuations in the capital market, current rates of interest and dividend. This enables him to mobilize the requisite funds from different sources in such a way as to minimize the composite cost of capital and risk while retaining the control of the firm in the hands of the existing shareholders. Thus, cost of capital also plays an important role in optimum mobilization of financial resources from different sources.
 4. **Evaluation of Expansion Project and Financial Performance of Top Management:** The cost of capital can be used to evaluate the financial feasibility of expansion projects. If the marginal rate of return on investment is higher than the cost of capital, the expansion projects are accepted otherwise rejected. The cost of capital can also be used to evaluate the financial performance of the firm's top executives. Such an evaluation will involve a comparison of actual profitability of the projects with the projected composite cost of capital and also with the actual cost incurred in raising the required funds.
 5. **Other Uses:** The cost of capital is also important in many other areas of decision-making, such as comparative study of alternative financial resources, optimum allocation of financial resources, dividend policy decisions, working capital management policies, capital budgeting and capital expenditure control etc. In social accounting, the concept of cost of capital can be used in selecting the best investment opportunities which would maximize the social wealth and minimize the social costs.

2.18 ASSUMPTIONS OF COST OF CAPITAL

The theory of cost of capital is based on the following assumptions :

1. **Business Risk Unaffected:** In analyzing cost of capital throughout this chapter it has been assumed that the business risk complexion of the firm remains unaffected by accepting and financing a new investment proposal. As pointed out above, the term business risk refers to the variability in operating profits (EBIT) due to changes in sales. If a firm accepts a project having more than average risk, the suppliers of funds are quite likely to expect a higher rate of return than the average rate. The cost of capital will thus, increase. The business risk complexion is generally determined by the capital budgeting decisions. However, in determining a firm's cost of capital we assume that business risk of firm remains unaffected by the acceptance and financing of new investment proposals.
2. **Financial Risk Unaffected:** In addition to business risk, we also assume that the firm's financial risk complexion also remains unaffected by the acceptance and financing of new projects. The term financial risk refers to the risk arising on account of changes in financial leverage or capital structure. In general, higher debt content in capital structure increases the financial risk. It is because the firm would require higher operating profits to cover the periodic interest payment and repayment of principle amount of debt at the time of maturity. Thus, an increase in debt capital and preference shares in the capital structure increases the changes of cash insolvency of the firm. The suppliers of funds would, therefore, expect a higher rate of return from such firms as compensation for financial risk. However, in the analysis cost of capital, the firm's financial structure is assumed to remain unchanged and hence financial risk remain unaffected by the acceptance and financing of new projects.
3. **After Tax Basis:** Since benefits arising from a proposed project are evaluated on an after-tax basis, the cost of capital for source is also determined on an after-tax basis in order to ensure consistency. In fact, only the cost of debt capital requires tax adjustments as interest paid on debt constitutes a deductible expense for determining taxable income. However, dividend payments to preferential as well as equity shareholders are not deductible for determining taxable income.

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2.19 COMPONENTS OF COST OF CAPITAL

The cost of capital of a firm comprises the following three components:

1. **Return at Zero Risk:** This refers to the projected rate of return on investment when the project does not involve any business or financial risk.
2. **Premium for Business Risk:** Besides the normal rate of return at zero risk level, the cost of capital also includes premium for business risk. Business risk refers to the changes on operating profits on account of changes in of changes in sales. The projects involving higher risk than the average risk can be financed at a higher rate of return than the normal rate. This is due to the fact that the supplies of funds for such projects will expect a premium for increased business risk. The business risk is generally determined while taking capital budgeting decisions.
3. **Premium for Financial Risk:** The cost of capital also includes premium for financial risk arising on account of higher debt content in capital structure requiring higher

operating profit to cover periodic payment of interest and repayment of principle amount on maturity. Since the changes of cash insolvency of a firm with higher debt content in its capital structure are greater, the suppliers of funds would expect a higher rate of return as a premium for higher risk.

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The above three comments of cost of capital may be expressed by the following equation:

Where

$$K = C_0 + b + F$$

K = Cost of Capital

C_0 = the riskless cost of financing

b = business risk premium

F = financial risk premium.

2.20 BASE OF COST OF CAPITAL

The cost of capital can be classified on certain comparable basis as follows:

1. **Explicit and Implicit Cost:** The explicit cost of any source of finance is the discount rate that equates the present value of funds raised by the firm with the present value of its expected cash outflows. These cash outflows may relate to interest payments, payment of principal or dividend. In other words, it is the internal rate of return, the firm can afford for financing an investment proposal. The determination of the explicit cost of capital is similar to the determination of the IRR, with the difference that in case of explicit cost of capital, the cash inflows take place in the beginning followed by a series of cash outflows subsequently. Thus, the explicit cost of capital is the annual cash outflows for several years.

The implicit cost of capital may be defined as the rate of return associated with the best investment opportunity for the firm and its shareholders that would be foregone, if the project presently under consideration by the firm were accepted. Thus, the concept of opportunity cost gives rise to the implicit cost of capital. The cost of retained earnings is, therefore, an opportunity cost or implicit cost of capital, in the sense that it is the rate of return at which the shareholders could invest these funds, had these been distributed to them as dividends. Likewise, other forms of capital also have implicit cost because implicit costs arise when funds are used. The basic difference between explicit and implicit costs is that the explicit cost arises when funds are raised whereas implicit costs arise when funds are used. However, for purposes of capital investment decisions the explicit cost is considered as cost of capital.

2. **Future Cost and Historical Cost:** Future cost refers to the expected cost of capital financing an investment proposal, while historical cost is the actual cost of capital already incurred in financing a project. Historical costs are useful in projecting the future costs and appraising the past performance as against predetermined standard or cost. However, for purposes of capital budgeting decisions, the relevant costs are future costs and not the historical costs.
3. **Specific Cost and Composite Cost:** The cost of each component of capital, *i.e.*, equity shares, preference shares, debentures, loans etc., is known as specific cost, while composite cost refers to the average cost of capital, the determination of cost of each specific source of capital becomes necessary. For purposes of investment decisions, the composite cost of capital is treated as cost of capital.

4. **Average Cost and Marginal Cost:** The Average cost of capital refers to the weighted average of the costs of each specific component of capital of a firm. The weights are in proportion of the share of each component of capital in the capital structure of the firm. Conversely, marginal cost of capital is the weighted average cost of new capital raised by the firm. For purposes of capital budgeting and financial decisions, the marginal cost of capital is considered as the most important factor.

2.21 APPROACHES OF COST OF CAPITAL

The concept of cost of capital is not only useful and has considerable practical utility in finance, but it is also the most controversial topic in the theory of finance. A basic point of dispute regarding long-term financing is whether a firm's cost of capital depends upon the method and level of financing or its capital structure. There are two following important approaches of cost of capital:

1. **Traditional Approach:** This approach emphasizes that a firm's cost of capital hinges upon its capital structure, and it can change its overall cost of capital by changing debt-equity ratio. Since the cost of debt capital is cheaper due to lower rate of interest and tax-saving as compared to the cost of equity capital involving relatively higher rate of dividend and foregone tax benefit, the traditional theorists argue that the weighted average cost of capital will decrease with every increase in debt content in the total capital structure. However, the debt content in the overall structure should be maintained at a proper level because cost of debt is a fixed burden on the profits of the firm and may adversely affect the firm in periods of lower profitability. Further, if the debt content in the total capital structure is raised beyond a certain point, the investors will expect a higher rate of return on account of increase in business and financial risks.
2. **Modigliani-Millar Approach (M-M):** According to this approach, the cost is an independent factor and remains unaffected by changes in the firm's capital structure. In other words, a change in capital structure or debt-equity ratio does not affect the firm's total cost of capital. This approach is based on the reasoning that each change in the debt-equity ratio automatically off-sets change in one with the change in the other due to change in the expectation of equity shareholders. The Modigliani-Miller hypothesis, therefore, suggests that the market value of the firm and cost of capital is the same for all the firms irrespective of the proportion of debt included in the capital structure because of the arbitrage in the capital market.

Assumptions of the M-M Approach: The Modigliani-Miller Approach is based on the following assumptions:

1. **Perfect capital market:** This implies that the investors are rational persons and have full information of the capital market. They are free to buy or sell securities. They can borrow without restrictions on the same terms and conditions as the firm can, and there are no transaction or information costs.
2. **Firms can be classified in homogeneous risk classes:** Firm with identical risk characteristics may be grouped in homogeneous risk classes. Firms in each class is considered to have the same degree of business and financial risk. All firms within an industry are assumed to be within the same risk class.
3. **Same expectations of investors:** All investors expect the same net operating income which is used in evaluation of a firm. The firms distribute all of their net earnings to the shareholders.

4. **No taxes:** In the original formulation of this hypothesis, Modigliani and Miller assumed that there are no corporation taxes. This assumption has been removed later.

This approach is subject to criticisms on account of its basic assumption that capital markets are perfect. This approach applies only in an equilibrium state, but it is unrealistic to assume the existence of equilibrium position. Thus, the traditional approach is more realistic.

2.22 MEASUREMENT OF COST OF CAPITAL

As pointed out above, the cost of capital of a firm is the weighted average of the cost of each type of its capital. If the capital of a firm consists of equity shares, preference shares, debentures, loans and retained earnings, its cost of capital will be the weighted average of all these sources of financing. Thus, the first stage in the measurement of a firm's cost of capital is the accumulation of the cost of each specific type of capital, i.e., debt capital, preference share capital, equity share capital and retained earnings.

Once the cost of each specific source of capital is computed, weighted average of all these costs is calculated to determine the overall cost of capital to the firm. The weight assigned to each type of capital is the ratio of the market value of each specific component of capital in proportion to their respective shares in the total capital structure.

Problems in Determining the Cost of Capital

1. **Problems of Controversy regarding Cost Capital:** There is a major controversy whether or not the cost of capital is dependent upon the method and level of financing by the firm. While traditional theorists maintain that a firm's cost of capital depends upon its capital structure and is subject to changes in its debt equity mix, the modern theorists argue that the firm's total cost of capital is independent of its capital structure and change in debt equity mix does not affect the firm's overall cost of capital.
2. **Problem Regarding Quantification of Shareholders' Expectations:** The determination of cost of equity capital is another problem as it is considered to be the minimum rate of return expected by its equity shareholders and which will maintain the present market value of the firm's equity shares. This means that the determination of the cost of equity share capital will require the quantification of the firm's equity shareholders, which is a very difficult task because the equity shareholders value a firm's equity shares on the basis of a number of factors including financial and psychological.
3. **Problems Regarding Computation of Cost of Retained Earnings and Depreciation Funds:** Since the cost of capital through these sources will depend upon the approach followed for computing the cost of equity capital, the finance manager is confronted with the problem of selecting the appropriate approach because of controversial views regarding cost of capital.
4. **Problem of Weights:** Another problem in determining the cost of capital relates to the assignment of appropriate weights to each component of capital. The finance manager has to make a choice between the book value and the market values of each type of capital. The cost of capital will be different in each case.
5. **Problem Regarding Type of Cost:** It is argued that historical costs are not relevant for decision making purposes and only the future costs should be considered. This again creates the problem whether to consider marginal cost of capital or the average cost of capital.

It is clear from the above discussion that it is quite difficult to determine the accurate cost of capital. Since the cost of capital is one of the most crucial factors in managerial decisions, it should be estimated with a reasonable range of accuracy.

2.22.1 Cost of Debt Capital

The cost of debentures and long-term loans is the contractual rate of interest. This rate is calculated on after-tax basis because interest payments are treated as tax deductible expenses. The debt capital may be issued at par, at premium or at discount. It may be perpetual or redeemable. The technique of computation of cost of debt capital in each case is explained as follows:

NOTES

1. **Cost of Short-term Debt Issued at Par:** The short-term debt is generally raised for meeting the working capital requirements of the firm. The cost of capital in this case is the contractual rate of interest.
2. **Cost of Long-term Debt Issued at Premium or Discount:** Long-term debts are generally obtained through the issue of debentures. The issue of debentures involves a number of floatation expenses such as printing, underwriting commission, brokerage, discount etc. Moreover, debentures may be issued at premium or at discount. These floatation costs and modes of issue have important bearing on the cost of debt capital. It is, therefore, necessary to ascertain the net proceeds from such issues as the cost of debt is calculated on the basis of net proceeds realized from the issue of debentures or bonds. It is customary to compute the cost of debt capital on an after-tax basis as interest payments are treated as tax deductible expenses. However, the tax adjusted rate of interest should be used in case where the firm's earnings before interest and (EBIT) is equal to or exceeds the interest. In case the EBIT is in negative, the cost of debt should be computed before adjusting the interest rate for tax.
3. **Cost of Perpetual Debt:** The computation of the cost of perpetual or irredeemable debt is relatively easy. Perpetual debt refers to the amount of debt which is not redeemable during the life time of the firm. Further a decision to maintain a fixed amount of debt in the firm's capital structure also amounts to perpetual debt. In this case, if the old debt is redeemed, a new debt of an equal amount is raised. The coupon or nominal rate of interest is the before-tax cost of debt. Since the effective cost of debt is the tax adjusted rate of interest, the before-tax cost of debt is adjusted for the tax effect.
4. **Cost of Redeemable/Irredeemable Debt:** Debentures may be redeemable or irredeemable. There are two formulas are used to calculate the cost of debenture are as follows:

Type of debt-capital, terms of issue and floatation cost affect the computation of cost of this capital. Debt-capital is of two types:

- A. Perpetual or Irredeemable Debt
- B. Redeemable Debt.

A. **Perpetual or Irredeemable Debt:** These are the debts which are repayable only on the liquidation of the company. For calculating cost of this type of debt-capital, amount of interest payable on it is divided by the net proceeds form its issue. The formula is:

$$C_d = \frac{i}{NP} \times 100$$

where

i = Amount of Annual Interest
NP = Net Proceeds

Net proceeds of debt implies par value of debt plus premium on issue and minus its floatation cost (such as underwriting commission, brokerage, advertisement, printing charges etc.) and discount on issue.

NOTES

$$C_d = \frac{i + \frac{MV - NP}{n}}{\frac{MV + NP}{2}} \times 100$$

where,

C_d = cost of debt capital

i = annual interest payment

MV = maturity value

NP = net proceeds

n = number of years to maturity.

Alternative formula:

$$C_d = \frac{i + \frac{\text{Discount}}{n} + \frac{\text{Cost of Issue}}{n} + \frac{\text{Premium on Redemption}}{n} + \frac{\text{Premium of Issue}}{n}}{\frac{MV + NP}{2}} \times 100$$

Important Notes:

- (i) Since interest payable on debt finance is an admissible deduction in computing taxable income of a business unit, it provides tax shield to the concern in the ratio of its applicable tax rate. Hence, cost of debt capital calculated by the above formula is before tax rate. Its after tax cost will be calculated by applying the following formula:

$$\text{After-tax cost} = \text{Before tax cost} (1 - \text{tax rate})$$

- (ii) In the above example, we have assumed the debentures to have been issued at par and also redeemed at par but in practice; debentures may be issued at discount or at premium and these can be redeemed at premium. In such cases also, the same formula is applicable but maturity value and net proceeds will be adjusted accordingly.

Example 18. A company issued 10,000 ten-years 8% Debentures of ₹ 100 each at 4% discount. Under the terms of Debenture Trust, these debentures are to be redeemed after 10 years at 5% premium. The cost of issue is 2%. Assuming tax rate at 50%, calculate the cost of debt capital.

Solution:

$$NP = 10,00,000 - 40,000 - 20,000 = ₹ 9,40,000$$

$$MV = 10,00,000 + 50,000 = ₹ 10,50,000$$

$$i = 8\% \text{ of } 10,00,000 = ₹ 80,000$$

$$C_d (\text{before tax}) = \frac{i + \frac{MV - NP}{n}}{\frac{MV + NP}{2}} \times 100$$

$$= \frac{80,000 + \frac{10,50,000 - 9,40,000}{10}}{\frac{10,50,000 + 9,40,000}{2}} \times 100$$

$$= \frac{80,000 + 11,000}{9,95,000} \times 100 = 9.15\%$$

$$C_d (\text{after-tax}) = \text{Before tax cost} (1 - \text{tax rate}) = 9.15 (1 - 0.50) = 4.57\%$$

2.22.2 Cost of Preference Share Capital

The computation of the cost of preference share capital poses some conceptual difficulties as compared to the cost of debt capital. In case of debt capital, the contractual rate of interest is a legal obligation on the part of the company and constitutes the basis for calculating the cost of debt. However, there is no such obligation in case of preference shares. Although preference shares bear a fixed dividend rate and the holders of such shares have a preferential right to receive dividend as well as principal, but unlike debt there is no risk of legal bankruptcy if the company does not pay the dividend to the preference shareholders. Hence, some experts hold the view that dividends payable on preference shares do not constitute cost. However, it is not true. A number of factors make it obligatory on the part of the company to pay the stipulated dividends whenever it makes sufficient profits. This is because:

NOTES

- (i) The preference shareholders have a priority in dividend payment over the equity shareholders;
- (ii) The equity shareholders will not receive dividends unless the company pay dividends to the preference shareholders;
- (iii) The accumulation of preference dividend will prevent the equity shareholders to receive dividend as long as it remains the equity shareholders to receive dividend as long as it remains in arrears;
- (iv) The equity shareholders may even loose control of the company as non-payment of preference dividend may entitle their holders to participate in the general meeting of the company; and
- (v) The company will face difficulty in raising further equity capital on account of non-payment of preference dividend followed by non-payment of dividend to equity shareholders.

On account of the above reasons, the cost of preference share capital is computed on the basis of the stipulated rate of dividend similar to the cost of debt capital which is computed on the basis of the rate of interest. However, unlike interest payments on debt, dividend payments on preference shares are not tax deductible. Hence, there is no need for tax adjustment in calculating the affective cost of preference share capital. Again there are two types of preference shares, viz., irredeemable and redeemable.

1. **Cost of Irredeemable Preference Share Capital:** Cost of such preference shares is the ratio of annual dividend burden on each such share to its net proceeds. As per formula:

$$C_p = \frac{PD}{NP} \times 100$$

where,

 C_p = Cost of preference capital

PD = Preference dividend amount per share

NP = Net Proceeds per share

Example 19. A Ltd. issued 1,000 10% Preference shares of ₹ 100 each. Cost of issue is ₹ 2 per share. Calculate cost of preference capital if these shares are issued:

1. at par
2. at 5% premium and
3. at 2% discount.

Solution:

$$1. C_p \text{ (after-tax)} = \frac{PD}{NP} \times 100 = \frac{10}{100 - 2} \times 100 = 10.20\%$$

NOTES

$$C_p \text{ (before-tax)} = \text{After-tax cost} \left(\frac{1}{1 - \text{tax rate}} \right) \cong 10.20 \left(\frac{1}{1 - 0.50} \right) \\ = 20.40\%$$

$$2. \quad C_p \text{ (after-tax)} = \frac{10}{105 - 2} \times 100 = 9.71\%$$

$$C_p \text{ (before-tax)} = 9.71 \left(\frac{1}{1 - 0.50} \right) = 19.42\%$$

$$3. \quad C_p \text{ (after-tax)} = \frac{10}{98 - 2} \times 100 = 10.42\%$$

$$C_p \text{ (before-tax)} = 10.42 \left(\frac{1}{1 - 0.50} \right) = 20.84\%$$

2. **Cost of Redeemable Preference Share Capital:** When there preference shares are redeemable during the life-time of the company, the effective cost of redeemable preference shares is computed according to the same formula as applicable for determining the cost of redeemable debentures.

Such shares are redeemed after a specified period. Cost of such shares is calculated in the same way as discussed in the case redeemable debentures. Necessary adjustments will have to be made for terms of issue, terms of redemption and floatation charges. The following formula may be used for this purpose:

$$C_p = \frac{PD + \frac{MV - NP}{n}}{\frac{MV + NP}{2}} \times 100$$

where,

PD = amount of annual preference dividend

MV = amount to be paid on maturity

NP = net proceeds

n = number of years after which the preference shares will be repaid

Example 20. A Ltd. issued at par 10,000 10% Preference Shares of ₹ 100 each. These shares are redeemable after 10 years at a premium of ₹ 5 per share. The cost of issue is ₹ 2 per share. Find out the cost of preference capital. Assume 50% tax rate.

Solution:

$$C_p \text{ (after-tax)} = \frac{1,00,000 + \frac{10,50,000 - 9,80,000}{10}}{\frac{10,50,000 + 9,80,000}{2}} \times 100 \\ = \frac{1,00,000 + 7,000}{10,15,000} \times 100 = 10.54\%$$

$$C_p \text{ (before-tax)} = 10.54 \left(\frac{1}{1 - 0.50} \right) = 21.08\%$$

The cost equity share capital is after-tax cost which can be converted into before tax cost by applying the following formula:

$$C_e \text{ (before-tax)} = \frac{\text{After-tax cost}}{1 - \text{tax rate}}$$

2.22.3 Cost of Equity Share Capital

NOTES

The cost of equity share capital refers to the minimum rate of return that a firm must earn on the equity share capital in order to leave the market price of equity share unchanged. The computation of the cost of equity poses some conceptual problems. Since equity shares are variable dividend securities without any stipulated rate of dividend and legal obligation to pay dividend on them, the computation of cost of equity capital is a more difficult task as compared to the determination of cost of debt capital and preference capital. Some experts argue that the equity capital does not involve any cost because the payment of dividend on equity shares is not legally binding on the part of the company. However, this is not true. The company also wants to pay dividends to the equity shareholders and aims at maximizing their wealth through maximizing the market price of equity shares which ultimately depends upon the rate of dividend to equity shareholders. Thus, equity shares implicitly involve a return in terms of dividend expected by the equity shareholders and therefore, carry a cost. In fact, the cost of equity capital is the highest among all the sources of funds as these shares involve the highest degree of financial and business risks.

There are following possible approaches for calculating the cost of equity share capital as under:

1. **Dividend Price Approach:** According to this approach, the cost of equity share capital is calculated on the basis of a required rate of return in term of future dividends to be paid on equity shares for maintaining their present market price, the process of determining the cost of equity shares is the same as for calculating the before-tax cost of debt and cost of preference share capital.

This is also called as Dividend/Price Ratio Method or D/P Ratio Method. This method is based on the thinking that when an investor invests his savings in a company, he expects dividend at least at current rate of return. It is assumed that market price of an equity share is a function of the expected dividends. Hence, for finding out the cost of such shares dividend received is capitalised at the market value of the share. The formula is:

$$C_e \text{ (after tax)} = \frac{\text{DPS}}{\text{MP}} \times 100$$

where,

C_e = Cost of Equity Share Capital

DPS = Current Cash Dividend Per Share

MP = Market Price Per Share.

Example 21. A Ltd. has issued 20,000 equity shares of ₹ 100 each as fully paid. The present market price of these shares is ₹ 160 per share. The company has paid a dividend of ₹ 8 per share. Find out the cost of equity capital.

Solution:

$$C_e = \frac{\text{DPS}}{\text{MP}} \times 100 = \frac{8}{160} \times 100 = 5\%$$

2. **Dividend Price plus Growth Approach:** According to this approach the cost of equity share capital is determined on the basis of the expected dividend rate plus the rate of growth in dividend. The growth rate in dividend is assumed to be equal to the growth rate in earnings per share and market price per share.

According to this method, the yearly growth rate in dividend is added to the cost of equity capital as ascertained in accordance with D/P ratio method. The formula is:-

$$C_e \text{ (After-tax)} = \left(\frac{\text{DPS}}{\text{MP}} \times 100 \right) + G$$

NOTES

where,

C_e = Cost of Equity Share Capital

DPS = Current Cash Dividend Per Share

MP = Market Price Per Share

G = Growth Rate in Dividend (or expected annual percentage rate of increase in future dividends)

There is difficulty in the practical application of this method. It is difficult to determine the rate of growth of price appreciation expected by a shareholder.

Example 22. A company has 10,00,000 equity shares of ₹ 10 each. The company earned a net profit of ₹ 30,00,000 after tax during 2003-04, out of which 60% was distributed as dividend. Rate of growth of dividend is 2% p.a. Calculate cost of equity shares, assuming a tax rate of 50%. The market price of shares of company is ₹ 15 per share.

Solution: Working Note:

$$(1) \text{ Earning Per Share (EPS)} = \frac{30,00,000}{10,00,000} = ₹ 3$$

$$(2) \text{ Dividend Per Share (DPS)} = \frac{60\% \text{ of } 30,00,000}{10,00,000} = ₹ 1.80$$

Calculation of Cost of Equity Shares

(A) Dividend Yield Method:

$$C_e \text{ (After-tax)} = \frac{\text{DPS}}{\text{MP}} \times 100 = \frac{1.80}{15} \times 100 = 12\%$$

$$C_e \text{ (Before-tax)} = \frac{\text{After-tax cost}}{1 - \text{tax rate}} = \frac{12}{1 - 50\%} = 24\%$$

(B) Earnings Yield Method:

$$C_e \text{ (After-tax)} = \frac{\text{EPS}}{\text{MP}} \times 100 = \frac{3}{15} \times 100 = 20\%$$

$$C_e \text{ (Before-tax)} = \frac{\text{After-tax cost}}{1 - \text{tax rate}} = \frac{20}{1 - 50\%} = 40\%$$

(C) Dividend Yield + Growth in Dividend Method:

$$C_e \text{ (After-tax)} = \left(\frac{\text{DPS}}{\text{MP}} \times 100 \right) + G = \left(\frac{1.80}{15} \times 100 \right) + 2 = 14\%$$

$$C_e \text{ (Before-tax)} = \left(\frac{\text{After-tax cost}}{1 - \text{tax rate}} \right) = \frac{14}{1 - 50\%} = 28\%$$

Cost of Newly Issued Equity Shares: Cost of newly issued equity shares will be higher than the old shares because the company will have to pay flotation charges on new issue of shares which reduces the net proceeds of the issue. In such a case, for calculating the cost of such newly issued shares, earning per share (or dividend per share) will be divided by the net proceeds per share (and not market price per share). Rest is the same as for existing equity share capital. If cost of equity capital is being estimated by E/P ratio method, the formula will be adjusted as follows:

$$C_e (\text{After-tax}) = \frac{\text{EPS}}{\text{NP}} \times 100 \text{ or } \left(\frac{\text{DPS}}{\text{NP}} \times 100 \right) \text{ or } \left(\frac{\text{DPS}}{\text{NP}} \times 100 \right) + G$$

where,

EPS = Earnings Per Share; NP = Net Proceeds

3. **Earning Price Approach:** It is also called "Earning Price Ratio" Method or "Earning Yield" Method. According to this approach, it is the earning per share which determines the market price of equity shares. The earnings price approach assumes that the invested capital in a business firm is equal to the market price of shares. The cost of equity share capital according to this approach is equal to the rate which must be earned on incremental issues of equity share so as to maintain the present value of investment in fact. However, the advocates of this approach differ on earnings figure and market price for determining the cost of capital, while others recommend average earnings and average market price over the past few years. The cost of equity share capital according to this approach is calculated by using the following formula:

NOTES

$$C_e (\text{After-tax}) = \frac{\text{EPS}}{\text{MP}} \times 100$$

where

C_e = Cost of Equity Share Capital

EPS = Earnings Per Share

MP = Market Price Per Share.

Example 23. X Ltd. has issued 1,000 equity shares of ₹ 100 each as fully paid. It has earned a profit of ₹ 10,000 after tax. The market price of these shares is ₹ 160 per share. Find out the cost of equity capital before and after tax assuming a tax rate of 50%.

Solution:

$$C_e (\text{After-tax}) = \frac{\text{EPS}}{\text{MP}} \times 100 = \frac{\text{₹ } 10,000/1,000}{160} \times 100 = 6.25\%$$

$$C_e (\text{Before-tax}) = \frac{\text{After-tax cost}}{1 - \text{tax rate}} = \frac{6.25}{1 - 50\%} = \frac{6.25}{1 - 0.5} = 12.5\%$$

2.22.4 Cost of Retained Earnings

Retained earnings represent the accumulated amount of undistributed profits belonging to the equity shareholder. Retained earnings provide a major source of finance expansion and diversification projects. Financial Manager consider these funds as free of cost which is not true. The cost of retained earnings is the opportunity cost of these funds. Had the retained earnings been distributed to the shareholders, they would have reinvest them and earned a return on them. If they had reinvested these undistributed profits in the same company by purchasing its equity shares, they would have earned on these additional shares the same rate of return as they are earning on their existing shares. Thus, the cost of retained earnings is the same as the cost of equity capital. The same logic applies to the cost of depreciation funds/reserves. These reserves are also reinvested in income generating assets of the company in the same cost as that of cost of equity capital. However, retained earnings do not involve the payment of personal income-tax as well as any flotation cost as in the case of issue of equity shares. This factor makes the cost of retained earning slightly lower than the cost of equity capital. The cost of retained earnings can be calculated by using the following formula:

$$C_r = \frac{\text{DPS} (1 - T_i) (1 - B)}{\text{MP} (1 - T_c)} \times 100$$

or

$$C_r = \frac{(DPS + G)(1 - T_i)(1 - B)}{MP(1 - T_c)}$$

NOTES

where,

 C_r = Cost of Retained Earnings

DPS = Dividend Per Share

 T_i = Marginal tax rate applicable to individual shareholder

B = Brokerage Cost

MP = Present Market Price per share

 T_c = Capital Gains Tax

G = Growth rate of dividends

Notes:

1. Cost of retained earnings calculated by the above formula is after tax cost. It can, however, be converted into before tax cost by applying the following formula:

$$\text{Before-tax cost} = \frac{\text{After tax cost}}{1 - \text{tax rate}}$$

2. As there is no floatation cost of retained earnings, hence cost of retained earnings will always be less than *i.e.*, cost of equity share capital.
3. The above approach is very complicated due to tax implications. A company may have thousands of shareholders whose personal tax rate will differ significantly.

Hence, it is practically impossible to find out a single tax rate. Therefore, some experts have suggested to ignore the adjustments of income-tax and capital gains tax in computing the cost of retained earnings. If this approach is followed, costs of retained earnings and equity capital will almost be similar.

Example 24. Find out the cost of retained earnings from the information given below:

Dividend Per Share	= ₹ 10
Personal Income Tax Rate	= 30%
Personal Capital Gains Tax Rate	= 20%
Corporate Tax Rate	= 50%
Market Price Per Share	= ₹ 100
Brokerage	= 2%

Solution:

$$\begin{aligned} C_r (\text{After-tax}) &= \frac{DPS(1 - T_i)(1 - B)}{MP(1 - T_c)} \times 100 \\ &= \frac{10(1 - .30)(1 - .02)}{100(1 - .20)} \times 100 = 8.575\% \end{aligned}$$

$$C_r (\text{Before-tax}) = 8.575 \left(\frac{1}{1 - .50} \right) = 17.15\%$$

Note: If the shareholder is not in taxable limit then for him opportunity cost of retained earnings will be the whole dividend rate which he is getting on his present shares.

2.22.5 Weighted Average Cost of Capital

After determining the cost of each specific component of capital, the average cost of capital is generally ascertained on the basis of weighted average method. It is also termed as 'Composite Cost of Capital' or 'Overall Cost of Capital'. The weighted average Cost of Capital or the composite cost of capital of firm is the weighted average of the cost of each specific source of its funds. The computation of the weighted average cost of capital involves the following steps:

NOTES

- (i) Computation of relative weights to be assigned to each source of funds which is equal to its proportion in the total capital structure of the company.
- (ii) Computation of the cost of each specific type of capital and
- (iii) Multiplication of the cost of each type of capital with its weight, which will represent the weighted cost of that type of capital.
- (iv) Addition of all types of weighted cost of capital which all represent the weighted average cost of capital.

There are three major approaches to the computation of the composite or weighted average cost of capital:

1. **Book Value Approach:** In this approach to the computation of weighted average cost of capital, the book value of securities are taken as their values, and weights are assigned according to the relative proportions of different kinds of securities in the existing capital structure of the firm.
2. **Market Value Approach:** In this approach, weights are assigned on the basis of the relative proportion of each type of security in the capital structure, but the values of securities are their market values. Most of the financial analysis prefers to use market value because unlike book values will do not reflect true current values of the securities, the market values of the specific securities are closely approximate to their current values. However, there are practical difficulties in its use as it is difficult to determine the market value of securities, particularly the values of retained earnings. Moreover, the market values of the securities are subject to wide fluctuations.
3. **Marginal Cost Approach:** This approach disregards the existing capital structure and takes into account the proportion of each type of security in the total additional funds raised from the entire securities and assigns weights on this basis. The values of securities are taken to be their market values. This approach is more realistic than other approaches it takes into account the market prices of securities in the computation of cost of each type of capital and assigns the weights to each type of capital in proportion of their relative shares in the total additional funds raised from all sources. However, this approach also does not provide the exact cost of capital as an investment decision criterion. Hence, the cost of capital as an investment decision should be used only as a guideline.

Computation of Weighted Average Cost of Capital: It involves the following four steps:

1. The computation of specific costs of various sources. It has already been explained in the preceding pages in this chapter.
2. Assignment of weights to each type of funds. It is explained in detail hereafter.
3. Each specific cost is multiplied by the corresponding weight and in this way weighted cost of each source is determined.

NOTES

4. Finally, weighted cost of all sources of capital as calculated in (3) are added together to get an overall weighted average cost of capital.

This involves the determination of share of each source of capital in the total capital structure of the company. There are two approaches of assigning weights :

Historical Weights Approach: According to this approach, the relative proportions of various sources of capital to the existing capital structure are used to assign weights. The assumption of this approach is that the company's present capital structure is optimum and it will raise additional funds from various sources in proportion to their share in the existing capital structure.

Historical weights can be given on the basis of face or book value of securities or on the basis of their market value.

Book Value Weights: This is most convenient to be used. In this method proportion of each source in total capital structure is determined on the basis of the book value of securities. This is explained below.

Example 25. The capital structure of a company and its specific costs are given below. Find out simple and the weighted average cost of capital of the company.

Source	Amount	Specific cost
Long-term Debts	₹ 15,00,000	4% (after tax)
Preference Shares	10,00,000	12%
Equity Shares	20,00,000	15%
Retained Earnings	5,00,000	15%
	50,00,000	

Solution:

**Calculation of Average Cost of Capital
(using historical weights)**

Source of Capital	Amount ₹	Book Value Weights		Specific Cost Rate	Weighted Costs
		Percentage	Proportion		
Long-term Debts	15,00,000	30%	0.30	4%	1.20
Preference Shares	10,00,000	20%	0.20	12%	2.40
Equity shares	20,00,000	40%	0.40	15%	6.00
Retain Earnings	5,00,000	10%	0.10	15%	1.50
Total	50,00,000	100%	1.00	46%	11.10

Thus, weighted average cost of capital is 11.10% while simple average of cost of capital = $46\% \div 4 = 11.50\%$.

- Market Value Weights:** In this method, market value of invested capital funds of each type of security is calculated on the basis of their prevailing market values and proportion of each type of security to the total of market values of all securities is used as weight. This is theoretically more sound and appealing approach since market values of the securities closely approximate the actual rupees to be received from their sale.

However, it is more difficult to calculate the market values of a firm's sources of equity financing (i.e., preference shares, equity shares and retained earning) than to use book values. Particularly, it is very difficult to allocate a market value to the firm's retained earnings. Since

market value of preference shares and equity shares is usually higher than their book values, the weighted average cost of capital based on market value weights is typically greater than the weighted average cost based on book value weights.

Example 26. In example of Book value weight, assume market value of preference shares at 150%, equity shares and retained earnings at 160% and debentures at par, calculate average cost of capital.

NOTES

Solution:

Source of capital	Amount ₹	Market-Value Weights		Specific Cost Rate	Weighted Costs
		Percentage	Proportion		
Long-term Debts	15,00,000	21.4	.214	4	0.856
Preference Shares	15,00,000	21.4	.214	12	2.568
Equity Shares	32,00,000	45.7	.457	15	6.855
Retained Earnings	8,00,000	11.5	.115	15	1.725
Total	70,00,000	100.0	1.000	46	12.004

Thus, weighted average cost of capital is 12%

- Target Weights Approach:** If a firm has determined the capital structure which it believes most consistent with its goal of owner's wealth maximisation and it is directing its financing policies toward achievement of this "optimal" capital structure, then the use of these target capital structure weights may be appropriate. Because of the frequent fluctuations expected in the market values of the capital components these target weights are typically based upon historic book values rather than market values. Unless a firm's existing capital structure significantly differs from the optimal capital structure, the weighted average cost of capital using historic book value weights is not expected to differ greatly from the weighted average cost of capital calculated using target capital structure proportions.

Example 27. In example of Book value weight, the firm believed that its optimal capital structure is consisting of 40% debt, 10% preferred shares, 35% equity shares and 15% retained earnings, calculate weighted average cost of capital using target weights.

Solution:

**Calculation of Weighted Average Cost of Capital
(using target weights)**

Source	Target Proportions		Specific Cost	Weighted Cost
Long-term Debts	40%	.40	4%	1.60%
Preference Shares	10%	.10	12%	1.20%
Equity Shares	35%	.35	15%	5.25%
Retained Earnings	15%	.15	15%	2.25%
Total	100%	1.00		10.30%

Limitations of Weighted Average Cost of Capital: Following are the difficulties in computing the weighted average cost of capital:

1. **Determination of Weights:** The determination of weights for computing the weighted average cost of capital on the basis of book values or market values of securities poses the major problem as the cost of capital according to the book value weights and market value weights will be different. Cost of capital will be higher if computed on the basis of market value weights as compared to the cost of capital computed on the basis of book value weights.
2. **Choice of Capital Structure:** Another problem in calculating the weighted average cost of capital is the choice of capital structure from which the weights are obtained. There are three types of capital structures :
 - (i) Current or existing capital structure,
 - (ii) Marginal capital structure and
 - (iii) Optimum capital structure. Generally existing or current capital structure is regarded as the optimum capital structure which is not always correct.
3. **Other Limitations:** The weighted average cost of capital has a limited applicability and it is not relevant when :
 - (i) The company is considering radical changes in its debt policy;
 - (ii) The dividend policy of the company is being changed with a view to adjust the proportion of retained earnings.
 - (iii) The company makes significant change in its growth objectives, and
 - (iv) The company is contemplating a significant change in its capital structure involving a change in debt-equity mix.

2.23 SUMMARY

- Investment decision is concerned with allocation of funds. As financial management deals with mobilization and deployment of funds, equal importance must be given to both the functions.
- Capital expenditure decisions relate to fixed assets or long-term investments which yield a return over a period of time.
- The term 'Capital Budgeting' refers to long-term planning for making and financing proposed capital outlays.
- The basic features of capital budgeting is as follows:
 - (i) It has the potentiality of large anticipated profits.
 - (ii) It involves a relatively high degree of risk.
 - (iii) It involves a longer gestation period between the initial outlay and the anticipated returns.
- Capital expenditure decisions are of paramount significance to the firm as the future success and growth of the firm hinges heavily upon them. However, managerial decision-making in respect of investment proposals is a difficult and complicated problem.

NOTES

- Capital budgeting decisions are among the most crucial and important business decisions.
- Capital investment involves a business unit's decision to invest its current funds for adoption, disposition, modification and replacement of fixed assets, whose returns would be available only after a period of time longer than one year, hence involves an element of risk and uncertainty of returns.
- Profitability is the most decisive factor in taking decision on capital expenditure proposals. Such decisions are based on future costs and revenues.
- Capital expenditure is undertaken either for reducing current costs or for increasing the existing revenues.
- There are several methods of Evaluating Ranking the capital investment Proposals. Most of these methods evaluate investment proposals on the basis of the desired rate of return.
- Payback period refers to the time period during which a firm fully recovers its investment on a capital project.
- The Average Rate of Return (ARR) Method of evaluating investment proposals is also known as 'Accounting Rate of Return Method', or 'Unadjusted Rate of Return Method', or 'Financial Statement Method', or 'Return on Investment Method'. This method is based on accounting income instead of cash inflows.
- The Net Present Value (NPV) Method is generally considered to be the best method of evaluating capital investment proposals. This method is a variant of the present value decision criterion. It is also called the 'Excess Present Value' or 'Net Gain' Method.
- PI method is also known as Benefit-Cost Ratio (B/C Ratio). This time-adjusted capital budgeting technique is a refinement of the net present value method. It is also called 'Net Present Value Index' or 'Desirability Factor'.
- The IRR Method of project evaluation is also known as 'Time Adjusted Rate of Return Method', 'Discounted Cash Flow Rate of Return Method', 'Yield Rate Method', 'Marginal Efficiency of Capital Method', or 'Marginal Productivity of Capital Method'.
- Capital Rationing refers to the situation in which the firm has more acceptable investment proposals requiring greater amount of finance than is available with the firm.
- Risk involves situations in which the probabilities of an event is due to repetitive nature of the event. Under such situation frequency distribution of the event is used to study the future probabilities.
- Firms believe that projects with long payback period involves a high degree of risk, than those with the shorter payback period.. This technique can give better results if used in combination with a cut-off period.
- The technique of risk-adjusted discount rate suggests the variation of discount rate in correspondence with change in the amount of risks. This technique aims to discount risky projects with higher rate as compared to less risky projects.
- Certainty equivalent approach suggests to counter the risk of the projects in terms of certainty equivalents.

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- Sensitivity analysis evaluates the responsiveness of capital investment variables to changes in parameter value. It is a technique to study the changing behaviour of net present value with a change in key variable.
- Probability is the method of establishing the predictability of events from the known occurrence of past events. In capital investment planning this concept refers to the estimation of cash flows from a given project.
- "A decision-tree is a graphic display of the relationship between a present decision and future events, future decision and their consequences
- Cost of capital is an important in taking capital investment decisions.
- The term cost of capital refers to the price paid by a firm for obtaining funds from investors through insurance of a specific type of security.
- The concept of cost of capital is not only useful and has considerable practical utility in finance, but it is also the most controversial topic in the theory of finance.
- Once the cost of each specific source of capital is computed, weighted average of all those costs is calculated to determine the overall cost of capital to the firm. The weight assigned to each type of capital is the ratio of the market value of each specific component.
- The cost of debentures and long-term loans is the contractual rate of interest. This rate is calculated on after-tax basis because interest payments are treated as tax deductible expenses.
- The computation of the cost of preference share capital poses some conceptual difficulties as compared to the cost of debt capital. In case of debt capital, the contractual rate of interest is a legal obligation on the part of the company and constitutes the basis for calculating the cost of debt.
- The cost of equity share capital refers to the minimum rate of return that a firm must earn on the equity share capital in order to leave the market price of equity share uncharged.
- Cost of newly issued equity shares will be higher than the old shares because the company will have to pay floatation charges on new issue of shares which reduces the net proceeds of the issue.
- Retained earnings represent the accumulated amount of undistributed profits belonging to the equity shareholder. Retained earnings provide a major source of finance expansion and diversification projects.
- After determining the cost of each specific component of capital, the average cost of capital is generally ascertained on the basis of weighted average method. It is also termed as 'Composite Cost of Capital' or 'Overall Cost of Capital'.

2.24 REVIEW EXERCISE

1. What do you mean by capital budgeting? Discuss basic features of capital budgeting.
2. Discuss various reasons for the need of capital budgeting.
3. Write the objectives and significance of capital budgeting.
4. Explain essential components of capital budgeting analysis.

5. Write short notes on:

- (a) Limitations of capital budgeting (b) Payback-period method
(c) Average rate of return method (d) Net present value method
(e) Internal rate of return method.

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6. A company is considering whether to purchase some special machines. Management does not wish to buy the machines unless their cost can be recovered in three years. The following information is available:

- (a) Cost of the machine ₹ 3,00,000.
(b) Life of the machine 8 years.
(c) Sales revenue generated by the new machine ₹ 4,00,000 per annum
(d) Variable cost is 60% of sales.
(e) Annual fixed costs other than depreciation ₹ 15,000.
(f) Tax is at 50 %.

Based on the criterion of three years recovery period, should the special machines be purchased? Support your answer with a computation of the period of time required for the investment of ₹ 3,00,000 to be recovered. The company has adopted straight line method of depreciation.

7. XYZ Co. is proposing to make a capital investment of ₹ 3,00,000 which is estimated to produce the following profit figures after allowing for depreciation over 5 years on straight line basis:

Year 1	₹ 75,000
Year 2	₹ 75,000
Year 3	₹ 60,000
Year 4	₹ 45,000
Year 5	₹ 7,500

To undertake this programme, the company will have to issue debentures at 10% per annum. Over the past few years, the company's profits have been of the order of 22% on shareholders equity.

You are required to prepare a report for management indicating profitability of the proposal, ignore taxation

8. It is proposed to purchase an equipment costing ₹ 56,000 which will cause an excess of receipts over disbursements of ₹ 9,000 per year for 10 years, after which the equipment will have Zero salvage value. Find the rate of return:

$$.(PWF - 10 - 8\%) = 6.710; (PWF - 10 - 10\%) = 6.144$$

9. What do you mean by cost of capital? Discuss its importance.
10. Explain the various assumptions on which theory of cost of capital is based upon.
11. Explain various approaches of cost of capital.
12. Discuss various types of problems in determining the cost of capital.
13. Write short notes on:
(a) Components of cost of capital
(b) Base of cost of capital
(c) Cost of equity share capital

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14. A company issued 1,000, 10% debentures of ₹ 100 each at a premium of 5%, with a maturity period of 10 years. The cost of issue is 2%. The tax rate applicable to the firm is 50%. Find out the cost of capital.
15. A company has issued 1,00,000 equity shares of ₹ 10 each as fully paid. The present market price of these shares is ₹ 20 per share. During 2003-04, the company's divisible profit is ₹ 3,00,000. The company is maintaining a dividend payout ratio of 80%. Assuming a tax rate of 40%, calculate cost of capital after and before tax.
16. The average rate of dividend paid by X Ltd. for the last five years is 21 per cent. The earnings of the company have recorded a growth rate of 3 per cent per annum. The market value of the equity shares is estimated to be ₹ 105. Find out (a) the cost of equity share capital. (b) Determine the estimated market price of the equity shares if the anticipated growth rate of the firm rises to 5%. (c) If the company's cost of capital is 20% and anticipated growth rate is 5%, determine the market price of the share, assuming the same dividend per share.

UNIT 3: CAPITAL STRUCTURE DECISION

Structure

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- 3.1 Introduction
 - 3.1.1 Capital, Assets and Financial Structure
- 3.2 Determinants of Capital Structure
 - 3.2.1 Internal Factors
 - 3.2.2 External Factors
- 3.3 Optimum Capital Structure
 - 3.3.1 Characteristics of a Optimum Capital Structure
 - 3.3.2 Objectives and Importance of Optimum Capital Structure
- 3.4 Changes in Capital Structure
 - 3.4.1 Mode of Changes in Capital Structure
- 3.5 Approaches of Capital Structure
- 3.6 Readjustments in Capital Structure
- 3.7 Summary
- 3.8 Review Exercise

3.1 INTRODUCTION

Capital structure of a company refers to the composition of long-term sources of funds, such as ordinary shares, preference shares, debentures, bonds, long-term debts etc. It refers to the kind and proportion of securities for raising long-term funds and implies the determination of form or make-up of a company's capitalization. Some authors use capitalization and capital structure interchangeably. However, capitalization merely refers to the determination of the amount of capital needed for successful business operations, whereas capital structure is concerned with the determination of proportion of different sources of long-term funds in the capitalization of a company. It is, therefore, evident that 'capital structure' are the two different aspects of financial planning.

Some definitions of 'capital structure' are as follows:

C.W. Gerstenberg, "Capital structure refers to the kind of securities that make up the capitalization".

I.M.Pandey, "Capital structure refers to the composition of long-term sources of funds such as debentures, long-term debt, preference share capital and ordinary share capital including reserves and surpluses (retained earnings)."

3.1.1 Capital, Assets and Financial Structure

In the words of **Weston and Brigham**, "Capital structure is the permanent financing of the firm, represented by long-term debt, preferred stock and net worth and financial structure refers to the way the firm's assets are financed. It is the entire right hand side of the balance sheet."

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Thus, it becomes clear to us that capital structure refers to the make up of the total long-term capital while financial structure studies the total finance mix of the firm. It includes all types of resources whether long-term, medium-term or short-term. Thus, its scope is very wide in comparison to capital structure. On the other hand, the asset structure shows the make up of assets, i.e., utilisation aspect of finance. In nutshell, we can conclude that the assets structure shows the business risk while the financial structure indicates the financial risk. To understand these three concepts thoroughly, we consider the following Balance Sheet and calculate these values as follows:

Balance Sheet of Archna Ltd. as on 31-12-2007

Liabilities	Amount ₹	Assets	Amount ₹
Share Capital:		Fixed Assets:	
1,000 Equity Shares of ₹ 10 each fully paid	10,000	Buildings	1,00,000
500 11% Preference Shares of ₹ 100 each fully paid	50,000	Plant & Machinery	80,000
Reserves & Surplus:		Current Assets:	
General Reserve	10,000	Cash in hand	2,000
Liabilities:		Cash, at Bank	14,000
1,000 5% Debentures of ₹ 100 each fully paid	1,00,000	Bank Sundry	18,000
Sundry Creditors	30,000	Debtors Inventories	20,000
Bank Overdraft	20,000		
Bills Payable	10,000		
	2,30,000		2,30,000

$$\text{Capital Structure} = \text{Equity Share Capital} + \text{Preference Share Capital} + \text{Reserves} + \text{Debentures} = ₹ 1,70,000$$

$$\text{Financial Structure} = \text{Capital Structure} + \text{Current Liabilities, i.e., ₹ 1,70,000} + ₹ 60,000 = ₹ 2,30,000$$

$$\text{Asset Structure} = \text{Fixed Assets} + \text{Current Assets} = ₹ 2,30,000$$

3.2 DETERMINANTS OF CAPITAL STRUCTURE

The following factors must be considered while determining the capital structure of a company:

3.2.1 Internal Factors

1. **Nature of Business:** Capital structure of a company is considerably affected by the nature of its business. Public utilities, extractive, financing and merchandising enterprises are more stable in their earnings and enjoy greater degree of freedom from competition than industrial concerns. Thus, companies having stable earnings can afford to raise funds through sources involving fixed charges, while other companies have to rely heavily on equity share-capital.
2. **Regularity and Certainty of Income:** Capital structure is also affected by the regularity and certainty of income. If company expects sufficient regular income in future,

debentures and bonds should be issued. Preference shares may be issued if company does not expect regular income but it is hopeful that its average earnings for a few years may be equal to or in excess of the amount of dividend to be paid on such preference shares. If company does not expect any regular income in future, it should never issue any type of securities other than equity shares.

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3. ***Desire to Control the Business:*** The shareholders' or promoters' desire to control the affairs of the company directly affects its capital structure. If the control of the company is to be retained within few hands, a large proportion of funds are raised by issuance of non-voting right securities, such as debentures and preference shares. Thus, majority of funds are raised from public retaining the control of the company with the promoters or the existing shareholders.
4. ***Future Plans:*** Capital structure of a company is also affected by its development and expansion programs in future. For the purpose, the amount of authorized capital is kept higher so that the requisite amount may be raised at the time of need. At the outset, the company collects capital by issuing shares. Thereafter, capital structure is devised in accordance with the future development and expansion programs and the requisite capital is raised by issuing preference shares and debentures.
5. ***Purpose of Finance:*** An important factor determining the type of capital to be raised is the purpose for which capital is required. If funds are needed for some productive activity which will directly add to the profitability of the company, capital may be raised by issuing securities bearing fixed charges like preference share and debentures. Conversely, if funds are needed for such purposes as betterment, maintenance, etc., which does not directly add to the earnings of the company, retained earnings or equity share capital will be the better source of financing.
6. ***Attitude of Management:*** Capital structure of a company is also affected by the attitude of the management. Management varies in relation to skill, judgment, experience, temperament and motivation. It evaluates the same risks differently and its willingness to employ debt-capital also differ. The capital structure is, therefore, equally influenced by the age, experience, ambition, confidence and conservativeness of the management.
7. ***Trading on Equity:*** Trading on equity refers to the regular use of borrowed capital as well as equity capital in the conduct of a company's business. In other words, when a company employs borrowed capital including preference share capital in such a way as to increase the rate of return on equity shares, it is said to be trading on equity. Obviously, if the fixed rate of interest on borrowed capital or dividend on preference shares is lower than the general rate of earnings of the company, the equity shareholders will have an advantage in the form of additional dividend. Trading on equity, therefore, implies the presence of a favorable financial leverage in the company's capital structure. Thus, a company would prefer to issue debentures or preference shares having a rate of interest or dividend lower than the general rate of its earnings.
8. ***Debt Capacity and Extent of Risk:*** The use of borrowed capital becomes risky for the company after a certain extent because it would lead to increase the fixed liability of interest payment adversely affecting the company's income and reducing its liquidity. In the long-run, excessive use of borrowed funds also endangers the solvency of the company. High debt equity ratio is particularly risky for the companies with uncertain, irregular and inadequate earnings. So, the determination of debt-equity ratio of such companies should be in accordance with their debt capacity.

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9. **Cost of Capital:** Cost of capital is an important determinant of capital structure of a company. Since cost of capital directly influences the profitability and general rate of earnings, a company must select such sources of finance as would entail the incurrence of the least cost. Generally, a company must raise capital funds by borrowings when rate of interest is low, and by issuing equity shares when rate of earnings and share prices are high.
10. **Capital Gearing Ratio:** Equity shares are the foundation of capital of a company. The ratio of equity share capital to the total capital is called 'Capital Gearing'. When the ratio of equity shares is low in the total capital structure, it is called 'High Gearing'. Conversely, when the ratio of equity shares in the total capital structure of a company is high, it is called 'Low Gearing'. Stability in equity share price and goodwill of company depends on adequate capital gearing. A high capital gearing ratio encourages speculation in shares of such a company and market price of shares continues to fluctuate.
11. **Timing and Duration of Finance:** If capital funds are needed for short-term, they must be arranged through borrowings. Funds raised by issuing fixed cost securities (debentures and redeemable preference shares) can be repaid as soon as company's financial position becomes strong, however, equity share capital cannot be repaid until the company survives. On the other hand, long-term capital funds must be raised by issuing equity shares.
12. **Flexibility and Simplicity:** The capital structure must be flexible as to increase or decrease the funds as per requirements of the enterprise. Excessive dependence on fixed cost securities make the capital structure rigid because of fixed payment of interest or dividend. Thus, these sources should be kept in reserve for emergency and expansion purposes. The capital structure must also be simple, so that financial crisis may be avoided.

3.2.2 External Factors

1. **Nature and Kind of Investors:** The success of capital structure largely depends upon the psychological conditions of different types of investors. An ideal capital structure is one which suits the needs of different types of customers. Some investors prefer security of investment and stability of income, while others prefer higher income and capital appreciation. Thus, shares and debentures should be issued in accordance with the tastes and preferences of all types of customers. A company should issue different types of securities with different denominations to suit the financial status of various sections of the society.
2. **State of Capital Market:** Conditions of capital market have a direct bearing on the capital structure of a company. In times of depression, the rate of dividend on equity shares comes down and the possibilities of profit are the least. In such a situation the investors would prefer to invest in debentures and not in equity shares. Thus, debentures should be issued in times of depression. Conversely, during boom period when people have sufficient funds, any type of security can be issued to raise the requisite funds. Hence, equity shares should be issued during boom period.
3. **Cost of Capital Issue:** Capital structure of a company is also affected by the cost of capital issue. The capital structure should, therefore, be designed in such a way as to minimize the commission payable to brokers, middlemen and underwriters or the discount payable on issue of debentures and bonds. Thus, a company should raise funds by issuing different types of securities in such a way as would minimize the cost of capital issue.

4. **Present Statutes and Rules:** Capital structure is also influenced by the statutes and rules prevailing in the country. For example, Banking Companies Act restricts a banking company from issuing any type of securities other than equity shares. Similarly, Control of Capital Issues Act has fixed 4 : 1 ratio debt and equity, and 3 : 1 ratio between equity and preference share capital. Besides complying the legal restrictions, a company's capital structure is also influenced by possible changes in the law of the country. For instance, if company's income is taxed at a higher rate then directors would prefer to issue debentures because the amount of interest payable to debenture holders is deducted while computing the company's total income. It is a statutory deduction whereas dividend is not an accepted deduction.

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3.3 OPTIMUM CAPITAL STRUCTURE

It is often suggested that the financial manager should attempt to achieve an optimal capital structure in order to minimize the shareholder's wealth. Balanced or optimum capital structure refers to an ideal combination of various sources of long-term funds in such a way as to minimize the overall cost of capital and maximize the market value per share. The optimal capital structure could only be achieved when the marginal cost of each source of finance is the same. However, it is incorrect to form an opinion that there exists an ideal mix of debt and equity capital which will produce an optimum capital structure leading to the maximization of market price per share. In real life, there is no single optimal capital structure for all firms, or for the same firm from time to time depending upon a multitude of factors. The financial manager should, therefore, attempt to develop an appropriate capital structure for his firm instead of trying for an optimum 'optimal Capital Structure'.

3.3.1 Characteristics of a Optimum Capital Structure

1. **Simplicity:** A sound capital structure is one which is kept simple in the initial stage by limiting the number of issues and types securities. If the capital structure is complicated from the very beginning by issuing different types of securities, the investors hesitate to venture their investments in such a company and the company may also face difficulties in the raising additional capital structure, it is advisable to issue equity and preference shares only. Debentures and bonds should be reserved for future financial requirements of the company.
2. **Minimum Cost:** A sound capital structure should attempt to establish the security mix in such a way as to raise the requisite funds at the lowest possible cost. The cost of various sources of capital is not equal in all circumstances. Thus, the cost of every source of finance should be ascertained on the basis of weighted average cost of capital. The management should also aim at keeping the expenses of issue and fixed annual payments at a minimum to maximize the return to equity shareholders.
3. **Maximum Return:** A balanced capital structure should be devised in such a way as to maximize the profits of the corporation. With a view to maximization of return on investments the company should follow a proper policy of trading on equity so as to minimize the cost of capital.
4. **Minimum Risk:** An ideal capital structure should also possess the quality of minimum risk. Business involves various risks, such as – increase in taxes, rates of interest, costs etc., and decrease in prices and value of shares as well as natural calamities, all of which

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adversely affect the company's earnings. Thus, the corporation's capital structure should be devised in such a way as to enable it to afford the burden of these risks easily.

5. **Maximum Control:** A sound capital structure has also the quality of retaining the control of the existing shareholders on the affairs of the company. Generally, the ultimate control of a company exists with the equity shareholders who have the right to elect directors. Thus, while deciding the issue of securities due consideration needs to be given to the question of control in management. If a large number of equity shares are issued, the existing shareholders may not be able to retain control. The company should, therefore, issue preference shares or debentures to the public instead of equity shares because preference shares carry limited voting rights and debentures do not have any voting rights. Thus, the capital structure of a company should not be changed in such a way which would adversely affect the voting structure of the existing shareholders, dilute their control on the company's affairs.
6. **Flexibility:** An optimum capital should also have the quality of flexibility in it. A flexible capital structure enables the company to make the necessary changes in it according to the changing conditions. In other words, under flexible capital structure it is possible to procure more capital whenever required, or redeem the surplus capital.
7. **Proper-Liquidity:** Liquidity is necessary for the solvency of a corporation. All such debts should, therefore, be avoided which threaten the solvency of the company. Thus, a proper balance between fixed assets and current assets should be maintained. The ratio of fixed and liquid assets depends upon the nature and size of business.
8. **Conservatism:** A company should follow the policy of conservatism in devising the capital structure. This would help in maintaining the debt capacity of the company even in unfavourable circumstances.
9. **Full Utilization:** A balance capital structure is necessary for the optimum structure of a company. Both, under capitalization and over capitalization are injurious to the financial interests of a company. Thus, there should be a proper co-ordination between the quantum of capital and the financial needs of the corporation. A fair capitalization enables a company to make full utilization of the available capital at minimum cost.
10. **Balanced Leverage:** A sound capital structure should attempt to secure a balanced leverage by issuing both types of securities, i.e., ownership securities and creditorship securities. Normally, shares are issued when the rate of capitalization is high, and debentures are issued when rate of interest is low.

3.3.2 Objectives and Importance of Optimum Capital Structure

1. **Minimization of Cost:** The primary objective of a company is to maximize the shareholders' wealth. In this direction, a well-devised capital structure enables a company to raise the requisite funds from various sources at the lowest possible cost in terms of market rate of interest, earnings rate expected by prospective investors, expenses of issue etc. Minimum average cost of capital maximizes the returns to the equity shareholders as well as the market value of shares held by them.
2. **Maximization of Return:** A primary aim of every corporation is to promote the shareholders' interests. A balanced capital structure enables a company to provide maximum return to the equity shareholders of the company by raising the requisite capital funds at the minimum cost.
3. **Minimization of Risks:** A sound capital structure serves as an insurance against various business risks, such as—increase in costs, interest rates, taxes and reduction in prices.

These risks are minimized by making suitable adjustments in the components of capital structure. A balanced capital structure also enables the company to meet the business risks by employing its retained earnings for the smooth business operations.

4. **Retention of Control:** The management of a company is in the hands of directors. But indirectly, a company is controlled by equity shareholders who have right to elect directors. Since preference shares carry limited voting rights and debentures do not have any voting rights, a well – devised capital structure ensures the retention of control over the affairs of the company within the hands of the existing equity shareholders by maintaining a proper balance between voting right and non-voting right capital.
5. **Adequate Liquidity:** One of the objectives of a balanced capital structure is to maintain proper liquidity which is necessary for the solvency of the company. A sound capital structure enables a company to maintain a proper balance between fixed and liquid assets, and avoid the various financial and managerial difficulties of the company.
6. **Full Utilization:** Optimum utilization of the available financial resources is another important objective of a balanced financial structure. An ideal financial structure enables the company to make full utilization of available capital by establishing a proper co-ordination between the quantum of capital and the financial requirements of the business. Thus, a balanced capital structure helps a company in eliminating both the states of over-capitalization and under capitalization which are harmful to the financial interests of the company.
7. **Other Objectives:** In addition to the above, a balanced capital structure has also the following objectives:
 - (i) **Simplicity:** A balanced capital structure is aimed at limiting the number of issues and types of securities, thus, making the capital structure as simple as possible.
 - (ii) **Flexibility:** A balanced capital structure is devised in such a way as to make the necessary changes in it according to the changing conditions. Flexibility of capital structure enables the company to raise additional capital at the time of need, or redeem the surplus capital. Thus, the flexibility in capital structure not only helps in fuller utilization of the available capital but also eliminates the two undesirable states of over-capitalization and under capitalization.

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3.4 CHANGES IN CAPITAL STRUCTURE

Generally, the capital structure of a company is considered as permanent and static in nature. But change in capital structure becomes inevitable due to changes in economic trends. Thus, change in capital structure may be sought by the management as a means of easing tension and giving corporation a better opportunity to pursue its purposes. Following are the important reasons responsible for readjustment in the capital structure of a business corporation.

1. **Legal Requirements:** Sometimes, changes in the statutes in force make it obligatory on the part of corporations to effect the requisite changes in their existing capital structure. For instance, the Indian Companies Act, 1956 abolished the deferred shares and required the companies to have only and preference shares. Thus, companies were found to make the necessary changes in their capital structure by converting deferred shares into equity shares.

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2. **Attracting Investors:** In order to make the shares more attractive and popular amount investors, especially when the company's shares have very limited market due to high face-value subject to wide price fluctuations, the company may split its shares of high face-value into low face-value. Generally, investors prefer to invest in low face-value shares. Thus, a company has to make the necessary changes in the face-value of its shares for raising substantial share capital.
3. **Capitalization of Retained Earnings:** With the progress of a company its earnings also increase, which creates the state of under-capitalization, the company has to capitalize its reserves and surpluses by issuing bonus shares to the existing shareholders. This leads to changes in capital structure.
4. **Combination and Amalgamation:** In order to simplify the merger and amalgamation, the concerned companies are required to readjust their capital structure. In this case, the intrinsic value of shares of the concerned corporation is equalized. Obviously, this would lead to change in the capital structure of the companies.
5. **Writing-off of Assets:** Sometimes, current assets of a company are deranged due to continuous heavy losses. Similarly, the value of fixed assets comes down due to heavy reduction in their values. Under such circumstances, the company's balance sheet will display a deficit requiring adjustment of liabilities to offset the deficit of assets. This calls for an adjustment in the company's capital structure by reducing the value of shares to the real worth of the company's assets.
6. **Simplifying the Capital Structure:** Sometimes, corporations have issue a verity of securities to accommodate their development programs. As and when market conditions are favourable, the corporations consolidate such securities in order to simplify the capital structure. This results in change in capital structure.
7. **Restoration of Balance in the Financial Plan:** Where a company has excessively issued fixed cost structure i.e., debentures and preference shares which have strained the financial position of the company, the management may redeem such securities out of the proceeds of issue of equity shares as and when the market conditions are favourable. Such readjustment may restore the balance in the financial plan and reduce the strain on the financial position of the company. Thus, restoration of balance in the financial plan may also serve as a means of easing tension and giving a better opportunity to the corporation to pursue its purposes.
8. **Avoidance of Default on Debentures:** Sometimes, a company is unable to pay-off interest on debentures or principal amount on due dates. This compels the company to make certain arrangements with its bankers or debenture holders to avoid the dissolution of the company resulting from the default on debentures. Thus, change in capital structure may also be sought as a means of avoidance of default on debenture which may lead to the dissolution of the company.
9. **Funding the Accumulated Dividend:** Where a company has large accumulated dividend on preference share, it may enter into an agreement with the preference shareholders either to accept bonds or equity shares or new preference shares along with cash bonus against their claim in the accumulated balance of dividend. In accordance with the favourable market conditions, many companies reduce the rate of dividend on preference shares either by calling the old shares or issuing new shares for cash to redeem the old ones.

3.4.1 Modes of Changes in Capital Structure

The changes in capital structure of a company may be either voluntary or compulsory. Voluntary changes in capital structure are undertaken when with the expansion of business the financial

requirements of the company increase. In such a situation recapitalization or readjustment or re-construction of the company is desirable. Compulsory changes in the capital structure are made in fulfillment of the legal requirements. A brief description of the three modes of changes in capital structure is as follows:

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1. **Re-capitalization:** If a company increases or decreases its capital or brings any short of changes therein, it is known as re-capitalization. Re-capitalization is also known as re-organization. Re-capitalization may be effected by increasing or decreasing the existing capital.
2. **Re-adjustment:** Under re-adjustment, major changes in the composition of the financial plan are made. It includes change of short-term debts into long-term debts, change in rates of interest, change in the face-value of shares, capitalization of accumulated reserves, etc. Such changes in the capital structure are made by a company in order to overcome the financial difficulties and attain its objectives.
3. **Re-construction:** Re-construction implies the elimination of fictitious assets including accumulated losses and allocation thereof between various categories of shareholders and creditors, re-organization of share and debt capitals, an raising of additional funds specially for working capital. Re-construction may be internal or external. In case of external re-construction the assets of the old company are taken over by the new company in such a way as would equitably affect the interests of all the concerned parties. Based on the honest estimates of future earnings, the re-construction scheme should be fair and equitable to safeguard the interest of all the concerned parties. In the process of re-construction the entire capital structure of the existing or new company is changed. Re-construction, scheme is undertaken in order to strengthen the deteriorating financial position of the company and give it a better opportunity to pursue its purposes instead of winding up its business.

3.5 APPROACHES OF CAPITAL STRUCTURE

Different kinds of approaches are as follows:

1. Net income approach
2. Net operating income approach
3. The traditional approach
4. Modigliani-Millar approach

We will discuss here one-by-one:

1. Net Income Approach

This approach has been suggested by **Durand**. According to this approach, a firm can minimise the overall cost of capital and increase the value of the firm as well as market price of equity shares by using debt financing to the maximum possible extent. This theory states that weighted average cost of capital decreases with every increase in proportion of debt in capital structure as debt is less expensive source of financing. This theory is based on the following assumptions:

- (i) Debt is always cheaper to equity.
- (ii) There are no corporate taxes.
- (iii) The risk perception of investors is not changed by the use of debt.

The reasons for presuming debt as less expensive source of financing are:

- (a) Interest rates are usually lower than dividend rates and
- (b) Interest is a deductible expense for computing taxable income while dividend is not.

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According to this approach, overall cost of capital will decrease and the value of the firm as well as the market price of its shares will increase if the amount of equity is decreased by the issue of debentures, bonds etc. to equity shareholders. Similarly, overall cost of capital will increase and the value of the firm as well as the market price of its shares will decrease, if the amount of debt is decreased by issuing additional equity shares.

Example 1. *Mira Ltd. is expecting an annual EBIT of ₹ 10,00,000. The company has ₹ 40,00,000 in 10% debentures. The equity capitalization rate is 12.5%. The company decides to raise ₹ 10,00,000 by issue of 10% debentures and use the proceeds thereof to buy back and cancel the equity shares.*

You are required to calculate:

- (i) The total value of the firm,
- (ii) The overall cost of capital before and after the issue of fresh debentures for redeeming equity shares.

Solution:

Statement Showing Value of the Firm

	Before ₹	After ₹
EBIT	10,00,000	10,00,000
Less interest on Debentures at 10%	4,00,000	5,00,000
	6,00,000	5,00,000
Market value of Equity at 12.5%	$\frac{6,00,000 \times 100}{12.5}$	$\frac{5,00,000 \times 100}{12.5}$
	= 48,00,000	= 40,00,000
Market Value of Debt	40,00,000	50,00,000
Total Value of Firm	88,00,000	90,00,000
Overall Cost of Capital	$\frac{10,00,000}{88,00,000} \times 100$	$\frac{10,00,000}{90,00,000} \times 100$
	= 11.36%	= 11.1%

The above table shows that issuing debentures and using its proceeds in redeeming equity shares has increased the total value of the firm and reduced the overall cost of capital.

2. Net Operating Income Approach

This approach has also been suggested by **Durand**. This is just opposite of Net Income Approach. According to this approach, change in the capital structure of a company does not affect the market value of the company and overall cost of capital. It implies that whether the debt equity ratio is 50 : 50, or 25 : 75 or 75 : 25 or there is 100% equity or 100% debt, the overall cost of capital remains the same. Hence, there is nothing like optimum capital structure and every capital structure is the optimum capital structure. This theory is based on the following assumptions:

- (i) The market capitalises the value of the firm as a whole.

(ii) The overall cost of capital remains constant at every level of debt-equity mix.

(iii) There are not corporate taxes.

Example 2. Ranjan Ltd. has an EBIT of ₹ 10,00,000. The company has ₹ 40,00,000 in 10% debentures. The overall capitalization rate is 12.5%. The company decides to raise a sum of ₹ 10,00,000 through debt at 10% and uses the proceeds to pay off equity shareholders.

Calculate total value of the firm and the equity capitalization rate and prove that overall cost of capital remains unaffected by the change in debt-equity mix.

Solution:

Statement Showing Value of the Firm.

	Before increase ₹	After increase ₹
EBIT	10,00,000	10,00,000
Overall Capitalisation Rate	12.5%	12.5%
Market value of the firm at 12.5%	$\frac{10,00,000}{12.5} \times 100$	$\frac{10,00,000}{12.5} \times 100$
	= 80,00,000	= 80,00,000
Total Value of Debt	40,00,000	50,00,000
Market Value of Equity	40,00,000	30,00,000
Equity Capitalisation Rate	$\frac{10,00,000 - 4,00,000}{40,00,000} \times 100$	$\frac{10,00,000 - 5,00,000}{30,00,000} \times 100$
	= 15%	= 16.67%
EBIT - Interest		
Market Value of Equity		

Verification of Overall Cost of Capital

$$\begin{aligned} \text{Overall Cost of Capital} &= \text{Cost of Debt} \times \frac{\text{Total Debt}}{\text{Total Value of Firm}} \\ &+ \text{Cost of Equity Capital} \times \frac{\text{Market Value of Equity}}{\text{Total Value of the Firm}} \end{aligned}$$

(i) Before increase in debt equity mix

$$\begin{aligned} \text{Overall Cost of Capital} &= 10\% \times \frac{40,00,000}{80,00,000} + 15\% \times \frac{40,00,000}{80,00,000} \\ &= 5\% + 7.5\% = 12.5\% \end{aligned}$$

(ii) After increase in debt-equity mix

$$\begin{aligned} \text{Overall Cost of Capital} &= 10\% \times \frac{50,00,000}{80,00,000} + 16.67\% \times \frac{30,00,000}{80,00,000} \\ &= 6.25\% + 6.25\% = 12.5\% \end{aligned}$$

3. The Traditional Approach

The traditional approach is a compromise between the two extremes of net income approach and net operating income approach. It is also known as 'Intermediate Approach'. Initially, the value of the firm can be increased or cost of capital can be decreased by increasing debt content of capital structure as debt is a cheaper source of funds than equity. Beyond a particular point, the cost of equity increases because increasing proportion of debt increases the financial risk of

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equity shareholders. The advantage of cheaper debt is thus offset by increased cost of equity. Later, the debt also becomes costly due to increasing financial risk and in this way a point comes when the increased cost of equity can not be offset by the advantage of low cost debt and the overall cost of capital increases.

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The essence of the Traditional Approach is that in the beginning with the increase in debt funds, overall cost of capital decreases up to a particular point, after that decreasing trend of overall cost of capital stops and remains constant before going up, which can be called as the optimum capital structure, giving the minimum cost of capital.

The validity of the traditional approach has been criticised that the market value of the firm depends upon its net operating income and risk attached to it. The financing mix can neither change the net operating income nor the risk attached to it. It only changes the way in which the income of the firm is distributed between debt-holders and equity-holders. Hence, the firms with similar net operating income and risk but differing in their debt-equity mix should have the same total value.

Example 3. Compute the market value of the firm, value of shares and the average cost of capital from the following information:

Net Operating Income ₹ 2,00,000

Total Investment ₹ 10,00,000

Equity Capitalisation Rate:

- (a) If the firm uses no debt 10%
- (b) If the firm uses ₹ 4,00,000 debt 11%
- (c) If the firm uses ₹ 6,00,000 debt 12%

Assume that ₹ 4,00,000 debentures can be raised at 5% rate of interest whereas ₹ 6,00,000 debentures can be raised at 6% rate of interest.

Solution:

Computation of Market Value of Firm, Value of Shares and the Average Cost of Capital

	(a) No debt	(b) ₹ 4,00,000 5% Debentures	(c) ₹ 6,00,000 6% Debentures
Net Operative Income	₹ 2,00,000	₹ 2,00,000	₹ 2,00,000
Less: Interest	—	20,000	36,000
Earnings Available to equity shareholders	₹ 2,00,000	₹ 1,80,000	₹ 1,64,000
Equity Capitalisation Rate	10%	11%	12%
Market Value of Shares	₹ 20,00,000	₹ 16,36,363	₹ 13,66,667
Market Value of Debentures	—	₹ 4,00,000	₹ 6,00,000
Market Value of the Firm	₹ 20,00,000	₹ 20,36,363	₹ 19,66,667
Average Cost of Capital	$\frac{2,00,000}{20,00,000} \times 100$ = 10%	$\frac{2,00,000}{20,36,363} \times 100$ = 9.8%	$\frac{2,00,000}{19,66,667} \times 100$ = 10.17%

Comment: As is clear from the above calculations, ₹ 4,00,000 Debt is an optimum debt-equity mix because at this stage, the value of the firm increases and overall cost of capital decreases.

If ₹ 6,00,000 Debentures are issued, the value of the firm decrease and overall cost of capital increase due to higher rate of interest on debentures and higher equity capitalization rate.

4. Modigliani-Miller (M-M) Approach

Modigliani-Miller (MM) Approach is similar to the Net Operating Income Approach if taxes does not exist. The NOI approach is purely conceptual and does not provide operational justification for irrelevance of the capital structure in the valuation of the firm. On the other hand, M-M in their article in 1958, provide analytical sound and logically consistent behavioural justification for their hypothesis. If corporate taxes are assumed to exist, M-M hypothesis is similar to Net Income Approach.

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- (a) **In the absence of taxes:** The theory proves that the cost of capital is not affected by the changes in capital structure. The reason is that though debt is cheaper to equity but with increased use of debt, cost of equity capital increases due to increased financial risk and the advantage of low-cost debt is offset equally by the increased cost of equity. The theory further propounds that beyond a certain limit of debt, the cost of debt increases but the cost of equity increases at a decreasing rate. Here again the two costs are balanced and the over all cost of capital remains the same.

Assumptions: The M-M approach is based on the following assumptions:

1. **Perfect Capital Markets:** This means:
 - (a) The investors are free to buy and sell securities.
 - (b) The investors can borrow on the same terms on which the firm can borrow.
 - (c) The investors are well informed and they behave rationally.
 - (d) There is no transaction cost.
2. **Homogeneous Risk Classes:** The firms can be classified into homogeneous risk classes and all firms within the same class will have the same degree of business risk.
3. **Risk:** The expected earnings of all the firms have identical risk characteristics.
4. **No Taxes:** In the original formulation of their hypothesis in 1958, M-M assume that no corporate taxes exist.
5. **Full Pay-out:** All earnings are distributed to the shareholders.
6. **Cut-off Point:** The cut-off point of investment in a firm is capitalisation rate.

Arbitrage Process: The 'arbitrage process' is the operational justification of M-M hypothesis. The term "arbitrage" implies an act of buying an asset or security in one market having lower price and selling it in another market at a higher price. M-M argue that two identical firms in all respects except in their capital structures cannot for long remain different in different markets because arbitrage will take place and the investors will engage in 'personal or home-made leverage' i.e., they will buy equity of the under valued company by selling equity of the overvalued company as against the 'corporate leverage' and this will render the two firms to have the same total value.

Example 4. The following is the data regarding two companies 'X' and 'Y' belonging to the same equivalent risk class:

	Company X	Company Y
Number of Equity Shares	1,00,000	1,50,000
8% Debentures	50,000	—
Market Price per share	₹ 1.30	₹ 1.00
Profit before interest	₹ 20,000	₹ 20,000

Assuming 100% payout, you are required to explain how under Modigliani and Miller approach, an investor holding 10% of shares in company 'X' will be better off in switching his holding to company 'Y'.

Solution:

According to M-M approach, two identical firms can not have different market values. If it exists, arbitrage process will take place and the investors will engage in personal leverage as against corporate leverage. In the given problem, arbitrage process will be as follows:

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1. A will sell in the market 10% of shares in company X for

$$\frac{10}{100} \times 1,00,000 \times 1.30 = ₹ 13,000.$$

2. He will raise a loan of ₹ $\frac{10}{100} \times 50,000 = ₹ 5,000$ to take advantage of personal leverage as against corporate leverage as company Y is not using debt in its capital structure.

3. With his total amount of ₹ $13,000 + ₹ 5,000 = ₹ 18,000$, A will buy 18,000 shares in company.

Calculation of A's Gain by Switching His Holding

	₹
Present Income of A in Company X:	
Profit before interest	20,000
Less Interest on Debentures	4,000
Profit available to Equity Shareholders	<u>16,000</u>
Share of A 10% of ₹ 16,000 = ₹ 1,600	
Income of A after switching his holding to Company Y:	
Profit before interest in Company Y	<u>20,000</u>
Share of A $20,000 \times \frac{18,000}{150,000}$	2,400
Less: Interest paid on loan 8% of ₹ 5,000	<u>400</u>
Net Income of the Investor A	<u>2,000</u>

$$\text{Investor's gain in switching} = ₹ 2,000 - ₹ 1,600 = ₹ 400$$

Note: The above analysis shows that A will gain by switching his holding from Company X to Company Y. Other investors will also follow the same process. As a result there will be an increase in demand for the securities of Company Y which will lead to increase in market price of its securities. On the other hand, price of the shares of Company X will decline as a result of selling pressure of its securities. This process will continue till the total value of the two companies as well as their overall cost of capital becomes the same.

- (b) *When corporate taxes exist:* M-M recognised in their article of 1963, that the value of firm will increase or overall cost of capital will decrease with the use of debt on account of deductibility of interest charges for tax purposes. The market value of a levered firm will be greater than an unlevered firm. It will exceed by an amount equal to the levered firm's debt multiplied by the tax rate it can be expressed as follows :

$$V_l = V_u + B_t$$

where

$$V_l = \text{Value of a levered firm}$$

$$V_u = \text{Value of an unlevered firm}$$

B = Amount of Debt

t = Tax rate

The market value of an unlevered firm will be equal to the market value of its shares, i.e.,

$$V_u = \frac{\text{Profit available for equity shareholders, i.e., EBT } (L - t)}{\text{Equity Capitalisation Rate}}$$

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Thus, the optimum capital structure can be achieved by maximising debt content in the capital structure. However, if the cost of debt increases due to market imperfections, the debt should be used within limits.

Example 5. Two firms A and B are identical in all respects except the degree of leverage. Firm A has 6% Debentures of ₹ 30,00,000 while firm B has no debt. EBT of both firms is ₹ 12,00,000. The equity capitalisation rate is 10% and the corporate tax is 50%.

Compute the market value of the two firms.

Solution:

Value of Unlevered Firm B

$$\begin{aligned} V_u &= \frac{\text{Profits available for Equity Shareholders}}{\text{Equity Capitalisation Rate}} \\ &= \frac{12,00,000 \times 1 - 0.5}{10\%} = ₹ 60,00,000 \end{aligned}$$

Value of Levered Firm A

$$\begin{aligned} V_l &= V_u + B_t = 60,00,000 + (30,00,000 \times 0.50) \\ &= 60,00,000 + 15,00,000 = ₹ 75,00,000 \end{aligned}$$

Limitations of M-M Hypothesis

The Limitations of M-M Approach are as follows:

1. Rates of interest are not the same for the individuals and the firms because firms have the higher credit standing as compared to individuals.
2. Home made leverage is not perfect substitute for corporate leverage. The risk exposure to the investor is usually greater than the company because of his unlimited liability character.
3. Buying and selling of securities involve transaction costs. Hence, to earn the same return, the investor will have to invest a larger amount than his present investment.
4. The switching option for unlevered to levered firm and vice-versa is not available to all investors, particularly institutional investors, viz., L.I.C., U.T.I., etc.

3.6 READJUSTMENTS IN CAPITAL STRUCTURE

As it has been said, the changes in capital structure may be sought as a means of easing tension and the giving corporation a better opportunity to pursue its purposes. The following are the main reasons for adjustments in capital structures :

1. **To Simplify the Capital Structure:** If various issues of securities have been made at different times and it may have loaded the firm with tough terms and conditions of financing. So, to simplify the capital structure, its revision may be a necessity.

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2. **To Capitalize the Retained Earnings:** If the corporation is using cost free reserves and surpluses and it has resulted into capitalisation, the management may take steps to make them a part of equity share capital.
3. **To Reduce the Cost Burden:** If corporation has become heavy with fixed cost bearing securities resulting into a great strain on the finances of the company. The management may think it fit to redeem such debentures and preference shares and issue the equity shares in place of them. Such rearrangement can reduce the fixed obligations and make capital structure more serviceable.
4. **Making the Shares more Attractive:** The split of shares may sometimes, take place in order to make them more attractive. Investors prefer to purchase 100 shares of ₹ 10 each rather than 1 share of ₹ 1,000 each, though the amount of investment is the same.
5. **To Extinguish Deficit Balance of B/S:** Often, the changes in capital structure may be sought as means to extinguish the deficit balances against share capital. It may require reduction in the value of shares or any other arrangement.
6. **To Meet Certain Legal Requirements:** Sometimes, due to changes in financial statutes or the Companies Act, the management may be compelled to make changes in capital structures. For example, in India when deferred shares were abolished by the Companies Act, 1956, the companies changed their capital structure and deferred shares were generally converted into equity shares.
7. **To Facilitate Mergers and Integrations:** Before going to the actual merger, the different intending corporations may be required to make certain adjustment in their capital structure in order to pave the way of merger or integration.

Readjustment is considered to be a major change in composition of the financial plan whereas recapitalisation is interpreted as a single amendment of the original plan such as changing the amount of started capitalisation.

3.7 SUMMARY

- Capital structure of a company refers to the composition of long-term sources of funds, such as ordinary shares, preference shares, debentures, bonds, long-term debts etc.
- Capital structure of a company is considerably affected by the nature of its business.
- Generally, the capital structure of a company is considered as permanent and static in nature. But change in capital structure becomes inevitable due to changes in economic trends.
- The changes in capital structure of a company may be either voluntary or compulsory. Voluntary changes in capital structure are undertaken when with the expansion of business the financial requirements of the company increase.
- Modigliani-Miller (MM) Approach is similar to the Net Operating Income Approach if taxes does not exist. The NOI approach is purely conceptual and does not provide operational justification for irrelevance of the capital structure in the valuation of the firm.
- The 'arbitrage process' is the operational justification of M-M hypothesis. The term "arbitrage" implies an act of buying an asset or security in one market having lower price and selling it in another market at a higher price.

3.8 REVIEW EXERCISE

1. What do you mean by capital structure of a company? Discuss the various factors must be considered while determining the capital structure of a company.
2. Discuss various characteristics of a optimum capital structure.
3. Explain objectives and importance of optimal capital structure.
4. Discuss important reasons responsible for readjustment in the capital structure of a business corporation.
5. Write short notes on:
 - (a) Optimum capital structure
 - (b) Modes of change in capital structure
 - (c) Readjustment in capital structure
6. Discuss the Net Income Approach of capital structure.
7. Write the various assumptions of Net Operating Income Approach.
8. Discuss Modigliani - Millar (M-M) Approach with its various assumptions on which it is based.

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UNIT 4: DIVIDEND AND DIVIDEND POLICY

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Structure

- 4.1 Introduction
 - 4.1.1 Types of Dividend
- 4.2 Dividend Policy
 - 4.2.1 Objectives and Importance of Dividend Policy
 - 4.2.2 Factors Affecting Dividend Policy
- 4.3 Theories of Dividend Decision
 - 4.3.1 Theory of Irrelevance
 - 4.3.2 Theory of Relevance
- 4.4 Essentials of Sound Dividend Policy
 - 4.4.1 Company Law and Dividend Distribution
 - 4.4.2 Dividend Policy of Indian Companies
 - 4.4.3 Bonus Shares of Stock Dividend
- 4.5 Summary
- 4.6 Review Exercise

4.1 INTRODUCTION

The term 'dividend' refers to that part of divisible profits of a company, which is distributed among its shareholders. In other words, dividend is that portion of company's profit, which is distributed among its shareholders as percentage of par value of share or at a fixed rate per share according to the decision of its board of directors.

According to **Hunt**, "*Dividend is the income received by the owners of corporation which they receive in the capacity of its owners.*"

Although entire profit of the company belongs to its shareholders but equity shareholders cannot force the company to declare dividend out of the residual income left after payment of dividend to preference shareholders at a fixed rate. If additional finance is required by company for its future programmes than its board of directors can retain entire or a portion of profits for the purpose of reinvestment. In such a situation either dividend will not be declared at all or it will be declared at a very low rate. While declaring the dividend Board should keep following in mind:

Shareholders expect reasonable return in the form of dividend on their investment in shares. Reasonable rate of dividend enhance goodwill, market price of shares of and future possibilities of investment in the company. Any decrease in dividend rate adversely affects the goodwill, market price of shares of company and shareholders also feel dissatisfied.

Financial needs of company should be considered before declaring dividend. If additional finance is required in future for the expansion and modernization programmes then dividend should be declared at a lower rate. Further to strengthen the financial position of the company, the Board should follow conservative dividend policy.

4.1.1 Types of Dividend

Dividend can be classified on the basis of distribution method. Different forms of dividend are as follows:

1. **Cash Dividend:** The company whose liquidation position is sound also prefer distribution of cash dividend, it is traditional, simple and very popular form. According to section 205 of Companies Act 1956, Indian companies cannot declare dividend except in cash, although stock dividend is an exception to it.
2. **Stock Dividend:** Stock dividend can be distributed when the company does not have enough cash resources for dividend payment. In this case company does not distribute dividend in cash rather it allots new shares to shareholders for an amount equal to dividend declared without payment being received in cash. Such shares are known as bonus shares. Further, a company may make its partly paid shares fully paid without payment being received in cash in lieu of dividend declared.
3. **Bond Dividend:** A company can also distribute dividend in the form of bond or debentures. These bonds are long term. Such type of dividend is distributed only when the company is capable of bearing the increased burden of interest on bonds, debentures. Sometimes promissory notes are given in lieu of dividend and interest may also pay on such notes. This is known as scrip dividend. Scrips are usually short-term. Usually such scrips are of short period, payable generally within a period of six months.
4. **Property Dividend:** Dividend can also be paid in the form of property instead of cash. Securities of other companies and government can also be distributed as dividend among the shareholders. This form of dividend payment is rarely opted by companies because this form of dividend is usually uncomfortable to the shareholders.
5. **Composite Dividend:** When the dividend is paid partly in cash and partly in the form of property then it is known as composite dividend.
6. **Optional Dividend:** Instead of paying composite dividend, if the company gives option to its shareholders either for cash dividend or for property dividend then it is called optional dividend. Usually shareholders prefer cash dividend.
7. **Interim Dividend:** Usually the company declares dividend at the end of financial year. In such a case it is called regular dividend. A company pays interim dividend for the current year before the accounts for that period have been closed. Such dividend is paid when the company has heavy earnings during the year. Sometimes such dividend is declared to affect favorably the total conditions of capital market. Interim dividend can be paid if authorized by the Articles. It is to be noted that the directors have the right to cancel the declared interim dividend before it is actually paid off.
8. **Extra or Special Dividend:** When the management of company do not want to make frequent changes in the regular rate of dividend but company is having good amount of profits or undistributed reserves then they can declare extra or special dividend. This dividend is usually paid separately with the regular dividend. Thus, special dividend is an abnormal and non-recurring form of dividend payment.

Special Note: Section 205 (3) of Companies Act 1956 prohibit payment of dividend in any form other than cash. But distribution of dividend by issue of bonus shares by capitalization of profits is an exception to it.

4.2 DIVIDEND POLICY

The term 'Dividend Policy' refers to the policy regarding quantum of profits to be distributed as dividend. Dividend is that part of a company's divisible profits which is distributed among its shareholders as they return on their shareholdings. The concept of dividend policy implies that companies through their Board of Directors evolve a pattern of dividend payment which has a bearing on future action.

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4.2.1 Objectives and Importance of Dividend Policy

Dividend Decisions are of crucial significance to the maximization of shareholders' wealth and the firm. The most important aspect of dividend policy is to determine the amount of profit to be distributed among shareholders and the amount of profit to be retained in the business for financing its long-term financing and the wealth of shareholders as there is a reciprocal relationship between the cash dividend and retained earnings. Thus, while evolving a Dividend Policy, the Corporate Management will be guided by the following three Objectives:

1. **Adequate Provision of Funds:** Since dividend policy has a direct bearing on retained earnings of a company, the first objective of its dividend policy should be to ensure that retained earnings are sufficient enough to finance the investment requirements of the company.
2. **Return to Shareholders:** The second objective of dividend policy should be to ensure a reasonable rate of return to shareholders on their investment in the form of dividend in order to satisfy their desire for current income and develop their confidence in the company's successful operations.
3. **Maximization of Shareholders Wealth:** The third objective of a company's dividend policy should be to maximize the shareholders' wealth in the long-run through retention of earnings and their investment in profitable projects.

4.2.2 Factors Affecting Dividend Policy

The management of every company attempts to distribute a reasonable dividend to the shareholders. But they are not successful in doing so, because a number of factors may restrict them from regular payment of dividend at a reasonable rate to the shareholders. The various internal and external factors affecting the Dividend Policy of a company are as follows:

Internal Factors

1. **Nature of Business:** The nature of a company's business affects its dividend policy. Companies with regular and definite earnings such as public utilities can follow a stable dividend policy. On the other hand, companies with fluctuating earnings can not follow a stable dividend policy.
2. **Age of Company:** Dividend Policy is also influenced by the age of a Corporation. A newly established company may require much of its earnings for its expansion and development purposes and cannot distribute reasonable dividend to the shareholders regularly. Thus, they may follow a rigid dividend policy. On the other hand, well established old companies may regularly distribute a reasonable dividend to the shareholders by adopting a stable Dividend Policy.
3. **Liquidity Position:** Liquidity Position of the company is also an important determinant of the Dividend Policy to be followed by the management, because the payment of dividends results in cash outflow from the company. Companies with insufficient cash resources and unsatisfactory overall liquidity position cannot pay dividend in cash or at a higher rate. Conversely, companies with sufficient cash resources and strong liquidity position can pay cash dividend to the shareholders at a reasonable rate.
4. **Need for Additional Capital:** Financial needs of the company also affect its dividend policy because a part of its divisible profits may be retained for strengthening the financial position of the company. Of course, the financial needs of the company may be indirect

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conflict with the desire of the shareholders to receive large dividends, but it is prudent to retain a large part of divisible profits for meeting the current financial requirements of the company than the desire of the shareholders. In order to maximize the shareholders' wealth, it is desirable to retain earnings in the business only when profitable investment opportunities exist. Thus, companies requiring more additional working capital for expansion and development programs, a rigid dividend policy will be adopted. Small and new companies find it difficult to raise additional working capital, and so they retain a big part to their profits and distribute dividends at low rates.

5. **Desire of Shareholders:** Although the directors have considerable liberty in respect of the disposal of the company's divisible profits for various purposes, but they can not overlook the desire of shareholders while deciding about the dividend policy. The shareholders expect a reasonable return on investment regularly and an increase in the market value of shares held by them. If the management does not distribute dividends to respect the desire of shareholders, it will be difficult for the company to raise additional capital in future. Thus, shareholders desire influence the Dividend Policy.
6. **Nature of Ownership:** The nature of ownership also influences the dividend decisions. A closely held company with ownership in the hands of a limited number of persons may adopt a conservative dividend policy with the assent of the shareholders because ploughing back of a large part of profits will ultimately increase the benefits of the existing shareholders only. But, if the number of shareholders of a company is very large and widely scattered, the company will face a great difficulty in securing such assets as they may insist on the distribution of higher dividend in cash immediately. In this case, the company will have to adopt a liberal Dividend Policy.
7. **Desire of Control:** Dividend Policy is also affected by the desire of shareholders or the management to retain control over the company. Issue of new shares for procuring additional funds will inevitably dilute the control of the existing shareholders over the company. In case of strong desire for control, the additional funds for profitable investment opportunities shall be mobilized by retaining sufficient earnings, and the company will follow a rigid Dividend Policy.
8. **Dividend Policies of Other Companies:** Dividend Policy of a company is also influenced by the dividend policies of the competing companies. The current rate of dividend should be around the average past rate of dividend. Other thing being equal, a company would never like to pay dividends at a lower rate than that paid by the rival companies.
9. **Redemption of Debts:** Company can redeem its part debts either by taking fresh loans or by retention of its earnings at a high rate. If the second alternative is adopted by the management, a large part of company's divisible profits will have to be retained for this purpose. Obviously, it will lower down the rate of dividend and the company will have to adopt a rigid dividend policy. Sometimes, the creditors may also restrict the company from the dividend distribution so long as their loan is outstanding.
10. **Access to the Capital Market:** Where the liquidity position of a company is not good still it can distribute dividends if it has access to the capital market for raising additional funds. Well established large firms usually have better access to the capital market and can adopt a liberal and stable dividend policy. Small and new companies, on the other hand, depend on their internal resources, i.e., retained earnings, as they find it difficult to raise the additional funds from external sources.
11. **Investment Opportunities:** The dividend policy has the affect of dividing a company's divisible profits into two parts, namely, retained earnings and dividends. Retained

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earnings provide funds for financing the company's long-term growth whereas cash dividends involve the use of available funds of the company. Since retaining of divisible profits belonging to the shareholders has cost equal to the external sources of financing, the management retains a large part of it so long as sufficient profitable investment opportunities are available. Where the company has no profitable investment opportunities, it distributes the divisible profits and retained earnings by way of cash dividends. Thus, availability of profitable investment opportunities also influences the dividend policy.

12. **Financing Policy of the Company:** Dividend Policy is also influenced by the Financing-Policy of the company. If the company decides to finance the development and expansion program through retention of earnings, it will have to pay lower dividend. However, if the company feels that external borrowing is cheaper than internal financing, it may decide to pay higher dividends. Thus, financing policy of the company determines its dividend policy.

External Factors

1. **General State Economy:** The general economic conditions of the economy affect significantly the management decision to retain or distribute the company's earnings. In case of uncertain economic and business conditions, the management may retain the whole or a large part of the companies' profits to build up reserves to absorb shock in future. Similarly, the management may also retain a large part of its earnings in period of depression in order to preserve the company's liquidity position. The management may also not be liberal in dividend payments in periods of prosperity when the earning power of the company warrants it because of a availability of larger profitable investment opportunities. In periods of inflation, the management may also withhold dividend payments in order to retain a large part of the earnings for replacement of worn-out assets.
2. **Legal Restrictions:** The dividend policy of companies is also conditioned by the provisions of the Companies Act which puts several restriction regarding payments and declaration of dividends. Moreover, companies are required to provide for depreciation on assets and transfer a certain prescribed percentage of net profits to the reserves before declaring dividend on shares. It is provided that dividends can only be paid out of current and accumulated profits of the company. Likewise, the Indian Income Tax Act also lays down certain restrictions on payment of dividends. The management has to take into consideration all the legal restrictions while determining the dividend policy of the company otherwise it may be declared as ultra virus.
3. **State of Capital Market:** In case of favorable capital market conditions when funds may be raised from different sources without much difficulty, the management of company may follow a liberal dividend policy. However, if capital market conditions are unfavourable for raising funds, the management should follow a conservative Dividend Policy.
4. **Change in Government Policies:** The Profit earning capacity of companies are widely affected by the change in fiscal, industrial, labour, control and other Government Policies. Sometimes, Government restricts the distribution for divided beyond a certain percentage in a particular industry as was done by the Government of India in July 1974.
5. **Taxation Policy:** The tax policy followed by the Government also affects the dividend policy. High taxation reduces the earnings of companies as a result of which the rate of

dividend is lowered down. Sometimes, Government levies dividend tax on distribution of dividend a certain limit. Likewise, the Government may give tax incentives to companies retaining a large part of their profits. In such a case, the management may be inclined to retain a large part of profit's and follow a conservative Dividend Policy.

6. **Contractual Responsibility:** Sometimes dividend policy is also influenced by the contractility of the company in respect of loans taken from financial agencies. The tenders of the company generally put restrictions on dividend payments to protect their interests in case the firm is experiencing liquidity or profitability problems. The loan agreement may restrict the company from declaring dividend until a certain level of earnings has been achieved, or paying cash dividends beyond a certain amount or percentage of profits until the entire amount of loan is refunded.
7. **Public Opinion:** Public Opinion also affects the dividends policy. Companies which distribute dividends at a very high rate are generally criticized in all sections of the society. Consumers demand for curtailment in price of goods produced by the company and employees of the company demand for increased wages and salaries. Thus, the management has also to consider the public opinion while determining the dividend policy of the company.

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4.3 THEORY OF DIVIDEND DECISION

4.3.1 Theory of Irrelevance

According to this approach the retained earnings can be used only when sufficient opportunities are available for investments or distribute the entire profits to equity shareholders. Therefore, it is a financial decision and does not influence the market value of the shares. Thus, the decision to pay dividends to retain the earnings may be taken as a residual decisions.

Modigliani and Miller Approach (MM Approach)

According to Modigliani and Miller, dividends are irrelevant to the value of shares (and firm) because it does not affect the wealth of shareholders. The value of the firm depends on the firm's earnings from its investment policy. The dividend decision is of no significance in determining the value of the firm.

1. **Assumption:** There is a perfect capital market in which all investors are rational. Information is available to all free of cost. There are not transaction costs. Securities are infinitely divisible. No investor is large enough to influence the market price of securities. There are no flotation costs.
2. **No Taxes:** There are no taxes or there are no differences in tax rates applicable to capital gains and dividends.
3. **Fixed Investment Policy:** Every firm has a given (fixed) investment policy which does not change. Financing of new investments out of retained earnings will not change the business risk complexion of the firm and therefore, is no change in the required rate of return.
4. **Perfect Knowledge:** There is perfect knowledge with every investor as to future investments and profits of the firm. They are able to fore cast future prices and dividends with certainty.

The Arbitrate Argument

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The crux of MM theory is the arbitrate argument. Arbitrate refers to entering simultaneously into two transactions which balance or completely offset each other. These are the acts of paying out dividends and raising external funds to finance investment programs. Between dividend and retention of earnings, the investors would be indifferent mainly due to the balancing nature of internal financing (retained earnings) and external financing (raising of funds externally) consequent upon distribution of earnings to finance investment programmes.

This can be expressed symbolically as follows:

$$P_0 = \frac{D_1 + P_1}{1 + K_e}$$

where,

P_0 = Prevailing market price of a share or market price per share at the beginning of the period.

K_e = Cost of equity capital or rate of capitalisation

D_1 = Dividend per share at the end of period one

P_1 = Market price of a share at the end of period one.

The following equation can be derived for determining the value of P_1 .

$$P_1 = P_0(1 + K_e) - D_1$$

Computation of the Number of New Shares to be Issued

The investment programme of a firm, in a given period of time, can be financed either by retained earnings or by issue of new shares or both. The number of new shares to be issued can be determined by the following equation:

$$m = \frac{I - (X - nD_1)}{P_1}$$

where,

m = Number of new shares to be issued

P_1 = Price at which new issue is to be made

I = Amount of investment required

X = Total net profit of the firm during period

nD_1 = Total dividends paid during the period.

Calculation of Value of Firm According to M.M. Model

The value of the firm can be ascertained with the help of the following formula:

$$nP_0 = \frac{(n + m)P_1 - (I - X)}{1 + K_e}$$

where,

m = Number of shares to be issued.

I = Investment required.

X = Total earnings of the firm during the period.

P_1 = Market price per share at the end of the period.

K_e = Cost of equity capital.

n = number of shares outstanding at the beginning of the period.

D_1 = Dividend to be paid at the end of the period.

nP_0 = Value of the firm.

According to M.M. Model, the dividend policy of a firm is irrelevant as it does not affect the value of the firm. *Dividend and Dividend Policy*

Example 1. A company belongs to a risk class for which the capitalisation rate is 25%. Its total number of existing shares are 1,00,000 at selling price of ₹ 40 each. The company is thinking to declare dividend of ₹ 2.50 per share at the end of the current year. Using the Modigliani and Miller Model and assuming no taxes, answer the market price of equity share at the end of the year, when

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- (i) Dividend is declared and
 (ii) Dividend is not declared. Explain that whether dividend is paid or not, the wealth of equity shareholder is equal.

Solution. Given: $P_0 = ₹ 40$, $D_1 = ₹ 2.50$, $K_e = 25\%$ or 0.25 , $P_1 = ?$

- (i) If dividend is declared:

$$\begin{aligned} P_1 &= P_0 (1 + K_e) - D_1 \\ &= 40 (1 + 0.25) - 2.50 = 50 - 2.50 = ₹ 47.50 \end{aligned}$$

- (ii) If dividend is not declared:

$$\begin{aligned} P_1 &= P_0 (1 + K_e) - D_1 \\ &= 40 (1 + 0.25) - 0 = 50 - 0 = ₹ 50 \end{aligned}$$

Conclusion: It can be observed that whether dividend is paid or not the wealth of equity shareholders is equal as under.

- (i) **When dividend is paid:** Equity shareholders will get ₹ 47.50 from share's price & ₹ 2.50 as dividend i.e., $= ₹ (47.50 + 2.50) = ₹ 50$
 (ii) **When dividend is not paid:** Equity shareholders will get ₹ 50 from share's market price & gets no dividend i.e., $= ₹ (50 + 0) = ₹ 50$

Example 2. Meerut Syntex Limited belongs to a risk class for which the appropriate capitalisation rate is 10%. It currently has outstanding 50,000 shares of ₹ 10 each. The firm is contemplating the declaration of dividend at ₹ 0.60 per share at the end of the current financial year. The company expects to have a net income of ₹ 50,000 and has a proposal for making new investments of ₹ 1,00,000. Show that under the M.M. hypothesis, the payment of dividend does not affect the value of the firm.

Solution.

(A) **Value of the firm when dividends are paid**

- (i) Price of the share at the end of the current financial year

$$\begin{aligned} P_1 &= P_0 (1 + K_e) - D_1 \\ &= 10 (1 + 0.10) - 0.60 \\ &= (10 \times 1.10) - 0.60 \\ &= ₹ 10.40 \end{aligned}$$

- (ii) Number of shares to be issued

$$\begin{aligned} m &= \frac{I - (X - nD_1)}{P_1} \\ &= \frac{1,00,000 - [(50,000)] - (50,000 \times 0.60)}{10.40} \end{aligned}$$

$$= \frac{80,000}{10.40} = 7,700 \text{ (Approx)}$$

(iii) Value of the firm

$$\begin{aligned} nP_0 &= \frac{(n+m)P_1 - (I-X)}{1+K_e} \\ &= \frac{\left(50,000 + \frac{80,000}{10.40}\right) \times 10.40 - (1,00,000 - 50,000)}{1+0.10} \\ &= \frac{(5,20,000 + 80,000) - (50,000)}{1+0.10} \\ &= \frac{6,00,000 - 50,000}{1.10} = \frac{5,50,000}{1.10} = 5,00,000 \end{aligned}$$

(B) Value of the firm when dividend are not paid

(i) Price per share at the end of current financial year

$$\begin{aligned} P_1 &= P_0(1+K_e) - D_1 \\ &= 10(1+0.10) - 0 = 10 \times 1.10 = ₹ 11 \end{aligned}$$

(ii) Number of shares to be issued

$$\begin{aligned} m &= \frac{I - (X - nD_1)}{P_1} \\ &= \frac{1,00,000 - (50,000 - 0)}{11} \\ &= \frac{50,000}{11} = 4,545 \text{ (Approx)} \end{aligned}$$

(iii) Value of the firm

$$\begin{aligned} nP_0 &= \frac{(n+m)P_1 - (I-X)}{1+K_e} \\ &= \frac{\left(50,000 + \frac{50,000}{11}\right) \times 11 - (1,00,000 - 50,000)}{1+0.10} \\ &= \frac{(5,50,000 + 50,000) - (50,000)}{1+0.10} \\ &= \frac{5,50,000}{1.10} = ₹ 5,00,000 \end{aligned}$$

Since the value of the firm in both the cases (*i.e.*, when dividends are not paid and when paid) is ₹ 5,00,000. It can be concluded that the payment of dividend does not affect the value of the firm.

Criticism

M.M.'s Hypothesis assumptions are unrealistic. Its validity is open to question on two counts:

- (i) Imperfection of capital market, and
- (ii) Resolution of uncertainty. It is wrong to presume that there are no taxes, flotation costs do not exist and that there is absence of transaction costs.

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4.3.2 Theory of Relevance

According to this theory, the dividend decision directly influences the value of the firm. If a firm has higher returns than the cost of equity, then it has the opportunity of investing finance for expansion and diversification, can keep certain amount of profits in the form of retained earnings. This method of financing increases the value of the firm or increases earnings per share.

If a firm's returns are equal to the cost of funds which are also known as normal firms, the dividend decisions and the decisions as the retained earnings does not have any bearing as the market value of shares.

If the firm's returns are less than the cost of funds, the dividend pay out ratio should be more to gain higher market value of shares otherwise, investors may prefer to have their investments on same other opportunities which would directly affect the EPS.

1. Walter's Model

Walter's model supports the theory that dividends are relevant. The choice of dividend policies affects the value of enterprise because it maximizes the wealth of shareholders. The investment policy of a firm can not be separated from its dividend policy and both are, inter linked. The choice of an appropriate dividend policy affects the value of an enterprise.

Assumptions

1. All the financing is done through retained earnings and external sources of funds like debt or new equity capital are not used.
2. With additional investments undertaken, the firm's business risk does not change. It implies that firm's internal rate of return 'R' and its cost of capital 'K' are constant.
3. The firm has a very long or perpetual life.
4. All earnings are either distributed as dividends or internally retained.
5. There is no change in the key variables, namely beginning earnings per share (E) and dividend per share (D)..

The Key Arguments

Key argument in support of this model is the relationship between the return on a firm's investment of its internal rate of return (r) and its cost of capital or the required rate of return (K). The firm would have an optimum dividend policy which will be determined by the relationship of r and k . If the return on investments exceeds the cost of capital, the firm should retain the earnings. On the contrary, It should distribute the earnings to the shareholders if the required rate of return exceeds the expected return on the firm's investments. If a firm has adequate profitable investment opportunities, it will be able to earn more than what the investors expect so that $r > K$. Such firms are called 'growth firms' who should plough back the entire earnings with in the firm. If a firm does not have profitable investment opportunities (When $r < k$) the entire earnings should be distributed as dividend.

Walter's view on the optimum dividend payout ratio can be summarised as follows:

- (i) *Growth Firm: Internal Rate more than Opportunity Cost of Capital ($r > c$):* Growth firms are those firms which expand rapidly because of ample investment opportunities yielding returns higher than the opportunity cost of capital. These firms are able to reinvest earnings at a rate (r) which is higher than the rate expected by shareholders (c). They will maximise the value per share if they follow a policy of retaining all earnings for internal investment. In other words, in such a case optimum pay-out ratio would be zero.

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- (ii) **Declining Firms** : Internal Rate less than Opportunity Cost of Capital ($r < c$): On the contrary, when $r < c$, it indicates that a firm does not have profitable investment opportunities to invest their earnings. They are known as declining firms. In this case, rate of return from new investment (r) is less than the required rate of return or opportunity cost of capital (c), and as such, retention is not at all profitable. The investors will be better-off if earnings are paid to them by way of dividend and they will earn a higher rate of return by investing such amounts elsewhere. For such firms the optimum pay out ratio would be 100% and the firms should distribute the.
- (iii) **Normal Firms** : Internal Rate Equals Opportunity Cost of Capital: Most of the firms do not have unlimited surplus-generating investment opportunities, yielding returns higher than the opportunity cost of capital. After exhausting super-profitable opportunities, these firms earn on their investments a rate of return that is equal to the cost of capital i.e., $r = c$. Such firms are termed as normal firms.

Walter's Formula for Determining the Value of a Share

Prof. Walter has given the following formula to ascertain the market price of share:

$$P = \frac{DPS + \frac{r}{c}(EPS - DPS)}{c}$$

where,

P-Theoretical market value of the company's equity shares

DPS-Dividend per share

r-Internal rate of return on investment

c-Rate of capitalization in the market

EPS-Earning per share

Example 3. From the following information supplied to you, ascertain whether the firm's dividend payout ratio is optimal according to Walter. The firm was started a year ago with an equity capital of ₹ 10 lakh.

Earnings of the firm	₹ 1,00,000
Dividend Paid	₹ 75,000
Price-earnings ratio	12.5

Equity Share Capital : 10,000 shares @ ₹ 100.

The firm is expected to maintain its current rate of earnings on investment.

- (i) What should be the price-earnings ratio at which the dividend payout ratio will have no effect on the value of the share?
- (ii) Will your decision be changed if the P/E ratio is 8, instead of 12.5?

Solution.

$$\therefore \text{EPS} = \frac{₹ 1,00,000}{10,000 \text{ shares}} = ₹ 10.$$

$$\text{We know that P/E Ratio} = \frac{\text{Market Price}}{\text{EPS}}$$

$$\therefore \text{Market Price} = \text{P/E Ratio} \times \text{EPS} \\ = 12.5 \times 10 = ₹ 125$$

$$\therefore \text{Rate of Capitalisation in the market (C):} \\ = \frac{\text{EPS}}{\text{Market Price}} \times 100 = \frac{10}{125} \times 100 = 8\%$$

Internal rate of return on investment (r):

$$= \frac{1,00,000}{10,00,000} \times 100 = 10\%$$

$$\text{Dividend Payout Ratio} = \frac{75,000}{1,00,000} \times 100 = 75\%$$

Market Price per share when D/P ratio is 75%.

$$\begin{aligned} P &= \frac{\text{DPS} + \frac{r}{C}(\text{EPS} - \text{DPS})}{C} \\ &= \frac{(75\% \text{ of } ₹ 10) + \frac{10\%}{8\%}(10 - 7.50)}{8\%} \\ &= \frac{(7.50) + (1.25)(2.50)}{8\%} \\ &= \frac{7.50 + 3.125}{8\%} = \frac{10.625}{8\%} = \frac{10.625 \times 100}{8} = ₹ 132.81 \end{aligned}$$

In this problem $r > c$, 75% dividend payout ratio is not optimal. The zero percent dividend payout ratio would be optimum, as at this payout ratio, the value of the share would be maximum. This is shown in the following calculations:

$$\begin{aligned} P &= \frac{0 + \frac{10\%}{8\%}(₹ 10 - 0)}{8\%} = \frac{(1.25 \times 10) \times 100}{8} \\ &= ₹ 156.25 \end{aligned}$$

(i) According to Walter if $r = c$ then there will be no effect on the value of the share. As $r = 10\%$, so P/E Ratio of $100/10 = 10$ times would have no effect on the value of the share.

(ii) If P/E Ratio = 8

∴ Rate of capitalisation in the market (C) = $\frac{1}{8} \times 100 = 12.5\%$

In this situation $C (12.5\%) > r (10\%)$, the 100% dividend payout ratio would maximise the value of the share. It is evident from the following:

$$P = \frac{₹ 10 + \frac{10\%}{12.5\%}(₹ 10 - ₹ 10)}{12.5\%} = \frac{10 \times 100}{12.5} = ₹ 80$$

Weaknesses

Though Walter's model of share valuation is useful in explaining the effect of dividend policy on value of shares under different circumstances and assumptions, it has the following weaknesses:

1. That ' r ' is constant is not a realistic assumption because when increased investments are made by the firm, r also changes. Thus, this model becomes in-operative.
2. By assuming k to be constant, it ignores the effect of risk on the value of the firm.
3. The Firm's investments are financed exclusively by retained earnings and no external financing is used. It is an unrealistic assumption.

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Conclusion

If the cost of funds is less than Rate of Return, firm should retain its profit for further investments of growth. As the growth firm can exploit more returns and provide these value to shareholders.

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If the cost of funds is higher than Rate of Return, firm should declare high dividend to maintain high returns to equity shareholders.

If the cost of funds is equal to Rate of Return, dividend payout does not affect the market values of shares.

2. Gordon's Model

According to Gordon's Model dividends are relevant and dividend policy affect's the value of the firm. The financial manager can use the relationship of dividend policy and the market value of the firm to determine how should be retained or paid out and can also ascertain its subsequent effect on market price.

Assumptions

1. The firms are in all equity firm. No external financing is used and investment programmes are financed exclusively by retained earnings.
2. The internal rate of return r and appropriate discount rate k for the firm are constant.
3. The firm has perpetual life and its stream of earnings is perpetual.
4. The corporate taxes do not exist.
5. The retention ratio, once decided upon, is constant. Thus, $(g - br)$ the growth rate is also constant.
6. $K < br$. If this condition is not fulfilled, the firm cannot get a meaningful value for the share.

Comparison to Water's Model

Gordon's model contents that dividend policy of the firm is relevant and that investors put a positive premium on current incomes/dividends. He argues that dividend policy affects the value of shares even in a situation in which the return on investments of a firm is equal to the required/capitalization rate (i.e., $= K_p$). On the other hand, Walter's model is of the view that the investors are indifferent between dividend and retention.

Crux of Arguments

The crux of Gordon's arguments is that investors are risk averse and they put a premium on a certain return and discount/penalize uncertain returns. The investors are rational and on the want to avoid risk which means the possibility of not getting a return on investment the payment of current dividends which removes any chance of risk. If the firm retains the earnings and current dividends are withheld the investors can expect to get a dividend in future. Both with respect to the amount as well as the timing the future dividend is uncertain. The national investors can be expected to prefer current dividend and discount future dividends. As compared to current dividend they would place less importance on future dividends. If the earnings are retained, the market price of the shares would be adversely affected.

Bird in the House Argument

The above argument under Gordon's model of dividend relevance has been described as a bird in the hand argument. It is based on the logic that what is available at present is preferable to what may be available in the future. Basing his model on this argument, Gordon argues that the

future is uncertain and the more distant the future, the more uncertain it is likely to be. If current dividends are withheld to retain profits it is uncertain whether the investor would at all receive them later. Investors would naturally like to avoid uncertainty. They would be inclined to pay a higher price for shares on which current dividends are paid. Conversely, they would discount the value of shares of a firm which postpones dividends. The discount rate changes with the retention rate or the level of retained earnings.

According to Gordon, the market value of a share is equal to the present value of future streams of dividends.

Gordon's formula for Determining the Value of a Share at the beginning of year:

$$P = \frac{E(1-b)}{(k-br)}$$

where,

P - Value of equity shares

E - Earning per share

b - Retention Ratio Or Percentage of Earnings Retained

(1 - b) = D/P ratio i.e., percentage of earnings distributed as dividend

r = Rate of return earned on investments made by the firm

br - Growth rate of earnings and dividends

k - Cost of Capital Or Capitalisation Rate Or Rate of Return required by shareholders

Implications of Gordon's Model

1. When the rate of return of firm on its investment is greater than the required rate of return, i.e., when $r > k$, the price per share increases as the dividend payout ratio decreases. Thus, growing firm should distribute smaller dividends and should retain maximum earnings.
2. When the rate of return is equal to the required rate of return, i.e., when $r = k$, the price per share remains unchanged and is not affected by dividend policy. Thus, for a normal firm there is no optimum dividend payout.
3. When the rate of return is less than the required rate of return, i.e., when $r < k$, the price per share decreases as the dividend payout ratio increases. Thus, the shareholders of declining firm stand to gain if the firm distributes its earnings. For such firms, the optimum pay out would be 100%.

Example 4. The following information is given about Vishank Ltd.:

EPS (Earning Per Share)	₹ 8.00
Rate of return required by shareholders	16%

Assuming that Gordon Valuation Model holds, what rate of return should be earned on investments to ensure that the market price is ₹ 50 when the dividend payout ratio is 20%.

Solution.

Given: EPS (E) = 8.00;

Rate of return required by shareholders (k) = 16% = 0.16

Market Price of Share (P) = ₹ 50

D/P Ratio (1 - b) = 20% = 0.20

$b = 1 - 0.20 = 0.80$

$$P = \frac{E(1-b)}{(k) - (br)}$$

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by substituting the value in the above formula:

$$50 = \frac{8(0.20)}{(0.16) - (0.80)(r)}$$

$$50 \times [(0.16) - (0.80)(r)] = 1.60$$

$$(50 \times 0.16) - (50 \times 0.80 r) = 1.60$$

$$8 - 40r = 1.60$$

$$40r = 8 - 1.60$$

$$r = 6.40/40 = 0.16\%$$

Hence, the firm should earn a return of 16% on its investments.

4.4 ESSENTIALS OF SOUND DIVIDEND POLICY

1. **Stability of Dividend:** Shareholders value stable dividends more than the fluctuating ones. Thus, regular payment of a certain amount of dividend for a long period, irrespective of fluctuations in the company's earnings, constitutes the main characteristic feature of a Sound Dividend Policy.
2. **Gradual Increases in Dividends:** In order to attract the Potential investors and satisfying the existing shareholders, the management should gradually increase the rate of dividend with the increase in earnings of the company. However, it must be particularly taken into account that dividend is paid out of current earnings or retained profits only. In case the company earns more profit in a year, the management can maintain the stability of dividend by distributing interim dividend along with the regular dividend. In this way, a sudden increase in the rate of dividend may be avoided in years when the company earns more profits.
3. **Moderate Dividend during Initial Years:** During Initial Years of a company, the shareholders should be distributed dividend at a low rate so that the liquidity position of the company may be strengthened. Afterwards, the dividends may be gradually increased along with the progress and increase in earnings of the company.
4. **Distribution of Cash Dividend:** For avoiding the uncertainty of rate of return in return in future and for meeting their current living expenses, the shareholders usually prefer cash dividends than capital gains accruing as a result of ploughing back of profits in the business. Hence, dividends should be distributed in cash. However, when the company's liquidity position is not sound or it wants to capitalize its earnings, it may also distribute dividends in the form of shares known as bonus shares. Distribution of stock dividend should be within reasonable limits otherwise the company may face the problem of over-capitalization.
5. **Other Considerations:** Dividend should be distributed only after taking into consideration the liquidity position of the company. In case the losses of previous years are still pending, the company should pay dividends at a lower rate until such losses are fully written off. In order to maintain stability in dividends, the company should establish Dividend Equalization Fund so that money in this fund may be used for distribution of dividend in years of low earnings.

4.4.1 Company Law and Dividend Distribution

It is obligatory for Indian companies to follow the provisions of section 93 and 205 to 207 as well as the rules contained in table 'A' of the Indian Companies Act 1956 for declaration and distribution of dividend. Some of the provisions regarding Declaration and Distribution of Dividend are as follows:

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1. **Payment of Dividend on Paid-up Capital:** According to section 93, a company may, if so authorized by its Articles, pay dividend on the paid-up value of shares.
2. **Rules Regarding Dividends:** Rules 85 to 94 of table A provide:
 - (i) A company may declare dividend in its general meeting provided it does not exceed the amount recommended by the board of directors;
 - (ii) The board of directors may from time to time pay to the members such interim dividends as appears it to be justified by the profits of the company;
 - (iii) Notice of any dividend should be given to those who are entitled to receive it;
 - (iv) The directors may transfer any amount they think proper to the reserve fund which may be utilized for any contingencies;
 - (v) When a dividend has been declared, it becomes a liability of the company to the shareholders from the date of its declaration but no interest can be claimed on it.
3. **Dividend only out of the Profits:** Dividends can only be declared or paid out of the current profits of the company or past accumulated profits, and money provided by the central or any State Government for the payment of dividends in pursuance of a guarantee given by that Government. No dividend can be paid out of capital. Director who is responsible for payment of dividend out of capital shall be personally liable to make such amount good to the company. Companies are not entitled to pay any dividend unless current year's depreciation or arrears of depreciation have been provided for out of the profits and an amount of 10% of profits has been transferred to the reserves of the company. However, Central Government may allow any company to declare or pay dividends out of profits before providing for any depreciation. Capital gains may also be utilized for the declaration of dividends provided there is nothing in Articles prohibiting distribution of dividend out of capital gains, they have been realized in cash and they remain as profits after revaluation of all assets and liabilities. Dividends can not be paid out of accumulated profits unless current losses are made good. (Section 205).
4. **Payment of Dividend only in Cash:** Dividends are to be paid in cash only except in the following circumstances:
 - (i) By capitalizing the profits by issues of fully paid bonus shares, if Articles so permit, provided all legal formalities have been satisfied in respect of issue of bonus share;
 - (ii) By paying up any unpaid amount on partly paid-up shares. (Section 205).
5. **Payment of Dividend to Specified Persons:** Dividends shall be paid only to those whose names appear on the Register of Members on the date of declaration of dividends or to the holders of dividend warrants, if issued by the company. (section 206)
6. **Payment of Dividend within 42 Days:** Dividend must be paid within 42 days of its declaration, except in the following circumstances:
 - (i) By operation of law of insolvency;
 - (ii) Incompliance of the directors of the shareholders;

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(iii) Where right to receive dividend is pending decision;

(iv) Where it is not due to the default of the company;

(v) If company lawfully adjusts the amount against any debt due from the shareholders.

Any director in default shall be liable to punishment of 7 days of simple imprisonment or fine or both. (Section 207)

7. **Payment of Interim Dividend:** Directors of a company may pay interim dividend subject to the provision of Articles. Interim Dividend can be paid at anytime between the two annual general meetings taking into full year's accounts and after providing full year's depreciation on the fixed assets.
8. **Transfer of Unpaid Dividend to a Special Account:** Where a company has declared a dividend but has not posted the dividend warrant in respect thereof within 42 days to the shareholders entitled to it, such unpaid dividends shall be transferred to a special account to be opened by the company in that behalf in any scheduled bank to be called 'Unpaid Dividend Account'. If the unpaid dividends are not so transferred, the company shall pay an interest at 12% per annum. (Section 205)
9. **Transfer of Unclaimed Dividend to Central Government:** Any amount transferred to the Unpaid Dividend Account remains unclaimed or unpaid for three years from the date of such transfer shall be transferred to the General Revenue Account of the Central Government by the company along with a statement giving full particulars in respect of the sums so transferred and the last known address of the persons entitled to receive it and such other particulars as may be prescribed. The company is entitled to a receipt for such transfer from the Reserve Bank of India.

Where a company fails to comply with the above provisions, the company and every officer of the company who is in default shall be punishable with a fine which may extend to ₹ 500 for everyday during which default continues.

4.4.2 Dividend Policy of Indian Companies

Three types of Dividend Policies are usually followed by companies:

1. **Liberal Dividend Policy:** Under Liberal Dividend Policy a large part of profits is distributed as dividend among the shareholders. The dividend payout ratio under this policy exceeds 80%. Adoption of this policy increases the goodwill of the company and income of the shareholders, but the financial soundness of the company is adversely affected in the long run. Liberal Dividend Policy also encourages speculation in shares and provides opportunity to the directors and their officers of the company to fulfill their vested interests.
2. **Conservative or Strict Dividend Policy:** Under this policy, companies retain a large part of profits financing their expansion and development programs and distribute minimum dividend to the shareholders. The companies adopting a conservative dividend policy either do not distribute dividends to the shareholders or distribute a minimum part of profits as dividends. Thus, the companies following strict dividend policy are in a position to retain sufficient financial resources for their development and expansion purposes. The profitable investment of retained profits results in increased earning to the company. Consequent to the increased earning capacity and financial soundness of the company, the market value of shares goes up, and the shareholders reap the capital gains. However, in practice, the shareholders are not satisfied with Strict Dividend Policy.

3. **Stable or Sound Dividend Policy:** Stable Dividend Policy refers to a dividend policy which ensures regular payment of a certain minimum amount as dividend irrespective of fluctuation in earnings from year to year. A Sound Dividend Policy attaches equal importance to the financial requirements of the company and interests of the shareholders. The dividend payout ratio under this policy is 50%. In other words, 50% of the total profits is retained for profitable investment projects in the business so as to increase the earning capacity and goodwill of the company and also the market price of shares.

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4.4.3 Bonus Shares of Stock Dividend

Bonus shares refer to the distribution of shares in lieu of or in addition to the cash dividend to the existing shareholders of the company. The bonus shares are allocated to the existing shareholders of the company in proportion to their present shareholdings. Hence, no change in ownership equity is effected. Bonus shares are, therefore, shares allotted by capitalization of reserves or surplus of a corporate enterprise.

Reasons for Issuing Bonus Shares

Issue of Bonus shares results in conversion of the company's profits into share capital and so it is also termed as capitalization of company's profits. A company Issues Bonus Shares in lieu of cash dividend for the following reasons:

- (i) When Company is short of cash resources required for operation or expansion.
- (ii) When Company wants to retain the entire profits for investment in profitable projects and satisfy the shareholders' desire to receive dividend.
- (iii) When Company wants to earn higher profits in future in order to distribute increased dividends to shareholders.
- (iv) When Company wants to avoid the conditions of under capitalization.

Effects of Issuing Bonus Shares

For Issuing Bonus Shares, an amount equal to the par value of bonus shares is transferred from reserves and surplus profit account to the shares capital account. The issue of bonus shares has the following three effects:

- (i) It increases the total number of shares and reduces the retained earning of the company,
- (ii) It reduces the earning and dividend per share,
- (iii) It strengthens the liquidity position of the company.

Advantages to the Company

Issuing of bonus shares by the company have following advantages to the company:

- (i) *Conservation of Cash:* The issue of Bonus Shares or Stock Dividend enables the company to declare a dividend without using the cash resources that may be needed for financing the profitable investment opportunities with the company. The company may, thus, maintain its liquidity by retaining into earnings and, at the same time, satisfy the desire of the shareholders to receive dividends.
- (ii) *Lowering the Increased EPS:* A company is having a high earning per shares (EPS) is likely to face problems both from employees and consumers. The employees of the company may feel that they are under-paid while consumers may demand a reduction in price for the company's products. Since issue of bonus shares results in increasing the number of share, the company can bring down the EPS to a reasonable limit without affecting the interests of the shareholders and annoyance of employees and consumers.

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- (iii) *Widening the Market for Shares:* Issue of Bonus Shares reduces the market price of the company's shares making them attractive for the ordinary investors. If bonus shares are not issued in case of highly profitable companies with increased business; the earning per share will go up and the market price their shares will touch a peak level. Thus, a large number of ordinary investors will not be attracted to the company's shares, and the market for its shares will be limited. Issue of Bonus Shares solves this problem by widening the market for the company's shares enabling it to trade on equity.
- (iv) *Diffusion of Ownership:* Issue of Bonus Shares helps in diffusing the existing ownership of the company, because many existing shareholders sell their bonus shares in the market in order to convert them into cash for meeting their living expenses.
- (v) *Economy in Capital Issue:* This is the most economical method of issue of share capital because underwriting commission or brokerage, etc., is paid in respect of issue of bonus shares to the existing shareholders.
- (vi) *Increase in Borrowing Capacity:* Issue of Bonus Shares increases the credit worthiness of the company for the loan giving agencies, and so the company can arrange loans on more favourable terms and conditions.
- (vii) *Savings of Taxes:* Issue of Bonus Shares enables a company to avail tax benefits, because under the Payment of Bonus Act, 1965 the taxation rate on paid-up capital is higher than on retained earnings. In case of issue of Bonus Shares or stock dividend, the company also saves income tax payable on cash dividend.

Advantages to Shareholders

Issuing of bonus shares by the company have following advantages to the shareholders:

- (i) *Tax Benefits:* Receipt of Stock Dividend results in tax benefits to the shareholders because stock dividend is not taxable. Distribution of dividend in cash is included in the income of the shareholders and is taxed at usual income tax rates. Thus, receipt of bonus shares in lieu of cash dividend results in savings of income tax to the shareholders. Moreover, the profit made by the shareholder on sale of bonus shares is treated as a capital gain which is subject to a lower rate of Income Tax.
- (ii) *Higher Profits in Future:* Since Stock Dividend is generally declared only when the company's earnings are expected to increase, the issue of bonus shares is normally interpreted by shareholders as an indication of higher profits to the company in future. The Conveyance of such information may, therefore, have favourable impact of the market value of the Company's Shares.
- (iii) *Higher Dividends in Future:* Where the company follows a stable dividend policy, the issue of bonus shares will result in increased dividends to the shareholders even if the existing dividend per share is continued.
- (iv) *Psychological Value:* The declaration of stock dividend or issue of bonus shares has a high psychological value as it gives to the shareholders an impression of prosperity of the company. Issue of Bonus Shares is usually received positively in the market, which tends to create greater demand for the company's shares. Thus, issue of bonus shares may increase the share prices of the company's shares in the stock exchange resulting capital gains to the shareholders.

Advantages to Creditors

Issuing of bonus shares by the company has following advantages to the creditors:

- (i) *Increased Margin of Safety:* Distribution of Stock Dividend does not affect the asset of the company as in case of cash dividend. In issue of bonus shares strengthens the

liquidity position of the company due to capitalization the retained earnings, which provides an increased margin of safety to the company's creditors. *Dividend and Dividend Policy*

- (ii) *Psychological Effect on Creditors:* Issue of Bonus Shares has a favourable effect on the creditors of the company because issue of bonus shares does not influence the cash position of the company. Issue of Bonus Shares in lieu of cash dividends gives an impression of strong liquidity position of the company and increases the creditor worthiness, goodwill and financial soundness in the eyes of the creditors.

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4.5 SUMMARY

- The term 'dividend' refers to that part of divisible profits of a company, which is distributed among its shareholders. In other words, dividend is that portion of company's profit, which is distributed among its shareholders as percentage of par value of share or at a fixed rate per share according to the decision of its board of directors
- According to Hunt, "Dividend is the income received by the owners of corporation which they receive in the capacity of its owners."
- Dividend can be classified on the basis of distribution method. Different forms of dividend are as follows: (i) Cash dividend, (ii) Stock dividend, (iii) Bond dividend, (iv) Property dividend, (v) Composite dividend, (vi) Optional dividend, (vii) Interim dividend, (viii) Extra or Special dividend.
- The term 'Dividend Policy' refers to the policy regarding quantum of profits to be distributed as dividend. Dividend is that part of a company's divisible profits which is distributed among its shareholders as they return on their shareholdings. The concept of dividend policy implies that companies through their Board of Directors evolve a pattern of dividend payment which has a bearing on future action
- It is obligatory for Indian companies to follow the provisions of section 93 and 205 to 207 as well as the rules contained in table 'A' of the Indian Companies Act 1956 for declaration and distribution of dividend.
- Three types of Dividend Policies are usually followed by companies: (i) Liberal Dividend Policy, (ii) Conservative or Strict Dividend Policy, (iii) Stable or Sound Dividend Policy.
- Bonus shares refer to the distribution of shares in lieu of or in addition to the cash dividend to the existing shareholders of the company. The bonus shares are allocated to the existing shareholders of the company in proportion to their present shareholdings.

4.6 REVIEW EXERCISE

1. Define dividend and discuss the types of dividend.
2. What do you mean by dividend policy? Discuss its objectives and importance.
3. Explain various factors affecting dividend policy.
4. Discuss Modigliani and Miller approach of dividend policy.
5. Explain essentials of sound dividend policy in detail.
6. Write short notes on:
 - (a) Theory of Irrelevance of dividend decision
 - (b) Dividend policy of Indian companies

UNIT 5: WORKING CAPITAL MANAGEMENT

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Structure

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- 5.23 Inventory Control Techniques
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 - 5.23.2 Determination of Stock Levels
 - 5.23.3 Two-Bin System
 - 5.23.4 Perpetual Inventory System
 - 5.23.5 Inventory Turnover Ratios
 - 5.23.6 Inventory Control Through ABC Analysis
 - 5.23.7 Aging Schedule of Inventory
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- 5.24 Factors Determining Optimum Investment in Inventory
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5.1 INTRODUCTION

Working capital commonly refers to the excess of current assets over current liabilities. Working capital, however, represents investment in current assets, such as cash, marketable securities, inventories and bills receivables and current liabilities which include bills payable, notes payable and miscellaneous accruals. Net working capital is the excess of current assets over current liabilities. Current assets are those assets which are normally converted into cash, with an accounting year, and current liabilities are usually paid within an accounting year. Following are some of the important definitions of working capital:

Mead, Molott and Fild, "*Working capital means current assets.*"

J.S. Mill, "*The sum of the current assets is the working capital of a business.*"

Bonneville and Dewey, "*Any acquisition of funds which increases the current assets, increases working capital for they are one and the same.*"

C.W. Gerstenberg, "*Working capital has ordinarily been defined as the excess of current assets over current liabilities.*"

Working Capital management refers to the management of current assets and current liabilities. Working Capital management, therefore, refers to all aspects of the administration of both current assets and current liabilities. In the words of Prof. **K.V. Smith**, "*Working Capital Management is concerned with the problems that arise in attempting to manage the current assets, the current liabilities and the inter-relationship exists between them.*"

The basic objective of the Working Capital Management is to manage the company's current assets and liabilities in such a way that an adequate working capital is maintained. In fact, Working Capital Management policies have a direct bearing on a business concern's profitability, liquidity and its structural health.

Working Capital Management is an important aspect of Financial Management due to following reasons:

1. Management of current assets and current liabilities represented mainly by cash, inventories, bills receivable and bills payable, is a continuous process occupying a major portion of the financial managers time. On the contrary, decisions relating to investments in fixed assets and long-term financing are episodic.
2. Current assets in a typical manufacturing concern represent more than half of its total investment in assets. The portion of current assets to total assets is higher in case of a trading company, and lower in a service industry. In manufacturing concerns, working capital needs differ widely depending on the length of the manufacturing cycle, market characteristics etc.
3. Working capital requirements are volatile in nature due to seasonal variations in sales.
4. Since current assets are divisible and have a short durability, the financial manager can easily match them with current liabilities than he can match long-lived fixed assets with long-term liabilities.
5. Current assets and current liabilities are shown in balance sheets of companies separately from fixed assets and long-term liabilities. Thus, proper estimation of working capital requirements of a business concern is a pre-condition for running the business efficiently and profitably.

5.1.1 Objectives of Working Capital Management

The basic objectives of working capital management are as follows :

1. To optimize the investment in current assets and to reduced the level of current liabilities, so that the company can reduce the locking up of funds in working capital and, can improve the return on capital employed in the business.
2. The second important objective of working capital management is that the company should always be in a position to meet its current obligations which should properly be supported by the current assets available with the firm. But maintaining excess funds in working capital means locking of funds without return.
3. To manage the firm's current assets in such a way that the marginal return on investment in these assets is not less than the cost of capital employed to finance the current assets.

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5.2 CLASSIFICATION OF WORKING CAPITAL

Working capital may be classified on the basis of its concepts as well as on the basis its requirement of time. On the basis of quantitative and qualitative concepts working capital can be classified into two categories, viz., (i) Gross Working Capital and (ii) Net Working Capital. Further, working capital can be classified into (iii) Permanent Working Capital and (iv) Temporary Working Capital on the basis of time.

5.2.1 Gross Working Capital

It refers to the company's total current or circulating assets, such as-cash, marketable securities, bills receivables, inventories, etc., which are normally converted into cash within an accounting year.

5.2.2 Net Working Capital

Net working capital is the excess of current assets over current liabilities. In other words, it is that portion of a company's current assets which is financed by long-term funds.

5.2.3 Permanent Working Capital

It refers to that portion of investment in current assets which is required at all times to carry on the business operations at a minimum level. It represents the current assets required on a continuing basis over the entire year. It remains in the business in one form or another, and also grows with the size of the business. Since it is permanently needed for the business operations, permanent working capital should be financed out of long-term funds.

5.2.4 Temporary Working Capital

It is also called variable working capital. The amount of temporary working capital keeps of fluctuating with the increase or decrease in business activities. It represents additional current assets needed at different times during the operating year. Since, it is required for carrying out seasonal or special operations of short duration such as extensive marketing campaigns; it should be financed from the short-term sources of finance like bank credit.

5.3 NEED AND SIGNIFICANCE OF WORKING CAPITAL

Regular availability of adequate working capital is inevitable for sustained business operations. It should neither be excessive nor inadequate. Both, inadequate and redundant working capital

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situations are dangerous. Excessive working capital situations are dangerous. Excessive working capital means idle funds laying with the firm and not earning any profit for it. Whereas, inadequate working capital means that the enterprise does not have sufficient funds for financing its daily business activities, which ultimately results in production interruptions and reduced productivity. It is rightly said that inadequate working capital is disastrous; whereas redundant working capital is a criminal waste. The advantage and importance of adequate working capital are the enumerated as follows:

1. **Increase in Debt Capacity and Goodwill:** Adequate working capital represents the financial soundness of a company. Promptness in payments creates goodwill and increases the debt capacity of the firm. Regular availability of adequate working capital creates confidence among investors and lenders that they will get their due interest and principal in time. Thus, a firm with adequate working capital can raise the requisite funds from market, borrow short-term credit from banks and purchase inventories of raw materials, etc., for the smooth operations of its business.
2. **Facility in obtaining Loans from Financial Institutions:** Adequate working capital representing excess of current assets over current liabilities is considered as an ideal security for trade credits. Thus, the presence of adequate working capital and current assets help a company to raise unsecured and secured loans from financial institutions.
3. **Increase in Production Efficiency:** If adequate working capital is maintained in the business, the firm can successfully carry out its operations, research and development programmes etc., which would lead to increased production efficiency, in turn, will increase the efficiency of the employees and boost up their morale. Further, it would also enable the company to discharge its social responsibility towards the society.
4. **High Executive Morale:** Maintenance of adequate working capital also boosts up the morale of the executives insofar as they have an environment of creativity, security and confidence, which is an important psychological factor in improving the efficiency and morale of the business executives who are at the helm of affairs in the firm.
5. **Exploitation of Favorable Opportunities:** In the presence of adequate working capital, a company can avail the benefits of favorable opportunities. For example, the company having adequate working capital can avail the benefits of bulk supply orders, bulk purchases of raw materials, off season purchases, etc.
6. **Meeting Contingencies and Adverse Changes:** In case of adequate working capital, a company can easily face certain business and economic crisis. For example, the demand for goods decreases during the depression period and the payment of credit sales is also made after a long period. In this case, companies with adequate working capital can only successfully meet this adverse situation. Certain other contingencies, such as business oscillations, financial crisis arising from heavy losses etc., can be successfully met by a company having adequate working capital.
7. **Availing Cash Discount:** Maintenance of adequate working capital enables a company to avail the advantage of cash discount by making cash payments to the suppliers of raw materials and merchandise. Obviously it will reduce the cost of production and increase the profits of the company.
8. **Attractive Dividend to Shareholders:** Adequate working capital enables a company to declare and distribute attractive dividend to its shareholders. Conversely, a company not having adequate working capital cannot distribute attractive dividend in spite of sufficient profits. Moreover, distribution of goods dividend also increases the market value of shares.
9. **Sense of Security and Confidence:** Adequate working capital creates a sense of security and confidence not only among the business executives but also among the customers, creditors and business associates.

10. **Solvency and Efficiency of Fixed Assets:** Availability of adequate working capital is essential for maintaining the solvency of the company, so that payments could be made in time as and when they fall due. Likewise, adequate working capital also increases the efficiency of fixed assets insofar as their proper maintenance depends upon the availability of funds. It has been rightly said, "The fate of large scale investment in fixed assets is often determined by a relatively small amount of current assets."

Large investment in fixed assets is not sufficient to run a business successfully. Adequate working capital, i.e., investment in current assets is equally important for meeting the day-to-day expenditure on raw materials, salaries, wages, rents, advertisements and maintenance of fixed assets. Without working capital fixed assets are like a gun which cannot shoot as there are no cartridges. Working capital is the heart of a business. If it is weak, the business cannot prosper and survive although there is a large body of fixed assets. It is, therefore, rightly said, "The fate of large scale investment in fixed assets is often determined by a relatively small amount of current assets."

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5.4 DANGERS OF INADEQUATE WORKING CAPITAL

The possible dangers of inadequate and redundant working capital are as follows:

1. **Loss of Goodwill and Creditworthiness:** The firm loses its creditworthiness and goodwill as it fails to honor its current liabilities. Consequently, the firm finds it difficult to procure the requisite funds for its business operations on easy terms, which ultimately results in reduced profitability as well as production interruptions.
2. **The Firm cannot Avail the Favourable Opportunities:** The firm with inadequate working capital fails to undertake the profitable projects, which not only prevent the firm from availing the benefits of favourable opportunities but also stagnate its growth.
3. **Adverse Effect on Credit Opportunities:** The firm also fails to avail the attractive credit opportunities due to inadequacy of working capital.
4. **Operational Inefficiencies:** Inadequacy of working capital leads to operating inefficiencies as day-to-day commitments cannot be met.
5. **Low Rate of Return on Fixed Assets:** Inadequacy or shortage of working capital also results in lowering down the rate of return on fixed assets because fixed asset can not be efficiently utilized or maintained due to inadequacy of working capital.
6. **Increase in Business Risks:** Inadequate working capital increases the risk of the firm. In the absence of ample working capital, the firm cannot discharge its current liabilities and is liable of being declared as insolvent. Inadequate working capital, therefore, poses a serious threat to the survival of the firm.
7. **Non-achievement of Profit Target:** The firm with inadequate working capital cannot achieve its profit target because it cannot implement its operating plans due to shortage of working capital.
8. **Adverse Effect on the Morale of Business Executives:** In-adequacy of working capital also adversely affects the morale of the firm's executives because they do not have an environment of certainty, security and confidence, which is a great psychological factor in improving the overall efficiency of the business.
9. **Effect on Financial Capacity:** In-adequacy of working capital also weakens the shock-absorbing capacity of the firm because it cannot meet the contingencies arising from business oscillations, financial losses etc., due to shortage of working capital.

5.5 DANGERS OF REDUNDANT WORKING CAPITAL

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Dangers of redundant working capital are:

1. **Low Rate of Return on Capital:** Excessive or redundant working capital implies the presence of idle funds which earn no profit for the firm. Thus, the firm with excessive working capital cannot earn a proper rate of return on its total investments; whereas profits are distributed on the whole of its capital. This would ultimately result in bringing down the rate of return to the shareholders. Lower dividend, in turn, reduce the market value of shares and causes capital loss to the shareholders.
2. **Decline in Capital and Efficiency:** Due to low rate of return and low dividend to shareholders, companies often adopt some objectionable devices to inflate profits to maintain or increase the rate of dividend. Sometimes, unearned dividends are paid out of the company's capital to keep up the show of prosperity by window dressing of accounts. In order to make up the deficiency of reduced earnings, certain provisions, such as provision for depreciation, repairs and renewals are not made. This leads to decline in operating efficiency and fall in profits.
3. **Loss of Goodwill and Confidence:** Excessive working capital leads to lower rate of return on the company's total investments. Shareholders also get lower dividend. Lower rate of dividend leads to reduce the market value of the company's shares much less than the book value. The shareholders lose confidence in the company. The goodwill or credit of the company suffers a serious setback. The financial stability of the company is jeopardized.
4. **Misapplication of Funds:** Companies with excessive working capital do not utilize the societies' resources prudently. In case of excessive working capital, it becomes difficult to control the purchases of many things which are not required in the business. Often excessive inventories and fixed assets are purchased by the company, which do not add to the profitability of the company but adds to its maintenance costs and losses due to theft, waste and mishandling.
5. **Evils of Over-capitalization:** Excessive working capital is often responsible for giving birth to the situation of overcapitalization in the company with all its evils. Over capitalization is not only disastrous to the smooth survival of the company but also affects the interests of those associated with the company.
6. **Inefficient Management:** Existence of excessive working capital is an indication of in-efficient management of the company. it shows that the management is not interested in expanding the business, otherwise the excessive working capital might have been utilized in expanding the business.
7. **Destruction of Turnover Ratio:** Redundant working capital often destroys the control of turnover ratio, which is commonly used in the conduct of an efficient business. Excessive working capital also eradicates all other guides and sign posts commonly employed in conducting and operating a business.

It is evident from the foregoing discussion that a company must have adequate working capital pursuant to its requirements. It should neither be excessive nor inadequate. Both situations are dangerous. While inadequate working capital adversely affects the business operations and profitability, excessive working capital remains idle and earn no profit for the company. It is, therefore, rightly said, "Inadequate working capital is disastrous; whereas redundant working capital is a criminal waste."

1. **Nature of Business:** Working capital requirements of an enterprise are basically determined by the nature of its business. Trading concerns invest a major part of their funds on inventories and bills receivable, and they also have to keep large amounts of cash. Conversely, the public utility concerns like railways, electricity, insurance etc., need relatively much less inventories and cash. Manufacturing concerns stand in between these two extremes. Working capital requirements of these concerns depends on a number of factors including nature of products, technology, marketing policies etc.
2. **Production Policies:** Production policies perused by the management constitute an important factor determine the working capital requirements of the firm. More working capital is required by those industries which produce or sale goods in a particular season. For example, sugar and woolen textile industries require more working capital in winter season. Likewise, concerns engaged in the manufacturing of fans, refrigerators, water coolers etc., undertake production whole year, whereas sales take place only in summer season. Such concerns of seasonal nature also require more working capital.
3. **Size of Business:** The amount of working capital also depends upon the size of a business unit. Generally, large scale concerns require more working capital as against the small concerns for maintaining big inventories and carrying out business operations.
4. **Length of Manufacturing Cycle:** The size of working capital is also influenced by the length of the manufacturing cycle. Manufacturing process always involves a time lag between the time when raw materials are fed in the production line and finished products are finally turned out by it. The length of this period depends on the nature of products and production technology used by a concern. Longer the manufacturing process, the higher will be the requirements of working capital and vice versa. Generally, highly capital-intensive industries need more working capital because of their highly sophisticated and production process. A concern can reduce its working capital needs by shortening the length of its manufacturing cycle through technological improvements, and also by efficient planning and control of its manufacturing operations.
5. **Credit Policy:** Almost all manufacturing companies and also several trading company's use customer credit as one of their promotional tools. Companies allowing liberal credit to their customers require more working capital as against the companies which have efficient debt collection machinery and observe strict credit terms. This is because in the former case, a substantial amount of fund is tied up in bills receivable or sundry debtors. Similarly, working capital needs are also determined by the credit facilities availed by a business concern from its suppliers. Liberal credit facilities from the suppliers of raw materials inventories reduce the working capital requirements of a concern to that extent. A company which does not enjoy liberal credit facilities from its suppliers will need more amount of working capital.
6. **Turnover of Circulating Capital:** There is a high degree of correlation between the quantum of working capital and the speed with which the sales are affected. Companies with higher rate of turnover or faster sales will need less amount of working capital as against the companies with low turnover ration.
7. **Business Fluctuations:** Cyclical changes in the economy also influence the level of working capital. During boom period, the tendency of management is to pile up inventories of raw materials and finished goods to avail the advantage of rising prices.

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This creates demand for more capital. Similarly, during depression when the prices and demand for manufactured goods constantly reduce, the industrial and trading activities show a downward trend. Hence, the demand for working capital is low.

8. **Growth and Expansion of Business:** In the beginning the working capital requirements of a company are low. However, with the gradual growth and expansion, its working capital needs also increase. Discernibly, large amount of working capital in a growing concern is required for its expansion programmes.
9. **Economies of Scale:** Need for working capital is also influenced by a company's desire to take advantage of the economies of scale. In purchasing inventories, it balances the ordering costs against carrying costs so as to arrive at the optimum order quantity. Similarly, it balances the transaction costs of borrowed funds against their interest costs.
10. **Current Assets Policies:** The quantum of working capital of a company is significantly determined by its current assets policies. A company with conservative assets policy may operate with a relatively high level of working capital than its sales volume. It may carry larger volume of raw materials and finished goods inventories, after liberal terms of credit of its customers and carry a large amount of cash to meet its current expenditure. On the contrary, a company pursuing an aggressive current assets policy operates with a relatively lower level of working capital.
11. **Fluctuations of Supply:** Certain companies have to maintain large reserves of raw material due to their irregular sales and intermittent supply. This is particularly true in case of companies which require special kind of materials available from limited sources. Similarly, companies using bulky materials also maintain large reserves of raw materials inventories. In case of such companies, the working capital requirements would be large.
12. **Labour-intensive Vs. Capital-intensive Industries:** In case of labour-intensive industries the working capital requirements will be high due to regular payments of heavy wage-bills and overtime. On the other hand, highly automatic and capital intensive industries require lesser amount of working capital because of heavy investments in fixed assets and shorter time in manufacturing process.
13. **Seasonal Variations:** A number of industries manufacture and sell goods only during certain seasons. For example, sugar, oil and woollen textile industries have either seasonal supplies of raw materials or make their sales in a particular season. Hence, the working capital requirements of such industries will be higher during a certain season as compared to any other period.
14. **Dividend Policy:** Dividend policy also influences the working capital requirements of a business enterprise. If a company follows a conservative dividend policy, more working capital would be required because more funds would be needed for payment to the shareholders even if the company's earnings are not sufficient to cover such payment. On the contrary, if a strict dividend policy is followed by the management, less working capital will be needed by the concern. This is so because a portion of the company's earnings may be retained in the business.
15. **Other Factors:** Besides the above considerations, there are a number of other factors which affect the working capital of a business concern. Some of them are as follows:
 - (i) Effective co-ordination between production and distribution policies will reduce the quantum of working capital in a business concern.
 - (ii) Less developed means of transportation and communication add to the quantum of working capital of companies in such areas, because of stock piling.
 - (iii) The magnitude of working capital is also determined by the extent of hazards and contingencies inherent in a particular type a business.

- (iv) Absence of specialization in marketing of goodwill requires more working capital because such concerns will have to maintain their own marketing organisation.
- (v) Companies which have good banking connections and proved credit worthiness will require less working capital as they can easily obtain the requisite funds from banks.

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5.7 METHODS OF WORKING CAPITAL ANALYSIS

Working capital management involves management of different components of working capital, such as cash, inventory, and creditors. To assess the serving of working capital its analysis becomes inevitable. The analysis of working capital can be made by employing the following three tools or techniques:

5.7.1 Funds Flow Analysis

Funds flow analysis is a useful tool of working capital analysis, and is widely used by the financial analysis. Funds flow analysis is the study of the sources of funds and their application in the business. It shows the sources and uses of funds. By the use of this technique, changes in the working capital between the two dates can be easily analyzed by studying the changes in each type of current assets and current liabilities. Funds flow analysis is an instrument of allocation of resources, and answers a number of intricate queries, such as the overall creditworthiness of the concern, sources of repayments of the loans taken, quantum of funds generated during a specific period, etc.

5.7.2 Ratio Analysis

Another tool of working capital analysis is the technique of ratio analysis, which is widely used by the corporate sector for checking upon the efficiency with which the working capital is being utilized in the business. It serves as a useful tool of financial analysis.

5.8 APPROACHES FOR WORKING CAPITAL

There are three approaches for working capital

5.8.1 Matching Approach or Hedging Approach

When the firm follows matching approach, long term financing will be used to finance permanent working capital. Temporary working capital should be financed out of short term funds. The rationale underlying matching approach is that the maturity of source of funds should match the nature of assets to be financed.

5.8.2 Conservative Approach

According to the approach all requirements of funds should be met from long term sources. Short-term sources should be used only for emergency requirements. Under a conservative plan, a firm finances its permanent current assets and a part of the temporary current assets with a long term financing. In periods when the firm has no temporary current assets, it shores liquidity by investing surplus funds in marketable securities. Conservative approach is less risky but more costly as compared to matching approach. In other words, it is low profit low risk approach.

5.8.3 Aggressive Approach

Under an aggressive policy firm uses more short financing than warranted by the matching plan, *i.e.*, the firm finances a part of its permanent current assets with short term financing. On the other hands more, use of short term financing makes the firm more risky.

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5.9 PROFITABILITY AND LIQUIDITY TRADE-OFF

The overall objective of the business firm is to achieve wealth maximization. This concept could be attained only when the principal of financial management are put into practice. The proportionate investment on current assets to fixed assets or vice-versa directly influences the profitability, liquidity and the turnover of a company. A company which maintains higher current assets ratio (CA/FA) no doubt has the higher liquidity as the investment on current assets can be liquidated (converted into cash) immediately. This approach has the concept of loosing the opportunity of earning profits if the excess current assets investments are deployed elsewhere contrary to this, if a firm maintains lower current assets to fixed assets ratio, no doubt reduces the idle investment and reflects amounts of risk of stoppage of production due to want of materials. Therefore, the financial manager has to carefully plan to provide optimum ratio of current assets to fixed assets ratio. In a real life situation, the risk of maintaining optimum ratio is very difficult. However, the concept of understanding the mode of deployment of funds on current assets and fixed assets helps in increasing the profitability and liquidity position of the business firm. The following are the three approaches would assist the financial manager in working capital management:

5.9.1 Approach-A

According to this approach, if a business firm maintains high investment on current assets to a constant investment on fixed assets (or low investment on fixed assets), it is said to be a conservative policy of working capital management, where liquidity position of the company is good. Liquidity refers to the ability of the company to meet the obligation of third parties *viz.*, creditors, bankers, etc., in addition to this, firm have to forego the opportunity cost of idle investment on excess current assets associated with lower return on investment, when other factors are assumed to be constant.

5.9.2 Approach-B

According to this approach, if a business firm maintains the moderate level of current assets to constant fixed assets, it is said to be average approach of working capital management. Average level of investment on current assets refers to neither excess nor lesser amount of investment on current assets. Under such a situation, the company will have moderate liquidity position with sufficient profit without having any substantial financial crisis. The rate of return on investment would be such higher than the situation of A. (because of idle investment).

5.9.3 Approach-C

According to this approach, if a business firm maintains lower level of investment on current assets to constant fixed assets, it said to be aggressive policy of working capital management. This situation reflects the operational efficiency of the management. In other words, the production activities of such a business firm will be operated with lower level of current assets. The success of this approach mainly depends on how well and quick materials are obtained and supplied to production department. This approach is directly linked with higher percentage of profits or

return on investments. But under the prevailing socio-economic and infrastructural condition the business under this approach increases the stress, strain on the labour force. However, if it is implemented successfully, it provides higher percentage of profits to the business firm. Even a minor negligence or inefficiency crops in, it results in stoppage of production due to the want of raw materials.

The detailed analysis of the above three approaches helps the financial manager to evolve a suitable policy to maintain an optimal current assets to fixed assets ratio. In addition to the basic knowledge of these three approaches, he has to consider number of factors, viz., production policy, and technology used, projected sales, supply of raw materials, infrastructure and the level of operating efficiency.

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5.10 WORKING CAPITAL REQUIREMENT

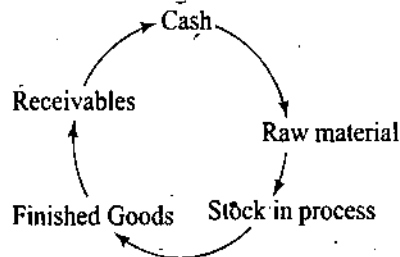
Working capital for any manufacturing unit means the total amount of circulating funds required for the continuous operation of the unit on an ongoing basis. For an uninterrupted functioning of a unit at a given capacity, it requires a specified level of current assets namely raw materials, stock-in-process, finished goods, receivables apart from reasonable cash in hand etc., these are known as gross working capital. In other simple words:

Gross working capital = Total current assets

Net working capital = Current assets - current liabilities

5.10.1 Operating Cycle

The duration of time needed to complete the chain of events from cash to production and back to cash is termed the operating cycle:



This means there are four distinct stages of a working capital cycle as under:

1. Funds (whether own or bank's) are utilized for purchase of raw materials.
2. Raw materials are converted into finished goods.
3. Finished goods are stored in the godown before they are sold.
4. Finished goods are sold on credit and converted into accounts receivables which, when realized, are converted into funds and the process recycles itself.

Thus, in order to find out the total working capital requirement of a manufacturing unit, the needs at each of the four stages mentioned above are calculated and the sum total thereof is its total working capital requirement. However, in order to arrive at each of the four stages, one has to assess two parameters with reference to each stage:

(i) Time Factor

(ii) Value

These parameters for various stages can be enumerated as follows:

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Stage	Item	Time	Value
I	Raw material	Consumption Storage period	Value of consumed raw materials for the period
II	Stock-in-process	Time taken to Convert Raw Material into finished goods	Raw materials consumed plus manufacturing expenses for he said period (cost of production)
III	Finished goods	Period for which Finished Goods are kept in Storage before Actual sale	Raw materials consumed plus manufacturing expenses plus administrative overheads for the period (cost of sales)
IV	Receivables	Credit period Allowed to Buyer	Raw Material consumed plus Administrative Expenses plus profit for period (sales)

The total working capital requirement is calculated by adding the values at column No. IV.

5.11 METHODS OF ESTIMATING WORKING CAPITAL

Every firm finds it difficult to ascertain the Working Capital requirement which is a very practical and important problem. While inadequate Working Capital creates a lot of problems, an amount in excess of the requisite working Capital which is not utilised properly and remains idle, can also increase the cost. Therefore, in order to avoid both these difficulties, a working Capital Requirement Forecast is to be prepared after scrutinising and analyzing every aspect of business activity.

The main methods of estimation of working capital are as follows:

5.11.1 Cash Forecasting Method

In this method an estimate is made of the possible cash receipts and payments in the forthcoming period. The estimated cash receipts are added in the working capital available at the beginning of the period and the estimated cash payments are deducted. This shows the deficiency or surplus of cash at a definite point of time. This method has been discussed in detail in chapter 7 of this book 'Management of Cash'.

5.11.2 Adjusting Profit and Loss Method

Under this method the forecasted profits are adjusted on cash basis. The estimation of working capital requirement by this method can be easily understood by the following format:

Computation of Working Capital

	Net Income
Add :	(i) Non-Cash Items
	Cash Inflow Items
Less :	(ii) Cash outflow Items
	
	Net Change in Working Capital

5.11.3 Projected Balance Sheet Method

Under this method of forecasting, a forecast is made of the various assets and liabilities of the firm. Afterwards, the difference between the two is taken which will indicate either cash surplus or cash deficiency.

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Example 1. From the following informations given below, prepare an estimate of working capital requirements by project Balance Sheet Method:

		(₹)
Issued share capital		4,20,000
6% Debenture		80,000
Fixed Assets at cost		80,000
The expected ratios of cost to selling price are:		
Raw Materials	50%	
Labour	20%	
Overheads	20%	
Profit	10%	

Following further information's are available:

- (i) Raw materials are kept in store for an average period of two months;
- (ii) Finished goods remain in stock for an average period of three months;
- (iii) Production during the previous year was 1,80,000 units and it is planned to maintain the same in the current year also;
- (iv) Each unit of production is expected to be in process for half a month;
- (v) Credit allowed to customers three months and given by suppliers is two months;
- (vi) Selling price is ₹ 10 per unit;
- (vii) There is a regular production and sales cycle;
- (viii) Calculation of debtors may made at selling price.

Solution.

Projected Balance Sheet

(As on.....)

Liabilities	Amount ₹	Assets	Amount ₹
Share Capital	4,20,000	Fixed Assets	80,000
6% Debenture	80,000	<i>Current Assets:</i>	
Profit and Loss A/C	1,75,200	Stock:	
<i>Current Liabilities:</i>		Raw Materials	1,50,000
Creditors	1,50,000	Finished Goods	4,05,000
Bank Overdraft (Balancing figure)	3,27,300	Work-in Progress	67,500
		Debtors	4,50,000
	11,52,500		11,52,500

Working Notes:

(i) Calculation of Profit	₹	₹
Sales (1,80,000 Units @ ₹ 10 per unit)		18,00,000
(-) Material (18,00,000 × 50%)	9,00,000	
Labour (18,00,000 × 20%)	3,60,000	
Overheads (18,00,000 × 20%)	3,60,000	16,20,000
Gross Profit (being 10% of Sales)		1,80,000
(-) Debenture Interest (assumed as being paid) (80,000 × 6%)		4,800
Net Profit		<u>1,75,200</u>
 (i) Debtors = $18,00,000 \times \frac{3}{12} = ₹ 4,50,000$		
 (iii) Calculation of Stock of Raw Materials (2 Months):		
$18,00,000 \times \frac{50}{100} \times \frac{2}{12} = ₹ 1,50,000$		
 (iv) Calculation of Stock of Finished Goods (3 Months):		
Raw Material	$\left(18,00,000 \times \frac{50}{100} \times \frac{3}{12}\right)$	2,25,000
Labour	$\left(18,00,000 \times \frac{20}{100} \times \frac{3}{12}\right)$	90,000
Overheads	$\left(18,00,000 \times \frac{20}{100} \times \frac{3}{12}\right)$	90,000
Total		<u>₹ 4,05,000</u>
 (v) Calculation of Stock of Work-in-Progress (1/2 Month):		
Raw Material	$\left(18,00,000 \times \frac{50}{100} \times \frac{3}{12}\right)$	37,500
Labour	$\left(18,00,000 \times \frac{20}{100} \times \frac{3}{12}\right)$	15,000
Overheads	$\left(18,00,000 \times \frac{20}{100} \times \frac{3}{12}\right)$	15,000
Total		<u>₹ 67,500</u>
 (vi) Calculation of Creditors (2 Months): $18,00,000 \times \frac{50}{100} \times \frac{2}{12} = ₹ 1,50,000$		
 (vii) Calculation of Required Working Capital:		
Current Assets:		₹
Stock (Calculated as above)		6,22,500
Debtors		4,50,000
		<u>10,72,500</u>
(-) Current Liabilities:	₹	
Creditors	1,50,000	
Bank Overdraft	3,27,300	
		<u>4,77,300</u>
		<u>5,95,200</u>

5.11:4 Forecasting of Current Assets and Current Liabilities Method

This is the most popular method of estimating the working capital requirement. Generally we make the estimate on the basis of past experience related to production process, credit policy and stock policy. In brief, the following points are taken into consideration at the time of estimating the amount of current assets and current liabilities:

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- (i) The total number of units to be manufactured throughout the year;
- (ii) The cost of raw materials, wages and overheads for each unit;
- (iii) Information about the period during which raw materials will remain in stock on an average before the same are issued to production;
- (iv) Information about the period during which the product will be processed in the factory i.e., the length of the production process;
- (v) Information about the period during which finished products will remain in the warehouse before sale i.e., the length of sales cycle;
- (vi) Information about the period of credit allowed to debtors;
- (vii) Information about the period of credit allowed by suppliers;
- (viii) Information about the lag in payment of wages and overheads.

Estimation of Current Assets:

(i) Stock of raw Materials:

$$= \frac{\text{Budget Production (in units)} \times \text{Cost of raw materials per unit} \times \text{Average inventory holding period (months/days)}}{12 \text{ months}/365 \text{ days}}$$

(ii) Work-in-progress:

$$= \frac{\text{Budgeted Production (in units)} \times \text{Estimated Work in process cost (per unit)} \times \text{Average time span of work-in-progress inventory (months/days)}}{12 \text{ months}/365 \text{ days}}$$

(iii) Finished Goods Inventory:

$$= \frac{\text{Budgeted Production (in units)} \times \text{Cost of goods produced per unit (excluding depreciation)} \times \text{Finished Goods holding period (months/days)}}{12 \text{ months}/365 \text{ days}}$$

(iv) Debtors:

The amount of funds locked up in sundry debtors will be computed on the basis of credit sales and the time-lag in collecting payment.

$$= \frac{\text{Budgeted Credit sales (in units)} \times \text{Cost of sales per unit excluding depreciation} \times \text{Average debt collection period (months/days)}}{12 \text{ months}/365 \text{ days}}$$

(v) Cash and Bank Balance:

Apart from working capital needs for financing inventories and debtors, firms also find it useful to have some minimum cash balances with them. It is difficult to lay down the exact

procedure of determining such an amount. The amount to be kept as cash in hand or cash at bank can be estimated on the basis of past experience. Every businessman knows the amount that he will require for meeting his day-to-day payments.

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In brief, the computation of working capital is summarised in the following format:

Statement Showing Working Capital Requirements

	Amount
Current Assets:	
(i) Stock of Raw Materials (for months consumption)
(ii) Work-in-Process (for months):	
(a) Raw Material
(b) Direct Labour
(c) Overheads
(iii) Stock of Finished Goods (for month's sales):	
(a) Raw Material
(b) Labour
(c) Overheads
(iv) Sundry Debtors or Receivables (for month's sales):	
(a) Raw Material
(b) Labour
(c) Overheads
(v) Payments in Advance (if any):	
(vi) Balance of Cash (required to meet day-to-day expenses):	
(vii) Others (if any)	
Less: Current Liabilities:	
(i) Creditors (for months; purchase of Raw Material)
(ii) Lag in payment of expenses (Outstanding expenses month's)
(iii) Others (if any)	
Net Working Capital (C.A. – C.L.)
Add: Provision for Contingencies
Total working Capital Required

Example 2. Delhi Manufacturing company sells goods in the home market only and earns a gross profit of 20% on sales. For the year ending 31st December, 2019, the following figures are available:

Material used	1,12,500
Wages paid	90,000
Manufacturing expenses	1,35,000
Administrative expenses	30,000
Depreciation	15,000
Sales promotion expenses	15,000
Sales	3,00,000

Other particulars are:

- (i) Suppliers of materials provide two months credit.
- (ii) Wages are paid half month in arrear.
- (iii) Manufacturing and administrative expenses are all cash expenses and are paid one month in arrear.
- (iv) Sales promotion expenses are paid quarterly in advance.
- (v) Sales are made at one month's credit.
- (vi) Company wishes to keep one month stock of raw materials and also of finished goods.
- (vii) The Company believes in keeping ₹ 25,000 available to it including the overdraft limit of ₹ 12,500 not yet utilised by the company.

You are requested to ascertain the requirements of Working Capital for the year 2019.

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Solution. Statement Showing Working Capital Requirement

		₹	
(A)	Current Assets :		
	(i) Debtors $(3,00,000 - 20\% \text{ of } 3,00,000) + 12$	20,000	
	(ii) Advance Payment of Sales Promotion Expenses $\left(15,000 \times \frac{3}{12}\right)$	3,750	
	(iii) Stock of Raw Materials $(1,12,500, 12)$	9,375	
	(iv) Stock of Finished Goods $(1/12 \text{ of } ₹ 2,40,000)$	20,000	
	(v) Minimum Cash Balance	12,500	65,625
(B)	Current Liabilities:		
	(i) Creditors for Raw Materials $\left(1,12,500 \times \frac{2}{12}\right)$	18,750	
	(ii) Outstanding Expenses:		
	(a) wages $\left(90,000 \times \frac{1}{24}\right)$	3,750	
	(b) Manufacturing expenses $\left(1,35,000 \times \frac{1}{12}\right)$	11,250	
	(c) Administrative Expenses $\left(30,000 \times \frac{1}{12}\right)$	2,500	(-) 36,250
	Amount of Required working Capital (A) - (B)		29,375

Working Notes:

1. For calculating the debtors, only cash cost of sales has been taken into account. Thus,

	₹
Sales	3,00,000
(-) Gross Profit 20% on Sales	60,000
Cash Cost of Sales	<u>2,40,000</u>
Debtors $\cong 1/12 \text{ of } ₹ 2,40,000 = ₹ 20,000$	

2. Stock of Finished goods is also taken at cash Cost of Sales. Hence, it is $1/12$ of ₹ 2,40,000 = ₹ 20,000

3. The company wants to maintain ₹ 25,000 including ₹ 12,500 the overdraft limit. Hence the minimum ₹ 12,500 has been taken into account.
4. Depreciation is not a cash expense.

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5.11.5 Operating Cycle Method

This method is more dynamic and refers to working capital in realistic way. Recently this method has gained importance because of its more rational approach based on operating cycles of a firm.

According to this approach, the requirement of working capital depends upon the operating cycle of the business. The operating cycle begins with the acquisition of raw materials and ends with the collection of receivables. It may broadly be classified into the following four stages, viz.,

- (i) Raw material and stores storage stage;
- (ii) Work-in-process stage;
- (iii) Finished goods inventory stage; and
- (iv) Receivables collection stage.

In this method, the following four steps are involved to estimate the requirements of working capital:

- (i) **Duration of Operating Cycle:** The duration is computed in days by adding together the average storage period of raw materials, works-in-progress, finished goods and the average collection period and then deducting from the total, the average payment period.

Symbolically, the duration of the working capital cycle can be put as follows:

$$O = (R + W + F + D) - C$$

Where:

- O = Duration of Operating cycle
 R = Raw material average storage period
 W = Average period of work-in-process
 F = Finished goods average storage period
 D = Debtors collection period
 C = Creditors payment period.

Each of the components of the operating cycle can be calculated as follow:

$$R = \frac{\text{Average stock of raw materials and stores}}{\text{Average Raw Materials and stores consumption per day}}$$

$$W = \frac{\text{Average work-in-process inventory}}{\text{Average cost of production per day}}$$

$$F = \frac{\text{Average finished stock inventory}}{\text{Average cost of goods sold per day}}$$

$$D = \frac{\text{Average book debts}}{\text{Average credit sales per day}}$$

$$C = \frac{\text{Average trade creditors}}{\text{Average credit purchases per day}}$$

- (ii) **Number of Operating Cycles in Operating Period:** This is found out by dividing the total number of days in the operating period by the number of days in the operating cycle as shown below:

$$N = \frac{P}{O}$$

where:

N = Number of Operating Cycles in the operating period

P = Number of days in the operating period

O = Duration of operating cycle (in days)

Suppose the operating period is one year (360 days) and the duration of operating cycle is 60 days then number of operating cycles in the operating period will be calculated as follows:

$$N = \frac{360}{60} = 6 \text{ Cycles}$$

- (iii) **Total amount of Annual Operating Expenses:** These expenses include purchase of raw materials, direct labour costs and the overhead costs-calculated on the basis of average storage period of raw materials and the time-lag involved in the payment of various times of expenses. The aggregate of such separate average amounts will represent the annual operating expenses.
- (iv) **Estimating the Working Capital Requirement:** This is calculated by dividing the total annual operating expenses by the number of operating cycles in the operating period as shown below:

$$R = \frac{E}{N}$$

where:

R = Requirement of Working Capital (Estimated)

E = Annual Operating Expenses

N = Number of Operating Cycles in the Operating Period.

In order to provide for contingencies, some extra amount generally calculated as a fixed percentage of the working capital may be added as a margin of safety.

The estimation of working capital by operating cycle method can be understood with the help of following example :

Example 3. From the following information extracted from the books of a manufacturing company, compute the operating cycle in days:

Period covered	365 days
Average period of credit allowed by suppliers	16 days
Raw materials consumption	₹ 73,000
Average total of debtors outstanding	₹ 7,900
Total production cost	₹ 1,09,500
Total cost of sales	₹ 1,13,150
Sales for the year	₹ 1,80,000
Value of average stock maintained:	
Raw Material	₹ 5,600
Work-in-progress	₹ 4,800
Finished goods	₹ 4,340

Solution.

Computation of Operating Cycle

- (i) Material Storage Period

$$= \frac{\text{Average Stock for the year}}{\text{Daily Average Consumption}}$$

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(ii) Production Process Period

$$= \frac{5,600}{73,000 \div 365}$$

$$= \frac{5,600}{200} = 28 \text{ days}$$

(iii) Finished Goods Storage Period

$$= \frac{\text{Average W.I.P.}}{\text{Average Production Cost}}$$

$$= \frac{4,800}{1,09,500 \div 365}$$

$$= \frac{4,800}{300} = 16 \text{ days}$$

(iv) Debtors Collection Period

$$= \frac{\text{Average Stock of Finished Goods}}{\text{Average Cost of Sales}}$$

$$= \frac{4,340}{1,13,150 \div 365}$$

$$= \frac{4,340}{310} = 14 \text{ days}$$

$$= \frac{\text{Average Debtors}}{\text{Daily Average Sales}}$$

$$= \frac{7,900}{1,80,000 \div 365} = \frac{7,900 \times 365}{1,80,000}$$

$$= 16 \text{ days approximate}$$

(v) Average Credit Period Granted by Suppliers = 16 days (given)

$$\text{Operating Cycle Period} = (28 + 16 + 14 + 16) - 16$$

$$= 74 - 16$$

$$= 58 \text{ days}$$

MANAGEMENT OF CASH**5.12 INTRODUCTION OF CASH**

It is the duty of the Finance Manager to provide adequate cash to all segments of the organization. At the same time, he has also to ensure that no funds are blocked in idle cash as this will involve cost in terms of interest to the concern. A sound cash management scheme has to maintain the twin objectives of liquidity and cost.

The term cash management refers to the management of cash and 'near cash assets'. While cash includes coins, currency noted, cheques, bank drafts, and the demand deposits, the near-cash assets include marketable securities and time deposits with banks. Such securities and deposits are easily convertible into cash.

5.13 MOTIVES FOR HOLDING CASH

In spite of the fact that cash does not earn any substantial return for the business, it is held by the concern with the following motives:

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1. **Transaction Motive:** A company enters into a variety of business transactions resulting both inflows and outflows of cash. At times the cash outflows exceed the cash inflows. In order to meet the business obligations in such situation, it is necessary to maintain adequate cash balance. Thus, cash balance is maintained by a firm with the motive of making routine business payments.
2. **Precautionary Motive:** A firm holds cash balance to meet sudden cash needs arising out of unexpected contingencies such as floods, strike, obsolescence, sharp increase in prices of raw materials, presentation of bills for payment earlier than the expected date, excessive delay in collection of bills receivable, business recession, etc. More amounts of cash will be kept by the firm if there is more possibility of such contingencies.
3. **Speculative Motive:** A firm also keeps cash balance to take advantage of unexpected business opportunities. Such motive is, therefore, of speculative nature. For instance, a firm may like to take advantage of an opportunity of buying raw materials at the reduced price on cash down payment or postpone purchase of materials in anticipation of declining prices. Likewise, it may keep cash balance for making profit by purchasing securities in times when their prices fall on account of tight money conditions.
4. **Compensation Motive:** Banks provide certain services to their customers free of charge. So, they usually require the customers to keep minimum cash balance with them, which enables them to earn interest and compensate them for the free services so rendered.

5.14 PROBLEMS OF CASH MANAGEMENT

The problems of cash management are as follows:

1. **Controlling Level of Cash:** One of the basic objectives of cash management is to minimize the level of cash balances with the firm. This objective is sought to be achieved by means of the following:
 - (i) **Preparing Cash Budget:** Cash budget is the most important device for planning and controlling the use of cash. It involves a forecast of future cash receipt and cash payment of the firm over various time intervals. It reveals to the financial manager the times and amount of expected cash receipts and cash payments over a period of time. On the basis of this information the finance manager can determine the future cash needs of the firm, plan for financing these needs and exercise control over the cash and liquidity of the concern.
 - (ii) **Providing for Unpredictable Discrepancies:** Cash budget shows discrepancies between cash receipts and payments on the basis of normal business activities. It does not take into account certain unpredictable discrepancies between cash inflows and outflows or accounts of certain unforeseen circumstances like strikes, lock-out, recession, sharp rise in prices of raw materials, natural calamities etc. A reasonable amount of cash balance, therefore, has to be kept for meeting such unpredictable contingencies. Provision for contingencies is made on the basis of past experiences and some intuition about the future.

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- (iii) **Availability of Alternative Sources of Funds:** A firm need not keep large cash balance, if it has arrangements with banks for borrowing money in times of emergencies. Thus, if a company has cordial relations with its bankers, it may obtain the requisite funds from the banks to meet the unexpected challenges, and keep only a reasonably low amount of cash with it.
2. **Controlling Inflows of Cash:** In order to prevent fraudulent diversion of cash receipt and speeding up collections of cash, an adequate control on cash inflow, if necessary. A properly installed internal check system can, to a great extent, minimize the possibility of fraudulent diversion of cash. Speedier collection of cash can be made possible by adoption of the following two techniques, which have been found quite useful and effective in the U.S.A.:
- (i) **Concentration of banking system:** It is a system of decentralizing collection of account receivable. According to this system, company's regional branch offices are authorized to collect the payments from the customers, and deposit in the local bank accounts. Instructions are given to the regional or local collection centers to transfer the funds over a certain limit to the company's head office bank daily. Either telegraphically or by telex. Regional offices at the collection centers maintain an account of cost of remittances paid by them. This system facilitates fast movement of funds. On the basis of the daily report received for the head office bank about the collected funds, the treasurer can use them for disbursement as per requirements. This system is good in cash of large firm having their spread over a large area. The system of concentration banking, therefore, helps in quicker collection of cash.
- (ii) **Lock Box System:** This system is more popular in the U.S.A. and is a further step in speeding up collection of cash. This system has been devised to eliminate delay arising in cash of the concentration banking system on account of a time gap between actual receipt of cheques by the regional collection centers and its actual depositing in the local bank account. Under this system, the company hires a post office box and instructs customers to mail their remittances to the box. The company's local bank is authorized to pick the remittances directly from the local box. The bank picks up the mail several times a day instructions are also given to the local banks to transfer the collected funds to the head office bank when they exceed a certain limit. This system speeds up collection of cheques, and the firm comes to know about the dishonored cheques and weak credit situation very soon. It also reduces the chances of fraud in the cash collection process and controls the cash inflows better. In order to avoid the unnecessary pockets of idle funds, the company should maintain minimum number of bank accounts.
3. **Controlling Outflows of Cash:** An effective control over cash outflow is equally important for conserving cash and reducing financial requirements. Control over cash outflows signifies slow disbursements. A combination of fast collections and slow disbursements will, obviously, result in maximum availability of cash funds. In order to control the outflows of cash efficiently, a firm should keep in view the following considerations:
- (i) **Centralized System for Cash Payments:** It should be followed as compared to decentralized system in cash of collections. All payments should be made from a single control account, i.e., from the central office of the company. However,

local expenses may be paid by the local office of the company. This will result in delay in presenting cheques for payment by creditors who are away from the place of control account.

- (ii) **Payment should be Made on the Due Dates:** Neither before nor after. The company should neither lose cash discount nor its prestige on account of delayed payments. The company should, therefore, make payments within the terms offered by the suppliers.
- (iii) **'Playing Float' Technique:** Should be used by the company for maximizing the availability of funds. The term 'float' means the amount tied up in cheques which have been issued by the company but have not yet been presented for payment by the creditors. As a result of a time lag between issue of a cheque and its actual presentation, the actual bank balance of a firm may be more than the balance shown by its books. This difference is called 'payment in float'. The longer the 'float period' the greater would be the benefit to the firm. The opportunities for playing the float can be expanded by a firm by opening many bank accounts at different places. If the financial manager can accurately estimate the time lag between issue of cheques and actual presentation for payment, the amount of 'payment in float' can be used by the firm during the intermittent period.

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4. **Investment of Surplus Cash:** After controlling cash level-cash inflows and cash outflows, the next problem is that of short term investment of surplus cash available with the firm. This involves two basic problems of determination of the amount of surplus cash and determination of the channels of investment. The cash in excess of the company's normal cash requirements is called surplus cash. While determining the quantum of surplus cash, the financial manager should take into account the minimum amount of cash balance that must be kept in the business to avoid any risk or cost of running out of funds. Such minimum level of cash may be termed as 'safety level for cash'.

Determination of safety level of cash involves the determination of desired days of cash, i.e., the number of days for which cash balance should be sufficient to cover payments, and the determination of average daily cash outflows. After determining the desired days of cash and average cash outflows, safety level for cash can be determined as follows:

Safety Level for Cash = Average Daily Cash Outflows × Desired Day of Cash

5.15. CASH PLANNING AND CONTROL

Cash planning refers to cash forecast. It involves a projection of future cash receipts and cash disbursements of the firm over various intervals of time. The objective of cash planning is to procure adequate cash to the firm to meet its current obligations and expenses as well as to minimize the amount locked up as cash balance.

The ultimate objective of cash planning is to exercise control over cash inflows and cash outflows. Cash control, therefore, involves proper implementation of policies and procedures regarding receipts and payments of cash.

5.15.1 Tools of Cash Planning

Tools of cash planning are as follows:

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1. **Net Cash Forecast:** Net cash forecast involves a projection of the net cash availability to the firm in future. There are two methods of forecasting cash position in a given period, namely,
 - (a) Cash flow method, which projects expected cash receipts and cash disbursements, and
 - (b) Adjusted earning method, which predicts the net cash availability on the basis of estimated cash inflows and outflows.
2. **Cash Budget:** Cash budget is the most significant tool of cash planning. It is a systematic forecast of cash inflows and cash outflows over given period. It reveals the timings and amount of expected cash receipts and cash payments.
3. **Working Capital Analysis:** It is another significant tool of cash planning. It involves forecasting of the value of current assets and current liabilities to know the overall cash position of the firm.

5.15.2 Tools of Cash Control

Tools of cash control are:

1. **Cash Budget:** It is the most significant tool of controlling the use of cash. It provides a comparison between actual and budgeted cash receipts and disbursements locating the points of deviations, if any. The financial manager, after ascertaining the reasons for deviations between the actual and budgeted figures, can take the necessary action to remove them.
2. **Inflows and Outflows of Cash:** In order to check the change to cash position of the firm from one period to another, a cash flow statement is prepared. It helps management in controlling inflows and outflows of cash.
3. **Ratio Analysis:** Ratio analysis is also an important tool of cash control. Different financial ratios are used for this purpose. These ratios include current ratio, liquidity or acid test ratio, receivable turnover ratio, inventory turnover ratio and cash position ratio.

5.16 CASH BUDGET

A Cash Budget is a summary statement of the firm's cash inflows and cash outflows over a projected period of time. It is a mere forecast of cash position of a firm for a definite period. It involves a projection of future cash receipts and cash disbursements over various time intervals.

The significances of cash budget may be summarized as follows:

1. **Helpful in Planning:** It is helpful in planning the most efficient use of cash. It enables the firm to arrange for the deficiency of cash from various possible sources to meet its obligations in time, or to invest the surplus money profitably without any threat to the liquidity of the firm.
2. **Helpful in Determining Future Cash Needs:** Cash budget helps the management in determining the future cash needs of the firm, its timings and the amount of cash well in advance. Cash budget, therefore, helps the management in planning for raising the necessary funds from the most profitable source at reasonable terms and costs.

3. **Helpful in Exercising Control over Cash:** Cash budget also help the management in exercising effective control over cash expenditure and cash receipts. Thus, it helps in maintaining the liquidity of the firm, and also in controlling the mishandling of cash.
4. **Evaluation of Financial Performance:** Cash budget also helps in evaluating the financial performance of the firm. This is done by comparing the actual figures with the budgeted figures. Positive deviations will show efficiency in financial performance of the business.
5. **Helpful in Testing the Productivity of Proposed Expansion Programme:** Cash budget is also helpful in testifying the productivity of proposed projects or expansion programmes. This is done by making a comparison between the budgeted and actual figures of cash inflows.
6. **Determination of Sound Dividend Policy:** Cash budget helps in determining a sound dividend policy, as it plans for cash dividend to the company shareholder's in accordance with the liquid position of the company.
7. **Basis of Long-term Planning:** Cash budget serves an important basis of long-term financial planning, and is significantly helpful in establishing co-ordination between various finance functions such as—sales, credit, investment, working capital etc.

5.17 METHODS OF PREPARING CASH BUDGET

We have discussed in detail the methods for preparing Cash Budget earlier in Chapter-6, Budgetary Control in part-A of this book. A brief introduction of all methods is as follows:

A cash budget can be prepared by any of the following three methods:

1. Receipt and Payment Method,
2. Adjusted Profit and Loss Method,
3. Balance Sheet Method.

1. **Receipt and Payment Method:** It is most simple and popular method of preparing cash budget. It is most commonly used in forecasting the short-term cash position of a business concern. For the purpose of preparing cash budget under this method, cash informations are derived from other budgets such as—sales budget, selling and distribution cost budget, production budget, production cost budget, purchase budget, personnel budget, research and development budget, etc.
2. **Adjusted Profit and Loss Method:** This method is also known as Cash Flow Method. It is generally maintained that profits bring cash into business, provided balances of debtors, creditors, stocks, bills receivable and bills payable remained unchanged, and there is no fixed assets expansion or its wearing out. But normally all these items are subject to change and hence there is need for some adjustments because profit may have come into form of some assets. The opening cash balance is adjusted with the expected increases or decreases in current assets (except cash, bank or bank overdraft) and current liabilities, provision for depreciation, special receipts and the net profit for the year before taxation and appropriations. From the aggregate amount of these are deducted the estimated taxes and dividends payable, expenditure on fixed assets and special payments, if any. The resulting balance will represent the estimated cash balance at the end of the budget period.

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3. **Balance Sheet Method:** According to this method of preparing cash budget or cash forecast, a budgeted balance sheet is prepared at the end of the budget with all items of assets and liabilities except cash, bank or bank overdraft. The balancing figure on the asset side will be the estimated cash balance. However, the balancing figure on the liability side of the balance sheet will represent bank overdraft.

This method is similar that of Adjusted Profit and Loss method. Accordingly, it is of limited use for cash planning and control since it estimates the cash position at a particular point of time. It is, thus, suitable for preparing the long-term estimates of cash inflows and cash outflows.

MANAGEMENT OF INVENTORY

5.18 CONCEPT OF INVENTORIES

Inventories are the stocks of goods held by a firm for eventual sale or use in manufacturing goods meant for sale. It includes raw materials, work-in-progress and finished goods. 'Raw materials' are those goods which have not yet been committed to production in a manufacturing concern. They consist of basic raw materials or components. 'Work-in-progress' includes those materials which have been committed to production process but have not yet been converted into finished products. 'Finished Goods' are the completed products awaiting sale. They are the final output of the production process in a manufacturing concern. In case of wholesale and retail trade, the finished goods inventory is referred to as merchandise inventory.

5.18.1 Benefits of Holding Inventories

The specific benefits of holding adequate inventories are as follows:

1. **Avoiding Loss of Sales:** If a firm maintains adequate inventories, it can execute the customers' orders without any delay and thus avoid any possibility of losing the patronage of customers and hence sales.
2. **Awaiting Quantity Discount:** If a firm maintains sufficient inventories by making bulk purchases, it can avail the benefit of large discounts.
3. **Reducing Ordering Cost:** The firms maintaining adequate inventories can also achieve economies in ordering costs such as typing, checking, approving and mailing. If a firm places only a few large orders in place of numerous mail order. It can reduce the variable ordering cost associated with individual orders.
4. **Reducing the Set-up Cost:** Maintenance of large inventories helps the firm in making substantially high production runs resulting in reducing the set-up costs. For example, the set-up costs associated with a production run are ₹ 500 and the run produces 500 units, the per unit set-up cost will come to ₹ 1. However, subject to the availability of adequate inventories, if the run produces 5,000 units, the set-up cost will be reduced to 10 paise per unit.
5. **Avoiding Interruptions in Production:** Production operations cannot flow smoothly in the absence of sufficient inventories. Thus, maintenance of adequate inventories helps the firm in avoiding delays or halts in production giving rise to production losses.

5.18.2 Risks and Costs of Holding Inventories

The various risks and costs of maintaining higher levels of inventories have been highlighted as follows:

1. **Risks of Holding Inventories:** There are following three risks arising from holding of sufficient inventories :
 - (i) Risk of price decline due to increase in market supply of the product, introduction of a new product, price cutting by the rival firms, etc.;
 - (ii) Risk of product deterioration, which may arise due to holding a product for a too long period or careless storage ;
 - (iii) Risk of obsolescence, which may be due to change in consumers' taste, production technique, improvement in the product design, specifications, etc.
2. **Costs of Holding Inventories:** The costs of holding inventories include:
 - (i) Material costs, comprising the cost of purchasing goods, transportation and holding charges ;
 - (ii) Ordering cost; comprising the variable costs associated with placing an order for purchasing goods, e.g., typing; checking, approving and mailing the order;
 - (iii) Carrying costs, comprising the costs of storage, insurance, spoilage and cost of funds tied up in inventories.

5.19 INVENTORY CONTROL

Inventories mean goods held by a firm for eventual sale. It includes basic raw materials, supplies, purchased parts, work-in-progress and finished goods. The term inventory control refers to a systematic control over the purchasing, storing and using of inventories so as to have the minimum possible cost of inventories.

The term inventory control is used in two ways—'quantity control' and 'value control'. Purchase and production executives use this work in terms of quantity control because they are concerned with the physical control of inventories. On the other hand, financial executive use it in terms of operating or value control because they are concerned with the efficient management of funds in inventories. They are primarily interested in seeing that too much money is not invested in inventories and every rupee spent in inventories is efficiently and effectively utilized. Keeping in view the quantity control and value control, inventory control should meet these two conflicting functions of (i) maintaining adequate inventories for efficient operations, and (ii) maintaining an inventory level that is not detrimental financially.

There are two aspects of inventory control:

1. **Accounting Aspect:** Which is concerned with maintaining documentary evidence of movement of inventories at every stage, right from the time of sales and production budgets are approved to the point when inventories are purchased, committed to production process and turned into finished products.
2. **Operational Aspect:** Which is concerned with maintaining inventory supplies at a level so as to ensure that inventories are available for production and marketing as and when required by maintaining investment in inventories?

The area of inventory management covers the following aspects:

- (i) Determining the size of inventory to be carried;
- (ii) Establishing timing schedules, procedures, and lot of sized for new orders;
- (iii) Co-ordinating sales, production and inventory policies;
- (iv) Ascertaining minimum safety levels;
- (v) Providing proper storage facilities;

- (vi) Arranging the receipts, disbursements and procurement of inventories and developing forms of recording these transactions;
- (vii) Assigning responsibilities for carrying out inventory control functions;
- (viii) Providing the report necessary for supervising the overall activity.

5.20 OBJECTIVES OF INVENTORY MANAGEMENT

The fundamental objective of inventory management relating to the maintenance of inventories at the optimum level may be amplified into the following objectives:

1. **Ensuring Continuous Supply of Material:** The first and foremost objective of inventory management is to ensure a continuous supply of materials so that production is not held up for want of materials. Maintenance of adequate inventories reduce inter-dependence among various stages of operation. It permits the manufacturing operations to continue smoothly without interruptions resulting from days in supplies. Whereas work-in-progress inventories allow production process to proceed uninterrupted because of a temporary failure at a preceding stage in operations, the finished goods inventories reduce the need of scheduling production according to the sales orders.
2. **Efficient Utilization of Production Facilities:** Another objective of inventory management is to achieve the most efficient utilization of the installed production facilities. In many plants, some machines like leather, have capability of producing various kinds of products, yet production of anyone product or its part does not utilize them continuously. However, most machines are used for the production of one item at a time. In such cases, inventories allow continuous use of common-purpose machines and other production facilities.
3. **Controlling Production and Purchase Levels:** Inventory management attempts to exercise control over production and purchase levels. Maintenance of adequate inventories allows a firm in making long production runs and reducing the set-up costs associated with each run. Production can proceed at a uniform rate when sales are slack, and can be released when demand picks up. The firm may purchase inventories in economic lot sizes so that the overall cost of production is minimized. Production variations can also be avoided through prier control over inventories.
4. **Maintaining Buffer Stock against Fluctuations in Demand:** Since production is based on sales for casts which are seldom perfectly accurate, one objective of inventory management is to allow continuous production despite fluctuations in sales. When actual sales are less than forecasted, inventories of finished goods are allowed to accumulate. Sales in excess of anticipated demand are met by drawing from these accumulated inventories. This helps in avoiding dislocations caused by rush orders. Thus, inventory control is sought to provide safeguards against fluctuations in demand and avail the opportunities of earning maximum profits.
5. **Minimizing the Wastages:** Minimizing wastage of materials in the course of or chasing, storing and production is another objective of inventory management. Any abnormal wastage of materials by leakage, theft, embezzlement and spoilage due to rust, dust or dirt, should be strictly controlled.
6. **Efficient Service to Consumers:** All production is meant for sale. Thus, maintaining adequate stock of finished goods to meet the expectations of customers for prompt

execution of their orders is an important objective of inventory management. Customers seldom wait for a particular firm to supply their needs. A firm's success depends on its ability to meet customers' demand as and when it comes. Quick deliveries to customers depend upon the availability of inventories of finished goods. Efficient inventory management enables a firm to execute the customers' orders promptly and hence avoid loss of sales in case of non-supply of goods in time.

7. **Maintaining Optimum Level of Inventories:** Maintenance of inventories at the optimum level is the prime objective of inventory management. Optimum level of inventories is attained at a point where marginal cost and benefits of holding inventories are equal. Maintenance of optimum level of inventories helps the firm in achieving flexibility in production, eliminating losses resulting from interruption in production due to stock outs of materials and supplies, taking advantage of quantity discounts, and flexibility in sales.
8. **Efficient Use of Capital:** Keeping investment in inventories at the optimum level is an important financial objective of inventory control. Considering the various costs and benefits associated with maintaining of inventories, the optimum level of investment in inventories is the point at which its marginal cost is equal to its marginal benefit.
9. **Minimizing the Carrying Costs:** One of the main objectives of inventory management is to minimize the carrying costs which comprise of the expenses for storing, insurance, storage, and cost of funds tied up in inventories. Besides these carrying costs, other inventory costs such as—ordering cost, handling cost, transportation cost, etc., should also be controlled in a way that minimizes the cost per unit of inventory.
10. **Economies in Purchasing:** Efficient inventory management attempt of avail the economies in purchasing raw materials, supplies, etc., a firm should take advantage of quantity discounts offered by the suppliers of raw materials, keeping in view that the savings resulting from lower purchase price and ordering costs are more than the costs of carrying these inventories.
11. **Minimizing Risk of Loss:** Minimizing risk of loss due to price decline, product deterioration and obsolescence between the time of purchase and the time of sale is also an important objective of inventory control. Shrinkage in market value may be due to increase in the market supply of the product, price cutting by the competitors, arrival of new of the product, loss from product deterioration may be due to improper storage or holding a product for too long a period. Loss from obsolescence may result from change in customer tastes, new production techniques, improvement in product design, etc. All cost arising from the above risks are directly variable with the value of inventories. Management can, therefore, reduce these costs by holding reasonable stocks of various inventories.

5.21 IMPORTANCE OF INVENTORY MANAGEMENT

Inventories constitute the most significant part of a firm's total working capital; and form a major element of manufacturing cost. A large part of working capital of a firm's working capital is investors. Hence, it has been correctly observed, "if you are in need of money, look to your inventory first." In fact, good inventory management is good financial management.

Since effective inventory management enables a firm to keep materials cost at minimum which is a significant factor in profitable operations of a business, the importance of inventory control through proper planning, purchasing, handling and account can not be over-emphasized. Formulation and

execution of sound inventory management policies is, therefore, a managerial responsibility of the highest order. It is often said that more firms fail on account of absurd and inefficient inventory management than for any other reason. The focal point of inventory management is to avoid over-investment or under-investment in inventories and to maintain inventories at the optimum level for maximizing profits.

5.22. ESSENTIALS OF A GOOD INVENTORY CONTROL SYSTEM

An effective inventory control system should possess the following essentials:

1. **Centralized Purchasing:** Purchasing is the most important aspect of inventory management as a substantial part of the firm's finance is committed to materials inventories which affects the cash flow position of the firm. In order to avoid reckless buying, make continuous availability of materials for uninterrupted production, purchase materials in reasonable quantities to keep investment in materials minimize wastage and loss in production, develop better supplier relationship to ensure best terms of supply of materials, develop alternative sources of material supplies, serve as an information centre on the materials knowledge relating to prices, sources of supply, etc., purchasing should be centralized. All purchases should be made by a separately established purchasing department. The purchase department decides what to purchase? When to purchase? Where to purchase? How much to purchase? At what price to purchase? and procures all types of materials to the firm.
2. **Classification and Codification of Inventories:** An efficient and effective stores control is also essential for a good inventory control system. The investment in materials constitutes a major portion of current assets and represents an effective material control through an efficient and well-equipped stores department. Scientific classification and codification of various items of stores is essential for a good system of stores keeping. The usual inventories maintained by a manufacturing firm include raw materials, work-in-progress and finished goods. Each of these major categories may have a number of sub-divisions. In order to facilitate prompt recording, locating and dealing, each item of inventory must be assigned a particular code for proper identification. Inventories in stores are classified either on the basis of their nature or on the basis of their usage. The former method is widely used, and materials are classified as constructive materials, consumable stores, spare parts, abrasives lubricating oils, etc. After dividing all items into various classifications, each item is assigned a distinctive stores code number. For the purpose of selective control on materials; ABC classification of inventories is very useful for the manufacturing firms.
3. **Standardization and Simplification:** Standardization and simplification of materials is an important consideration of an efficient inventory system. Standardization refers to the fixation of standards of various kinds of inventories, whereas simplification refers to the elimination of excessive types and sizes of inventories. Standardization aims at clear specifications of different items of inventory so that the items of only requisite quality may be purchased, where as simplification aims at reducing the number of items carried in the store. It leads to reduction in carrying costs and investment in materials. Thus, standardization and simplification are the tools of controlling the size of materials as well as reducing the carrying costs.
4. **Adequate Storage and Handling Facilities:** Adequate storage and handling facilities constitute an important factor for an effective inventory control system. Well planned storage and handling of inventories avoid losses from theft, carelessness, damage,

deterioration, evaporation, pilferage, loading and unloading, leakage, inefficient handling, fire, etc.

5. **Adequate Inventory Records and Reports:** Another important consideration in the establishment of an efficient inventory control system is the maintenance of adequate inventory records and reports. Information about availability of various inventories should be adequate enough to meet the needs of purchasing, production, sales and financial departments of the firm. Information required about any kind of inventory may relate to its quantity in hand, location, unit cost, quantity in transit, amount set apart for particular customer or production orders, minimum and maximum quantities, output and sales, economic ordering quantity, re-ordering level, danger level and experiences regarding purchase. Information about absolute and defective stock should also be given to the management so that steps may be taken for the disposal of such stock.
6. **Efficient Staff:** More maintenance of records and establishment of procedures is not sufficient for an efficient system of inventory control because the former is accomplished through the action of people. Records may reveal certain weak points of the existing inventory control system, but the corrective action will have to be taken by the concerned personnel. Thus, efficient, experienced and intelligent personnel should be appointed in purchase, production and sales departments. Trained, qualified, experienced and devoted personnel should, therefore, be entrusted with the task of operating the system of inventory control. It is rightly observed, "*improperly trained and unqualified personnel, as well as improper organization is at the root of less effective inventory control in many business concerns.*"

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5.23 INVENTORY CONTROL TECHNIQUES

The various inventory control techniques used in determining the optimum size of investment in inventories are as follows:

5.23.1 Economic Order Quantity (EOQ)

Determination of the quantity for which the order should be placed is one of the important problems relating to efficient inventory control. Economic order quantity (EOQ) refers to the size of materials to be ordered at one time which gives maximum economy.

Sometimes, the EOQ is also called "Re-ordering Quantity" or "Economic Lot Size". The EOQ is determined in such a way as to minimize the cost of ordering the carrying costs. Thus, it is fixed after taking into consideration the following costs:

- (i) **Ordering Costs:** It is the cost of placing an order and securing the supplies. It includes cost of staff posted in the purchasing department, inspection section and payment department; cost of stationary, postage and telephone charges, thus, this type of cost comprises cost of floating tenders, cost of comparative evaluation of quotations, cost of paper work and postage involved in placing an order, cost of placing an order, cost of inspecting the inventories to be purchased, cost of accounting and making payments. Ordering cost varies from time to time depending upon the number of orders placed.
- (ii) **Carrying Cost:** It is the cost of holding inventories, and includes the cost of storage, cost of handling and transportation, cost of investment blocked in inventories, cost of spoilage, cost of obsolescence, cost of insurance, etc. All these costs taken together account for 20-25 percent of the cost of inventories per annum in India. The larger the volume of inventory, the higher will be the carrying cost. Either of these two costs

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affects the profits of the firm adversely. A balance between the cost of carrying adequate inventories as cost of not carrying adequate inventories determines the optimum level of inventories, where total cost is minimum. As discussed above, the cost of carrying includes, clerical, handling, transportation, insurance, storage, obsolescence, spoilage and other costs as well as interest on investment lock up in inventories. The costs of non-carrying adequate inventories includes extra cost of purchasing, handling and transportation, foregone quantity discount, extra cost of over-time, set-ups hiring and training as a result of disruption in production due to stock-outs, foregone contribution margin on lost sales, additional costs of uneconomic production runs, loss of customer goodwill associated with carrying too little inventory. With the interaction of these two costs, the optimum level of inventory is determined, where total annual cost of holding inventories is minimize.

The Economic Ordering Quantity can be determined by any of the following two methods:

1. Tabular Method.
2. Mathematical Method.

1. **Tabular Method:**

This technique is based on detailed analysis of data related to lot of sizes and their costs. A table can be constructed displaying costs involved for the various lots of quantities.

The mechanics of the computation of E.O.Q. by this method is illustrated in following example.

Example 4. A factory uses annually 24,000 units of a raw material which costs ₹ 10 per unit. Placing each order costs ₹. 30, and the carrying cost is 10% per year of the average inventory. The company has several alternatives regarding the number of orders to fulfill the annual requirement—2, 4, 8, 16, 20, 24 or 30 orders. Determine the economic order quantity by tabular method. What would be ordering and carrying cost at this optimum order quantity?

Solution.

$$\text{Given: } R = 24,000 \text{ unit } P = ₹ 1, CP = ₹ 30, CH = 10 \times \frac{10}{100} = ₹ 1$$

Table showing the Inventory Cost for Different Order Quantities

No. of Orders per year	Order quantity	Ordering cost in a year	Average Inventory	Annual carrying cost	Total Cost (C + E)
A	B	C	D	E	F
$\frac{R}{q_o}$	q_o	$\frac{R}{q_o} \times C_p$	$\frac{q_o}{2}$	$\frac{q_o}{2} \times C_u$	
		₹		₹	₹
2	12,000	60	6,000	6,000	6,060
4	6,000	120	3,000	3,000	3,120
8	3,000	240	1,500	1,500	1,740
16	1,500	480	750	750	1,230
20	1,200	600	600	600	1,200
24	1,000	720	500	500	1,220
30	800	900	400	400	1,300

It is clear from the above table that the carrying and ordering costs taken together are the lowest for the order size of 1,200 units. This, therefore, is the economic order quantity.

2. Mathematical Method:

This is a simple method for calculating E.O.Q. According to this method following mathematical formula is used for calculating E.O.Q.

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$$\text{E.O.Q.} = \sqrt{\frac{2R.C_p}{C_H}}$$

where,

R = Annual Requirement in Units

C_p = Ordering cost per order or set-up cost per set-up or cost placing in each order.

C_H = Holding (Carrying) cost per unit per year.

E.O.Q. = Economic order Quantity or Economic Lot Size

Example 5. Find out the E.O.Q. and No. of orders to be placed during the year from the following information :

Annual consumption = 120 Units

Buying cost per order = ₹ 20

Per unit price = ₹ 100

Storage and carrying cost as a % of average inventory = 12%

Solution.

Given: R = 120 units, C_p = ₹ 20, P = ₹ 100, C_H = 12%

i.e., $100 \times \frac{12}{100} = ₹ 12$

$$\begin{aligned} \text{E.O.Q.} &= \sqrt{\frac{2R.C_p}{C_H}} \\ &= \sqrt{\frac{2 \times 120 \times 20}{100 \times 12\%}} \\ &= \sqrt{\frac{240 \times 20}{12}} = \sqrt{20 \times 20} = 20 \text{ units} \end{aligned}$$

No. of Order to be placed in a year

$$= \frac{R}{q_0} = \frac{120}{20} = 6 \text{ orders}$$

E.O.Q. = 20 units; Orders to be placed in a year = 6

Calculation of Total Inventory Cost : In order to calculate the total inventory cost following are summed up:

(i) Purchase Cost of Material = R × P

Where, R = Annual Requirement of Material

P = Purchase Price per unit

(ii) Total Ordering Cost = $\frac{R}{q_0} \times C_p$

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Where, R = Annual Requirement of Material

C_p = Ordering Cost per order

q_0 = Quantity to be ordered

$$(iii) \text{ Total Carrying Cost} = \frac{q_0}{2} \times CH$$

Where, q_0 = Quantity to be ordered

C_H = Holding cost per unit per year

In brief, TIC = Material Purchase Cost + Ordering Cost + Carrying Cost

$$\text{Total Inventory Cost (TIC)} = (R \times P) + \left(\frac{R}{q_0} \times C_p \right) + \left(\frac{q_0}{2} \times C_H \right)$$

Minimum Inventory Cost at EOQ Level

$$= \sqrt{2 \cdot R \cdot C_p \cdot C_H}$$

Quantity Discount or Price Breaks

The EOQ model, as given above, assumes that the purchase price per unit is fixed and constant irrespective of the number of units purchased by the firm. However, in practice, it is not so and very often, the seller offers a discount for purchase of a particular quantity. If so, then greater the order size, the lower will be the cost per unit. This affects, therefore, the applicability of the EOQ model.

The discount in price affects inventory cost in three ways:

- As the price per unit purchased is reduced, the total purchase cost will decrease to that extent.
- Saving in total ordering cost, as fewer orders will be placed is a result of higher quantity per order.

Example 6. A manufacturer requires 4,000 kg. of a raw material annually. The ordering cost is ₹ 5 per order. The carrying cost is estimated to be 8% of a average inventory per year. The purchase price of the raw material is ₹ 2 per kg. Find the Economic lot size and the total cost. The manufacturer is offered a 5 % discount in purchase price for order of 800 kg. or more but less than 2,000 kg. A further 2% discount is available for order of 2,000 kg. or more. Which of the three ways of purchase he should adopt.

Solution.

$$\text{Given : } R = 4,000 \text{ kg., } CP = ₹ 5, CH = 2 \times \frac{8}{100} = ₹ 0.16$$

Purchase price, per kg. = ₹ 2

$$\text{E.O.Q.} = \sqrt{\frac{2 \cdot R \cdot C_p}{C_H}} = \sqrt{\frac{2 \times 4,000 \times 5}{0.16}} = \sqrt{2,50,000} = 500 \text{ kg.}$$

Total Inventory Cost :

(i) Cost of Material = $R \times P = 4,000 \times 2 =$	₹ 8,000
(ii) Ordering Cost = $\frac{R}{q_0} \times C_p = \frac{4,000}{500} \times 5 =$	40
(iii) Carrying Cost = $\frac{q_0}{2} \times C_H = \frac{500}{2} \times 0.16 =$	40

Total Inventory Cost

8,080

Total Inventory Cost in case of 5% Discount offer.

$$R = 4,000 \text{ kg.}, C_p = ₹ 5, P = 2 - \left(\frac{2 \times 5}{100} \right) = 1.90,$$

$$C_H = 1.90 \times \frac{8}{100} = ₹ 0.152, q_0 = 800 \text{ kg.}$$

(i) Cost of Material = $4,000 \times 1.90 =$	₹ 7,600.00
(ii) Ordering Cost = $\frac{4,000}{800} \times 5 =$	25.00
(iii) Carrying Cost = $\frac{800}{2} \times 0.152 =$	60.80
Total Inventory Cost	7,685.80

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Total Inventory Cost in case of 7% Discount.

$$R = 4,000 \text{ kg.}, C_p = 5, P = 2 - \left(2 \times \frac{7}{100} \right) = 1.86, C_H = 1.86 \times \frac{8}{100} = 0.1488, q_0 = 2,000 \text{ kg.}$$

(i) Cost of Material = $4,000 \times 1.86 =$	₹ 7,440.00
(ii) Ordering Cost = $\frac{4,000}{2,000} \times 5 =$	10.00
(iii) Carrying Cost = $\frac{2,000}{2} \times 0.1488 =$	148.80
Total Inventory Cost	7,598.80

Assumptions or Limitations of EOQ: The EOQ model of inventory control is based on the following assumptions:

- (a) The firm knows with certain the annual usage or demand of a certain item of inventory. This assumption is not true because there is a discrepancy between actual and anticipated demand for particular items of inventory.
- (b) The rate at which the firm uses inventories or makes sales is constant throughout the year. This assumption is also not valid.
- (c) The orders for replenishment of inventory are placed exactly when inventories reach the zero level. This assumption is also of doubtful validity.

5.23.2 Determination of Stock Levels

Various stock levels are determined as follows:

1. Re-order Level

Re-order level is that level of material stock at which it is necessary to take the steps for procurement of further lots of material. This is the level falling in between the two existences of maximum level and minimum level and is fixed in such a way that the requirements of production are met properly till the new lot of material is received. The re-order level depends upon:

- (i) **Minimum Stock Level or Safety Stock:** Safety stock is a buffer to meet some unanticipated increase in usage. This represents the quantity which must be maintained in hand at all times.

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- (ii) **Procurement Time or Lead Time:** The term 'lead time' refers to the time normally taken in receiving the delivery of inventory after the order has been placed.
- (iii) **Daily Usage Rate of Inventory:** The rate at which the inventory is being used up is called the usage rate.

Formula for Computation of Re-order Level:

- (a) **When safety stock, daily usage rate and lead time are given :**

$$\text{Re-order Level} = \text{Safety Stock} + [\text{Daily Usage Rate} \times \text{Lead Time in Days}]$$

$$\text{or} \quad = \text{SS} + [r \times t_p]$$

- (b) **When Maximum usage rate and Maximum procurement time are given:**

$$\text{Re-order Level} = \text{Maximum Usage Rate} \times \text{Maximum Procurement Time}$$

2. Minimum Stock Level

Minimum stock level is the lower limit below which the stock of any inventory item should not normally be allowed to fall. This level is also called safety stock or buffer stock level. The main object of establishing this level is to protect against stock out of a particular stock item and in fixation of which average rate of consumption and the average time required for replenishment, i.e., lead time are given prime consideration. Symbolically :

$$\text{Minimum Stock Level} = \text{Reorder Level} - (\text{Average or Normal Usage Rate} \times \text{Average or Normal Lead Time})$$

Where,

$$\text{Average or Normal Usage Rate} = \frac{\text{Maximum Usage Rate} + \text{Minimum Usage Rate}}{2}$$

$$\text{Average or Normal Lead Time} = \frac{\text{Maximum Lead Time} + \text{Minimum Lead Time}}{2}$$

3. Maximum Stock Level

Maximum stock level represents the upper limit beyond which the quantity of any inventory item is not normally allowed to rise to ensure that unnecessary working capital is not blocked in stock items.

The following formula may be used for calculating maximum stock level :

$$\text{Maximum Stock Level} = \text{Minimum Level} + \text{Reorder Quantity}$$

$$\text{or} \quad = (\text{Reorder Level} + \text{Reorder Quantity}) - [\text{Minimum Usage Rate} \times \text{Minimum Delivery (Lead) Time}]$$

4. Average Stock Level

The average stock level can be expressed in the formula given below :

$$\text{Average Stock Level} = \frac{\text{Maximum Stock Level} + \text{Minimum Stock level}}{2}$$

$$\text{or} \quad = \text{Minimum Level} + \frac{\text{Reorder Quantity}}{2}$$

5. Danger Level

This is the level fixed below minimum level. If the stock reaches this level, it indicates the need to take urgent action in respect of getting the supply. At this stage, the company may not be able to make the purchases in a systematic manner but may have to make rush purchases which may involve higher purchases cost. The following formula may be used for calculating 'Danger Level':

$$\text{Danger Level} = \text{Average usage rate} \times \text{Lead time for emergency purchase}$$

Example 7. From the following information, determine the reorder point, minimum stock level and the maximum stock level:

- (i) Minimum Consumption = 100 Units per day
- (ii) Maximum Consumption = 175 Units per day
- (iii) Normal Consumption = 125 Units per day
- (iv) Reorder Qty. = 1,500 Units
- (v) Minimum period for receiving goods = 7 days
- (vi) Maximum period for receiving goods = 15 days
- (vii) Normal period of receiving goods = 10 days

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Solution.

$$\begin{aligned}\text{Reorder Point} &= \text{Maximum Consumption} \times \text{Maximum period for receiving} \\ &\quad \text{goods} \\ &= 175 \times 15 = 2,625 \text{ units}\end{aligned}$$

Minimum Inventory (Safety Stock) :

$$\begin{aligned}&= \text{Reorder Point} - (\text{Normal Consumption} \times \text{Normal period} \\ &\quad \text{for receiving goods}) \\ &= 2,625 - (125 \times 10) = 2,625 - 1,250 = 1,375 \text{ units}\end{aligned}$$

Maximum Stock Level :

$$\begin{aligned}&= \text{Reorder Point} (\text{Minimum Consumption} \times \text{Minimum} \\ &\quad \text{delivery period}) + \text{reorder Qty.} \\ &= 2,625 - (100 \times 7) + 1,500 = 3,425 \text{ units}\end{aligned}$$

5.23.3 - Two-Bin System

This system of inventory control is usually followed for low-cost high-volume items which have regular usage. Under this system all inventory items are kept in two lots. One lot equal to reorder quantity is kept separately in a bin. The other lot is kept for issue against current requisitions. When this lot is finished and reordering occurs, the current requirements are met from the stock reserved in the second bin. The particular item of inventory is then purchased to bring the stock to the maximum level. If a firm wants to have a safety stock, it is kept separately in a third bin or shelf. This system is simple and inexpensive. It helps in exercising an effective physical control over inventories. However, a periodical review of reorder quantity, minimum and maximum stock levels is necessary for maintaining the inventories. However, a periodical review of reorder quantity, minimum and maximum stock levels is necessary for maintaining the inventories at the optimum level.

5.23.4 Perpetual Inventory System

This is a system of records maintained by the controlling department, which reflect the physical movements of stocks and their current balance. This system is based on bin cards on stores ledger as they make a record of the physical movement of stocks and also reflect the balance in the stores. This system of inventory control facilitates regular physical checking of stocks without closing down the work for stock taking. To ensure the accuracy perpetual inventory records, continuous stock taking is necessary. It is possible that the balance of stock shown by records may differ from the actual balance ascertained by physical verification due to clerical mistakes, pilferage and theft of inventories, short or over issue of stocks, carelessness in handling of inventories, shrinkage and

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evaporation, fire breakdown etc. Thus, the basic objective of maintaining systematic inventory records on a continuous basis is to have accurate information about the stock level of every item at any time. It also contains information relating to the quality of inventories ordered from time to time. Under the perpetual inventory record system, inventories are generally controlled on the basis of minimum inventory level and reorder quantity. A maximum inventory level is also fixed after considering the needs for safety stocks.

The perpetual inventory control system helps in avoiding over-stocking and under-stocking of inventories and serves as continuous system of internal check against abnormal loss or wastage. It enables the management to keep the investment in inventories under control and minimize the carrying costs.

5.23.5 Inventory Turnover Ratios

Inventory turnover ratio is also one method of exercising control over inventories. Inventory turnover ratios for various items are calculated to minimize the investment in inventories. Inventory turnover ratios for various items are calculated to minimize the investment in inventories. Average inventory is the average of the opening stock and closing stock.

For control purposes, it is essential to compute and compare the turnover rate of different times of inventory, so that to identify the slow moving inventories and avoid excessive investment of funds in such items. A low turnover ratio is an indicator of slow moving stock, accumulating of obsolete stock or carrying of excessive stock. On the contrary, a high turnover is an indication of fast moving stock and less investment in stock. Obviously, a low inventory turnover ratio leads to the higher carrying costs and risks as well as unnecessary blockage of investment. If the turnover ratio for a particular item is zero, it means that the item has not been used during the period and should be immediately disposed off in order to avoid the loss arising from the deterioration in quality of such item. Spare parts of machinery in use are an exception of this

For comparing the inventory turnover ratios of different items of inventory with the ratios of the earlier period as well as with each other, it will be worthwhile to have a discussion on different categories of inventories, which are as follows:

1. **Fast-moving Inventories:** These are inventories which are demanded regularly. Stocks of such inventories should be maintained at a higher level so that production operations may not suffer due to their shortage. These inventories have a high turnover rate.
2. **Slow-moving Inventories:** These are inventories which are not demanded at frequent intervals. These inventories have low turnover ratio. An attempt should, therefore, be made to keep such inventories at a low level.
3. **Dormant Inventories:** Those items of inventory which are seldom demanded are called dormant inventories. Decision regarding the level and desirability of holding such inventories should be taken judiciously.
4. **Obsolete Inventories:** These are inventories which are no more in demand because of their being out of date. Such inventories should be disposed of immediately so that their carrying costs and further deterioration in their value may be avoided.

5.23.6 Inventory Control through ABC Analysis

It is selective inventory control technique. This technique is based on the assumption that all inventory items do not require the same degree of control. Since a large number of manufacturing firms keep thousands of items of inventory, it is neither possible nor necessary to exercise the same degree of control on all the items. It is always desirable to exercise a greater degree of control on costly items as compared to those items which are less costly. According to this approach, all inventory items are divided into three categories A, B and C.

A-Category items represent a large value for a few items, while B - category items are numerous but represent smaller value, and C-category items are too numerous but represent the minimum value. Such an analysis of inventories is known as ABC analysis. Since this technique of inventory control gives more emphasis on important items, it is also known as 'Control by Importance and Exception'. This technique is also known as 'Always Best Control' as Always Better Control. Since the items of inventory are classified in accordance to their relative value, the ABC analysis is also known as 'Proportional Parts Value Analysis'. The general procedure for classifying the inventories into A, B, and C categories is as follows:

1. Determine the cost and consumption of each item of inventory over a given period.
2. Determine the net value of each item of inventory by multiplying the estimated quantity with the unit cost of the respective items.
3. List all items of inventory with their respective quantity and value, and arrange on total inventory in descending order.
4. Find out the total value and total number of items, and calculate percentage on total inventory in value and in number.
5. Draw a curve of percentage items and percentage value.
6. Mark off from the curve the percentages of total value of total items covered by A, B, and C categories, as decided by the management.

While exercising control over inventories, greater attention should be paid to A-category inventory items, and least attention to the bulk of inventories comprising C-category. B-category inventory items are subject to routine control.

However, the greatest setback of this system is that it ignores the significance of a particular item of inventory by analyzing the items according to their value.

The classification of store items into various categories is made on the following basis:

Category A—Constituting 60 to 70 per cent and 10 to 15 per cent of the store value and store items respectively.

Category B—Representing about 20 to 25 per cent of both store value and store items respectively.

Category C—Comprising 10 to 15% and 60 to 70 per cent of the store value and store items respectively.

Hence ABC analysis suggests greater care for the "A" category items and less control for the items in category "C". It is necessary to mention here that ABC technique takes into consideration annual consumption of the items rather than its unit cost while deciding about the categories of the items into A, B, and C. The important aspects of material management like purchase, inventory control, inspection, store keeping are within the scope of A-B-C analysis. The application of this technique is based on the following fundamental principles:

- (i) to ensure supply of material as per to the requirements of the production; and
- (ii) to avoid unnecessary blockage of capital in the inventory.

5.23.7 Aging Schedule of Inventory

Control on various items of inventory can also be exercised by preparing aging schedule of inventory. Classification of inventories according to age can greatly help the management in identifying the vital items of inventory which are moving fastly into production or sales, as well

as those items of inventory which are slow-moving. This requires the classified information regarding data of purchase or manufacture of each item of inventory and their values.

It is evident from the above aging schedule of inventories that 60 per cent of the total inventory falls within the age-group of 46-60 days, while 12 per cent is older than 60 days. In case, the stocks of these inventories are not cleared, it is possible that more than 70 per cent inventories may suffer deterioration in their values or may even become obsolete.

5.23.8 Budgetary Control System

Budgetary control system is also a commonly practiced technique of inventory control. Under this system, inventory budgets are prepared taking into account the inventory requirements during the budget period, purchase timings, rates, terms and condition of purchase, inventories and their control. The budgeted figures are then compared with the actual ones, and appropriate corrective action is initiated to control the variations. Budgetary control ensures the best utilization of inventories. It helps in systematic inventory planning and formulation of inventory policies. It also helps in determining the optimum investment in inventories, and limiting the chances of inventories wastages and losses.

5.24. FACTORS DETERMINING OPTIMUM INVESTMENT IN INVENTORY

The basic objective of inventory management is to maintain adequate stocks of goods to meet the requirements of production and sales as well as to keep the investment in inventories to an optimum level, *i.e.*, at a level at which marginal cost of inventories is equal to their marginal benefit. Excessive stocks of inventory result in high carrying costs which lead to reduce the profitability as well as the liquidity of the firm. On the other hand, shortage of inventories results in production interruptions and loss of sales, both of them result in reducing the profitability of the firm. The various internal and external factors determining the optimum level of investment in inventories are as follows:

1. **Seasonal Nature of Input and Output:** If certain raw materials are available only during a particular season, whereas they are continuously required throughout the year for running the production operations of the firm, the investment in such inventories would be larger. Likewise, seasonal industries such as woollen, sugar etc., purchase raw materials in a particular season. Thus, their investment in inventories in that particular season is very high. On the other hand, if demand for finished product is not stable or it is seasonal, the firm will have to maintain the finished goods inventory in orders to meet customers demand. Moreover, such firms will follow longer production-run during the period of peak demand. Thus, will call for more investment in inventories during the low-demand and off-season period.
2. **Length of Operating Cycle:** Investment in inventories depends on the length of its operating cycles. Inventories of raw materials are needed for manufacturing; work in-process inventories accumulate due to the time-lag between the feeding of raw materials into machines and turning out of the finished products, and finished goods inventories pile up because of the time gap between manufacturing of finished goods and sales. Thus, shorter the time-lag between the purchase of materials and manufacture of finished products, between the sales and production of goods, and between sales and purchase of goods, lesser will be the investment in inventories, and vice versa. Thus, a firm can reduce investment in inventories by shortening its operating cycle.

3. **Nature of Product and Production Technology:** The size of investment in inventories is also influenced by the nature of product and production technology. Manufacturing process always involves a time-lag between the feeding of raw materials in the manufacturing line and turning out of the finished product. The length of this period depends on the nature of products and production technology. For example, ship-building industry will require larger investment inventories because the nature of product is such which needs much time in its completion. The firms having developed production technology and efficient production planning and control have a high inventory turnover ratio due to short length of the manufacturing cycle, and hence do not require heavy investment in inventories.
4. **Nature of Business:** Investment in inventories is also determined by the nature of a firm's business. Trading firms have to invest huge funds in inventories. On the other hand, service industries such as insurance, banking transport, etc., need relatively much less inventories, and hence much less investment in inventories. Manufacturing business generally stand in between these two extremes in respect of investment in inventories.
5. **Economies of Size:** The size of investment in inventories is also influenced by the firm's desire to avail the economies of scale. If raw materials are available on long credit, favourable terms and attractive quantity discount, the firm may have larger investment in inventories. However, a firm should take advantage of the favourable terms of purchase only if savings resulting from such terms are more than the cost of carrying these inventories.
6. **Supply Conditions:** A firm's success depends on its ability to meet customers' demand as and when it exists. Quick deliveries depend on inventories as well as flexibility in manufacturing. Short notice increase in manufacturing depends on the availability of materials. Thus, if supply conditions are certain to meet the operating continuity, there will be relatively low investment in inventories. However, if supply of materials is uncertain or irregular, a firm will have a large investment in inventories so that chances of stock outs and interruptions in production may be avoided.
7. **Price Level Changes:** Price level changes also influence the size of investment in inventories. Some materials, particularly of seasonal nature such as oil seeds, cotton, jute, etc., are cheaper during the season. The manufacturing firms will invest more in inventories to protect themselves against shortages and off-season high prices. Similarly, if price rise is expected in near future, there will be more investment in inventories so as to avail the benefit of lower prices in a bid to minimise the cost of production. Conversely, if the price level is expected to go down, a firm will make the minimum investment in inventories by resorting to open market purchase of materials as per its requirements.
8. **Production Policies:** The production policies also influence the size of investment in inventories. If management decides for long production runs, the investment in inventories of raw materials and semi-finished goods will be higher, and vice versa.
9. **Credit Facilities:** The size of investment in inventories also depends on the availability of credit facilities. If the cost of borrowed funds or terms of credit sales are such which do not give rise to the cost of inventories, the investment in inventories will be higher. However, where the cost of carrying inventories and cost of credit facilities is more than the cost of borrowed funds, the investment in inventories will be less.
10. **Other Factors:** Other factors such as stock out costs, deterioration and obsolescence costs, shortage, insurance and depreciation costs, also effect the decision in respect of investment in inventories.

5.25 ROLE OF FINANCE MANAGER IN INVENTORY CONTROL

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Although the finance manager is not directly concerned with inventory policies, yet he can not ignore them since they have a direct bearing on the financial needs of the firm. It is, therefore, necessary for the finance manager to exercise effective financial control over inventories by purchase, production and sales departments. He has to play a very important rôle in the formulation of inventory policies so that the cash outlays for inventories can be reduced to the optimum level, and sufficient funds could be made available for more profitable purposes. An effective inventory control, in fact, is reflected in profitability and liquidity of the firm, which largely depends upon the efficient financial control over inventories. The finance manager makes all efforts to reduce investment in inventories to the optimum level by reducing lead time, regulating usage and minimizing the safety stock.

The role of Finance Manager in inventory control may be discussed through the following points:

1. **Optimum Investment in Inventories:** The financial manager should minimize cash outlays for inventories by maintaining inventories at optimum level. This would not only increase the profitability of the firm but would also enable it to maintain a proper liquidity for successful business operations. Regular and adequate supply of inventories helps the firm in reducing the setup costs by making long production runs. It also helps in avoiding losses of sales for non-supply of goods in time, and enables the firm to avail quantity discounts. Availing benefits and avoiding costs and losses would, obviously, add to the profitability and liquidity of the firm. The financial manager, thus, plays an important role in controlling investment in inventories at an optimum level.
2. **Ensuring Continuous Supply of Inventories:** Inventories constitute a major part of the total working capital of a firm, and hence it has been correctly observed that "*good inventory management is good financial management.*" Maintenance of adequate inventories is essential for efficient and smooth production and sales. If inventories are kept at a high level, higher interest and storage costs would be increased. Conversely, low level of inventories may result in frequent interruption in the production schedule leading to under-utilization of capacity and reduction in sales. The financial manager should, therefore, determine and maintain the optimum level of investment in inventories, which would help in ensuring a continuous supply of inventories for uninterrupted production and sales as well as in maintaining sufficient stock of inventories in periods of sort supply.
3. **Minimizing the Carrying Costs:** Holding of inventories involves ordering and carrying costs. While ordering cost includes the expenses associated with placing an order for inventories, the carrying costs comprise storage costs, insurance costs, handling costs, deterioration and obsolescence costs, depreciation and spoilage costs, cost of investment, property tax, etc. Here, the financial manager has to play a significant role by controlling such costs to the minimum.
4. **Minimizing the Risks of Holding Inventories:** Holding of inventories exposes the firm to a number of risks. These risks may be due to price decline, product deterioration and obsolescence. Risk from price decline may be due to increase in the market supply of the product introduction of a new competitive product, price reduction by the competitors, reduction in the price of substitutes, etc. Risk of loss from deterioration in quality of goods may be due to holding them for a very long period of time or due to improper storage conditions. Risk from obsolescence may be due to changes in customers'

tastes, fashion, product design, etc. The financial manager can also play an important role in avoiding or minimizing the risks of holding inventories by avoiding excessive investment or immediate disposal of obsolete stock.

MANAGEMENT OF ACCOUNT RECEIVABLE

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5.26 INTRODUCTION OF ACCOUNT RECEIVABLE

Trade credit is also known as accounts receivable, or book debts or sundry debtors. Thus, accounts receivable, popularly termed as receivables, are a direct consequence of trade credit which has become an inevitable marketing tool in modern business. Receivables constitute a significant portion of the total current assets of the firm, next to inventories and cash. Generally, 5 to 25 per cent of the total assets of the companies account for the investment in account receivable, depending upon the nature of business. This percentage varies between 5 to 10 per cent in case of manufacturing companies, and 20 to 25 per cent in case of trading companies. It is, therefore, necessary on the part of the financial manager to pay due attention to the management of accounts receivable. A constant vigilance in respect of the level of receivables, credit policy and procedures is essential for the growth and expansion of the firm.

Receivables, therefore, represent the claim of the firm against its customers, and are carried to the asset side of the balance sheet under titles such as book debts, accounts receivable, trade receivables or customer receivables. Receivables are the result of extension of credit facilities to the customers. The objective of receivables management is to promote sales and profits until a point is reached where the return on investment in further funding of receivables, is less than the cost of funds raised to finance that additional credit.

5.26.1 Objectives of Accounts Receivable

The main objectives of accounts receivable are as follows:

1. **Promoting Sales:** The basic objective of credit sale resulting in the creation of accounts receivable is to promote the firm's volume of sales. Extension of credit facilities to the customers is aimed at achieving growth in sales, which is not always possible when goods or services are sold for cash. In case, goods or services are sold for cash, the volume of sales is not likely to increase because many customers are not in a position to make cash purchases. However, if credit facilities are offered to customers by allowing them a reasonable time for making the deferred payments, the firm can successfully promote its sales.
2. **Increasing Profits:** Another objective of receivables or trade credit is to increase its profits. Increase in sales result in higher profits for the concern not only because of increase in the volume of sales of goods or services but also because of the fact that the firm offering trade credit usually charge a higher margin of profit on credit sales as compared to cash sales.
3. **Meeting Competition:** Credit facilities to the customers are also offered by the firm in order to eliminate any fall in the volume of sales or profits because of similar facilities being granted to its customers by the competing firm. In the absence of credit facilities, the customer would prefer to buy their needs from the competing firms who grant them credit facilities. Thus, avoidance of competition from other firms on grounds of trade credit facilities is also one of the objectives of accounts receivable.

The overall objective of investing funds in accounts receivable is to generate a large flow of operating revenue and profit.

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5.26.2 Maintenance of Accounts Receivables

Maintenance of accounts receivable involves the following costs:

1. **Capital Costs:** Maintenance of accounts receivable results in blocking of the firm's funds, because of the time lag between the sale of goods or services to the customers and the payment by them. The firm has thus, to arrange for additional financial resources for the operating needs of the business and meeting its obligations. Additional funds may be raised either from outside or out of retained profits. In both the cases, the firm incurs extra cost in terms of interest. In the former case, the firm has to pay interest to outsiders, whereas in the later case, the firm incurs an opportunity, *i.e.*, the loss of money which the firm could earn by investing the funds elsewhere.
2. **Administrative Costs:** Besides incurring the capital costs, the firm's has also to incur an additional administrative costs for maintaining the customers accounts and conducting investigations regarding credit worthiness of potential customers desirous of trade credit.
3. **Collection Costs:** Maintenance of accounts receivable also involves costs for collecting the payments from the customers. Sometimes, the firm has to take additional steps for recovering money from the defaulting customers.
4. **Defaulting Costs:** After taking all the serious steps to collect money from defaulting customers, the firm sometimes finds itself unable to recover the overdue because of the inability of the customers. Such irrecoverable credits are known as bad debts, and sometimes account for the highest of the costs of maintaining account receivable.

5.27 FACTORS DETERMINING THE SIZE OF INVESTMENT IN RECEIVABLES

Investment in accounts receivable constitute a significant portion of the total current assets of a firm. The size of investment in accounts receivable is determined by a number of internal and external factors. Some of the important factors are as follows:

1. **Volume of Sales:** Volume of credit sales is the most important factor is determining the size of investments in accounts receivables. Other things being equal, accounts receivable vary directly with the volume of sales. A firm can, therefore, forecast the size of investment in accounts receivables by predicting changes in the volume of sales.
2. **Terms of Sales:** If a firm decides to make all its sales for cash in-order to avoid the blocking up of funds in receivables and changes of bad debts, the firm will have no investment in accounts receivables. Some large retail houses such as chain-stores, super bazaars, etc., however, a majority of firms are obliged to sell on credit, depending upon trade customs, business practices and competition.
3. **Credit Policy:** The term credit policy refers to those decisions that directly affect the investment in accounts receivable. These decision variables include the quality of trade accounts to be accepted, the length of the credit period to be granted, the cash discount to be allowed and any special terms to be offered, depending upon the circumstances of the firm and the credit customers. In fact, a firm's credit policy determines the extent of risk. The firm is prepared to undertake its sales activities. If a firm follows a liberal

credit policy, it will have a higher investment in accounts receivable as compared to a firm with stringent credit policy. This is because a lenient credit policy encourages customers to make delays and defaults in payment, resulting in increasing the size of investments in receivables.

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4. **Period of Credit:** Credit period is one of the important factors determining the size of investments in accounts receivable. The term 'credit period' refers to the time duration for which credit is granted to the customers. It is generally expressed in terms of 'net days'. If the credit term of a firm are 'net 15 days', it means that the customers are expected to make payments within 15 days of credit sales. If firm is extending a longer credit period will have to invest more amount in accounts receivable as compared to the firms which allow short credit period.
5. **Cash Discount:** The amount of cash discount also determines the size of investment in accounts receivable. Most firms offer cash discount to their customers for encouraging them to make payments before the expiry of the credit allowed to them. The terms of cash discount indicate the rate of discount and the period for which the discount has been offered. For example, if the terms of cash discount are '3/10 net 30'. It means customers are expected to pay within 30 days, but in case they pay within 10 days they would get 3% discount on the amount due to them. Offering cash discount to customers is a direct loss of the firm. Contemporaneously, it reduces the volume of investment in accounts receivable and provides extra funds to the firm for alternative profitable investment. The liberal the terms of cash discount, the smaller will be the size of investment in accounts receivable.
6. **Facility of Discounting Bills:** The availability of bills discounting facility to the firm also affects the size of investment in accounts receivable. If the firm offering trade credit has the facility of discounting bills, the size of investment in receivables will be small. Conversely, the size of investment in accounts receivable will be large if the firm has no arrangement with the banks to get the bills discounted. Further, if the bills are not honoured on due dates, the level of investment in receivables will go up.
7. **General Factors:** General factors refer to those factors which are common to all firms and assets. These factors include the nature and type of business, volume of sales, price-level changes, availability of funds, size of business, attitude of management etc.

The financial manager can control the size of investment in accounts receivables by adopting an optimum credit without adversely affecting the chances of increasing sales and making more profits.

5.27.1 Optimum Credit Policy

The optimum size of investment in accounts receivable will be a point where there is a trade-off between costs and profitability. When the company follows a liberal credit policy, the profitability of the firm will increase in the volume of sales. However, such a policy will result in increased investment in receivables, increased costs of maintaining accounts receivable and increased chances of bad debts. With the increase in investment in receivables, the problem of liquidity arises. On the other hand, a stringent credit policy reduces the profitability but increases the liquidity of the firm. Thus, optimum credit policy occurs at a point where there is a "trade-off" between liquidity and profitability. Thus, determination of the optimum credit policy involves a risk-return trade-off.

The objectives of credit policy are:

1. To increase the volume of sales;
2. To earn higher profits;
3. To meet competition with other firms offering credit facilities.

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5.28 ANALYSIS AND CONTROL OF RECEIVABLES

The credit policy followed by a firm should be optimum, *i.e.*, neither too liberal nor too stringent. Since the basic objective of committing funds to accounts receivable is to promote sales and profits so as to generate a large flow of operating revenue, each and every firm must evaluate its credit policy from time to time.

In order to examine the credit policy and to analyse the investment in accounts receivable, the following techniques may be adopted:

1. **Computation of Average Age of receivables:** Computation of average age of receivables involves the computation of average collection period. The period so computed should be compared with the period for the industry as a whole or with similar firms. The technique of computation of average collection period has been made clear with the help of the following example.

Example. 8.

Credit sales for the year, 2008	₹ 60,000
Accounts receivable as on 1-1-2008	₹ 7,000
Accounts receivable as on 31-12-2008	₹ 5,000
Calculate the average age of receivables.	

Solution.

Average age of receivables may be calculated by any of the following methods :

$$(i) \text{ Average Age of Receivables} = \frac{\text{Months or Days in the period}}{\text{Accounts Receivable Turnover}}$$

$$\text{Average Age of Receivables} = \frac{12 \text{ months}}{10} = 1.2 \text{ months}$$

$$\text{When, Accounts Receivable Turnover} = \frac{\text{Credit Sales in the period}}{\text{Average Accounts Receivable}}$$

$$\text{Accounts Receivable Turnover} = \frac{60,000}{6,000} = 10$$

$$(ii) \text{ Average Age of Receivables} = \frac{\text{Average Accounts Receivable}}{\text{Average Monthly (or daily) Credit Sales}}$$

$$= \frac{\frac{7,000 + 5,000}{2}}{\frac{60,000}{12}} = \frac{6,000}{5,000} = 1.2 \text{ months}$$

(iii) Average Age of Receivable

$$= \frac{\text{Average Accounts Receivable} \times \text{Months (or days) in the period}}{\text{Credit Sales during the period}}$$

$$= \frac{6,000 \times 12}{60,000} = 1.2 \text{ months}$$

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An increase in the average age of receivables is an indication of a lenient credit policy or inefficiency in collection and vice versa. For example, if in the above illustration in the year 2008, debt collection period goes up to 1.5 months, it means either the firm has liberalised its credit policy or the debt collection process has become less efficient. On the other hand, if the collection period goes down to one month, it means that the firm has moved towards a more stringent credit policy.

2. **Computation of Aging Schedule of receivables:** On the pattern of aging schedule of inventories the aging schedule of receivables can also be prepared. This requires ascertaining of the sales made to and payments received from each customer by checking the receivables ledger. The schedule may be prepared in the following form:

Aging Schedule of Receivables

Age-Classes (days)	Month of Sale	As on December 31, 2003		As on December 31, 2004	
		Balance of Receivables	Percentage to Total	Balance of Receivables	Percentage to Total
1-30	December	25,000	22.7	10,350	11.9
31-60	November	62,500	56.8	18,550	21.4
61-90	October	12,000	10.9	46,400	53.4
91-120	September	10,000	9.1	8,850	10.2
121 and more	Earlier	500	0.5	2,700	3.1
	Total	1,10,000	100.0	86,850	100.0

Comments: In 2006, 56.8% of the total accounts receivable were in the age group of 31 to 60 days in 2007, this percentage has gone down to 21.4. Similarly in 2006 only 10.9% of the total receivables were in the age group of 61 to 90 days. In 2007, this percentage has gone up to 53.4 indicating that more than 50% of the accounts receivable are in this age group.

5.28.1 Evaluation of Credit Policies

Credit policy may be strict or lenient. A strict credit policy may affect volume of sales while a lenient credit policy may result in increase in volume of sales thereby increase in contribution margin but it may increase cost of financing receivables and increase in bad debts. So, the credit policy need by evaluated. The procedure is as follows:

- (A) **Compute Additional Profit on Increased Volume of Sales:** On increase in sales, only variable cost is increased. Hence, for calculating additional profit, an additional sales is multiplied by contribution per unit.

Additional Profit from Sales = Additional Sales in units × Contribution per unit

- (B) **Compute Cost of Additional Investment in Receivables:** If credit period is increased, the amount locked up in receivables will also increase. Hence, due to increase in the

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amount of receivables, cost of financing receivables will increase. For calculating the cost of investment in receivables, at first find out the amount of additional investment required in receivables and multiply this with required rate of return.

Cost of Additional Investment in Accounts Receivable

$$= \text{Additional Investment in Receivables} \times \text{Required Rate of Return}$$

where, Additional Investment in Receivables

$$= \frac{\text{Cost of Sales}}{\text{Turnover of Receivables}}$$

$$\text{Turnover of Receivables} = \frac{360 \text{ or } 365}{\text{Credit Period}}$$

(C) **Bad Debt Losses:** On increase in credit period, there is possibility to increase in the amount of bad debt losses. For finding additional bad debts, deduct present bad debts from anticipated future bad debts.

Evaluation: On the basis of above factors, credit policy is evaluated as follows:

Additional profit contribution from sales	—
Less Cost of additional bad debts	—
Net profitability on additional sales	—
Less Required return on additional investment in Receivable	—
Net Benefit	—

Example 9. Mohit Tools Co is currently selling a product for ₹ 10 per unit. Credit sales for last year were 60,000 units. The variable cost per unit is ₹ 6 and the average cost per unit at 60,000 units is ₹ 8. The Company is willing to relax its credit period from 30 days to 45 days. It is expected to result in a 5% increase in unit sales to 63,000 units and an increase in bad debts expenses from the current level of 1% of sales to 2%. The opportunity cost of tying up funds in accounts receivable is 15%. Assume 360 days in the year.

Determine whether company should implement the proposed relaxation in its credit policy?

Solution.

Evaluation of the Relaxation in Credit Policy

		₹
Additional profit contribution from sales :		
Additional sales in units × Contribution p.u. [(3,000 units × (₹ 10 - ₹ 6))]		12,000
Less Additional bad debts losses :		
Bad debts under proposed plan (63,000 × 10 × 2%)	12,600	
Less Bad debts under present plan (60,000 × 10 × 1%)	6,000	6,600
Net Profitability on additional sales		5,400
Less Required return on cost of additional investment in Receivables		
Average Investment in Receivables = $\frac{\text{Cost of sales}}{\text{Receivables Turnover}}$		

Average investment in proposed plan :		
= $\frac{(8 \times 60,000) + (6 \times 3,000)}{8} = \frac{4,98,000}{8}$	62,250	
Less Average investment in present plan :		
= $\frac{8 \times 60,000}{12} = \frac{4,80,000}{12}$	40,000	
Additional investment in Receivables	22,250	
Cost of additional investment in Receivables @ 15% on ₹ 22,250		3,338
Net benefit from implementation of proposed plan		2,062

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As, net benefit from implementation of plan is ₹ 2,062.

Therefore, credit period should be relaxed from 30 days to 45 days.

Working: Receivables Turnover = $\frac{360}{\text{Credit period}}$

Proposed Plan :

$$\frac{360}{45} = 8$$

Present Plan :

$$\frac{360}{30} = 12$$

5.29 SUMMARY

- Working capital commonly refers to the excess of current assets over current liabilities. Working capital, however, represents investment in current assets, such as cash, marketable securities, inventories and bills receivables and current liabilities which include bills payable, notes payable and miscellaneous accruals.
- **C.W. Gerstenberg**, "Working capital has ordinarily been defined as the excess of current assets over current liabilities.
- Working Capital management refers to the management of current assets and current liabilities. In the words of Prof. K.V. Smith, "Working Capital Management is concerned with the problems that arise in attempting to manage the current assets, the current liabilities and the inter-relationship exists between them."
- Working capital may be classified on the basis of its concepts as well as on the basis of its requirement of time. On the basis of quantitative and qualitative concepts working capital can be classified into two categories, viz., (i) Gross Working Capital and (ii) Net Working Capital. Further, working capital can be classified into (iii) Permanent Working Capital and (iv) Temporary Working Capital on the basis of time.
- Working capital management involves management of different components of working capital, such as cash, inventory, and creditors.
- There are three approaches for working capital
 - (i) Matching Approach or Hedging Approach
 - (ii) Conservative Approach
 - (iii) Aggressive Approach
- Working capital for any manufacturing unit means the total amount of circulating funds required for the continuous operation of the unit on an ongoing basis.

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- Every firm finds it difficult to ascertain the Working Capital requirement which is a very practical and important problem. While inadequate Working Capital creates a lot of problems, an amount in excess of the requisite working Capital which is not utilised properly and remains idle, can also increase the cost.
- It is the duty of the Finance Manager to provide adequate cash to all segments of the organization. At the same time, he has also to ensure that no funds are blocked in idle cash as this will involve cost in terms of interest to the concern. A sound cash management scheme has to maintain the twin objectives of liquidity and cost.
- The term cash management refers to the management of cash and 'near cash assets'. While cash includes coins, currency notes, cheques, bank drafts, and the demand deposits, the near-cash assets include marketable securities and time deposits with banks. Such securities and deposits are easily convertible into cash.
- In spite of the fact that cash does not earn any substantial return for the business, it is held by the concern with the following motives:
 - (i) Transaction Motive
 - (ii) Precautionary Motive
 - (iii) Speculative Motive
 - (iv) Compensation Motive
- Cash planning refers to cash forecast. It involves a projection of future cash receipts and cash disbursements of the firm over various intervals of time.
- The ultimate objective of cash planning is to exercise control over cash inflows and cash outflows. Cash control, therefore, involves, proper implementation of policies and procedures regarding receipts and payments of cash.
- A Cash Budget is a summary statement of the firm's cash inflows and cash outflows over a projected period of time. It is a mere forecast of cash position of a firm for a definite period. It involves a projection of future cash receipts and cash disbursements over various time intervals.
- A cash budget can be prepared by any of the following three methods:
 - (i) Receipt and Payment Method,
 - (ii) Adjusted Profit and Loss Method,
 - (iii) Balance Sheet Method.
- Inventories are the stocks of goods held by a firm for eventual sale or use in manufacturing goods meant for sale. It includes raw materials, work-in-progress and finished goods.
- The term inventory control refers to a systematic control over the purchasing, storing and using of inventories so as to have the minimum possible cost of inventories.
- The term inventory control is used in two ways— 'quantity control' and 'value control'. Purchase and production executives use this work in terms of quantity control because they are concerned with the physical control of inventories.
- Financial executive use it in terms of operating or value control because they are concerned with the efficient management of funds in inventories.
- There are two aspects of inventory control:
 - (i) Accounting Aspect
 - (ii) Operational Aspect
- Inventories constitute the most significant part of a firm's total working capital, and form a major element of manufacturing cost. A large part of working capital of a firm's

working capital is investors. Hence, it has been correctly observed, "if you are in need of money, look to your inventory first." In fact, good inventory management is good financial management.

- Purchasing is the most important aspect of inventory management as a substantial part of the firm's finance is committed to materials inventories which affects the cash flow position of the firm.
- Finance manager is not directly concerned with inventory policies, yet he can not ignore them since they have a direct bearing on the financial needs of the firm. It is, therefore, necessary for the finance manager to exercise effective financial control over inventories by purchase, production and sales departments.
- Receivables, represent the claim of the firm against its customers, and are carried to the asset side of the balance sheet under titles such as book debts, accounts receivable, trade receivables or customer receivables.
- The objective of receivables management is to promote sales and profits until a point is reached where the return on investment in further funding of receivables, is less than the cost of funds raised to finance that additional credit.
- The main objectives of accounts receivable are as follows:
 - (i) Promoting Sales
 - (ii) Increasing Profits
 - (iii) Meeting Competition
- The overall objective of investing funds in accounts receivable is to generate a large flow of operating revenue and profit.
- Maintenance of accounts receivable involves the following costs:
 - (i) Capital Costs
 - (ii) Administrative Costs
 - (iii) Collection Costs
 - (iv) Defaulting Costs
- Investment in accounts receivable constitute a significant portion of the total current assets of a firm. The size of investment in accounts receivable is determined by a number of internal and external factors.

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5.30 REVIEW EXERCISE

1. Define working capital management and discuss its various objectives.
2. Discuss the need and significance of working capital.
3. Write the possible dangers of inadequate and redundant working capital.
4. Explain various factors that determine working capital.
5. Discuss the reasons due to which working capital management is an important aspect of financial management.
6. Write short notes on:
 - (a) Approaches for working capital
 - (b) Working capital requirement
 - (c) Importance of operating cycle concept.

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7. From the following informations taken from the Black and White Limited, calculate the working capital required by the company by operating cycle method:
- Annual sales are estimated at 10,000 units @ ₹ 10 per unit;
 - Production and sales quantities coincide and will be carried on evenly throughout the year and production cost per unit is: Materials ₹ 5.00; Labour ₹ 2.00; Overheads ₹ 1.75 (including ₹ 2,500 for depreciation);
 - Customers are given 60 days' credit and 50 days' credit is taken from suppliers;
 - Forty days of supply of raw materials and fifteen days' supply of finished goods are kept in stock;
 - The production cycle is 20 days and all materials are issued at the commencement of each production cycle;
 - A cash balance equal to one-third of the average other working capital is kept for contingencies.
8. What are the principal motives for holding cash?
9. Briefly explain the problems of cash management a firm.
10. What do you mean by cash planning? Discuss various tools of cash planning.
11. Discuss the utility of cash budget as a tool of cash management. What are the methods of preparing cash budget?
12. Write short notes on:
- Tools of cash control
 - Cash budget.
13. What do you mean by inventory and why it is essential for all the firm?
14. Enumerate the objectives of the inventory management.
15. What is the need of inventory control system? On what key premise is ABC system based? Explain the limitation of ABC inventory control system.
16. Define EOQ. How can it be computed? What are the limitation of EOQ model?
17. Write short notes on:
- Benefits of holding inventories
 - Risks and cost of holding inventories
18. Discuss essentials of a good inventory control system.
19. Compute E.O.Q. and Total Inventory cost for the following:
- | | |
|-------------------|------------------|
| Annual Demand | = 5,000 units |
| Unit Price | = ₹ 20 |
| Order Cost | = ₹ 16 per order |
| Storage Rate | = 2% per annum |
| Interest Rate | = 12% per annum |
| Obsolescence Rate | = 6% per annum |
20. Two components A and B are used as follows :
- | | |
|---------------|------------------------|
| Normal Usage | 50 units per week each |
| Minimum Usage | 25 units per week each |
| Maximum Usage | 75 units per week each |

Reorder Quantity	A : 300 units B : 500 units
Reorder period	A : 4 to 6 weeks B : 2 to 4 weeks

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Calculate for each component:

- (a) Reorder Level, (b) Minimum Level,
(c) Maximum Level (d) Average Stock Level.
- Define the term trade credit and write its various objectives.
 - Discuss the cost involved in the maintenance of accounts receivables.
 - Explain important factor that determine the size of investment in receivables.
 - Write short notes on:-
 - Optimum credit policy
 - Analysis and control of receivables
 - Hindustan Ltd. has a present annual sale of 10,000 units at ₹ 300 per unit. The variable cost is ₹ 200 per unit and fixed costs amount 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:

	Existing	Proposed	
		2 months	3 months
Credit Policy	1 month		
Increase in sales	—	15%	30%
% of Bad Debts	1%	3%	5%

There will be increase in fixed cost by ₹ 50,000 on account of increase of sales beyond 25% of present level.

The company plans on a return of 20% on investments receivables.

You are required to calculate existing and proposed net profit and also calculate most paying credit policy for the company.