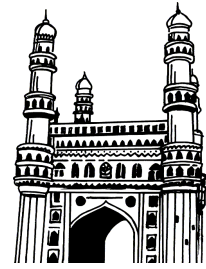


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FINANCIAL MANAGEMENT

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Time Value of Money: Meaning – Rationale of Time Preference for Money – Future Value – Present Value (Including Problems)

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1. Define Financial Management.

Ans : (Jan-18)

Refer Unit-I, Q.No. 1

2. Explain the Evolution of Financial Management.

Ans : (Imp.)

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3. What do you understand by Organiza-tion of Finance Function ?

Ans : (Jan-18, Dec.-16)

Refer Unit-I, Q.No. 6

4. Explain various approaches in Financial Decisions.

Ans : (Imp.)

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5. What are the Goals of Financial Management?

Ans : (Jan-20, Jan-18, June-16, Dec-16, Dec.-14, Imp.)

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6. Distinguish between profit maximization and wealth maximization.

Ans : (Imp.)

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7. Explain the Role of Finance Manager.

Ans : (Jan.-20, June-16, Imp.)

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1. What do you understand by Capital Budgeting ?

Ans : (Jan.-20, June-16, Imp.)

Refer Unit-II, Q.No. 1

2. Outline the process of capital budgeting.

Ans : (Dec.-16, Imp.)

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4. Define Accounting / Average Rate of Return. What are the advantages and disadvantages of Accounting / Average Rate of Return ?

Ans : (Jan-20, June-16, Imp.)

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5. Define Net Present Value. Explain advantages and disadvantages of NPV.

Ans : (Jan-20, June-16, Imp.)

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6. What is Internal Rate of Return? How is it calculated? State the merits and demerits of Internal Rate of Return.

Ans : (Jan-20, June-16, Imp.)

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7. Define Profitability Index. How is it calculated? State the merits and demerits of Profitability Index.

Ans : (Jan-20, June-16, Imp.)

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8. Explain the similarities and distinguish between NPV and IRR.

Ans : (Jan-20, Imp.)

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1. Explain the meaning of working capital.

Ans : (Jan.-20, Jan.-18, Dec.-16, Imp.)

Refer Unit-III, Q.No. 1

2. Discuss the various kinds of working capital.

Ans : (Dec.-14)

Refer Unit-III, Q.No. 2

3. Explain the factors determining the Working Capital requirements ?

Ans : (Jan.-20, Dec.-16, Dec.-14, Imp.)

Refer Unit-III, Q.No. 5

4. What are the sources of working capital finance.

Ans : (Jan.-20, Imp.)

Refer Unit-III, Q.No. 7

5. Discuss in detail about operating cycle.

Ans : (Jan.-18)

Refer Unit-III, Q.No. 8

6. Discuss various motives of holding cash.

Ans : (June-16, Imp.)

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7. What are the main Objectives of Inventory Management?

Ans : (Jan.-18)

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1. What is Cost of Capital ?

Ans : (Jan.-20, Dec.-16, Imp.)

Refer Unit-IV, Q.No. 1

2. Discuss about Weighted Average Cost of Capital.

Ans : (Jan.-18, Imp.)

Refer Unit-IV, Q.No. 12

3. What do you mean by leverage ?

Ans : (Jan.-20, June-16, Imp.)

Refer Unit-IV, Q.No. 15

4. Explain briefly about EBIT-EPS Analysis.

Ans : (Imp.)

Refer Unit-IV, Q.No. 19

5. Define capital structure ? Explain the features of capital structure.

Ans : (Jan.-20, June-16, Imp.)

Refer Unit-IV, Q.No. 21

6. Explain the traditional approach relating to optimal capital structure.

Ans : (Jan.-18)

Refer Unit-IV, Q.No. 22

7. Explain the factors determining capital structure.

Ans : (June-16, Dec.-16, Imp.)

Refer Unit-IV, Q.No. 23

8. What do you understand by Net Operating Income (NOI) Approach?

Ans : (Jan.-20, Imp.)

Refer Unit-IV, Q.No. 26

UNIT - V

1. Define Dividend Policy.

Ans : (Dec.-16, Imp.)

Refer Unit-V, Q.No. 1

2. Explain the classification of Dividend Policies.

Ans : (Jan.-20, Jan-18, June-16, Imp.)

Refer Unit-V, Q.No. 2

3. What are the Factors Influencing Dividend Policy?

Ans : (June-16, Dec.-14, Imp.)

Refer Unit-V, Q.No. 3

4. Explain different forms of dividends.

Ans : (Imp.)

Refer Unit-V, Q.No. 4

5. Explain about Walter's Model with an example.

Ans : (Jan-20, Dec.-14, Imp.)

Refer Unit-V, Q.No. 7

6. Explain about Gordon Model with an example.

Ans : (Jan-20, Imp.)

Refer Unit-V, Q.No. 8

7. Explain about Modigliani-Miller approach relating to dividend theories with an example.

Ans : (Imp.)

Refer Unit-V, Q.No. 9

UNIT I

INTRODUCTION TO FINANCIAL MANAGEMENT

Financial Management: Meaning- Evolution – Organization of Finance Function– Financial Decisions – Goals of Financial Management – Agency Problem – Changing Role of Finance Manager (Theory).

Time Value of Money: Meaning – Rationale of Time Preference for Money – Future Value – Present Value (Including Problems)

1.1 INTRODUCTION TO FINANCIAL MANAGEMENT

1.1.1 Meaning

Q1. Define Financial Management.

(OR)

Explain the meaning of financial management.

Ans : (Jan-18)

Meaning

To understand the meaning of Financial Management, one must understand the meaning of both words 'financial' and 'management' separately. 'Financial' means procuring sources of money supply and allocation of these sources on the basis of forecasting monetary requirements of the business. The word 'Management' refers to planning, organization, co-ordination and control of human activities and physical resources for achieving the objectives of an enterprise.

Financial management refers to the management of finance. It is the effective & efficient utilization of financial resources. It means creating a balance among financial planning, procurement of funds, profit administration & sources of funds. The financial management is defined as follows:

Definitions

- i) **According to J.F. Bradley**, "Financial management is the area of business management devoted to the judicious use of capital & careful selection of sources of capital in order to enable a spending unit to move in the direction of reaching its goals".

- ii) **According to Howard & Upton**, "Financial management is the application of the planning & control functions of the finance functions".

- iii) **According to Weston & Brigham**, "Financial management is an area of financial decision making harmonizing individual motives & enterprise goals".

1.1.2 Evolution

Q2. Explain the Evolution of Financial Management.

Ans : (Imp.)

The evolution of finance function/financial management consists of two phases:

1. Traditional Phase (Finance upto 1940)

The traditional phase can be summarized as follows:

- Finance function was concerned with procuring of funds to finance the expansion (or) diversification activities and thus the occurrence of finance function was episodic in nature. Finance function was not a part of regular managerial operations.
- In order to finance business growth, there was an emergence of institutional financing and institutional banking giving rise to finance industry.
- Finance function was viewed particularly from the point of view of supplier of funds, i.e., the lenders, both individuals and institutions. The emphasis was to consider the interest of the outsiders. The internal decision making process and the persons involved in the process were of lesser importance.

- iv) The focus of attention was on the long term resources and only the long term finance was of any concern. The concept of working capital and its management was virtually non-existent.
- v) The treatment of different aspects of finance was more of a descriptive nature rather than analytical. In fact, there were no analytical financial decisions making as such.
- vi) Finance was concerned with procuring of fund primarily by issue of securities such as equity shares, preference shares and debt instruments. So, knowledge of the sources of funds: what securities to sell, to whom and by what techniques to sell, was need.

2. Transitional Phase (After 1940)

Gradually, the scope of finance function widened and day-to-day problems of finance were also incorporated. Funds analysis and control on a regular basis, rather than on a casual basis started. This phase in fact was an extension of the traditional phase and continued upto early fifties when the scope of finance function started expanding in big way.

3. Integrated View of Finance Function (After 1950)

The scope of finance function has widened further and includes not only the measures of procuring funds at episodic events but also the optimum utilization through data based analytical decision making. The finance manager has emerged as a professional manager involved with capital funds to be raised by the firm, with the allocation of these funds to different projects and with the measurement of the results of each allocation. Today's finance manager deals with a variety-of situations arising in any organizations.

Significant contributions to the development of modern theory of financial management are:

- i) **Theory of Portfolio Management:** Developed by Harry Markowitz which deals with portfolio selection with risky

investments? This theory uses statistical concepts to quantify the risk-return characteristics of holding a group/ portfolio of securities, investments or assets. A significant contribution of this theory is that the risk of one investor is viewed in its totality rather than evaluating the risk of one security only. This theory at a later stage leads to the development of Capital Asset Pricing Model which deals with pricing of risky assets and the relationship between risk and return.

- ii) **Theory of Leverage and Valuation of Firm:** Developed by Modigliani and Miller, they have shown by introducing analytical approach as to how the financial decision making in any firm be oriented towards maximization of the value of the firm and the maximization of the shareholders wealth.

- iii) **Presentation of Option Valuation Model:** Developed by Black and Scholes is also regarded as a landmark in the area of financial management.

Q3. Explain the Importance of Financial Management.

Ans :

Some of the importance of the financial management is as follows:

1. Financial Planning and Control

Finance is a base for all the business activities. Business activities should be not only harmonized but also planning determination and implementation offer analysis of finance. All activities revolve around the finance. So finance planning and control are important function.

2. Essence of Managerial Decision

Financial management provides a sound base to all managerial decisions. Financial management is the focal point in the process of decision making. Production, sales, employees, research & development decisions are based on financial management.

3. Improve Profitability

Profitability of the concern purely depends on the effectiveness and proper utilization of funds by the business concern, Financial management helps to improve the profitability position of the concern with the help of strong financial control devices such as budgetary control, ratio analysis and cost volume profit analysis.

4. Financial Management is a Scientific & Analytical Analysis

In the process of decision making and financial analysis modern mathematical techniques are used. It requires not only a feeling for the situation & an analytical skill, but also a thorough knowledge of the techniques and tools of financial analysis & the knowledge to apply them & interpret the results.

5. Continuous Administration Function

In older times financial management was used periodically and its importance was limited to the procurement of funds but in modern times finance is a continuous administrative function. Its relation is with the procurement of capital, sources of funds, capital budgeting decisions etc.

6. Centralized Nature

All business activities are centrally administered & control. All financial decisions in business are taken at a central point. Functional areas such as marketing & production are decentralized in the modern industrial concern, but financial co-ordination and control are achieved through centralization.

7. Basis of a Managerial Process

Financial management is the basis of whole management process, such as planning, co-ordination and control. According to sound financial planning all other plans are executed & controlled.

8. Measure of Performance

Financial management deals with risk & uncertainty factors which are directly hit by profitability & risk. Thus, financial management is needed for maintaining proper balance in risk & uncertainty.

Q4. Explain the Scope of Financial Management.

Ans :

1. Estimating Financial Requirements

The finance department must estimate the capital requirements of the firm accurately for long term and short term needs. In estimating the capital requirements of the business, the finance department must take help of the budgets of various activities of the business e.g. sales budget, production budget, expenses budget etc. prepared by the concerned departments. In the initial stage, the estimate is done by promoters but in a growing concern, it is done by the finance department. Unless the financial forecast is correct, business is likely to run into difficulties due to excess or shortage of funds. Correct estimates ensure the availability of funds as and when they are needed.

2. Deciding Capital Structure

By capital structure we mean the kind and proportion of different securities for raising the required funds. Once the total requirement of funds is determined, a decision regarding the type of securities to be issued and the relative proportion between them is to be taken. The finance department must determine the proper mix of debt and equity. It should also decide the ratio between long term and short term debts.

3. Selecting a Source of Finance

A company can raise funds from different sources e.g. shareholders, debenture holders, banks, financial institutions, public deposits etc. Before raising the funds, it has to decide the source from which the funds are to be raised. The choice of the source of finance should be made very carefully by taking a number of factors into account such as cost of raising funds, conditions attached, charge on assets, burden of fixed charges, dilution of ownership and control etc.

4. Selecting a Pattern of Investment

When funds have been procured than a decision about investment pattern is to be taken. The selection of an investment pattern is related to the use of funds. The decision-making techniques such as capital budgeting, opportunity cost analysis may be applied in making decision about capital budgeting. While spending on various assets, the principles of safety profitability and liquidity should not be ignored.

5. Proper Cash Management

It is the prime responsibility of the finance manager to see that an adequate supply of cash is available at proper time for the smooth running of the business. Cash is needed to purchase raw materials, pay off creditors, to pay to workers and to meet the day to day expenses of the business. Availability of cash is necessary to maintain liquidity and credit-worthiness of the business. Excess cash must be avoided as it costs money. If there is any cash in excess, it should be invested in near cash assets such as investments etc. which may be converted into cash within no time.

6. Proper Uses of Surpluses

One of the prime function of the finance department is to allocate the surplus. After paying all taxes, the available surplus of the business can be allocated for three purposes:

- i) For paying dividend to the shareholders as a return on their investment,
- ii) For distributing bonus to workmen and company's contribution to other profit sharing plans, and
- iii) For ploughing back of profits for the expansion of business.

7. Implementing Financial Controls

The financial manager is under an obligation to check the financial performance of the funds invested in the business. There are a number of techniques to evaluate the performance viz. Return on Investment (ROI), budgetary control, cost control, internal audit, ratio analysis and break-even point analysis. The financial manager must lay emphasis on financial planning as well.

Q5. What are the Functions of Financial Management?

Ans :

The primary aim of finance function is to arrange as much funds for the business as are required from time to time. This aim has the following functions :

1. Estimation of capital requirements

A finance manager has to make estimation with regards to capital requirements of the company. This will depend upon expected costs and profits and future programmes and policies of a concern. Estimations have to be made in an adequate manner which increases earning capacity of enterprise.

2. Determination of capital composition

Once the estimation have been made, the capital structure have to be decided. This involves short- term and long- term debt equity analysis. This will depend upon the proportion of equity capital a company is possessing and additional funds which have to be raised from outside parties.

3. Choice of sources of funds

For additional funds to be procured, a company has many choices like:

- a. Issue of shares and debentures
- b. Loans to be taken from banks and financial institutions
- c. Public deposits to be drawn like in form of bonds.

Choice of factor will depend on relative merits and demerits of each source and period of financing.

4. Investment of funds

The finance manager has to decide to allocate funds into profitable ventures so that there is safety on investment and regular returns is possible.

5. Disposal of surplus

The net profits decision have to be made by the finance manager. This can be done in two ways:

- i) **Dividend declaration:** It includes identifying the rate of dividends and other benefits like bonus.
- ii) **Retained profits :** The volume has to be decided which will depend upon expansional, innovational, diversification plans of the company.

6. Management of cash

Finance manager has to make decisions with regards to cash management. Cash is required for many purposes like payment of wages and salaries, payment of electricity and water bills, payment to creditors, meeting current liabilities, maintenance of enough stock, purchase of raw materials, etc.

7. Financial controls

The finance manager has not only to plan, procure and utilize the funds but he also has to exercise control over finances. This can be done through many techniques like ratio analysis, financial forecasting, cost and profit control, etc.

1.2 ORGANIZATION OF FINANCE FUNCTION**Q6. What do you understand by Organization of Finance Function ?****(OR)**

Finance function is concerned with allocating funds to specific assets and obtaining the best mix of financing in relation to the over all valuation of the firm - Discuss.

Ans : **(Jan-18, Dec.-16)**

The vital importance of the financial decisions to a firm makes it imperative to set up a sound and efficient organization for the finance functions. The ultimate responsibility of carrying out the finance functions lies with the top management. Thus, a department to organize financial activities may be created under the direct control of the board of directors. The board may constitute a finance

committee. The executive heading the finance department is the firm's chief finance officer (CFO), and he or she may be known by different designations.

The finance committee or CFO will decide the major financial policy matters, while the routine activities would be delegated to lower levels. For example, at BHEL a director of finance at the corporate office heads the finance function. He is a member of the board of directors and reports to the chairman and managing director (CMD). An executive director of finance (EDF) and a general manager of finance (GMF) assist the director of finance. EDF looks after funding, budgets and cost, books of accounts, financial services and cash management. GMF is responsible for internal audit and taxation.

The reason for placing the finance functions in the hands to top management may be attributed to the following factors:

- First, financial decisions are crucial for the survival of the firm. The growth and development of the firm is directly influenced by the financial policies.
- Second, the financial actions determine solvency of the firm. At no cost can a firm afford to threaten its solvency. Because solvency is affected by the flow of funds, which is a result of the various financial activities, top management being in a position to coordinate these activities retains finance functions in its control.
- Third, centralisation of the finance functions can result in a number of economies to the firm. For example, the firm can save in terms of interest on borrowed funds, can purchase fixed assets economically or issue shares or debentures efficiently.

Status and Duties of Finance Executives

The exact organisation structure for financial management will differ across firms. It will depend on factors such as the size of the firm, nature of the business, financing operations, capabilities of the firm's financial officers and most importantly, on the financial philosophy of the firm. The designation of the chief financial officer (CFO) would also differ within firms. In some firms, the financial officer may

be known as the financial manager, while in others as the vice-president of finance or the director of finance or the financial controller. Two more officers - treasurer and controller - may be appointed under the direct supervision of CFO to assist him or her. In larger companies, with modern management, there may be vice-president or director of finance, usually with both controller and treasurer reporting to him.

Figure illustrates the financial organisation of a large (hypothetical) business firm. It is a simple organisation chart, and as stated earlier, the exact organisation for a firm will depend on its circumstances. Figure (a) reveals that the finance function is one of the major functional areas, and the financial manager or director is under the control of the board of directors. Figure (b) shows the organisation for the finance function of a large, multi-divisional Indian company.

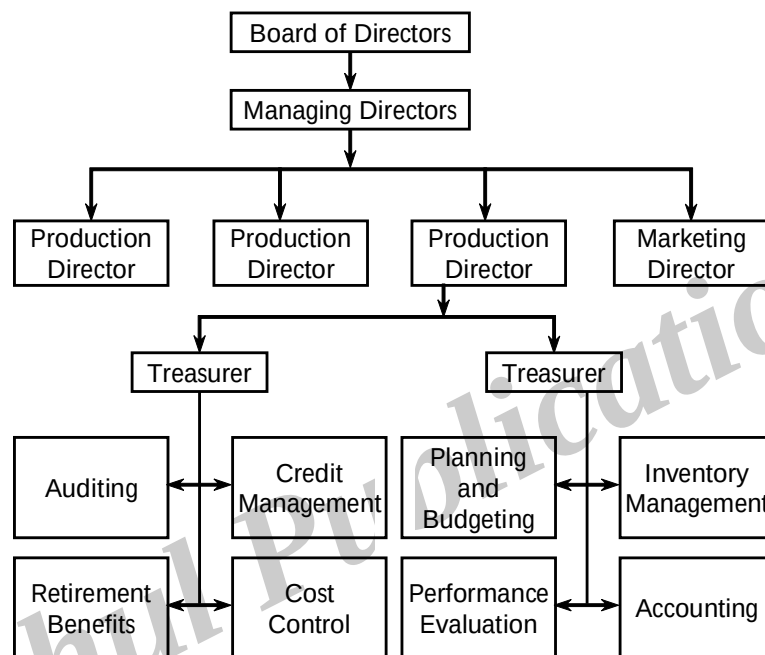


Fig. (a) : Organisation for Finance Function

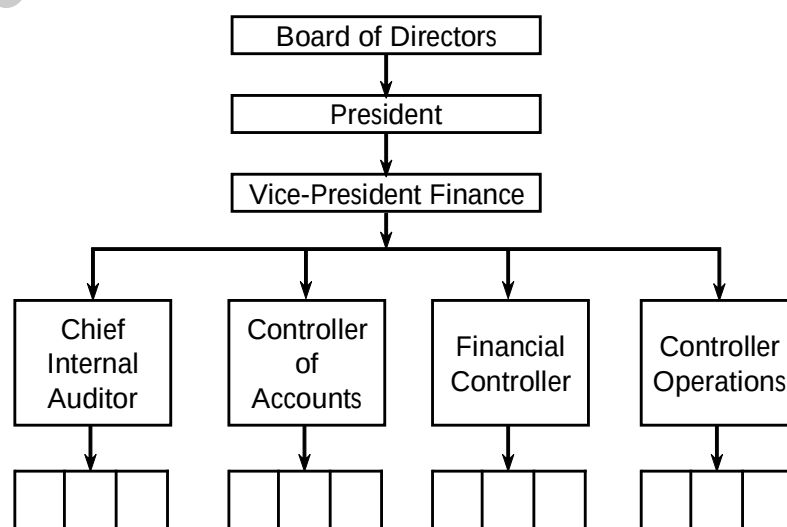


Fig. (b) : Organisation for finance function in a multi-divisional company

CFO has both line and staff responsibilities. He or she is directly concerned with the financial planning and control. He or she is a member of the top management, and he or she is closely associated with the formulation of policies and making decisions for the firm. The treasurer and controller, if a company has these executives, would operate under CFO's supervision. He or she must guide them and others in the effective working of the finance department.

The main function of the treasurer is to manage the firm's funds. His or her major duties include forecasting the financial needs, administering the flow of cash, managing credit, floating securities, maintaining relations with financial institution and protecting funds and securities. On the other hand, the functions of the controller relate to the management and control of assets. His or her duties include providing information to formulate accounting and costing policies, preparation of financial reports, direction of internal auditing, budgeting, inventory control, taxes etc. It may be stated that the controller's functions concentrate the asset side of the balance sheet, while treasurer's functions relate to the liability side.

Q7. What are the Functions of Finance Manager ?

Ans :

The changed business environment in the recent past has widened the role of a financial manager. The increasing phase of industrialisation, rise of larger-scale units, innovation in information processing techniques, intense competition etc. have increased the need for financial planning and control. The size and extent of business activities are dependent upon the availability of finances. Financial reporting may be used as a technique of control.

In the present business context, a financial manager is expected to perform the following functions.

1. Financial Forecasting and Planning

A financial manager has to estimate the financial needs of a business. How much money will be required for acquiring various assets ? The amount will be needed for

purchasing fixed assets and meeting working capital needs. He has to plan the funds needed in the future. How these funds will be acquired and applied is an important function of a finance manager.

2. Acquisition of Funds

After making financial planning, the next step will be to acquire funds. There are a number of sources available for supplying funds. These sources may be shares, debentures, financial institutions, commercial banks, etc. The selection of an appropriate source is a delicate task. The choice of a wrong source for funds may create difficulties at a later stage. The pros and cons of various sources should be analyzed before making a final decision.

3. Investment of Funds

The funds should be used in the best possible way. The cost of acquiring them and the returns should be compared. The channels which generate higher returns should be preferred. The technique of capital budgeting may be helpful in selecting a project. The objective of maximising profits will be achieved only when funds are efficiently used and they do not remain idle at any time. A financial manager has to keep in mind the principles of safety, liquidity and soundness while investing funds.

4. Helping in Valuation Decisions.

A number of mergers and consolidations take place in the present competitive industrial world. A finance manager is supposed to assist management in making valuation etc. For this purpose, he should understand various methods of valuing shares and other assets so that correct values are arrived at.

5. Maintain Proper Liquidity

Every concern is required to maintain some liquidity for meeting day-to-day needs. Cash is the best source for maintaining liquidity. It is required to purchase raw materials, pay workers, meet other expenses, etc. A finance manager is required to determine the needs for liquid assets and then arrange liquid assets in such a way that there is no scarcity of funds.

1.3 FINANCIAL DECISIONS

Q8. Explain various approaches in Financial Decisions.

Ans : (Imp.)

1. Traditional Approach

The scope of finance function was treated, in the narrow sense of procurement or arrangement of funds. The finance manager was treated as just provider of funds, when organisation was in need of them.

The utilization or administering resources was considered outside the purview of the finance function. It was felt that the finance manager had no role to play in decision making for its utilization. Others used to take decisions regarding its application in the organisation, without the involvement of finance personnel. Finance manager had been treated, in fact, as an outsider with a very specific and limited function, supplier of funds, to perform when the need of funds was felt by the organisation.

As per this approach, the following aspects only were included in the scope of financial management :

- i) Estimation of requirements of finance,
- ii) Arrangement of funds from financial institutions,
- iii) Arrangement of funds through financial instruments such as shares, debentures, bonds and loans, and
- iv) Looking after the accounting and legal work connected with the raising of funds.

Limitations of Traditional Approach

The traditional approach was evolved during the 1920s and 1930s period and continued till 1950. The approach had been discarded due to the following limitations :

i) No Involvement in Application of Funds

The finance manager had not been involved in decision-making in allocation of funds. He had been treated as an outsider. He had been ignored in internal decision making process and considered as an outsider.

ii) No Involvement in day to day Management

The focus was on providing long-term funds from a combination of sources. This process was more of one time happening. The finance manager was not involved in day to day administration of working capital management. Smooth functioning depends on working capital management, where the finance manager was not involved and allowed to play any role.

iii) Not Associated in Decision-Making Allocation of Funds

The issue of allocation of funds was kept outside his functioning. He had not been involved in decision- making for its judicious utilization. Raising finance was an infrequent event.

Its natural implication was that the issues involved in working capital management were not in the purview of the finance function. In a nutshell, during the traditional phase, the finance manager was called upon, in particular, when his speciality was required to locate new sources of funds and as and when the requirement of funds was felt.

2. Modern Approach

Since 1950s, the approach and utility of financial management has started changing in a revolutionary manner. Financial management is considered as vital and an integral part of overall management. The emphasis of Financial Management has been shifted from raising of funds to the effective and judicious utilization of funds.

The modern approach is analytical way of looking into the financial problems of the firm. Advice of finance manager is required at every moment, whenever any decision with involvement of funds is taken. Hardly, there is an activity that does not involve funds.

In the words of Solomon "The central issue of financial policy is the use of funds. It is helpful in achieving the broad financial goals which an enterprise sets for itself".

Nowadays, the finance manger is required to look into the financial implications of every decision

to be taken by the firm. His Involvement of finance manager has been before taking the decision, during its review and, finally, when the final outcome is judged. In other words, his association has been continuous in every decision-making process from the inception till its end.

The decisions related to finance of a business firm are considered as financial decisions. In order to maximize the shareholder's wealth, a firm makes various financial decisions such as acquisition of assets, structure of capitalization, distribution of firm's income, etc. These decisions can be categorized into three groups. They are,

i) Investment Decisions

Investment decisions are the most significant of all financial decisions taken by the financial manager. Investment decisions are those decisions which involves specification of total assets to be kept in the firm, structure of these assets and perspective of business risk which is observed by its investors. To achieve the goal of wealth maximization, funds must be effectively utilized as they are for limited quantity and involves cost. These investment decisions can be again classified into two groups.

- a) Long-term investment decisions and
- b) Short-term investment decisions.

Long term investment decisions are related to capital budgeting.

Whereas short-term decisions are related to working capital management.

Capital budgeting is a procedure in which decision related to capital expenditure takes place. It involves those expenses which can yield benefits after a long period of time.' Investment decisions are crucial in organization as they play, an important role in developing new business units and also for expanding present units, research and development costs involved in project and reallocation of funds.

Short term investment decisions are those decisions which involve distribution of funds among cash, receivables and inventory. A good working-capital management policy

must make sure that decisions taken have high profitability, appropriate liquidity and a good structure of the organization.

ii) Financing Decisions

After making investment decision, firms need to take financial decisions to finance new assets as well as preparing the best overall mix of financing. In this decision, financial manager must choose suitable sources of funds which develops an optimum capital structure and the proportion of different sources must also be identified. Financial manager must maintain a balance between debt-equity ratio so that it helps in increasing the profitability of the firm.

Factors Influencing Financial Decisions

There are a number of (both external as well as internal) factors that influence the financial decisions. A list of the important **external as well as internal** factors influencing the decisions is given below :

- State of economy
- Structure of capital and money markets.
- Requirements of investors
- Government policy
- Taxation policy

Lending policy of financial institutions. Internal Factors

- Nature and size of business
- Expected return, cost and risk
- Composition of assets
- Structure of ownership
- Trend of earnings
- Age of the firm
- Liquidity position
- Working capital requirements
- Conditions of debt agreements

iii) Dividend Decisions

Dividend decision is the last decision that is to be taken by financial manager with regard to

finance. In this decision, financial manager must decide the amount of dividend that is to be distributed to shareholders as their reward for investing in share capital. Dividend is the portion of profit which is distributed among shareholders.

Dividend decision can be any of these, distributing all profits as dividend, keeping all profits in business only or a part of profits are kept in business and rest amount is distributed to shareholders. While making dividend decision, firm must always consider stock dividend, cash dividend and stability in dividend.

3. Liquidity Decision

Liquidity decision is concerned with the management of current assets. Basically, this is Working Capital Management; Working Capital Management is concerned with the management of current assets. It is concerned with short-term survival. Short term-survival is a prerequisite for long-term survival.

When more funds are tied up in current assets, the firm would enjoy greater liquidity. In consequence, the firm would not experience any difficulty in making payment of debts, as and when they fall due. With excess liquidity, there would be no default in payments. So, there would be no threat of insolvency for failure of payments. However, funds have economic cost. Idle current assets do not earn anything. Higher liquidity is at the cost of profitability. Profitability would suffer with more idle funds. Investment in current assets affects the profitability, liquidity and risk. A proper balance must be maintained between liquidity and profitability of the firm. This is the key area where finance manager has to play significant role. The strategy is in ensuring a trade-off between liquidity and profitability. This is, indeed, a balancing act and continuous process. It is a continuous process as the conditions and requirements of business change, time to time. In accordance with the requirements of the firm, the liquidity has to vary and in consequence, the profitability changes. This is the major dimension of liquidity decision-working capital management. Working capital management is day to day problem to the finance manager. His skills of financial management are put to test, daily.

1.4 GOALS OF FINANCIAL MANAGEMENT

Q9. What are the Goals of Financial Management ?

(OR)

State the objectives of financial management.

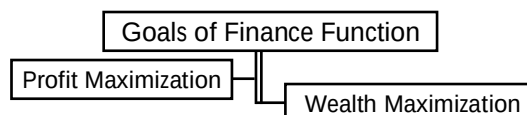
(Jan-20, Jan-18, June-16, Dec-16, Dec.-14, Imp.)

Ans :

- **Goals:** Financial goals can be expressed as part of an overall financial plan that might include profit targets, projected borrowing requirements, covering operating expenses, and developing a debt payback schedule.
- **Mission:** The mission - a similar concept is the vision of the firm encapsulates the firm's overall values and general aspirations.
- **Objectives:** These set out precisely the quantitative or qualitative goals through which the firm's mission is to be achieved.

Thus, the goals, mission and the objectives of the firm's are interrelated with each other in respect of finance functions. Below are the detail descriptions of the firm's objectives

The main objective of a business is to maximize the owner's economic welfare. There are two main objectives of financial management:



1. Profit Maximization

In the conventional theory of the firm, the principle objective of a business firm is to maximize profit. Under the assumptions of given taste and technology, price and output of a given product under competition are determined with the sole objective of maximization of profit.

Profit maximization refers to the maximization of rupee income of the firm. Under profit maximization objective, business firms attempt to adopt those investment projects, which yields larger profits, and drop all other unprofitable activities. In maximizing profits, input-output relationship is

crucial, either input is minimized to achieve a given amount of profit or the output is maximized with a given amount of input. Thus, this objective of the firm enhances productivity and improves the efficiency of the firm.

Profit maximization is the traditional and narrow approach, which aims at maximizing the profit of the concern. It is also called as cashing per share maximization.

Arguments in Favour of Profit Maximization

The following arguments are advanced in favour of profit maximization as the objective of business:

- 1. Profit is the Test of Economic Efficiency**
It is a measuring rod by which the economic performance of the company can be judged.
- 2. Efficient Allocation of Fund**
Profit leads to efficient allocation of resources as resources tend to be directed to uses which in terms of profitability are the most desirable.
- 3. Social Welfare**
It ensures maximum social welfare, i.e., maximum dividend to shareholders, timely payments to creditors, more and more wages and other benefits to employees, better quality at cheaper rate to consumers, more employment to society, and maximization of capital to the owners.
- 4. Internal Resources for Expansion**
Retained profits can be used for expansion and modernization. Thus, lot of difficulty of borrowings can be avoided.
- 5. Reduction in Risk and Uncertainty**
Once huge profits are availed the company develops the risk bearing capacity. The gross present value of a course of action is found out by discounting or capital sating its benefits at a rate which reflects their timing and uncertainty. A financial action which has positive net present value creates wealth and therefore, is desirable. The negative present value should be rejected.

6. More Competitive

More and more Profit enhances the competitive spirit thus, under such conditions firms having more and more profits can survive. Therefore, Profit maximization should be the aim of every business.

7. Desire for Controls

More and more profits do not add new shareholders as internal resources are used for expansion and modernization. Under such situation control of the company remains in the same hands.

8. Basis of Decision-Making

In all businesses profit earning capacity is the sound basis of decision-making.

Limitations

The profit maximization criterion is criticized on the following grounds:

1. Quality of Benefits

Profit maximization approach ignores the quality aspects of benefits associated with a financial course of action. The quality means the degree of certainty with which benefits are expected.

2. Ambiguity-Vague

The term 'profit' is vague and has different interpretations. It means different things to different people. It can be pre-tax or post-tax profit. It is not clear whether it is short-term profit or long-term profit. Does it mean operating profit or profit available for shareholders? The other equivalent term, often used, is 'Return'. Return can be on total capital employed or total assets or shareholders equity and so on.

3. Timing and Value of Money-Ignored

The concept of Profit maximization does not help in making a choice between projects, giving different benefits, spread over a period of time. It ignores the difference in time in respect of benefits arising from the similar amount of investment. The fact that a rupee received today is more valuable than the rupee received later is ignored in this concept.

4. Change in Organization Structure

Principle of Profit maximization was, earlier, accepted when the structure of the business was sole proprietorship. In this type of structure, sole proprietor managed the business, individually, and was the recipient of total profits. As total profit belonged to him, his wealth maximized. This was the picture in 19th century, when the business was, totally, self-managed.

5. Social Welfare may be Ignored

Due to Profit maximization objective, business may produce goods and services, which may not be necessary and beneficial to the society. So, it is, indeed, doubtful how far the Profit maximization objective serves or promotes social welfare, let alone optimizes social welfare.

6. Ignores Financing and Dividend Aspects

The Profit maximization concept concentrates on profitability aspect alone and impact of financing and dividend decisions on the market value of shares are, totally, ignored.

2. Wealth Maximization

Ezra Solomon has described a wealth maximization goal in these terms: "The gross present worth of a course of action is equal to the capitalized value of the flow of future expected benefits, discounted (or capitalized) at a rate which reflects the uncertainty or certainty. Wealth or net present worth is the difference between gross present worth and the amount of capital investment required to achieve the benefits."

The wealth maximization (also known as value maximization or net present worth maximization) is also universally accepted criterion for financial decision making. The value of an asset should be viewed in terms of benefits it can produce over the cost of capital investment.

This is also known as net present worth maximization approach, it takes into consideration the time value of money. Its operational features satisfy all the three requirements of a suitable operational objective of financial courses of action i.e. quality of benefits, timing of benefits and exactness.

The wealth maximization approach can be more explicitly defined in the following ways:

$$W = \frac{A_1}{(1+K)} + \frac{A_2}{(1+K)^2} + \frac{A_3}{(1+K)^3} + \dots + \frac{A_n}{(1+K)^n} - C = \sum_{t=1}^n \frac{A_t}{(1+K)^t} - C$$

Where,

A_1, A_2, A_n = Streams of benefits expected/ future cash flows

C = Cash outlay or cost of action/ cost of project

K = Discount rate/capitalization rate

W = Net present worth

The objective of wealth maximization helps to resolve two most trouble some problems attached with the flow of benefits. There is consideration of time value of money. The problem is handled by selecting an appropriate rate of discount and using this rate of discount the expected flow of future benefits.

The wealth maximization objective is consistent with the objective of maximizing the owner's economic welfare. The wealth maximization principle implies that the fundamental objective of a firm should be to maximize the market value of its shares.

Arguments in Favour of Wealth Maximization

The following arguments are advanced in favour of wealth maximization as the objective of business:

1. Wealth maximization is superior to the profit maximization because the main aim of the business concern under this concept is to improve the value or wealth of the shareholders.
2. Wealth maximization considers the comparison of the value to cost associated with the business concern. Total value detected from the total cost incurred for the business operation. It provides extract value of the business concern.
3. Wealth maximization considers both time and risk of the business concern.
4. Wealth maximization provides efficient allocation of resources.
5. It ensures the economic interest of the society.

Limitations

The wealth maximization criterion is criticized on the following grounds:

1. The objective of wealth maximization is not, necessarily, socially desirable.
2. There is some controversy whether the objective of maximization of wealth is of the firm or stockholders. If wealth of firm were maximized, it would be benefiting the interests of debenture holders and preference shareholders too.
3. In corporate sector, ownership and management are separate unlike in a sole proprietorship. Management acts as the agents of real owners i.e. shareholders. However, there is always a possibility of conflict of interest between the shareholders' interests and managerial interests.

The managers may act to maximize their managerial utility but not the wealth of stockholders of the firm. A particular decision may be taken to exhibit their managerial utility and that decision may not be in the exclusive interests of the firm. Many a time, individuals place their personal preferences and selfish interests, ahead of the institutional interests.

Q10. Distinguish between profit maximization and wealth maximization.

(OR)

Compare and contrast profit maximization and Wealth maximization.

Ans :

(Imp.)

S.No.	Basis of Difference	Profit Maximization	Wealth Maximization
1.	Definition	The concept of profit maximisation implies that a firm either produces maximum output for a given input, or Thus, uses minimum inputs for producing a given output. it relates to optimizing the input-output relationship of resources to minimise the wasteful costs.	The concept of shareholders' wealth maximization means maximising the wealth in the hands of shareholders by way of dividends and value-creation or Net Present Value (NPV) of a course of action such that future inflows value is maximized and determined precisely.
2.	Purpose	The main purpose of profit maximisation is to maximise the profitability derived out of economic activity of the business.	The main purpose of this concept is to enhance the value of the firm and the market value of the shares of the shareholders.
3.	Formulae	Profit maximisation concept is based on the determination of maximisation of profits. In a simple way: Profit = Total Revenue Receipts - Total Costs	The stockholders' current status of wealth in the firm is based on the share price and the number of shares held. It can be depicted as: Wealth = No. of Shares Owned x Current Stock Price Per Share.
4.	Rationale	The rationale behind this concept is the need for maximum profits and accumulated profits for growth in future and shelter against contingencies like economic recession, natural calamity, unforeseen losses in future, severe competition, etc.	The rationale behind this concept is maximisation of value of the firm and enhancing shareholders' wealth as a gratitude for their commitment of funds and continued investor relationship with the company.
5.	Time Span	This concept relates to relatively shorter time period, say a financial year. Thus, a short-term myopic vision.	This concept relates to long-term value building and augmenting individual shareholder's utility. Thus, a long-term vision.
6.	Time Value of Money (i.e., the Recognition that Value in Money Decreases Over Time)	This concept does not give due consideration to the issues of time value of money. It determines profits for the financial year and ignores discounting factor of earnings.	This concept gives due consideration to the time value of money and its implications. It calculates the future earning, at their exact value by applying Net Present Value (NPV) approach and discounting factor, etc.

7.	Immediate Beneficiaries Management versus Owners	The immediate benefit of this concept is derived by management and later by the shareholders, especially when there is separation of management from ownership.	The immediate benefits are availed by shareholders and later by the organization as a whole. This can potentially cause conflicts when there is separation ownership.
8.	Limitations and Constraints	The profit maximization concept has the following constraints i) It ignores the time value of money concept. ii) Short-term vision based. iii) Exploitative tendency towards resources, employees, customers if this concept is pursued beyond viable limits iv) Gives lower priority to shareholders' interest.	The wealth maximization concept has the following constraints: i) It suffers from drastic changes and fluctuations in financial markets. ii) Tendency to overlook short-term economic objectives of the business. iii) Very long span of time, so increased efforts on value building. iv) Conflict arises when there is separation of management from ownership.

1.5 AGENCY PROBLEM

Q11. What do you understand by Agency Problem?

Ans :

In proprietorships, partnerships, and cooperative societies, owners are actively involved in management. But in Companies, particularly large public limited companies, owners typically are not active managers. Instead, they entrust this responsibility to professional managers who may have little or no equity stake in the firm.

According to the theory of the relationship between principals (owners) and agents (managers) - principal-agent theory - owners hire managers to run the firm on their behalf.

The aim of company, which was earlier noted to be maximization of the market value of the company, often is not compatible with the interests of managers, as they prefer to maximize their own personal interests, if possible, even at the expense of owners. This discrepancy of interests leads to agency conflicts, which are especially severe in public companies. The separation of ownership and control causes serious conflicts of interests, among which the conflict between shareholders and managers, and shareholders (represented by managers) and creditors are the most important.

This is the main reason for conflicts between managers and owners of the company.

Reason for Conflicts between Managers and Owners

There are several reasons for the separation of ownership and management in such companies:

1. Most enterprises require large sums of capital to achieve economies of scale. Hence it becomes necessary to pool capital from thousands or even hundreds of thousands of owners. It is impractical for many owners to participate actively in management.
2. Professional managers may be more qualified to run the business because of their technical expertise, experience, and personality traits.
3. Separation of ownership and management permits unrestricted change in owners through share transfers without affecting the operations of the firm. It ensures that the 'know-how' of the firm is not impaired, despite changes in ownership.

4. Given economic uncertainties, investors would like to hold a diversified portfolio of securities. Such diversification is achievable only when ownership and management are separated.

Q12. Define :

- (a) **Agency Relationship**
(b) **Agency Cost**

Ans :

(a) Agency Relationship

The relationship between stockholders and management is called an agency relationship. Such a relationship exists whenever someone (the principal) hires another (the agent) to represent his or her interests. **For example**, suppose a person hire someone to sell a car and agree to pay that person a flat fee when sale takes place. The agent's incentive in this case is to make the sale, not necessarily to get the best price. If person offer a commission of, say ten per cent of the sales price instead of a flat fee, then this problem might not exist. This example illustrates that the way in which an agent is compensated is one factor that affects agency problems.

Problems with the Agency Relationship

In an agency relationship, the agent is charged with the responsibility of acting for the principal. Is it possible the agent may not act in the best interest of the principal, but instead act in his or her own self-interest because the agent has his or her own objective of maximizing personal wealth.

In a large corporation, e.g., the managers may enjoy many fringe benefits, such as golf club memberships, access to private jets and company cars. These benefits (also called perquisites or "perks") may be useful in conducting business and may help to attract or retain management personnel, but there is room for abuse. What if the managers start spending more time at the golf course than at their desks? What if they use the company jets for personal travel? What if they buy company cars for their teenagers to drive? The abuse of perquisites imposes costs on the firm - and ultimately on the owners of the firm. There is also a possibility that managers who feel secure in their positions may not bother to expend their best efforts toward the business. Finally, there is the possibility that managers

will act in their own self-interest, rather than in the interest of the shareholders when those interests clash. For example, management may fight the acquisition of their firm by some other firm even if the acquisition would benefit shareholders. Because in most takeovers, the management personnel of the acquired firm generally lose their jobs.

(b) Agency Cost

The term agency costs refer to the costs of the conflict of interest between stockholders and management. These costs can be indirect or direct.

1. Indirect Agency Cost

An indirect agency cost is a lost opportunity, such as the one we have just described.

2. Direct Agency Costs

Direct agency costs come in two forms:

- i) The first type is a corporate expenditure that benefits management but costs the stockholders. Perhaps the purchase of a luxurious and unneeded corporate jet would fall under this heading.
- ii) The second type of direct agency cost is an expense that arises from the need to monitor management actions. For example, paying outside auditors to assess the accuracy of financial statement information.

To see how management and stockholder interests might differ, imagine that the firm is considering a new investment. The new investment is expected to favourably impact the share value, but it is also a relatively risky venture. The owners of the firm will wish to take the investment (because the stock value will rise), but management may not because there is the possibility that things will turn out badly and management jobs will be lost. If management does not take the investment, then the stockholders may lose a valuable opportunity. This is one example of an agency cost.

It is sometimes argued that managers would tend to maximize the amount of resources over which they have control or, more generally, corporate power or wealth. This goal could lead to an over emphasis on corporate size or growth. For example, cases in which management is accused of

overpaying to buy-up another company just to increase the size of the business or to demonstrate corporate power are not uncommon. Obviously, if over-payment jobs take place, such a purchase does not benefit the stockholders of the purchasing company.

Q13. How to resolve agency problems

Ans :

The agency problem can be prevented/minimized by acts of:

1. Market Forces

Market forces act to prevent/minimize agency problems in two ways:

- i) **Behaviour of Security Market Participants:** The security market participants/shareholders in general and large institutional investors like mutual funds, insurance organizations, financial institutions and so on which hold large blocks of shares of corporates, in particular, actively participate in management. To ensure competent management and minimize agency problems, they have in recent years actively exercised their voting rights to replace more competent management in place of under-performing management. In addition to exercising their legal voting rights, the large institutional shareholders also from time to time communicate with, and exert pressure on, corporate management to perform or face replacement.
- ii) **Hostile Takeovers:** Another market force that has in recent years threatened corporate management to perform in the best interest of the owners/shareholders is the possibility of a hostile takeover, i.e., acquisition of the (target) firm by another firm/group (i.e., acquire) that is not supported by management. Such takeovers typically occur when the acquire is of the view that the target firm is under-valued due to poor management and that its acquisition at its current low price may

result in the enhancement of its value (i.e., share price) through restructuring its management, operations and financing. The constant threat of a takeover would motivate management to act in the best interests of the owners despite the fact that techniques are available to defend against a hostile takeover.

2. Agency Costs

To respond to potential market forces by preventing/maximizing agency problems and contributing to the maximization of owners' wealth/value, the shareholders/owners have to incur four types of costs:

- i) **Monitoring Expenditures:** Such expenditures relate to monitoring the activities of the management (agents) to prevent a satisfying in contrast to share price maximizing behaviour by them. The monitoring outlays relate to payment for audit and control procedures to ensure that managerial behaviour is turned to actions that tend to be in the best interest of the shareholders.
- ii) **Bonding Expenditures:** They protect the owners against the potential consequences of dishonest acts by management/managers. The firm pays to obtain a fidelity bond from a third-party bonding company to the effect that the latter will compensate the former upto a specified amount for financial losses caused by dishonest acts of manager(s).
- iii) **Opportunity Costs:** Such costs result from the inability of large corporates from responding to new opportunities. Due to the organizational structure, decision hierarchy, and control mechanism, the management may face difficulties in seizing upon profitable investment opportunities quickly.
- iv) **Structuring Expenditure:** The structuring expenditures are the most popular, powerful and expensive agency

costs incurred by corporate. They relate to structuring managerial compensation to correspond with share price maximization. The objective is to offer incentives/compensation to management to act in the best interests of the owners. The restructured higher compensation packages to managers also enable corporate to hire the best available managers. The management compensation plans fall into two groups:

- a) **Incentive Plans:** They tie management compensation to share price. The most widely-used incentive plan is stock options which confer on management the right to acquire shares of the corporate at a special/concessional price. A higher future price would result in larger management compensation. However, share prices may be affected by economic and behavioural "market forces" over which management may have no control. Despite positive management performance, market prices may decline.
- b) **Performance Plans:** These plans compensate management on the basis of its proven performance measured by EPS, growth in EPS and other ratios related to return. Based on these, performance shares may be given to management for meeting the stated performance goals. Another form of performance-based compensation is cash bonuses, i.e., cash payments tied to the achievement of certain performance goals.

In brief, unconstrained managers may have other goals in addition to share price maximization, but there are enough evidences to suggest that due to agency costs and market forces, share price maximization is the primary goal of most firms.

1.6 CHANGING ROLE OF FINANCE MANAGER

Q14. Explain the Role of Finance Manager.

(OR)

Discuss the changing role of financial manager in complex business environment.

Ans : **(Jan.-20, June-16, Imp.)**

Role of finance manager in financial management are as follows:

1. **Raising Funds of Company Finance**

The role of finance manager for raising funds of company. Finance manager checks different sources of company. He did not get fund from all sources. First, he check his need in short term and in long term and after this he select best source of fund. He has also power to change the capital structure of company for giving more benefit of company.

2. **Taking Maximum Benefits from Leverage**

The role of finance manager for taking maximum benefits from leverage. Finance manager uses both operating and financial leverage and try to use it for taking maximum benefit from leverage.

3. **International Financial Decision**

The role of finance manager for international financial decision. Finance manager finds opportunities in international financial decision. In these opportunities, he does the contracts of credit default swap, interest rate swap and currency swap.

4. **Investment Decisions**

The role of finance manager in investment decisions. Finance manager checks the net present value of each investment project before actual investment in it. Net present value of project means what net profit at discount rate, will company gets if company invests him money in that project. High NPV project will be accepted. So, due to high responsibility, role of finance manager in this regard is very important.

5. Risk Management

The role of finance manager in risk management. Happening of risks means facing different losses. Finance manager is very serious on risk and its management. He plays important role to find new and new ways to control risk of company. Like other parts of management, he estimates all his risks, he organize the employees who are responsible to control risk. He also calculates risk adjusted NPV. He meets all risk controlling organisations like insurance companies, rating agencies at pervasive level. He is able to convert company's misfortunes into fortunes. By good estimations of averse situations, he tries his best to safeguard the money of company.

1.7 TIME VALUE OF MONEY

1.7.1 Meaning

Q15. Define Time Value of Money. Explain the reasons for Time Value of Money.

Ans :

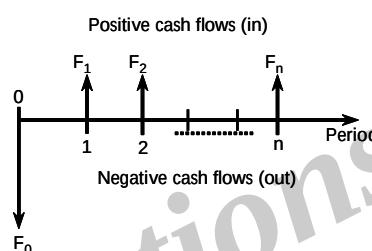
Meaning

The concept of TVM refers to the fact that the money received today is different in its worth from the money viable at some other time in future. In other words, the same principle can be stated as that the money receivable in future is less valuable than the money received today.

For example, if an individual is given an option to receive ₹1,000 today or to receive the same amount after one year, he will definitely choose to receive the amount today (of course he is presumed to be a rational being). The obvious reason for this reference for receiving the money today is that the rupee received today has a higher value than the rupee receivable in future. This preference for current money as against future money is known as the time preference for money or simply TVM.

Unless otherwise indicated, all such cashflows are considered to occur at the end of their respective periods. Cashflows can be positive and negative as shown in the below figure.

For example, a firm is selling a machine for ₹25,000. The buyer offers to pay ₹25,000 either now or after one year. The seller firm will naturally accept the first offer, i.e., to receive ₹25,000 now. In this case, if the firm reinvests the amount of ₹25,000 in fixed deposit account for one year at 10% p.a. interest, then after one year the firm will be having total money of ₹27,500 (₹25,000 + interest of ₹2,500). In the second option, the firm will receive only ₹25,000 after one year. Therefore, in the first option the firm will be better off by ₹2,500.



- 1) Upward arrows - positive cashflows (pay back)
- 2) Downward arrows - negative cashflows (investing)

On the other hand, if the buyer of the machine is ready to pay ₹27,500 instead of ₹25,000 after one year, then the firm may be indifferent. In this situation, the firm will be having ₹27,500 after one year either:

1. By receiving ₹25,000 now and reinvesting to get interest of ₹2,500 or
2. To get ₹27,500 from the buyer after one year. This interest amount of ₹2,500 is the TVM.

Thus, the TVM for the money is its rate of return which the firm can earn by reinvesting its present money. This rate of return can also be expressed as a required rate of return to make equal the worth of money of two different time periods. In simpler terms, the value of a certain amount of money today is more valuable than its value tomorrow. The difference in the value of money today and tomorrow is referred as time value of money.

Reasons for Time Value of Money

Money has time value because of the following reasons:

1. Risk and Uncertainty

Future is always uncertain and risky. Outflow of cash is in our control as payments to parties are made by us. There is no certainty for future cash inflows. Cash inflow is dependent out on our creditor, bank, etc. As an individual or firm is not certain about future cash receipts, it prefers receiving cash now.

2. Preference for Consumption

Most people have subjective preference for present consumption over future consumption of goods and services either because of the urgency of their present wants or because of the risk of not being in a position to enjoy future consumption that may be caused by illness or death, or because of inflation. As money is the means by which individuals acquire most goods and services, they may prefer to have money now.

3. Investment Opportunities

An investor can profitably employ a rupee received today, to give him a higher value to be received tomorrow or after a certain period of time.

4. Inflationary Economy

In an inflationary economy, the money received today, has more purchasing power than the money to be received in future. In other words, a rupee today represents a greater real purchasing power than a rupee a year hence.

1.7.2 Rationale of Time Preference for Money**Q16. Explain the Rationale of Time Preference for Money.**

Ans :

If an individual behaves rationally, he or she would not value the opportunity to receive a specific amount of money now equally with the opportunity to have the same amount at some future date. Most individuals value the opportunity to receive money now higher than waiting for one or more periods to receive the same amount. Time preference for money is an individual's preference for possession of a given amount of money now, rather than the same amount at some future time.

Three reasons may be attributed to the individual's time preference for money :

- Risk
- Preference for consumption
- Investment opportunities

We live under risk or uncertainty. As an individual is not certain about future cash receipts, he or she prefers receiving cash now. Most people have subjective preference for present consumption over future consumption of goods and services either because of the urgency of their present wants or because of the risk of not being in a position to enjoy future consumption that may be caused by illness or death, or because of inflation. As money is the means by which individuals acquire most goods and services, they may prefer to have money now. Further, most individuals prefer present cash to future cash because of the available investment opportunities to which they can put present cash to earn additional cash.

For example, an individual who is offered Rs 100 now or Rs 100 one year from now would prefer Rs 100 now as he could earn on it an interest of, say, Rs 5 by putting it in the savings account in a bank for one year. His total cash inflow in one year from now will be Rs 105. Thus, if he wishes to increase his cash resources, the opportunity to earn interest would lead him to prefer Rs 100 now, not Rs 100 after one year.

In case of the firms as well as individuals, the justification for time preference for money lies simply in the availability of investment opportunities.' In financial decision-making under certainty, the firm has to determine whether one alternative yields more cash or the other. In case of a firm, which is owned by a large number of individuals (shareholders), it is neither needed nor is it possible to consider the consumption preferences of owners.

The uncertainty about future cash flows is also not a sufficient justification for time preference for money. We are not certain even about the usefulness of the present cash held; it may be lost or stolen. In investment and other decisions of the firm what is needed is the search for methods of improving decision-maker's knowledge about the future. In the firm's investment decision, for example, certain statistical tools such as probability theory, or decision tree could be used to handle the uncertainty associated with cash flows.

Required Rate of Return

The time preference for money is generally expressed by an interest rate. This rate will be positive even in the absence of any risk. It may be therefore called the risk-free rate. For instance, if time preference rate is 5 per cent, it implies that an investor can forego the opportunity of receiving Rs 100 if he is offered Rs 105 after one year (i.e. Rs 100 which he would have received now plus the interest which he could earn in a year by investing Rs 100 at 5 per cent). Thus, the individual is indifferent between Rs 100 and Rs 105 a year from now as he considers these two amounts equivalent in value.

In reality, an investor will be exposed to some degree of risk. Therefore, he would require a rate of return, called risk premium, from the investment, which compensates him for both time and risk.

$$\text{Required rate of return} = \text{Risk-free rate} + \text{Risk premium.}$$

The risk-free rate compensates for time while risk premium compensates for risk. The required rate of return may also be called the opportunity cost of capital of comparable risk. It is called so because the investor could invest his money in assets or securities of equivalent risk. Like individuals, firms also have required rates of return and use them in evaluating the desirability of alternative financial decisions. The interest rates account for the time value of money, irrespective of an individual's preferences and attitudes.

How does knowledge of the required rate of return (or simply called the interest rate) help an individual or a firm in making investment decision? It permits the individual or the firm to convert different cash flows occurring at different times to amounts of equivalent value in the present, that is, a common point of reference.

Example

Let us assume an individual with a required interest rate of 10 per cent. If he/she is offered Rs 115.50 one year from now in exchange for Rs 100 which she should give up today, should He/she accept the offer? The answer in this particular case is that he/she should accept the offer. When his/her interest rate is 10 per cent, this implies that he/she is indifferent between any amount today and 110 per

cent of that amount one year. Hence, he/she would obviously favour more than 110 per cent of the amount (i.e. more than Rs. 110 in the example) one year from now; but if the amount offered one year from now were less than 110 per cent of the immediate payment, she would retain the immediate payment. He/She would accept Rs 115.50 after a year since it is more than 110 per cent of Rs 100, which she is required to sacrifice today.

We can ask a different question. Between what amount today and Rs 115.50 one year from now would our investor be indifferent? The answer is that amount of which Rs 115.50 is exactly 110 per cent. Dividing Rs 115.50 by 110 per cent or 1.10, we get

$$\frac{115.50}{1.10} = \text{Rs. } 105$$

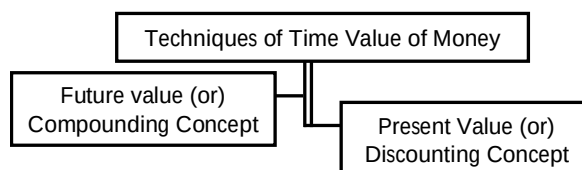
This amount is larger than what the investor has been asked to give up today. He/She would, therefore, accept the offer. This simple example illustrates two most common methods of adjusting cash flows for time value of money: compounding — the process of calculating future values of cash flows and discounting—the process of calculating present values of cash flows.

1.7.3 Future Value – Present Value

Q17. Explain the techniques of time value of money.

Ans :

There are two techniques for adjusting time value of money. They are:

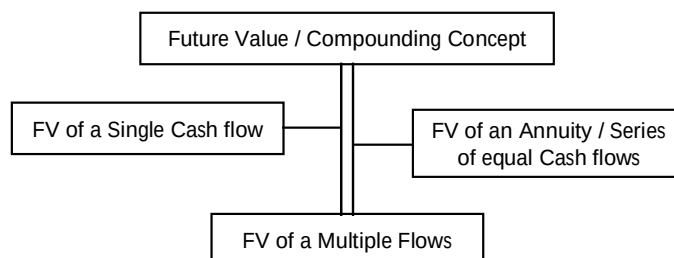


The worth of money today that is receivable or payable at a future date is called Present Value. Similarly, the value of money at a future date with a given interest rate is called future value.

A. Future value

The concept of compounding is used to find out the FV of present money. It is the same as the concept of compound interest, wherein the interest earned in a preceding year is reinvested at the

prevailing rate of interest for the remaining period. Thus, the accumulated amount (principal + interest) at the end of a period becomes the principal amount for calculating the interest for the next period. The compounding technique to find out the FV of present money is shown in figure:



i) Future Value of a Single Cash Flow

The future value of a single cash flow is defined in term of equation as follows:

$$FV = PV (1 + r)^n$$

Where,

FV = Future value;

PV = Present value (given)

r = % Rate of interest, and n = Time gap after which FV is to be ascertained.

The above equation explains that the FV depends upon the combination of three variables i.e., the PV, the r, and n. If any one of these three variables changes, the FV will also change. There can be an almost infinite number of combinations of these three variables and therefore there can be corresponding infinite number of FV. For example, one may be interested to find out then FV of ₹ 1,000 at 10% after 7 years or of ₹ 5,000 at 11% after 9 years or ₹ 50,000 at 16% after 3 years and so on. Every time the tedious calculations as per Equation are to be to find out the future value.

ii) Future Value of Annuity/Series of Equal Cash Flows

Quite often a decision may result in the occurrence of cash flows of the same amount every year for a number of years consecutively, instead of a single cash flow.

For example, a deposit of ₹ 1,000 each year is to be made at the end of each of the next 3 years from today. This may be referred to as an annuity of deposit of ₹ 1,000 for 3 years. An annuity is thus, a finite series of equal cash flows made at regular intervals. Calculation of the FV of an annuity can also be presented graphically as in figure (rate of interest 10% compounded annually).

Year 0	Year 1	Year 2	Year 3
	₹ 1,000	₹ 1,000	₹ 1,000
			→ ₹ 1,100
			→ ₹ 1,210
	Total		₹ 3,310

Fig. Calculation of Future Value of an Annuity of 3 Years (at r = 10%)

In this case, each cash flow is to be compounded to find out its FV. The total of these FVs of all these cash flows will be the total FV of the annuity. The FV of an annuity also depends upon three variables, i.e., the annual amount, the rate of interest and the time period.

In order to find out the FV of an annuity, the pre-calculated mathematical table is available for various combinations of the rate of interest, r, and the time period, n.

In general terms, the future value of an annuity is given as:

$$FVA_n = A \left[\frac{(1 + r)^n - 1}{r} \right]$$

where, FVA_n = Future value of an annuity which has duration of n years.

A = Constant periodic flow

r = Interest

n = Duration of the annuity

It is evident from the above that future value of an annuity depends upon three variables, A, r and n. The future value will vary if any of these three variables changes. For computation purposes, tables or calculators can be made use of.

iii) Future Value of Multiple Flows

Suppose the investment is ₹ 1,000 now (beginning of year 1), ₹ 2,000 at the beginning of year 2 and ₹ 3,000 at the beginning of year 3, how much will these flows accumulate to at the end of year 3 at a rate of interest of 12 per cent per annum?

This problem can be represented on the time line as follows:

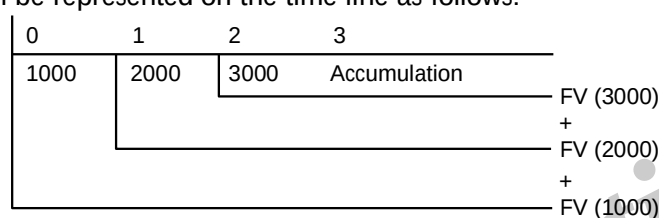


Fig. Compounding Process for Multiple Flows

To determine the accumulated sum at the end of year, add the future compounded values of ₹ 1,000, ₹ 2,000 and ₹ 3,000 respectively.

$$\begin{aligned}
 & FV(\text{₹ } 1,000) + FV(\text{₹ } 2,000) + FV(\text{₹ } 3,000) \\
 &= 1,000 \times FVF_{(12.3)} + 2,000 \times FVF_{(12.2)} + 3,000 \times FVF_{(12.1)} \\
 &= ₹ [(1,000 \times 1.405) + (2,000 \times 1.254) + (3,000 \times 1.120)] \\
 &= ₹ (1,405 + 2,508 + 3,360) \\
 &= ₹ 7,273
 \end{aligned}$$

Therefore, to determine the accumulation of multiple flows as at the end of a specified time horizon, find out the accumulations of each of these flows using the appropriate FVF and sum up these accumulations.

B) Discounting Concept (or) Present Value

The concept of discounting is the reverse of compounding technique and is known as the present value. As there are FVs of sums invested now, calculated as per the compounding techniques, there are also the present values of a cash flow scheduled to occur in future. Present value is the current value of a future amount. It is calculated by discounting (discounting is the process of determining present values of a series of future cash flows) technique by applying the following equation.

$$PV = FV / (1 + r)^n$$

Where, PV = Present value

FV = Future value (given)

r = % Rate of interest, and

n = No. of years for which discounting is done.

The relationships between the variables are as follows:

1. PV is Positively Related to FV

This means that to achieve a higher future value invest more today, all other things being equal. Similarly, if FV is lower, then so will be the PV.

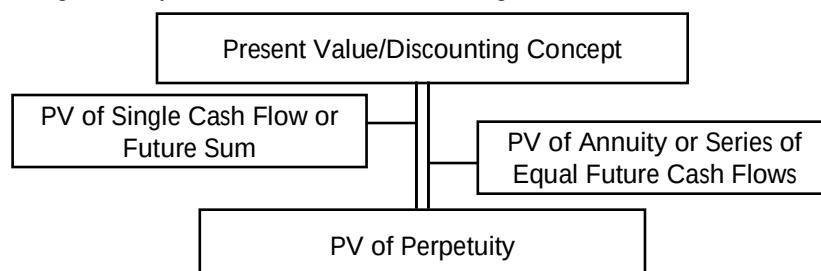
2. PV is inversely Related to the Interest Rate

Higher interest rates mean that the money grows more quickly. Therefore, if someone can earn a higher interest rate, he can invest less today (lower PV) to reach a particular FV. Similarly, the lower the interest rate, the more money will have to invest (higher PV) to meet the goal.

3. PV is Inversely Related to the Number of Periods

The longer the time frame, the less need to invest today. Alternatively, shorter time periods require larger initial investments.

The discounting technique to find out the PV is in figure below:

**i) Present Value of a Single Cash Flow**

The present value of a future sum will be worth less than the future sum because one foregoes the opportunity to invest and thus foregoes the opportunity to earn interest during that period. Expectation of receiving the money in future means that the money is not available presently and therefore one has to forego the interest which could be earned, had the money been available now. This also makes a person to lose the opportunities to get reward/return in terms of interest earnings on that investment. This interest foregone is the cost to the investor and the future expected money must be adjusted for this cost. As the length of time for which one has to wait for the future money increases, the cost attached to delay also increases reflecting the compounded value of the lost opportunities.

In order to find out the PV of future money, this opportunity cost of the money is to be deducted from the future money.

The present value of a single cash flow can be computed with the help of following formula:

$$PV = FV_n \left(\frac{1}{1+r} \right)^n$$

Where,

FV_n = Future value n years.

r = Rate of interest per annum.

n = Number of years for which discounting is done.

From the above, it is clear that the present value of future cash flow is dependent on three variables, namely, FV_n , r and n .

ii) Present Value of Annuity/Series of Equal Future Cash Flows

A decision taken today may result in a series of future cash flows of the same amount over a period of number of years.

For example, a service agency offers the following options for a 3-year contract:

1. Pay only ₹ 2,500 now and no more payment during next 3 years, or
2. Pay ₹ 900 each at the end of first year, second year and third year from now. A client having rate of interest at 10% p.a. can choose an option on the basis of the present values of both options as follows:

Option 1: The payment of ₹ 2,500 now is already in terms of the present value and therefore do not require any adjustment. A decision taken today may result in a series of future cash flows of the same amount over a period of number of years.

Option II: The customer has to pay an annuity of ₹ 900 for 3 years. This can be presented graphically as in fig.

Year 0	Year 1	Year 2	Year 3
	₹ 900	₹ 900	₹ 900
₹ 818	←		
₹ 744	←	←	
₹ 676	←		←
₹ 2238	Total		

Calculation of present value of an annuity (of $r = 10\%$)

In order to find out the PV of a series of payment, the PVs of different amounts accruing at different times are to be calculated and then added. For the above example, as shown in figure, the total PV is ₹ 2,238. In this case, the client should select the option II, as he is paying a lower amount of ₹ 2,238 in real terms as against ₹ 2,500 payable in option I.

The present value of an annuity may be expressed as follows:

$$PVA_n = \frac{A}{(1+r)^1} + \frac{A}{(1+r)^2} + \dots + \frac{A}{(1+r)^{n-1}} + \frac{A}{(1+r)^n} = A \left[\frac{1}{(1+r)^1} + \frac{1}{(1+r)^2} + \dots + \frac{1}{(1+r)^{n-1}} + \frac{1}{(1+r)^n} \right]$$

$$PVA_n = A \left[\frac{1 - \frac{1}{(1+r)^n}}{r} \right] = A \left[\frac{(1+r)^n - 1}{r(1+r)^n} \right]$$

Where, PVA_n = Present value of annuity which has duration of n years,

A = Constant periodic flow,

r = Discount rate

iii) Present Value of Perpetuity

Perpetuity may be defined as an infinite series of equal cash flows occurring at regular intervals. It

has indefinitely long life. If a deposit of ₹ 1,000 is made in a savings bank account at $4\frac{1}{2}\%$ for an indefinite period then the yearly interest of ₹ 50 is perpetuity of interest income so long as the initial deposit of ₹ 1,000 is kept unchanged. In order to find out the PV of perpetuity, the present value of each of the infinite number of cash flows should be added. If the first occurrence of the perpetuity takes place after 1 year from today then the present value of the perpetuity may be calculated with the help of the following equation (given the rate of interest, r) as follows:

$$PV = \frac{\text{Cash Flow}}{(1+r)^1} + \frac{\text{Cash Flow}}{(1+r)^2} + \dots + \frac{\text{Cash Flow}}{(1+r)^\infty}$$

Conceptually, it is difficult or rather impossible to find out the PV of perpetuity. However, mathematically it is the easiest stream of the cash flows to value. Mathematically, infinite summation adds up to the simple version

$$PV_p = \frac{\text{Annual Cash flow}}{r}$$

Where, PV_p is the present value of perpetuity.

Thus, the present value of perpetuity is equal to the amount of perpetuity divided by the rate of interest.

PROBLEMS ON TIME VALUE OF MONEY

1. Govind makes a deposit of ₹ 10,000 in a bank which pays 8% interest compounded annually for 8 years. You are required to find out the amount to be received by him after 8 years.

Sol : (Imp.)

$$FV_n = PV(1+r)^n$$

$$PV_n = ₹ 10,000, r = 8\% \text{ and } n = 8 \text{ years.}$$

$$FV_n = 10,000(1 + .08)^8 \quad FV_n = ₹ 10,000 (1.8509)$$

$$FV_n = ₹ 18,509$$

2. Mr. Sanath deposited ₹ 55,650 in a bank which was paying a 12% interest rate for 10 years time deposit. How much would the deposit grow at the end of 10 years?

Sol :

$$FV_n = PV(1+r)^n$$

$$= 55,650(1 + 0.12)^{10}$$

$$= 55,650 \times 3.1058 = ₹ 1,72,838$$

3. Calculate the compounded value of ₹ 10,000 at the end of 3 years at 12% rate of interest when interest is calculated:

- i) Yearly, ii) Half yearly
iii) Quarterly, and iv) Monthly

Sol : (Imp.)

$$A = P \left(1 + \frac{i}{m} \right)^{m,n}$$

where,

A/FVA = future value of money after n year

P/A = amount at the beginning of the year

i/r = rate of interest

n = number of years

m = number of times per year compounding is made

- i) When interest is compounded yearly basis.

$$FV = PV(1+r)^n$$

$$= 10,000(1 + 0.12)^3$$

$$= 10,000(1.405) = ₹ 14,050$$

ii) When interest is compounded half yearly.

$$A = P \left(1 + \frac{i}{m}\right)^{m \times n} = 10,000 \left(1 + \frac{0.12}{2}\right)^{2 \times 3} = 10,000(1.06)^6 = 10,000(1.4185) = ₹ 14,185$$

iii) When interest is compounded quarterly.

$$A = 10,000 \left(1 + \frac{0.12}{4}\right)^{4 \times 3} = 10,000(1.03)^{12} = 10,000(1.4257) = ₹ 14,257$$

iv) When interest is compounded monthly.

$$A = 10,000 \left(1 + \frac{0.12}{12}\right)^{12 \times 3} = 10,000(1.01)^{36} = 10,000(1.4307) = ₹ 14,307$$

4. Find out the present value of a 5 year annuity of ₹ 50,000 discounted at 8%.

Sol :

PV = Amount of annuity × PV (r, n)

n = 5 years

$$\begin{aligned} PV &= ₹ 50,000 \left[\frac{(1 + 0.08)^5 - 1}{0.08(1 + 0.08)^5} \right] = ₹ 50,000 \left[\frac{(1.08)^5 - 1}{0.08(1.08)^5} \right] \\ &= ₹ 50,000 \left[\frac{1.4693 - 1}{0.08 \times 1.4693} \right] = ₹ 50,000 \left[\frac{0.4693}{0.1175} \right] = ₹ 50,000 [4.056] = ₹ 2,02,800 \end{aligned}$$

5. A makes a deposit of Rs. 5,000 in a bank which pays 10% interest compounded annually for 6 years. You are required to find out the amount to be received after 6 years.

Sol :

$$FV = PV (1 + r)^n$$

Now, PV = Rs. 5,000, r = 10% and n = 6 years

$$\begin{aligned} FV &= 5,000 (1 + 10\%)^6 \\ &= 5,000 \times 7.771 * \\ &= ₹ 38,855 \end{aligned}$$

* From table of compounded value of an annuity.

6. Mr. X deposits Rs. 5,000 at the end of every year for 5 years and the deposit earns a compound interest @ 8% per annum. Determine how much money he will have at the end of 5 years?

Sol :

(Jan.-20)

$$\begin{aligned} FV_n &= PV (1 + r)^n \\ PV &= ₹ 5,000, r = 8\% = 0.08, n = 5 \text{ years} \\ FV_n &= 5,000 (1 + 0.08)^5 \\ &= 5,000 (1.08)^5 = 5,000(1.4693) \\ \therefore FV_n &= ₹ 7,346.5 \end{aligned}$$

6. A person is required to pay four equal annual payments of Rs. 5,000 each in his deposit account that pays 8% interest per year. Find out the future value of annuity at the end of 4 years.

Sol :

$$\begin{aligned} FVA &= A \left(\frac{(1+r)^n - 1}{r} \right) \\ &= \text{Rs. } 5,000(4.507) \\ &= \text{Rs. } 22,535. \end{aligned}$$

7. Find out the present value of Rs. 2,000 received after in 10 years hence, if discount rate is 8%.

Sol :

(Imp.)

$$\text{Present value of an the amount} = FV_n \left(\frac{1}{1+r} \right)^n$$

Now, $r = 8\%$

$n = 10$ years

$$\begin{aligned} \text{Present value of an amount} &= \text{Rs. } 2,000 \left(\frac{1}{1+0.08} \right)^{10} \\ &= \text{Rs. } 2,000 (0.463) \\ &= \text{Rs. } 926. \end{aligned}$$

8. Find out the present value of a 4 year annuity of Rs. 20,000 discounted at 10 percent.

Sol :

(Imp.)

PV = Amount of annuity x Present Value (r, n)

Now $r = 10\%$,

$n = 4$ years

$$\begin{aligned} PV &= FV \left[\frac{1}{(1+r)^n} \right] \\ PV &= 20000 \left[\frac{1}{(1+0.1)^4} \right] \\ &= \text{Rs. } 20,000 \times 0.683 \\ &= \text{Rs. } 13,660 \end{aligned}$$

9. A deposit of Rs. 10,000 is made in a bank for a period of 1 year. The bank offers two options:

- (i) To receive interest at 12% p.a. Compounded monthly or
- (ii) To receive interest at 12.25% p.a. compounded half-yearly. Which option should be accepted? In this case, the two options can be evaluated as follows:

Sol/:

Option (i) Rate of interest 12% p.a., compounded monthly

The effective rate of interest can be calculated with the help of the following equation :

$$\begin{aligned}(1+r_e) &= (1+r/m)^m \\ &= (1+0.12/12)^{12} \\ &= 1.1268\end{aligned}$$

Thus, $r_e = 0.1268$ or 12.68 %

Option (ii) Rate of interest 12.25% p.a. compounded half-yearly

The effective rate of interest can be calculated with the help of the following equation:

$$\begin{aligned}(1+r_e) &= (1+r/m)^m \\ &= (1+0.1225/2)^2 \\ &= 1.1263\end{aligned}$$

Thus, $r_e = 0.1263$ or 12.63 %

In this case, the normal rate of return is higher in option (ii) i.e., 12.25% but the effective rate of interest is higher in option (i) i.e., 12.68%. Therefore, the depositor should select the option (i) i.e., interest at 12% p.a. compounded monthly.

10. Find out the present value of an investment which is expected to give a return of Rs. 2,500 p.a. indefinitely and the rate of interest is 12% p.a.

Sol :

$$\begin{aligned}PV_p &= \text{Annual Cash flow} / r \\ &= \text{Rs. } 2,500 / 0.12 \\ &= \text{Rs. } 2,083.33\end{aligned}$$

11. A finance company makes an offer to deposit a sum of Rs. 1,100 and then receive a return of Rs. 80 p.a. perpetually. Should this offer be accepted if the rate of interest is 8%? Will the decision change if the rate of interest is 5%?

Sol :

(Imp.)

In this case, a person should accept the offer only if the PV of the perpetuity is more than the initial deposit of Rs. 1,100.

If the rate of interest is 8% then

$$\begin{aligned}PV_p &= \text{Annual Cash flow} / r \\ &= \text{Rs. } 80 / 0.08 \\ &= \text{Rs. } 1,000.\end{aligned}$$

If the rate of interest is 5% then

$$\begin{aligned} PV_p &= \text{Annual Cash flow} / r \\ &= \text{Rs. } 80 / 0.5 \\ &= \text{Rs. } 160. \end{aligned}$$

- 12. A machine costs Rs. 98,000 and its effective life is estimated at 12 years. If the scrap value is Rs. 3,000, what should be retained out of profit at the end of each year to accumulate at compound interest rate at 5% p.a. so that a new machine can be purchased after 12 years?**

Sol :

(Dec.-16)

Effective cost of the machine = Rs. 98,000 - 3,000 = Rs. 95,000

$$\text{Now FV} = \text{Annuity Amount} \times \text{CVAF}_{(5\%, 12 \text{ years})}$$

$$\text{or Rs. } 95,000 = \text{Annuity Amount} \times 15.917$$

$$\text{or Annuity Amount} = \text{Rs. } 95,000 / 15.913$$

$$= \text{Rs. } 5,969.$$

So, annual profit retained of Rs. 5,968 for 12 years @ 5% will accumulate to Rs. 95,000 which together with scrap value of Rs. 3000 can be used to purchase the new machine.

- 13. Calculate the present value of the following cash flows assuming a discount rate of 8%.**

Year	1	2	3	4
Cash Flows (Rs.)	10,000	20,000	10,000	5,000

Sol :

Year	Cash Flow	PV @ 8%	PV of CFAT
1	10,000	0.926	9260
2	20,000	0.855	17,100
3	10,000	0.794	7940
4	5000	0.735	3675
		$\Sigma \text{ PV of CFAT} = 37,975$	

- 14. A company is considering an investment proposal, involving an initial cash outlay of Rs. 45 lakhs. The proposal has an expected life of 7 years and zero salvage value. At required rate of return of 12 percent, the proposal has profitability index of 1.82. Calculate the Annual cash inflows.**

Sol :

(Dec.-14)

Calculation of Annual Cash Inflows (ACI)

Given that,

$$PI = 1.182$$

$$\text{Initial cash outlay} = 45 \text{ lakhs}$$

Expected life = 7 years

Required rate of return = 12% or 0.12

Annual rate of return = 12% or 0.12

Annual Cash Inflows (ACI) = ?

PI = Present Value of Cash Inflows $\times$ AC / Initial Cash Outlay

$$1.182 = \frac{4.564 \times \text{ACI}}{45}$$

(where, PV @ 12%, 7 years = 4.564)

$$1.182 \times 45 = 4.564 \times \text{ACI}$$

$$53.19 = 4.564 \times \text{ACI}$$

$$\text{ACI} = \frac{53.19}{4.564}$$

$$\text{ACI} = 11.65 \text{ lakhs.}$$

15. From the following information calculate total present value of future cash flows:

Years	Cash Inflows (Rs.)
1	40,000
2	60,000
3	50,000
4	30,000
5	80,000

Use the discount rate of 10%

Sol :

(June-16)

Year	Cash flows	pv@10%	pv of CFAT
1	40,000	0.909	36,360
2	60,000	0.826	49,560
3	50,000	0.751	37,550
4	30,000	0.683	20,490
5	80,000	0.621	49,680
			$\Sigma \text{pv of CFAT} = 1,93,640$

Exercise Problems

1. If a man deposit ` 55,650 in a bank which is paying a 12 per cent rate of interest on a ten-year time deposit, how much would the deposit grow at the end of ten years?

[Ans: ` 1,72,848.90]

2. Find the amount of annuity if payment of ` 500 is made annually for 7 years at interest rate of 14% compounded annually.

[Ans: ` 5,365.251]

3. Find the present value of ` 10,000 to be required after 5 years if the interest rate be 9 per cent.

[Ans: ` 6,500]

4. What is the present value of ` 2,000 receivable annually for 30 years? The first receipt occurs after 10 years and the discount rate is 10% p.a.

[Ans: ` 6,564.7]

5. A sinking fund consists of 15 annual deposits of ` 1000 each, with interest earned at the rate of 4% compounded annually. What is the principal in the fund at its terminal date?

[Ans: ` 20,023.6]

6. Mr. Longman borrow ` 10,00,000 at an interest rate of 15% and the loan is to be paid in 5 equal installments payable at the end of each of the next 5 years. Prepare the loan-amortisation schedule.

[Ans: ` 2,98,312]

Short Question and Answers

1. Define Financial Management.

Ans :

Meaning

To understand the meaning of Financial Management, one must understand the meaning of both words 'financial' and 'management' separately. 'Financial' means procuring sources of money supply and allocation of these sources on the basis of forecasting monetary requirements of the business. The word 'Management' refers to planning, organization, co-ordination and control of human activities and physical resources for achieving the objectives of an enterprise.

Financial management refers to the management of finance. It is the effective & efficient utilization of financial resources. It means creating a balance among financial planning, procurement of funds, profit administration & sources of funds. The financial management is defined as follows:

Definitions

- i) **According to J.F. Bradley**, "Financial management is the area of business management devoted to the judicious use of capital & careful selection of sources of capital in order to enable a spending unit to move in the direction of reaching its goals".
- ii) **According to Howard & Upton**, "Financial management is the application of the planning & control functions of the finance functions".
- iii) **According to Weston & Brigham**, "Financial management is an area of financial decision making harmonizing individual motives & enterprise goals".

2. What are the Functions of Financial Management?

Ans :

The primary aim of finance function is to arrange as much funds for the business as are required from time to time. This aim has the following functions :

i) Estimation of capital requirements

A finance manager has to make estimation with regards to capital requirements of the company. This will depend upon expected costs and profits and future programmes and policies of a concern. Estimations have to be made in an adequate manner which increases earning capacity of enterprise.

ii) Determination of capital composition

Once the estimation have been made, the capital structure have to be decided. This involves short-term and long- term debt equity analysis. This will depend upon the proportion of equity capital a company is possessing and additional funds which have to be raised from outside parties.

iii) Choice of sources of funds

For additional funds to be procured, a company has many choices like:

- a) Issue of shares and debentures
- b) Loans to be taken from banks and financial institutions
- c) Public deposits to be drawn like in form of bonds.

Choice of factor will depend on relative merits and demerits of each source and period of financing.

3. Limitations of Traditional Approach.

Ans :

The traditional approach was evolved during the 1920s and 1930s period and continued till 1950. The approach had been discarded due to the following limitations :

i) No Involvement in Application of Funds

The finance manager had not been involved in decision-making in allocation of funds. He had been treated as an outsider. He had been ignored in internal decision making process and considered as an outsider.

ii) No Involvement in day to day Management

The focus was on providing long-term funds from a combination of sources. This process was more of one time happening. The finance manager was not involved in day to day administration of working capital management. Smooth functioning depends on working capital management, where the finance manager was not involved and allowed to play any role.

iii) Not Associated in Decision Making Allocation of Funds

The issue of allocation of funds was kept outside his functioning. He had not been involved in decision-making for its judicious utilisation. Raising finance was an infrequent event.

Its natural implication was that the issues involved in working capital management were not in the purview of the finance function. In a nutshell, during the traditional phase, the finance manager was called upon, in particular, when his speciality was required to locate new sources of funds and as and when the requirement of funds was felt.

4. Investment Decisions.

Ans :

Investment decisions are the most significant of all financial decisions taken by the financial manager. Investment decisions are those decisions which involves specification of total assets to be kept in the firm, structure of these assets and perspective of business risk which is observed by its investors. To achieve the goal of wealth maximization, funds must be effectively utilized as they are for limited quantity and involves cost. These investment decisions can be again classified into two groups.

- a) Long-term investment decisions and
- b) Short-term investment decisions.

Long term investment decisions are related to capital budgeting, whereas short-term decisions are related to working capital management.

Capital budgeting is a procedure in which decision related to capital expenditure takes place. It involves those expenses which can yield benefits after a long period of time.' Investment decisions are crucial in organization as they play, an important role in developing new business units and also for expanding present units, research and development costs involved in project and reallocation of funds.

5. Financing decisions.

Ans :

After making investment decision, firms need to take financial decisions to finance new assets as well as preparing the best overall mix of financing. In this decision, financial manager must choose suitable sources of funds which develops an optimum capital structure and the proportion of different sources must also be identified. Financial manager must maintain a balance between debt -equity ratio so that it helps in increasing the profitability of the firm.

Factors Influencing Financial Decisions

There are a number of (both external as well as internal) factors that influence the financial decisions. A list of the important external as well as internal factors influencing the decisions is given below :

- State of economy
- Structure of capital and money markets.
- Requirements of investors
- Government policy
- Taxation policy

Lending policy of financial institutions. Internal Factors

- Nature and size of business
 - Expected return, cost and risk
 - Composition of assets
 - Structure of ownership
 - Trend of earnings
 - Age of the firm
 - Liquidity position
 - Working capital requirements
 - Conditions of debt agreements
-

6. Limitations of profit maximization.

Ans :

i) Quality of Benefits

Profit maximization approach ignores the quality aspects of benefits associated with a financial course of action. The quality means the degree of certainty with which benefits are expected.

ii) Ambiguity-Vague

The term 'profit' is vague and has different interpretations. It means different things to different people. It can be pre-tax or post-tax profit. It is not clear whether it is short-term profit or long-term profit. Does it mean operating profit or profit available for shareholders? The other equivalent term, often used, is 'Return'. Return can be on total capital employed or total assets or shareholders equity and so on.

iii) Timing and Value of Money-Ignored

The concept of Profit maximization does not help in making a choice between projects, giving different benefits, spread over a period of time. It ignores the difference in time in respect of benefits arising from the similar amount of investment. The fact that a rupee received today is more valuable than the rupee received later is ignored in this concept.

7. Arguments in favour of wealth maximization.

Ans :

The following arguments are advanced in favour of wealth maximization as the objective of business:

1. Wealth maximization is superior to the profit maximization because the main aim of the business concern under this concept is to improve the value or wealth of the shareholders.
2. Wealth maximization considers the comparison of the value to cost associated with the business concern. Total value detected from the total cost incurred for the business operation. It provides extract value of the business concern.
3. Wealth maximization considers both time and risk of the business concern.
4. Wealth maximization provides efficient allocation of resources.
5. It ensures the economic interest of the society.

8. Agency Cost.

Ans :

The term agency costs refer to the costs of the conflict of interest between stockholders and management. These costs can be indirect or direct.

i) Indirect Agency Cost

An indirect agency cost is a lost opportunity, such as the one we have just described.

ii) Direct Agency Costs

Direct agency costs come in two forms:

- a) The first type is a corporate expenditure that benefits management but costs the stockholders. Perhaps the purchase of a luxurious and unneeded corporate jet would fall under this heading.
- b) The second type of direct agency cost is an expense that arises from the need to monitor management actions. For example, paying outside auditors to assess the accuracy of financial statement information.

To see how management and stockholder interests might differ, imagine that the firm is considering a new investment. The new investment is expected to favourably impact the share value, but it is also a relatively risky venture. The owners of the firm will wish to take the investment (because the stock value will rise), but management may not because there is the possibility that things will turn out badly and management jobs will be lost. If management does not take the investment, then the stockholders may lose a valuable opportunity. This is one example of an agency cost.

9. Time value of money.

Ans :

The concept of TVM refers to the fact that the money received today is different in its worth from the money available at some other time in future. In other words, the same principle can be stated as that the money receivable in future is less valuable than the money received today.

For example, if an individual is given an option to receive ₹1,000 today or to receive the same amount after one year, he will definitely choose to receive the amount today (of course he is presumed to be a rational being). The obvious reason for this preference for receiving the money today is that the rupee received today has a higher value than the rupee receivable in future. This preference for current money as against future money is known as the time preference for money or simply TVM.

10. Reasons for time value of money.

Ans :

Money has time value because of the following reasons:

i) Risk and Uncertainty

Future is always uncertain and risky. Outflow of cash is in our control as payments to parties are made by us. There is no certainty for future cash inflows. Cash inflow is dependent out on our creditor, bank, etc. As an individual or firm is not certain about future cash receipts, it prefers receiving cash now.

ii) Preference for Consumption

Most people have subjective preference for present consumption over future consumption of goods and services either because of the urgency of their present wants or because of the risk of not being in a position to enjoy future consumption that may be caused by illness or death, or because of inflation. As money is the means by which individuals acquire most goods and services, they may prefer to have money now.

iii) Investment Opportunities

An investor can profitably employ a rupee received today, to give him a higher value to be received tomorrow or after a certain period of time.

iv) Inflationary Economy

In an inflationary economy, the money received today, has more purchasing power than the money to be received in future. In other words, a rupee today represents a greater real purchasing power than a rupee a year hence.

11. State the objectives of financial management.

Ans :

i) Profit Maximization

In the conventional theory of the firm, the principle objective of a business firm is to maximize profit. Under the assumptions of given taste and technology, price and output of a given product under competition are determined with the sole objective of maximization of profit.

Profit maximization refers to the maximization of rupee income of the firm. Under profit maximization objective, business firms attempt to adopt those investment projects, which yields larger profits, and drop all other unprofitable activities. In maximizing profits, input-output relationship is crucial, either input is minimized to achieve a given amount of profit or the output is maximized with a given amount of input. Thus, this objective of the firm enhances productivity and improves the efficiency of the firm.

ii) Wealth Maximization

Ezra Solomon has described a wealth maximization goal in these terms: "The gross present worth of a course of action is equal to the capitalized value of the flow of future expected benefits, discounted (or capitalized) at a rate which reflects the uncertainty or certainty. Wealth or net present worth is the difference between gross present worth and the amount of capital investment required to achieve the benefits."

The wealth maximization (also known as value maximization or net present worth maximization) is also universally accepted criterion for financial decision making. The value of an asset should be viewed in terms of benefits it can produce over the cost of capital investment.

12. Finance function.

Ans :

The vital importance of the financial decisions to a firm makes it imperative to set up a sound and efficient organization for the finance functions. The ultimate responsibility of carrying out the finance functions lies with the top management. Thus, a department to organise financial activities may be created under the direct control of the board of directors. The board may constitute a finance committee. The executive heading the finance department is the firm's chief finance officer (CFO), and he or she may be known by different designations.

The finance committee or CFO will decide the major financial policy matters, while the routine activities would be delegated to lower levels. For example, at BHEL a director of finance at the corporate office heads the finance function. He is a member of the board of directors and reports to the chairman and managing director (CMD). An executive director of finance (EDF) and a general manager of finance (GMF) assist the director of finance. EDF looks after funding, budgets and cost, books of accounts, financial services and cash management. GMF is responsible for internal audit and taxation.

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Choose the Correct Answer

1. Financial management is mainly concerned with [b]
 - (a) Arrangement of funds
 - (b) Proper utilization of funds
 - (c) Profit maximization
 - (d) Efficient management of every business
2. The primary goal of the financial management is [d]
 - (a) To maximize the return
 - (b) To minimize the risk
 - (c) To maximize the wealth of owners
 - (d) To maximize profit
3. In his traditional role the finance manager is responsible for _____. [d]
 - (a) Proper utilization of funds
 - (b) Arrangement of financial resources
 - (c) Acquiring capital assets of the organization
 - (d) Efficient management of capital
4. Investment is the _____. [b]
 - (a) Net additions made to the nation's capital
 - (b) Employment of funds on asset to earn return
 - (c) person's commitment to buy an asset
 - (d) None of the above
5. Time value of money _____. [d]
 - (a) The value of money reduces
 - (b) Earning alternative source
 - (c) Today's money discounted tomorrow at fixed rate
 - (d) Money received today is more than the value of same amount of money received after a certain period
6. Investment is the _____. [b]
 - (a) Person to invest in a property
 - (b) Employment of fund to earn return
 - (c) Invest with no expectations
 - (d) None of the above
7. Finance function consists of [d]
 - (a) Safe custody of funds only
 - (b) Expenditure of funds only
 - (c) Procurement of finance only
 - (d) Procurement and effective use of funds

8. The objective of wealth maximization takes into account [d]
- (a) Amount of return's expected
 - (b) Timing of anticipated returns
 - (c) Risk associated with uncertainty of returns
 - (d) All the above
9. The purpose of financial management is [a]
- (a) Wealth manimization
 - (b) Sales maximization
 - (c) Profit maximization
 - (d) Asset maximization
10. Financial management deals with [b]
- (a) Investments
 - (b) Financing decision
 - (c) a & b
 - (d) None of the above

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Fill in the blanks

1. _____ means planning, organising, directing and controlling the financial activities such as procurement and utilization of fund of the enterprise
2. _____ refers to the increase in the value of share holder equity and assets.
3. _____ is the reward/return of the share holders for their investment made by them.
4. Capital budgeting is the process of making investment decisions in _____ expenditure
5. _____ is essential for fulfilling social goals.
6. _____ are the result of conflicts that exist between owner and management.
7. _____ are responsible for the financial health of an organisation
8. _____ means functional activities to an enterprise undertakes in achieving its desired objectives.
9. _____ means that worth of a rupee received today is different from the worth of a rupee to be received in future.
10. _____ and _____ are major factors every investors investigates.

ANSWERS

1. Financial management
2. Wealth maximisation
3. Dividend
4. capital
5. Income/returns/profits
6. Agency problem
7. Financial managers
8. Wealth maximisation
9. Time value of money
10. Every investors, investigates

UNIT II

CAPITAL BUDGETING:

Capital Budgeting: Meaning – Importance – Process – Kinds of Decisions – Cash Flow Estimation – Techniques of Capital Budgeting

Traditional Techniques: Payback Period – Accounting / Average Rate of Return – Discounted Techniques – Discounted Payback Period – Net Present Value – Internal Rate of Return – Profitability Index – NPV Vs. IRR – Capital Rationing

Risk Analysis in Capital Budgeting Decisions: Sources and Perspectives of Risk– Traditional Tools – Payback Period – Risk Adjusted Discount Rate – Certainty Equivalent Coefficient of Variation – and Decision Tree Analysis

2.1 CAPITAL BUDGETING

2.1.1 Meaning

Q1. What do you understand by Capital Budgeting?

(OR)

What is capital budgeting.

Ans : (Jan.-20, June-16, Imp.)

Meaning

Capital budgeting is the process of making investment decisions in capital expenditures. A capital expenditure may be defined as an expenditure the benefits of which are expected to be received over period of time exceeding one year. The main characteristic of a capital expenditure is that the expenditure is incurred at one point of time whereas benefits of the expenditure are realised at different points of time in future. In simple language we may say that a capital expenditure is an expenditure incurred for acquiring or improving the fixed assets, the benefits of which are expected to be received over a number of years in future.

The following are some of the Examples of capital expenditure:

- Cost of acquisition of permanent assets as land and building, plant and machinery, goodwill, etc.
- Cost of addition, expansion, improvement or alteration in the fixed assets.
- Cost of replacement of permanent assets.
- Research and development project cost, etc.

Capital expenditure involves non-flexible long-term commitment of funds. Thus, capital expenditure decisions are also called as long term investment decisions. Capital budgeting involves the planning and control of capital expenditure. It is the process of deciding whether or not to commit resources to a particular long term project whose benefits are to be realised over a period of time, longer than one year. Capital budgeting is also known as Investment Decision Making, Capital Expenditure Decisions, Planning Capital Expenditure and Analysis of Capital Expenditure.

Definitions

- i) **According to Charles T. Horngreen** has defined capital budgeting as, “Capital budgeting is long term planning for making and financing proposed capital outlays.”
- ii) **According to G.C. Philippatos**, “Capital budgeting is concerned with the allocation of the firm’s scarce financial resources among the available market opportunities. The consideration of investment opportunities involves the comparison of the expected future streams of earnings from a project with the immediate and subsequent streams of earning from a project, with the immediate and subsequent streams of expenditures for it”.
- iii) **According to Richard and Greenlaw** have referred to capital budgeting as acquiring inputs with long-run return.”
- iv) **According to Lynch**, “Capital budgeting consists in planning development of available capital for the purpose of maximising the long term profitability of the concern.”

From the above description, it may be concluded that the important features which distinguish capital budgeting decision from the ordinary day to day business decisions are :

1. Capital budgeting decisions involve the exchange of current funds for the benefits to be achieved in future ;
2. The future benefits are expected to be realised over a series of years;
3. The funds are invested in non-flexible and long term activities;
4. They have a long term and significant effect on the profitability of the concern;
5. They involve, generally, huge funds;
6. They are irreversible decisions.
7. They are 'strategic' investment decisions, involving large sums of money, major departure from the past practices of the firm, significant change of the firm's expected earnings associated with high degree of risk, as compared to 'tactical' investment decisions which involve a relatively small amount of funds that do not result in a major departure from the past practices of the firm.

2.1.2 Importance

Q2. Explain the Importance of Capital Budgeting.

Ans :

Capital budgeting means planning for capital assets. Capital budgeting decisions are vital to any organization as they include the decisions as to :

- a) Whether or not funds should be invested in long term projects such as setting of an industry, purchase of plant and machinery etc.
- b) Analyze the proposal for expansion or creating additional capacities.
- c) To decide the replacement of permanent assets such as building and equipments.
- d) To make financial analysis of various proposals regarding capital investments so as to choose the best out of many alternative proposals.

The importance of capital budgeting can be well understood from the fact that an unsound investment decision may prove to be fatal to the very existence of the concern. The need, significance or importance of capital budgeting arises mainly due to the following :

1. Large Investments

Capital budgeting decisions, generally, involve large investment of funds. But the funds available with the firm are always limited and the demand for funds far exceeds the resources. Hence, it is very important for a firm to plan and control its capital expenditure.

2. Long-term Commitment of Funds

Capital expenditure involves not only large amount of funds but also funds for long-term or more or less on permanent basis. The long-term commitment of funds increases the financial risk involved in the investment decision. Greater the risk involved, greater is the need for careful planning of capital expenditure, i.e. Capital budgeting.

3. Irreversible Nature

The capital expenditure decisions are of irreversible nature. Once the decision for acquiring a permanent asset is taken, it becomes very difficult to dispose of these assets without incurring heavy losses.

4. Long-term Effect on Profitability

Capital budgeting decisions have a long-term and significant effect on the profitability of a concern. Not only the present earnings of the firm are affected by the investments in capital assets but also the future growth and profitability of the firm depends upon the investment decision taken today. An unwise decision may prove disastrous and fatal to the very existence of the concern. Capital budgeting is of utmost importance to avoid over investment or under investment in fixed assets.

5. Difficulties of Investment Decisions

The long term investment decisions are difficult to be taken because (i) decision extends to a series of years beyond the current accounting period, (ii) uncertainties of future and (iii) higher degree of risk.

6. National Importance

Investment decision though taken by individual concern is of national importance because it determines employment, economic activities and economic growth.

Thus, we may say that without using capital budgeting techniques a firm may involve itself in a losing project. Proper timing of purchase, replacement, expansion and alternation of assets is essential."

Q3. Explain the Features of Capital Budgeting.

Ans :

The capital budgeting decisions are often said to be the most important part of corporate financial management. Any decision that requires the use of resources is a capital budgeting decision; thus the capital budgeting decisions cover everything from broad strategic decisions at one extreme to say computerization of the office, at the other. The capital budgeting decisions affect the profitability of a firm for a long period, therefore the importance of these decisions is obvious. Even a single wrong decision by a firm may endanger the existence of the firm as a profitable firm.

A decision to diversify into a new product line if not taken correctly, may convert a profitable firm into a loss making firm. There are several factors and considerations which make the capital budgeting decisions as the most important decisions of a finance manager. The relevance and significance of capital budgeting may be stated as follows :

a) Long Term Effects

Perhaps, the most important features of a capital budgeting decision and which makes the capital budgeting so significant is that these decisions have long term effects on the risk and return composition of the firm. These decision affect the future position of the firm to a considerable extent as the capital

budgeting decisions have long term implications and consequences. By taking a capital budgeting decision, a finance manager in fact makes a commitment into the future, both by committing to the future needs of funds of the projects and by committing to its future implications.

b) Substantial Commitments

The capital budgeting decisions generally involve large commitment of funds and as a result substantial portion of capital funds are blocked in the capital budgeting decisions. In relative terms therefore, more attention is required for capital budgeting decisions, otherwise the firm may suffer from the heavy capital losses in time to come. It is also possible that the return from a projects may not be sufficient enough to justify the capital budgeting decision.

c) Irreversible Decisions

Most of the capital budgeting decisions are irreversible decisions. Once taken, the firm may not be in a position to revert back unless it is ready to absorb heavy losses which may result due to abandoning a project in midway. Therefore, the capital budgeting decisions should be taken only after considering and evaluating each and every minute detail of the project, otherwise the financial consequences may be far reaching.

d) Affect the Capacity and Strength to Compete

The capital budgeting decisions affect the capacity and strength of a firm to face the competition. A firm may loose competitive-ness if the decision to modernize is delayed or not rightly taken. Similarly, a timely decision to take over a minor competitor may ultimately result even in the monopolistic position of the firm.

Thus, the capital budgeting decisions involve a largely irreversible commitment of resources i.e., subject to a significant degree of risk. These decisions may have far reaching effects on the profitability of the firm. These decisions therefore, require a carefully developed decision making process and strategy based on a reliable forecasting system.

2.1.3 Process

Q4. Outline the process of capital budgeting.

(OR)

Enumerate briefly the major steps involved in capital budgeting.

Ans : (Dec.-16, Imp.)

Capital budgeting is a complex process as it involves decisions relating to the investment of current fund for the benefit to be achieved in future and the future is always uncertain.

The Steps Involved in Capital Budgeting Process are :

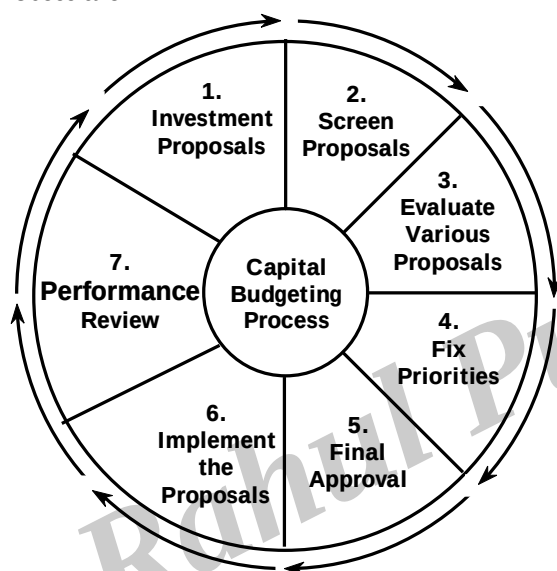


Fig.: Process of Capital Budgeting

1. Identification of Investment Proposals

The capital budgeting process begins with the identification of investment proposals. The proposal or the idea about potential investment opportunities may originate from the top management or may come from the rank and file worker of any department or from any officer of the organization.

The departmental head analyses the various proposals in the light of the corporate strategies and submits the suitable proposals to the Capital Expenditure Planning Committee in case of large organization or to the officers concerned with the process of long-term investment decisions.

2. Screening Proposals

The Expenditure Planning Committee screens the various proposals received from different departments. The committee view these proposals from various angles to ensure that these are in accordance with the corporate strategies or selection criterion of the firm and also do not lead to departmental imbalances.

3. Evaluation of Various Proposals

The next step in the capital budgeting process is to evaluate the profitability of various proposals. There are many methods which may be used for this purpose such as pay back period method, rate of return method, net present value method, internal rate of return method etc.

Independent proposals are those which do not compete with one another and the same may be either accepted or rejected on the basis of a minimum return on investment required.

The contingent proposals are those whose acceptance depends upon the acceptance of one or more other proposals e.g., further investment in building may have to be undertaken as a result of expansion programme. Mutually exclusive proposals are those which compete with each other and one of those may have to be selected at the cost of the other.

4. Fixing Priorities

After evaluating various proposals, the unprofitable or uneconomic proposals may be rejected straight away. But it may not be possible for the firm to invest immediately in all the acceptable proposals due to limitation of funds.

Hence, it is very essential to rank the various proposals and to establish priorities after considering, risk and profitability involved there in.

5. Final Approval and Preparation of Capital Expenditure Budget

Proposals meeting the evaluation and other criteria are finally approved to be included in the Capital Expenditure Budget. However,

proposals involving smaller investments may be decided at the lower levels for expenditure action. The capital expenditure budget lays down the amount of estimated expenditure to be incurred on fixed assets during the budget period.

6. Implementing Proposal

Preparation of a capital expenditure budgeting and incorporation of a particular proposal in the budget does not itself authorize to go ahead with the implementation of the project. A request for authority to spend the amount should further be made to the Capital Expenditure Committee which may be to review the profitability of the project in the changed circumstances.

Further, while implementing the project, it is better to assign responsibilities of completing the project within the given time frame and cost limit so as to avoid unnecessary delays and cost over runs. Network techniques used in the project management such as PERT and CPM and also be applied to control and monitor the implementation of the projects.

7. Performance Review

The last stage in the process of capital budgeting is the evaluation of the performance of the project. The evaluation is made through post completion audit by way of comparison of actual expenditure on the project with the budgeted one, and also by comparing the actual return from the investment with the anticipated return. The unfavorable variances, if any should be looked into and the causes of the same be identified so that corrective action may be taken in future.

Q5. What are the Problems involved in Capital Budgeting?

Ans :

The Capital Budgeting decisions are not only critical and analytical in nature, but also involve various difficulties which a finance manager may come across. The problems in Capital Budgeting decisions are as follows :

a) Future Uncertainty

All Capital Budgeting decisions involve long term which is uncertain. Even if every care is taken and the project is evaluated to every minute detail, still 100% correct and certain forecast is not possible. The finance manager dealing with the Capital Budgeting decisions, therefore, should try to be as analytical as possible.

The uncertainty of the Capital Budgeting decisions may be with reference to cost of the project, future expected returns from the project, future competition, expected demand in future, legal provisions, political situation etc.

b) Time Element

The implications of a Capital Budgeting decisions are scattered over a long period. The cost and benefit of a decision may occur at different point of time. As a result, the cost and benefits of a Capital Budgeting decisions are generally not comparable unless adjusted for time value of money.

The cost of a project is incurred immediately, however, it is recovered in number of years. These total returns may be more than the cost incurred, still the net benefit cannot be ascertained unless the future benefits are adjusted to make them comparable with the cost. Moreover, the longer the time period involved, the greater would be the uncertainty.

c) Measurement Problem

Sometimes a finance manager may also face difficulties in measuring the cost and benefits of a projects in quantitative terms.

For example, the new product proposed to be launched by a firm may result in increase or decrease in sales of other products already being sold by the same firm. But how much? This is very difficult to ascertain because the sales of other products may increase or decrease due to other factors also.

2.1.4 Kinds of Decisions

Q6. Explain different types of capital budgeting decisions.

Ans :

Types of Capital Budgeting / Investment Decisions

There are many ways to classify the capital budgeting decision. Generally capital investment decisions are classified in two ways.

- 1) On the Basis of Firm's Existence
- 2) On the basis of decision situation

1. On the Basis of Firm's Existence

The capital budgeting decisions are taken by both newly incorporated firms as well as by existing firms. The new firms may be required to take decision in respect of selection of a plant to be installed. The existing firm may be required to take decisions to meet the requirements to meet the requirement of new environment or to face the challenges of competition. These decisions may be classified into :

a) New Firm

A newly incorporated firm may be required to take different decisions such as selection of a plant to be installed, capacity utilization at initial stages, to set up or not simultaneously the ancillary unit etc.

b) Existing Firm

A firm which is already existing may also be required to take various decisions from time to time to meet the challenges of competition or changing environment. These decisions may be :

- i) **Replacement and Modernization Decision** : This is a common type of a capital budgeting decision. All types of plant and machineries eventually require replacement. If the existing plant is to be replaced because the economic life of the plant is over, then the decisions may be known as a replacement decision. However, if an existing plant is to be replaced because it has become technologically outdated (though the

economic life may not be over), the decision may be known as a modernization decision.

- ii) **Expansion** : Some times, the firm may be interested in increasing the installed production capacity so as to increase the market share. In such a case, the finance manager is required to evaluate the expansion program in terms of marginal costs and marginal benefits.

- iii) **Diversification** : Some times, the firm may be interested to diversify into new product lines, new markets, production of spare parts etc. In such a case, the finance manager is required to evaluate not only the marginal cost and benefits, but also the effect of diversification on the existing market share and profitability. Both the expansion and diversification decisions may also be known as revenue increasing decisions. Both expansions and diversification decisions are called revenue expansion decisions.

2. From the point of view of Decision Situation

In the view of the investments proposals under consideration, Capital Budgeting decisions may also be classified as

- a) Accept Reject Decisions
- b) Mutually Exclusive Project Decisions
- c) Capital Rationing Decisions:

a) Accept Reject Decisions

These relate to independent projects which do not compete with one another. Such decisions are generally taken on the basis of minimum return on investment. All those proposals which yield a rate of return higher than the minimum required rate of return or the cost of capital are accepted and the rest are rejected. If the proposal is accepted the firm makes investment in it, and if it is rejected the firm does not invest in the same.

b) Mutually Exclusive Project Decisions

Such decisions relate to proposals which compete with one another in such way that acceptance of one automatically excludes the acceptance of the other. Thus, one of the proposals is selected at the cost of the other. For example, a company may have the option buying a new machine or a second hand machine or taking a machine on hire or selecting a machine out of more than one brands available in the market. In such a case, the company may select one best alternative out of the various options by adopting some suitable technique or method of Capital Budgeting. Once one alternative is selected the others are automatically rejected.

c) Capital Rationing Decisions

A firm may have several profitable investments proposals but only limited funds to invest. In such a case, these various investments proposals compete for limited funds and thus the firm has to raise them. The firm selects the combination of proposals that will yield the greatest profitability by ranking them in descending order of their profitability.

2.1.5 Cash Flow Estimation**Q7. How to estimate cash flow in capital budgeting decisions**

Ans :

In capital budgeting, the cost and benefits of a proposal are measured in terms of cash flows. The term cash flow is used to describe the cash oriented measures of return generated by a proposal. Though it may not be possible to obtain exact cash-effect measurement, it is possible to generate useful approximations based on available accounting data. The costs are denoted as cash outflows whereas the benefit are denoted as cash inflows. It may be noted that the cash outflows represent outflows of purchasing power and cash inflow is an inflow of purchasing power. The cash outflows and inflows are used to denote the cost and benefit of a proposal.

Thus, it is clear that the cash flows as a measure of cost and benefits of a proposal is a better technique to evaluate a proposal. It may be further noted that the cash flows associated with a proposal may be classified into

- (i) Original (or) Initial cash outflow
- (ii) Subsequent cash in-flows and outflows and
- (iii) Terminal cash flow.
- (iv) Taxation and (cash flow)
- (v) Depreciation, Non-cash items, Cashflow.

i) Original (or) Initial Cash Outflow

All the capital projects require a sizeable initial cash outflow before any future inflow is realized. This initial cash outflow is needed to get a project operational. In most of the capital budgeting proposals, the initial cost of the project *i.e.*, the initial investment cost is the cash outflow occurring in the initial stages of the projects. Since the investment cost occurs in the beginning of the project, it is relatively easy to identify the initial cash outflows. It reflects the cash spent to acquire the asset. There are several points worth noting here as follows :

- a) Installation cost :** The initial cash outflow includes the total cost of the project in order to bring it in workable condition. Thus, the initial cash outflow includes not only the cost of plant, but also the transportation cost, installation cost and any other incidental cost.
- b) Sunk cost :** Sunk cost is that cost which the firm has already incurred and thus has no effect on the present or future decisions. If a firm which owns a plot of land which is lying idle for the time being, is now considering to construct a factory at this plot, then the cost of the plot is a sunk cost for the factory proposal, and is irrelevant. However, if the plot of land is to be purchased now, then the cost of the land will be included in the initial cost of the project.

ii) Subsequent Inflows And Outflows

The original investment cost or the initial cash outflow of the proposal is expected to generate a series of cash inflows in the form of cash profits contributed by the project. These cash inflows may be same every year throughout the life of the project or may vary from one year to another. The timings of the inflows may also be different. The cash inflows mostly occur annually, but in some cases may occur half- yearly or biannually also. These cash inflows generated during the life of the project may also be called *operating cash flows*. These are positive cash flows for most of the conventional revenue generating proposals, however, in case of cost reduction proposals these cash flows may be negative.

iii) Terminal Cash Inflows

The cash inflows for the last year will also include the terminal cash flows in addition to annual cash inflows. Two common terminal cash inflows may occur in the last year. First, as already noted, the estimated salvage or scrap value of the project realizable at the end of the economic life of the project or at the time of its termination is the cash inflow for the last year. At the time of disbanding or termination of the project, the market value of the land etc. also become cash inflows from the project. Second, as already noted, the working capital which was invested (tied up) in the beginning will no longer be required as the project is being terminated. This working capital released will be available back to the firm and is considered as a terminal cash inflow.

iv) Taxation and Cash Flows

The cash flows that are related to capital budgeting decisions are the after-tax cash flows only. The after-tax cash flows resulting from a project are in fact the relevant incremental cash flows. These after-tax cash flows would not occur if the project is not undertaken.

The annual cash inflow from a project will result in increase in the taxable profit. So, the cash flow from a project would also affect the

tax liability of the firm. The increase in tax liability will be equal to the cash inflow multiplied by the tax rate. Or, the net cash inflow will be equal to cash inflow (before tax) multiplied by (tax rate). Therefore, the relevant cash flow for a capital budgeting decision is the cash flow net of incremental tax liability.

So, the capital budgeting analysis should be done in after-tax terms. This implies that all items that affect taxes, even non-cash item such as depreciation, should be considered in the analysis.

v) Depreciation, Non-cash Items And Cash Flows

The fixed assets acquired as a result of capital budgeting decision would be depreciated in the usual way. The depreciation of the assets would reduce the expected profit being generated by the project, reducing the tax liability. Even though this depreciation does not involve any cash flow as such, it definitely affects the cash outflows by affecting the tax liability.

Every capital budgeting decision should therefore, consider this depreciation tax-shield i.e., reduction in tax liability as a result of depreciation. The depreciation is added back to the figure of profit after taxes to arrive at the cash inflows from the project. Similarly, any other non-cash expense which has already been deducted to arrive at the figure of profit after tax, is added back to ascertain the cash inflows even though they may not provide any tax benefit to the firm. For example, amortization of goodwill is not tax-deductible but it depresses the reported income and hence is added back.

2.2 TECHNIQUES OF CAPITAL BUDGETING**Q8. What are the different techniques of Capital Budgeting?**

Ans :

The investment evaluation techniques play a vital role in evaluating a project. Profitability of a firm will increase if the proposal is profitable and vice-versa. Selection of a profitable project will help

to maximise value of the firm through the maximisation of profits. Therefore, capital budgeting decisions form the framework for a firm's future development.

As we have seen in the analysis stage, project evaluation involves market analysis, financial analysis, technical analysis, economic analysis, and ecological analysis. In financial analysis, after estimation of the cash flows and required rate of return on the project then the next step is evaluation of various investment alternatives and selection of the most profitable project.

A wide range of criteria has been suggested to judge the worthiness of the investment alternatives. Evaluation techniques are divided into two broad categories, viz., (a) Traditional techniques or non-discounted techniques and (b) Modern techniques or discounted cash flow techniques. Figure shows the two techniques of evaluation of a project.

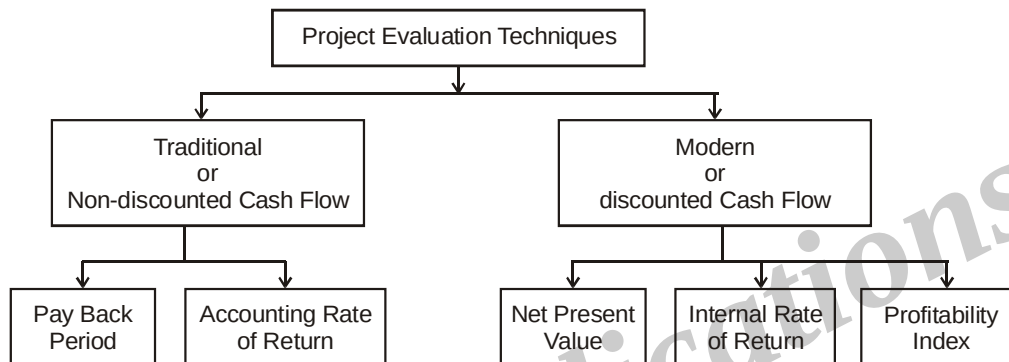


Fig.: Techniques of Project Evaluation

There are many methods of evaluating profitability of capital investment proposals. The various commonly used methods are as follows :

a) Traditional Methods

- i) Pay Back Period Method
- ii) Accounting Rate of Return Method

b) Time-adjusted Method/Discounted Methods

- i) Net Present Value Method (NPV)
- ii) Internal Rate of Return (IRR)
- iii) Profitability Index Method (PI).

Q9. Explain the Features of Capital Budgeting Techniques.

Ans :

Following are some of the features which a capital budgeting evaluation technique should possess :

1. The criterion must be able to incorporate all the cash flows associated with proposal.
2. It should also incorporate the time value of money i.e., the cash flows arising at different point of time must be differentiated in respect of their worth to the firm.
3. It should be capable of ranking different proposals in order of their worth to the firm.
4. It should be objective and unambiguous in its approach. There should not be any scope for subjectivity of the decision maker.
5. The last but not the least, the technique must be in the line with the objective of maximisation of shareholders wealth.

2.2.1 Traditional Techniques

2.2.1.1 Payback Period

Q10. Define Payback Period. What are the advantages and disadvantages of Payback Period?

Ans : (Jan.-20, Jun-16, Imp.)

Meaning

The payback period is defined as the number of years required for the proposal's cumulative cash inflows to be equal to its cash outflows. In other words, the payback period is the length of time required to recover the initial cost of the project. The payback period therefore, can be looked upon as the length of time required for a proposal to 'break even' on its net investment.

Calculation of the Payback Period

The payback period can be calculated in two different situations:

1. When Annual Inflows are Equal

When the cash inflows being generated by a proposal are equal per time period, i.e., the cash inflows are in the form of an annuity, the payback period can be computed by dividing the cash outflow by the amount of annuity.

2. When the Annual Cash Inflows are Unequal

In case the cash inflows from the proposal are not in annuity form then the cumulative cash inflows are raised to compute the payback period.

Advantages

Following are the advantages of payback methods:

1. Simple to Operate

The payback period is simple and easy, in concept as well as in its applications. In particular, it can be adopted by a small firm having limited man-power which does not have any special skill to apply other sophisticated techniques.

2. Liquidity Indication

It gives an indication of liquidity. In case a firm is having liquidity problems, then the payback period is a good method to adopt as it emphasizes the earlier cash inflows.

3. Risk of Obsolescence High

In a broader sense, the payback period deals with the risk also. The project with a shorter payback period will be less risky as compared to project with a longer payback period, as the cash inflows which arise further in the future will be less certain and hence more risky. So, the payback period helps in weeding out the risky proposals by assigning lower priority.

Disadvantages

Following are the disadvantages of payback methods:

1. Ignores Cash Inflows

The payback period entirely ignores many of the cash inflows which occur after the payback period. This could be misleading and could lead to discrimination against the proposal which generates substantial cash inflows in later years. It ignores what happens after the initial investment is recouped.

2. Equal Weightage to all Cash Flows

It ignores the timing of the occurrence of the cash flows. It considers the cash flows occurring at different point of time as equal in money worth and ignores the time value of money. It gives equal weights to all the cash flows before the payback date and no weight at all to cash flows occurring thereafter.

3. Ignores Salvage Value

The payback period also ignores the salvage value and the total economic life of the project. A project which has substantial salvage value may be ignored (though more profitable it may be otherwise) in favour of a project with higher inflows in earlier years. It is insensitive to the economic life span and thus not a truly meaningful criterion for determining the economic viability of a proposal. The speed with which the initial investment is recovered is not a sufficient way to appraise the profitability.

4. Method of Capital Recovery

The payback period is more a method of capital recovery rather than a measure of profitability of a project. To recover the capital is not enough, of course, because from an economic view point one would hope to earn a profit on the funds while they are invested.

2.2.1.2 Accounting / Average Rate of Return

Q11. Define Accounting / Average Rate of Return. What are the advantages and disadvantages of Accounting / Average Rate of Return ?

Ans :

(Jan-20, June-16, Imp.)

According to this method, the capital investment proposals are judged on the basis of their relative profitability. For this purpose, capital employed and related income is determined according to commonly accepted accounting principles and practices over the entire economic life of the project and then the average yield is calculated. Such a rate is termed as Accounting Rate of Return.

The ARR is also known as Return on Investment (ROI). It is the ratio of average after tax profit to average investment.

Calculation of ARR

$$\text{ARR} = \frac{\text{Average Annual Profit after Tax}}{\text{Average (or) Initial Investment}} \times 100 = \frac{\text{Average EBIT} (1 - t)}{\text{Average Investment}} \times 100$$

Where,

$$\text{Average Investment} = \frac{\text{Initial Investment} + \text{Salvage Value}}{2}$$

(or)

$$\frac{\text{Initial investment} - \text{Scrap value}}{2} + \text{Addl.net working capital} + \text{Scrap value}$$

Advantages

The advantages of average rate of return method are as follows:

1. Easy to Calculate

It is easy to calculate because it makes use of readily available accounting information. In contrast, discounted cash flow technique involves tedious calculations.

2. Considers Entire Cashflows

It takes into consideration the entire cash inflows during the project life. Payback Method does not use the entire stream of incomes.

3. Based on Financial Data

As this method is based upon accounting concept of profits, it can be readily calculated from the financial data.

Disadvantages

The disadvantages of average rate of return method are as follows:

1. Ignores Time Value of Money

If we use ARR to compare two projects having equal initial investments. The project which has higher annual income in the latter years of its useful life may rank higher than the one having higher annual income in the beginning years, even if the present value of the income generated by the latter project is higher.

2. Cost of Project cannot be Determined Accurately

Future sales and anticipated cost of project over a long period cannot be determined accurately because they are influenced by a large number of outside factors.

3. Used as the Only Way to Appraise a Project

It can not be used as the only way to appraise a project. The net present value should be also calculated as calculating only the return of a project can give a distorted image when projects that have significantly different capital expenditure are compared.

4. Uses Only Accounting Figures

It uses accounting figures which can be affected by judgment, accounting policies and non cash items (depreciation).

5. Problem of Comparability

There are two ways to calculate the accounting rate of return which causes a problem of comparability.

PROBLEMS ON TRADITIONAL METHODS OF CAPITAL BUDGETING

1. A project proposal requires a cash outflow of `1,00,000 and yield an annual cash inflows of `18,500/- for next 7 years. Calculate payback period for a given project.

Sol :

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

$$\Rightarrow \frac{1,00,000}{18,500} = 5.4 \text{ years}$$

2. A project proposed requires cash outlay of `19,000/- and is expected to generate cash inflows of `8,000/-, 6,000/-, 4,000/-, 2,000/- and 4,000/- over next 5 years. Calculate PBP for the given projects.

Sol :

In a given problem the cash inflows are unequal so PBP -

$$\text{PBP} = \text{Base year} + \frac{\text{Required CFAT}}{\text{Next year CFAT}}$$

Year	CFAT	Cumulative CFAT
1	8,000	8,000
2	6,000	14,000
3	4,000	18,000
4	2,000	20,000
5	4,000	24,000

$$\text{PBP} = 3 + \frac{1000}{2000} = 3.5 \text{ years}$$

Acceptance Rule for PBP

Many firms use the PBP as an accept or reject criteria as well as a method of ranking the projects. If the PBP is calculated for a project is less than the std PBP set by the management then such project would be accepted.

If the PBP is more than the std once such project would be rejected.

3. **Calculated PBP for the following projects each project requires initial cash outlay of Rs. 1,00,000/-. If standard PBP is 5 years. Suggest which project should be accepted?**

Year	Cash inflows		
	A	B	C
1	30,000	30,000	10,000
2	30,000	40,000	20,000
3	30,000	20,000	40,000
4	30,000	20,000	40,000
5	30,000	5,000	–

Sol :

Project A

Year	CFAT
1	30,000
2	30,000
3	30,000
4	30,000
5	30,000

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

$$\Rightarrow \frac{1,00,000}{30,000} \Rightarrow 3.3 \text{ years}$$

Project B

Year	CFAT	Cumulative CFAT
1	30,000	30,000
2	40,000	70,000
3	20,000	90,000
4	20,000	1,10,000
5	5,000	1,15,000

$$\text{PBP} = \text{Base year} + \frac{\text{Required CFAT}}{\text{Next year CFAT}} \Rightarrow 3 + \frac{10,000}{20,000} (1,00,000 - 90,000)$$

$$\Rightarrow 3 + 0.5 = 3.5 \text{ years}$$

Project C

Year	CFAT	Cumulative CFAT
1	10,000	10,000
2	20,000	30,000
3	40,000	70,000
4	40,000	1,10,000
5	–	1,10,000

$$\text{PBP} = \text{Base year} + \frac{\text{Required CFAT}}{\text{Next year CFAT}}$$

$$\Rightarrow 3 + \frac{30,000}{40,000} (1,00,000 - 70,000)$$

$$\Rightarrow 3 + 0.75 = 3.75 \text{ years}$$

Conclusion

In a given problem the std PBP for all projects is 5 years. All the 3 projects having less PBP when compared to the std PBP. So, all the 3 projects are acceptable. To rank the projects "Project A" is given 1st priority, as its PBP is less than the other 2 projects B and C.

4. The following details related to 3 mutually exclusive projects. Find PBP for all the 3 projects. The standard PBP is 3 years. Suggest the Management which project should be acceptable. The initial cash outlay of each project is ₹1,00,000/-

Year	Cash Inflows		
	A	B	C
1	30,000	30,000	40,000
2	30,000	50,000	50,000
3	30,000	40,000	10,000
4	30,000	20,000	20,000
5	30,000	10,000	20,000

Sol :

Project A

Year	CFAT
1	30,000
2	30,000
3	30,000
4	30,000
5	30,000

$$\text{PBP} = \frac{\text{Initial Investment}}{\text{Annual Cash Inflow}} \Rightarrow \frac{1,00,000}{3} \Rightarrow 3.3 \text{ years}$$

Project B

Year	CFAT	Cumulative CFAT
1	30,000	30,000
2	50,000	80,000
3	40,000	1,20,000
4	20,000	1,40,000
5	10,000	1,50,000

$$\text{PBP} = \text{Base year} + \frac{\text{Required CFAT}}{\text{Next year CFAT}} \Rightarrow 2 + \frac{20,000}{40,000} (1,00,000 - 80,000)$$

$$\text{PBP} \Rightarrow 2 + 0.5 = 2.5 \text{ years}$$

Project C

Year	CFAT	Cumulative CFAT
1	40,000	40,000
2	50,000	90,000
3	10,000	1,00,000
4	20,000	1,20,000
5	20,000	1,40,000

∴ The total/initial cash outlay is 1,00,000. We are recovering total amount of 1,00,000 in 3rd year.

∴ PBP = 3 yrs.

As project 'B' has less PBP, it should be acceptable.

5. A project requires an investment of ₹6,00,000 and has a scrap value of ₹30,000 after 4 years. It is expected to yield profits after depreciation and taxes during the four years amounting to ₹40,000, ₹60,000, ₹50,000 and ₹30,000. Calculate ARR on the investment.

Sol :

$$\begin{aligned} \text{Total profits} &= 40,000 + 60,000 + 50,000 + 30,000 \\ &= 1,80,000 \end{aligned}$$

$$\text{Average profit} = \frac{1,80,000}{4} = 45,000$$

$$\text{Average investment} = \frac{6,00,000 - 30,000}{2} = \frac{5,70,000}{2} = 2,85,000$$

$$\text{ARR} = \frac{45,000}{2,85,000} \times 100 = 15.8\%$$

6. Determine the average rate of return from the following data of two machines A and B

Particulars	Machine A	Machine B
Original Cost	Rs. 56,125-00	Rs. 56,125-00
Additional Working Capital	Rs. 5,000-00	Rs. 6,000-00
Life	5 years	5 years
Estimated Savage Value	Rs. 3,000-00	Rs. 3,000-00
Tax Rate	55%	55%

Annual Estimated Net Profit After Taxes

Year	A	B
1	3,375-00	11,375-00
2	5,375-00	9,375-00
3	7,357-00	7,375-00
4	9,375-00	5,375-00
5	11,375-00	3,375-00
Total	36,857-00	36,875-00

Sol :

$$ARR = \frac{\text{Average Net Profit after taxes}}{\text{Average Investment}} \times 100$$

Machine : A

$$\text{Average net profit after taxes} = \frac{36,875}{5} = \text{Rs. } 7,371$$

$$\text{Average investment} = \frac{56,125 - 3,000 + (5,000 + 3,000)}{2} = \text{Rs. } 30,562.50$$

$$ARR = \frac{\text{Rs. } 7,371}{\text{Rs. } 30,562} \times 100 = 24.11\%$$

Machine : B

$$\text{Average Net profit after taxes} = \frac{36,875}{5} = 7,375$$

$$\text{Average investment} = \frac{56,125 - 3,000 + (6,000 + 3,000)}{2} = \frac{62,125}{2} = 31,062.5$$

$$ARR = \frac{7,375}{31,062.5} \times 100 = 23.74\%$$

7. A machine costs Rs. 1,00,000 and has no scrap value after 5 years. It is depreciated on straight line basis. The expected net earnings after depreciation and taxes are as follows.

Year	1	2	3	4	5
EAT (Rs.)	50,000	40,000	60,000	20,000	30,000

Sol :

$$\text{Average Earning after tax} = 50,000 + 40,000 + 60,000 + 20,000 + 30,000 = 2,00,000$$

$$= \frac{2,00,000}{5} = 40,000$$

$$\text{Average Investment} = \frac{1,00,000}{2} = 50,000$$

$$\text{ARR} = \frac{40,000}{50,000} \times 100 = 80\%$$

ARR also can be calculated on total investment

$$\text{ARR} = \frac{40,000}{1,00,000} \times 100 = 40\%$$

8. A project requires a internal investment of ₹50,000 accepted to generate ₹10,000, 12,000, 15,000, 20,000, 18,000 as cash flows before tax @40% it is further estimated that accepting the project requires ₹11,600 additional working capital calculate PBP and ARR, if the project is having a scrap value of ₹10,000 at the end of the year.

Sol :

The cashflows which are generated in addition to the regular cash flows at the end of life time are called as terminal cash flows for some value of scrap additional working capital which can be realize in the given problem cash flows before tax is given to calculate PBP we requires cash flows after tax.

Calculation of Tax Flows After Tax

$$\text{Dep} = \frac{\text{Cost of Asset} + \text{Installation charges} - \text{Scrap value}}{\text{Estimated life}}$$

$$\text{Dep} = \frac{50,000 - 10,000}{5} = 8000$$

$$\text{Dep} = 8,000 \text{ p.a}$$

Year	CFBT	Dep	PBT	Tax & 40%	PAT	CFAT (6+3)	Cumulative CFAT
1	10,000	8,000	2,000	800	1,200	9,200	9,200
2	12,000	8,000	4,000	1,600	2,400	10,400	19,600
3	15,000	8,000	7,000	2,800	4,200	12,200	31,800
4	20,000	8,000	12,000	4,800	7,200	15,200	47,000
5	18,000	8,000	10,000	4,000	6,000	14,000	61,000
					21,000		

Terminal Cash Flow = Scrap value + Additional Working capital

$$14000 + 11,600 = 25,600$$

All the cash inflows are unequal to calculate PBP the formulae will be

$$\text{PBP} = \text{Base year} + \frac{\text{Required CFAT}}{\text{Next year CFAT}}$$

$$\text{Terminal Cash Inflows} = \text{Scrap Value} + \text{Additional Working Cap}$$

$$\therefore \text{Terminal Cash Inflows} = 11,600$$

(i) Pay Back Period

$$4 + \frac{3,000}{14,000} = 4.2 \text{ years}$$

$$\therefore \text{PBP} = 4.2 \text{ years (Accept)}$$

$$\text{(ii) ARR} = \frac{\text{Average PAT}}{\text{Average Investment}} \Rightarrow \frac{4,200}{41,600} = 0.10$$

$$\text{Average PAT} = \frac{\text{Total PAT}}{\text{Number of Years}}$$

$$= \frac{21,000}{5} = 4,200$$

$$\text{Average Inv.} = \frac{\text{Total Investment} - \text{Scrap}}{2} + \frac{\text{Additional Working Capital}}{2} + \text{Scrap value}$$

$$\Rightarrow \frac{50,000 - 10,000}{2} + 11,600 + 10,000$$

$$\Rightarrow 20,000 + 21,600$$

$$= 41,600$$

9. A project requires an initial investment of ₹ 1,00,000 expected to generate ₹ 15,000, 40,000, 55,000, 30,000 and 20,000 as cash flows before tax @50%. Accepting the project requires an additional W.C. of ₹ 20,000 calculate PBP and ARR if the residual value of the project is ₹ 20,000.

Sol :

$$\text{Dep} = \frac{1,00,000 - 20,000}{5} = \frac{80,000}{5} = 16,000$$

Year	CFBT (1)	Dep (2)	PBT (3)	Tax @ 50%	PAT (5)	CFAT (6) (2+5)	Cumulative (7) CFAT
1	15,000	16,000	(1,000)	–	(1000)	15,000	15,000
2	40,000	16,000	24,000	12,000	12,000	28,000	43,000
3	55,000	16,000	39,000	19,500	19,500	35,500	78,500
4	30,000	16,000	14,000	7,000	7,000	23,000	1,01,500
5	20,000	16,000	4,000	2,000	2,000	18,000	1,19,500

Terminal cash inflow = Scrap value + Add W.C.

$$\Rightarrow 20,000 + 2,000 \\ = 22,000$$

$$(i) \quad PBP = 3 + \frac{21,500}{23,000} (1,00,000 - 78,500)$$

$$3 + 0.93 = 3.93$$

$$(ii) \quad ARR = \frac{\text{Average PAT}}{\text{Average Investment}} = \frac{7,900}{62,000} = 0.127 \times 100 = 12.74$$

$$\text{Avg PAT} = \frac{\text{Total PAT}}{\text{No. of Years}} = \frac{39,500}{5} = 7,900$$

$$\text{Avg invt} = \frac{\text{Total Investment} - \text{Scrap}}{2} + \text{Additional working capital} + \text{Scrap value}$$

$$\Rightarrow \frac{10,00,000 - 20,000}{2} + 2,000 + 20,000 \\ = 40,000 + 2,000 + 20,000 \\ = 62,000$$

2.2.2 Discounted Techniques

Q12. Define Discounted cashflow method. Explain merits and demerits of Discounted cashflow method.

Ans :

Meaning

The time-adjusted or discounted cash flow methods take into account the profitability and also the time value of money. These methods also called modern methods of capital budgeting are becoming increasingly popular day by day.

Merits

1. The discounted cash flow methods take into consideration the time value of money to make effective capital budgeting decisions.
2. These methods give more emphasis to early inflows than later inflows.

3. These methods are suitable in situation where cash flows are uneven.
4. The entire economic life of the project investment and income is considered by these methods.
5. These methods make possible comparison of projects having different capital outlays, different lives, different timings of cash flows.

Demerits

1. These methods do not take into account the time value of money. A rupee today is definitely worth more than a rupee after an year. This basic fact is ignored by these methods.
2. Cost of capital is not considered, which is a crucial element in making investment decisions.
3. Cash flows are not involved in analysis which are more significant than the accounting profits.
4. Investment in a project in any circumstances is to be made in installments then traditional methods are not applicable.

Modern techniques are again subdivided into three, viz.,

- (a) Net present value,
- (b) Internal rate of return (or) trial and error, and
- (c) Profitability index or discounted benefit cost ratio.

2.2.2.1 Net Present Value

Q13. Define Net Present Value. Explain advantages and disadvantages of NPV.

Ans :

(Jan-20, June-16, Imp.)

The cash inflow in different years are discounted (reduced) to their present value by applying the appropriate discount factor or rate and the gross or total present value of cash flows of different years are ascertained. The total present value of cash inflows are compared with present value of cash outflows (cost of project) and the net present value or the excess present value of the project and the difference between total present value of cash inflow and present value of cash outflow is ascertained.

Calculation of NPV

The following four steps constitute a net-present-value analysis of an investment proposal:

1. Prepare a table showing the cashflows during each year of the proposed investment.
2. Compute the present value of each cashflow, using a discount rate that reflects the cost of acquiring investment capital. This discount rate is often called the hurdle rate or minimum desired rate of return.
3. Compute the net present value, which is the sum of the present values of the cashflows.
4. If the Net Present Value (NPV) is equal to or greater than zero, accept the investment proposal. Otherwise, reject it.

The present value of `1 due in any number of years can be found with the use of the following mathematical formula:

$$PV = \frac{1}{(1+r)^n}$$

Where, PV = Present Value; r = Rate of interest/discount rate; n = Number of years

Net present value gives explicit consideration to the time value of money; it is considered a sophisticated capital budgeting technique. All such techniques in one way or another, discount the firm's cash flows at a specified rate. This rate often called the discount rate, required return, cost of capital, or opportunity cost is the minimum return that must be earned on a project to leave the firm's market value unchanged.

The NPV is found by subtracting the present value of project's cash outflows (CF_0) from the present value of its cash inflows (CF_t) discounted at a rate equal to the firm's cost of capital (k).

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

$$\text{NPV} = \sum_{t=1}^n \frac{CF_t}{(1+k)^t} - CF_0 = \sum_{t=1}^n (CF_t \times PVIF_{k,t}) - CF_0$$

Accept-Reject Decision

When NPV is used to make accept-reject decisions, the decision criteria are as follows:

NPV > Zero	Accept the proposal
NPV < Zero	Reject the proposal
NPV = Zero	Indifference

Advantages

The advantages of NPV method for evaluating investment proposals are as follows:

1. Recognition of Time Value of Money

The most significant advantage is that it explicitly recognizes the time value of money, e.g., total cash flows pertaining to two machines are equal but the net present value are different because of differences of pattern of cash streams. The need for recognizing the total value of money is thus satisfied.

2. Sound Method of Appraisal

It also fulfils the second attribute of a sound method of appraisal. In that it considers the total benefits arising out of proposal over its life time.

3. Selection of Mutually Exclusive Projects

It is particularly useful for selection of mutually exclusive projects.

4. Maximization of the Shareholder's Wealth

This method of asset selection is instrumental for achieving the objective of financial management, which is the maximization of the shareholder's wealth. In brief the present value method is a theoretically correct technique in the selection of investment proposals.

Disadvantages

Disadvantages of NPV method are:

1. Difficult to Understand

It is difficult to calculate as well as to understand and use, in comparison with payback method or average return method.

2. May not Give Accurate Decision

NPV can not give accurate decision if the amounts of investment of mutually exclusive projects are not equal.

3. Difficult Calculation

The second and more serious problem associated with present value method is that it involves calculations of the required rate of return to discount the cash flows. The cost of capital is generally the basis of the firm's discount rate. The calculation of cost of capital is very complicated. In fact there is a difference of opinion even regarding the exact method of calculating it.

4. Absolute Measure

Another shortcoming is that it is an absolute measure. This method will accept the project which has higher present value. But it is likely that this project may also involve a larger initial outlay. Thus, in case of projects involving different outlays, the present value may not give dependable results.

2.2.2.2 Internal Rate of Return

Q14. What is Internal Rate of Return? How is it calculated? State the merits and demerits of Internal Rate of Return.

Ans :

(Jan-20, June-16, Imp.)

The internal rate of return is also one of the capital budgeting technique that identifies the time value of money. This method is also known as yield method, discounted rate of return and trial and error yield method. It is that rate of return which equates the present value of cash inflows to the present value of cash outflows. The hit and trial method is used in internal rate of return method to discount the cash flows of the project as discount rate is not known. The internal rate of return is calculated with the help of the following formula.

$$C = \frac{A_1}{(1+r)^1} + \frac{A_2}{(1+r)^2} + \frac{A_3}{(1+r)^3} + \dots + \frac{A_n}{(1+r)^n}$$

Where,

C – Initial outlay at time zero

r – Rate of discount of internal rate of return

$A_1, A_2, \dots, A_n$ – Future net cash flows at different periods

n – Number of years.

The internal rate of return method involves following steps,

1. Calculate the future cash inflows before depreciation but after tax.
2. Calculate fake payback period by dividing the initial investment by average cash flows. Initial investment

$\text{Fake payback period} = \frac{\text{Initial investment}}{\text{Average cash flows}}$

3. Identify the discounting factor from present value annuity table and calculate NPV with that percentage.
4. If NPV is positive take a higher rate and if NPV is negative take a lower rate and once again calculate NPV.
5. After getting one positive NPV and one negative NPV, to calculate actual IRR.
Actual IRR can be calculated by using the following formula,

$$\text{Lower rate} + \frac{\text{Present value at lower rate} - \text{Cash outflow}}{\text{PV at lower rate} - \text{PV at higher rate}} \times \text{Difference in the rates}$$

A particular project is accepted when IRR is more than cost of capital and if IRR of the project is less than cost of capital it is rejected.

Merits

1. IRR also take into consideration the time value of money and easily applicable to situations in which even and uneven cash flows exists.
2. It helps in calculating true profitability of the project as it consider all profits of the project.
3. The ascertainment of cost of capital is not very important as in case of NPV method.
4. It is suitable for goal of maximizing profits and it is one of the dependable techniques of capital budgeting.

Demerits

1. The internal rate of return is one of the difficult method for evaluation of investment proposals.
2. If the expected life, size and cash outlays of the projects are not equal then the result of NPV and IRR will also differ.
3. When different rates are used it may create confusion.

2.2.2.3 Profitability Index

Q15. Define Profitability Index. How is it calculated? State the merits and demerits of Profitability Index.

Ans :

(Jan-20, June-16, Imp.)

The profitability index (PI) refers to the ratio of discounted benefits over the discounted costs. It is an Evaluation of the profitability of an investment and can be compared with the profitability of other similar investments which are under consideration. The profitability index is also referred to as benefit-cost ratio, cost- benefit ratio, or even capital rationing.

Calculation of PI

The profitability index is one of the numerous ways used to quantify and measure the efficiency of a proposed investment. Calculation of PI is done by the following formula:

$$\text{Profitability Index} = \frac{\text{Present Value of Cashinflows}}{\text{Present Value of Cashoutflows}}$$

The profitability index may be found for net present values of inflows:

PV of Cash inflows

$$\text{P.I. (Net)} = \frac{\text{NPV (Net Present Value)}}{\text{Initial Cash outlay}} \text{ or } \text{P. I.} = \frac{\text{PV of Cash inflows}}{\text{Initial Cash outlay}}$$

The net profitability index can also be found as Profitability Index (gross) minus one.

Accept-Reject Decision

When PI is used to make accept-reject decisions, the decision criteria are as follows:

- $PI > 1$ Accept the proposal
 $PI < 1$ Reject the proposal
 $PI = 0$ Indifference

Advantages

Following are the advantages of profitability index method:

1. It is consistent with the goal of maximizing the shareholders wealth.
2. It recognizes the time value of money.
3. It considers analysis all cash flows of entire life.
4. It makes the right in the case of different amount of cash outlay of different project.
5. It ascertains the exact rate of return of the project.
6. It helps in ranking and picking projects while rationing of capital.

Disadvantages

Following are the advantages of profitability index method:

1. It requires detailed long term forecasts of the incremental benefits and costs.
2. It poses difficulty in understanding interest rate or discount rate.
3. It is difficult to calculate profitability index if two projects having different useful life

PROBLEMS ON NPV, IRR AND PI**10. Calculate NPV for the given project.**

Year	0	1	2	3	4	5
(A) Cash flows	200	35	80	90	75	20
(B) Cash flows	200	18	10	10	40	35

The company anticipates the cost of capital of 12%. Rank the project according to it ?

Sol :

Calculation of NPV for Project A

Year	CFAT	PV. factor @ 12%	PV CFAT
1	35	0.893	31.255
2	80	0.797	63.76
3	90	0.712	64.08
4	75	0.636	47.7
5	20	0.567	11.34
			218.135

$$\begin{aligned}
 NPV &= \text{Present value of cash inflow} - \text{Cashout flow} \\
 &= 218.135 - 200 = 18.135
 \end{aligned}$$

Calculation of NPV for Project B

Year	CFAT	PV. factor @ 12%	PV CFAT
1	18	0.893	16.074
2	10	0.797	7.97
3	10	0.712	7.12
4	40	0.636	25.44
5	35	0.567	19.845
			76.44

NPV = Present value of cash inflow – Cashout flow

$$76.44 - 200 = (-123.56)$$

- 11. A project cost Rs. 2,500/- and is expected to generate cash inflows of Rs. 900, 800, 700, 600 and 500 respectively for 5 years. The opportunity cost of capital may be assumed to be 10% calculate NPV for the given project.**

Sol :

Year	CFAT	PV factor @ 10%	PV. CFAT
1	900	0.909	818.1
2	800	0.826	660.8
3	700	0.751	525.7
4	600	0.683	409.8
5	500	0.621	310.5
			2,724.9

NPV = Present value of cash inflow – Cashout flow

$$NPV = 2724.9 - 2,500 = 224.9$$

- 12. A firm whose cost of capital is 10% considering two mutually exclusive projects X and Y. The details of which are:**

Particulars	Project A Rs.	Project B Rs.
Investment	Rs. 50,000	Rs. 50,000
Life	5 years	5 years
Cost of Capital 10%		
Tax Rate 50%		

Cash flows before depreciation and taxes (CFBT) are as follows:

Year	Rs.	Rs.
1	20,000	30,000
2	22,000	27,000
3	28,000	22,000
4	25,000	25,000
5	30,000	20,000

Which Project should be accepted under NPV method?

Project : A**Calculation of Net Cash Flows (CFAT)**

Year	CFBT	- DEP	= Net Profit	- TAX @50%	= PAT	+ DEP	= CFAT
1.	20,000	- 10,000	= 10,000	- 5,000	= 5,000	+ 10,000	= 15,000
2.	22,000	- 10,000	= 12,000	- 6,000	= 6,000	+ 10,000	= 16,000
3.	28,000	- 10,000	= 18,000	- 9,000	= 9,000	+ 10,000	= 9,000
4.	25,000	- 10,000	= 15,000	- 7,500	= 7,500	+ 10,000	= 17,500
5.	30,000	- 10,000	= 20,000	- 10,000	= 10,000	+ 10,000	= 20,000

$$\text{Depreciation} = \frac{50,000 - 0}{5}$$

$$= \text{Rs. } 10,000$$

Calculation of Net present value

Year	CFAT Rs.	Discount * Factor @ 10%	Total Present Value
1	15,000	0.909	13,635.00
2	16,000	0.826	13,216.00
3	19,000	0.751	14,269.00
4	17,500	0.683	11,952.50
5	20,000	0.621	12,420.00
Total present value			65,492.50
Investment			50,000.00
Net Present Value Rs.			15,492.50

Project : B**1) Calculation of CFAT**

Year	CFBT	- DEP	= Net Profit	- TAX @50%	= PAT	+ DEP	= CFAT
1.	30,000	- 10,000	= 20,000	- 10,000	= 10,000	+ 10,000	= 20,000
2.	27,000	- 10,000	= 17,000	- 8,500	= 8,500	+ 10,000	= 18,500
3.	22,000	- 10,000	= 12,000	- 6,000	= 6,000	+ 10,000	= 16,000
4.	25,000	- 10,000	= 15,000	- 7,500	= 7,500	+ 10,000	= 17,500
5.	20,000	- 10,000	= 10,000	- 5,000	= 5,000	+ 10,000	= 15,000

$$\text{Depreciation} = \frac{50,000 - 0}{5}$$

$$= \text{Rs. } 10,000$$

2) Calculation of Net Present Value

Year	CFAT Rs.	Discount * Factor @ 10%	Total Present Value
1	20,000	0.909	18,180.00
2	18,500	0.826	15,281.00
3	16,000	0.751	12,016.00
4	17,500	0.683	11,952.50
5	15,000	0.621	9,315.00
		Total present value	66,774.50
		- Initial Investment	50,000.00
		Net Present Value Rs.	16,774.50

Since NPV of project B is higher than that of project A, it is advisable to select project B.

13. The Alpha Company Ltd. is considering the purchase of a new machine. Two alternative machines (A and B) have been suggested each costing Rs. 4,00,000. Earning after taxation are expected to be as follows :

Year	Machine A Rs.	Machine B Rs.
1.	40,000	1,20,000
2.	1,20,000	1,60,000
3.	1,60,000	2,00,000
4.	2,40,000	1,20,000
5.	1,60,000	80,000

The company has a target of return on capital of 10% and on this basis, you are required to calculate NPV ?

Note : The present Value of Rs. 1

First years	0.91
Second years	0.83
Third years	0.75
Fourth years	0.68
Fifth years	0.62

Sol :

The profitability of the machine can be compared on the basis of net present value of cash inflows as follows :

Machine A			
Year	Cash Inflow Rs.	Discount Factor @ 10%	Present Value Rs.
1.	40,000	0.91	36,400
2.	1,20,000	0.83	99,600
3.	1,60,000	0.75	1,20,000
4.	2,40,000	0.68	1,63,200
5.	1,60,000	0.62	99,200
			5,18,400

$$\begin{aligned}\text{NPV} &= \text{Present value of cash inflow} - \text{Cashout flow} \\ &= 5,18,400 - 4,00,000 = 1,18,400\end{aligned}$$

Machine B

Year	Cash Inflow Rs.	Discount Factor @ 10%	Present Value Rs.
1.	1,20,000	0.91	1,09,200
2.	1,60,000	0.83	1,32,000
3.	2,00,000	0.75	1,50,000
4.	1,20,000	0.68	81,600
5.	80,000	0.62	49,600
			5,23,200

NPV = Present value of cash inflow – Cashout flow

$$= 5,23,200 - 4,00,000 = 1,23,200$$

14. Calculate the profitability index from the information given below

Cost of project Rs. 6,00,000

Life of the project 5 years

Annual cash Inflow Rs. 2,00,000

Cut off rate 10%

Sol :

Calculation of Profitability Index

Year	CFAT	PV factor	Total PV
1-5	2,00,000	3.791	7,58,200

$$\text{Profitability index} = \frac{7,58,200}{6,00,000} = 1.263$$

Since the calculated PI is more than 1, it is advisable to accept the project.

15. Calculate NPV and profitability index when cost of capital is 10%. Initial investment is 12,00,000/-. The estimated cash flows before Dep and taxes over 6 year period as Rs. 4,00,000/-, 5,00,000, 3,00,000, 2,00,000, 3,00,000 and 2,00,000 respectively. Additional working capital is Rs. 75,000/- tax rate is 40%?

Sol :

Year	CFBT	Dep	PBT	Tax(40%)	PAT	CFAT	PV 10%	PV CFAT
1	4,00,000	2,00,000	2,00,000	80,000	1,20,000	3,20,000	0.909	2,90,880
2	5,00,000	2,00,000	3,00,000	1,20,000	1,80,000	3,80,000	0.826	3,13,880
3	3,00,000	2,00,000	1,00,000	40,000	60,000	2,60,000	0.751	1,95,260
4	2,00,000	2,00,000	0	0	0	2,00,000	0.683	1,36,600
5	3,00,000	2,00,000	1,00,000	40,000	60,000	2,60,000	0.621	1,61,460
6	2,00,000	2,00,000	0	0	0	2,75,000	0.564	1,55,100
								12,53,180

$$\text{Dep} = \frac{12,00,000}{6} = 2,00,000$$

$$\begin{aligned}\text{NPV} &= \text{Present value of cash inflow} - \text{Cashout flow} \\ &= 12,53,180 - 12,00,000 = 53,180 \text{ [Accept]}\end{aligned}$$

$$\text{Profitability Index} \Rightarrow \frac{\text{Present value of cash inflow}}{\text{Present value of cash outflow}} = \frac{12,53,180}{12,00,000} = 1.044\%$$

- 16. Calculate IRR if the project requires an initial outlay of Rs. 6,000/- and expected to generate equal cash inflows of Rs. 2,000/- per annum. The project is having a life of 5 years. Advise the management if the company's cost of capital is 15%.**

Sol :

In the given problem the cash inflows are equal.

Step 1 : Calculate PBP

$$\text{PBP} = \frac{\text{Initial Investment}}{\text{Annual cash inflow}} = \frac{6,000}{2,000} = 3 \text{ years}$$

Step 2 : Search for 2 discount factor nearest to PBP in annuity Re 1 table.

$\therefore$ 19% and 20% are two discounting factor.

(3.058) (9.991)

Step 3 : Use IRR formulae

$$\text{IRR} = r_L + \frac{Df_{r_L} - \text{PBP}}{Df_{r_L} - Df_{r_h}} \times \Delta r$$

$$\Rightarrow 19\% + \frac{3.058 - 3}{3.058 - 2.991} \times (20 - 19)$$

$$\Rightarrow 19\% + \frac{0.058}{0.067} \times 1 \Rightarrow 19\% + 0.865$$

$\therefore$ 19.865%

Step 4 : Decision Rule

In the given problem $\text{IRR} > K$ i.e., $19.865 > 15\%$ let so, accept the project.

- 17. Calculate IRR if the project requires an Initial cash outflow of Rs. 1,00,000/- and expected to generate an equal cash inflows of Rs. 30,000/- each life of the project is 5 years. Advise the Management if the cost of the capital is 10%.**

Sol :

In the given problem cash inflows are equal.

Step 1 : Calculate PBP

$$\text{PBP} = \frac{\text{Initial investment}}{\text{Annual cash Inflow}} = \frac{1,00,000}{30,000} = 3.33 \text{ years}$$

Step 2 : Search for 2 discount factor nearest to PBP in Annuity Re 1 table.

$\therefore$ 15% and 16% are two discounting factor (3.352) (3.274)

Step 3 : Use IRR formulae

$$\text{IRR} = r_L + \frac{DF_{r_L} - \text{PBP}}{DF_{r_L} - DF_m} \times \Delta r$$

$$\Rightarrow 15\% + \frac{3.352 - 3.33}{3.352 - 3.274} \times (16 - 15)$$

$$\Rightarrow 15 + \frac{0.022}{0.078} \times 1 \Rightarrow 15 + 0.282$$

$$= 15.282$$

Step 4 : Decision Rule. In the given problem $\text{IRR} > K$ i.e., $15.282 > 10\%$. So accept the project.

18. Calculate NPV and IRR if the project requires an Initial outlay of Rs. 60,000/- and is expected to generate equal cash inflows of Rs. 15,000/- p.a. The life of the project is 5 years advice the management? Cost of capital 10%?

Sol :

Year	CFAT	PV 10%	PV CFAT
1	15,000	0.909	13,635
2	15,000	0.826	12,390
3	15,000	0.751	11,265
4	15,000	0.683	10,245
5	15,000	0.621	9,315

NPV = Present value of cash inflow – Cashout flow

$$\Rightarrow 56,850 - 60,000$$

$$\Rightarrow - 3150$$

$\therefore$ The NPV is negative so we can reject the project

Note : If the cash inflows are equal for all life of the project just see annuity table of Re.1.

For example : In the given problem cost of capital is 10% and life of the project is 5 years. See annuity Re 1 table at 5 period at 10% i.e., 3.791 and multiply it with cash inflow i.e., 15,000/-

Year life = 5 years

cash inflows = 15,000 (for all 5 years)

Annuity Re 1 table (Table 2) – 5 Period at 10% = 3.791

$$\therefore \Sigma \text{PV.CFAT} = 3.791 \times 15,000 = 56,865$$

$\therefore$ NPV = Present value of cash inflow – Cashout flow

$$\Rightarrow 56,865 - 60,000 - 3,135 \text{ (reject)}$$

IRR

Step 1 : Calculate PBP

$$\Rightarrow \frac{60,000}{15,000} = 4 \text{ years}$$

Step 2 : 6% and 7% are two nearest discounting factor to PBP

i.e., (4.212 and 4.100)

Step 3 : Use IRR Formula

$$6\% + \frac{4.212 - 4}{4.212 - 4.100} \times 1$$

$$\Rightarrow 6 + \frac{0.212}{0.112} \times 1$$

$$\Rightarrow 6 + 1.892$$

$$\Rightarrow 7.892$$

Step 4 : In the given problem $IRR < k$ i.e., $7.892 < 10\%$ & NPV is negative. Reject the project.

19. Calculate IRR and advise the management if the cost of the capital is 28%. Profit requires an initial outlay of 10,000 and is expected to generate Rs. 4,000, 3,000, 5,000, 6,000 and 2,000 as cash flows after tax ?

Sol :

In the given problem cash flows are unequal to calculate IRR.

Step 1 : Calculate Avg CFAT / Fake Annuity

$$\Rightarrow \frac{\text{Total CFAT}}{\text{No. of years}}$$

$$\Rightarrow \frac{20,000}{5} = 4,000$$

Step 2 : Calculate Fake PBP

$$\Rightarrow \frac{\text{Initial Investment}}{\text{Fake Annuity}} = \frac{10,000}{4,000} = 2.5$$

Step 3 : The discounting factor located in PV of annuity of Re 1 table which is nearest to the fake PBP in the year of project life time is 2.532 @ 28%. Hence use these % trial rate to find out PV. CFAT.

Year	CFAT	PV. factor @ 28%	Pv. CFAT
1	4,000	0.781	3,124
2	3,000	0.610	1,830
3	5,000	0.477	2,385
4	6,000	0.373	2,238
5	2,000	0.291	582
	20,000		10,159

$$NPV = 10,159 - 10,000 = 159$$

Let us try at 32%

Year	CFAT	PV. @ 32%	Pv. CFAT
1	4,000	0.758	3,032
2	3,000	0.574	1,722
3	5,000	0.435	2,170
4	6,000	0.329	1,974
5	2,000	0.250	500
			9,403

$$NPV = 9,403 - 10,000 = -597$$

$$28\% \rightarrow 10,154$$

$$32\% \rightarrow 9,403$$

$$\therefore r_L = 28\% \text{ and } r_h = 32\%$$

$$IRR = r_L + \frac{Pv \text{ CFAT} - Pv \text{ co}}{\Delta P_V \text{ CFAT}} \times \Delta r$$

$$\Rightarrow 28\% + \frac{10,159 - 10,000}{10,159 - 9,403} \times (32 - 28)$$

$$\Rightarrow 28\% + 0.84\%$$

$$\therefore 28.84\% \text{ (Accept)}$$

Note

1. If PV CFAT value is more than PV. Co take another rate of interest which is higher than the previous rate of interest.
2. If PV CFAT value is less than pv. Co take another rate of interest which is lesser than the previous rate of interest.

20. A Company has an investment opportunity costing Rs. 40,000 - with the following expected net cash flows after taxes before depreciation.

Year	Net Cash Flow (Rs.)
1	7000
2	7000
3	7000
4	7000
5	7000
6	8000
7	10000
8	15000
9	10000
10	4000

Using 10% as the cost of Capital, determine the following

- Pay back period
- Net Present Value
- Profitability Index
- Internal Rate of Return

Sol :

- A) Calculation of pay Back Period** Since the cash flows are not uniform cumulative method should be used.

Year	Net Cash Flow (Rs.)	Cumulative Cash flow (Rs)
1	7000	7000
2	7000	14000
3	7000	21000
4	7000	28000
5	7000	35000
6	8000	43000
7	10000	53000
8	15000	68000
9	10000	78000
10	4000	82000

$$\text{Pay back period} = 5 \text{ year} + \frac{5,000}{8,000} (40,000 - 35,000)$$

$$= 5.625 \text{ years}$$

- (B) Calculation of Net present value at 10% discount rate**

Year	Net Cash Flow (Rs.)	P.V. factor	Total P.V Rs.
1.	7000	0.909	6,363
2.	7000	0.826	5,782
3.	7000	0.751	5,257
4.	7000	0.683	4,781
5.	7000	0.621	4,347
6.	8000	0.564	4,512
7.	10000	0.513	5,130
8.	15000	0.467	7,005
9.	10000	0.424	4,240
10.	4000	0.386	1,544
		Total P.V Investment	48,961
			40,000
		NPV	Rs. 8,961

(C) Calculation of Profitability Index

$$\text{Profitability Index} = \frac{\text{PV of cash inflow}}{\text{PV of cash outflow}} = \frac{48,961}{40,000} = 1.22$$

(D) Calculation of Internal Rate of Return

Year	Net Cash Flow (Rs.)	P.V. Factor @ 15%	Total P.V Rs.
1	7,000	0.870	6,090
2	7,000	0.756	5,292
3	7,000	0.658	4,606
4	7,000	0.572	4,004
5	7,000	0.497	3,479
6	8,000	0.432	3,456
7	1,000	0.376	3,760
8	15,000	0.327	4,905
9	10,000	0.284	2,840
10	4,000	0.247	988
Total P.V Investment			39,420
			40,000
NPV =			Rs. (580)

Since the NPV at 10% discount rate is positive and at 15% rate is negative the correct IRR can be computed by applying interpolation formula

$$\begin{aligned} \text{IRR} &= 10\% + \frac{48,961 - 40,000}{9,541} \times 50 \\ &= 10 + 4.7\% = 14.7\% \end{aligned}$$

21. From the following details, calculate Internal Rate of Return.

Initial Investment Rs. 60,000

Life of the Asset 4 years

Estimated net Annual Cash Flows:

Year	Cash Flows (Rs.) Rs.
1	15,000
2	20,000
3	30,000
4	20,000

Sol :

(Jan.-20)

To determine the lowest discount factor (LDF) and Highest discount factor (HDF) the following principle is adopted.

$$\begin{aligned}
 &= \frac{\text{Original Investments}}{\text{Average Cash Flows}} \\
 &= \frac{60,000}{\frac{15,000 + 20,000 + 30,000 + 20,000}{4}} \\
 &= \frac{60,000}{\frac{85,000}{4}} \\
 &= \frac{60,000}{21,250} = 2.8235
 \end{aligned}$$

According to table II the value 2.8235 is yielded around 15%

Calculation of NPV @ 15%

Years	Cash Flows	D.F @15%	P.V of CF
1	15,000	0.870	13,050
2	20,000	0.756	15,060
3	30,000	0.658	10,740
4	20,000	0.572	11,440
P.V of future cash flows			50,290
(-) Original Investments			60,000
NPV			-9,710

Calculation of NPV @ 10%

Years	Cash Flows	D.F @10%	P.V of CF
1	15,000	0.909	13,635
2	20,000	0.826	16,460
3	30,000	0.751	22,500
4	20,000	0.683	13,660
P.V of future cash flows			66,255
(-) Original Investments			60,000
NPV			+ 6,255

$\therefore$ LDF = 10%, HDF = 15%

Different between DF% = 15% – 10% = 5%

P.V at HDF (15%) = 50,290

P.V at LDF (10%) = 66,255

$$\text{IRR} = \text{LDF} + \left[\frac{\text{Positive NPV}}{\text{P.V at LDF} - \text{P.V. at HDF}} \right] \times \text{Difference in DF\%}$$

$$= 10\% + \left[\frac{6,255}{66,255 - 50,290} \right] \times 5\%$$

$$= 10\% + \left[\frac{6,255}{15,965} \right] \times 5\%$$

$$= 10\% + [0.3917] \times 5$$

$$= 10\% + 1.95\% = 11.95\%$$

$$\therefore \text{IRR} = 11.95\%$$

- 22. A project requires an investment of ` 11,11,111 and is expected to generate cash in flows of ` 3,33,333, ` 4,44,444, ` 5,55,555, ` 4,44,444 and ` 3,33,333 for the next five years. The risk free cost of capital is 11 percent. Evaluate the project using IRR method. If a risk premium of 9 percent is considered how do you evaluate the project and do you observe any change in your earlier decision?**

Sol :

Step-1

Calculation of fake pay back period,

$$\text{FPBP} = \frac{\text{Investment}}{\text{Average yearly inflow}}$$

$$\begin{aligned} \text{Average yearly inflow} &= \frac{21,11,109}{5} \\ &= 4,22,221.8 \\ &= \frac{11,11,111}{4,22,221.8} \\ &= 2.632 \end{aligned}$$

Step-2

Present value annuity table indicates that, IRR lies between 25% and 26%.

Step-3

Calculation of present values at different rates.

Year	CFAT in flow	PV@ 25%	P.V. of cash	P.V.@ 26%	P.V. of cash
1	3,33,333	0.800	2,66,666	0.794	2,64,666
2	4,44,444	0.640	2,84,444	0.630	2,80,000
3	5,55,555	0.512	2,84,444	0.500	2,77,778
4	4,44,444	0.410	1,82,222	0.397	1,76,444
5	3,33,333	0.328	1,09,333	0.315	1,05,000
			11,27,109		11,03,888

Step-4

$$\begin{aligned}
 \text{IRR} &= \text{Lower rate} + \frac{\text{NPV @ LR}}{\Delta \Sigma \text{PVs}} \times \Delta R \\
 &= 25 + \frac{11,27,109 - 11,11,111}{11,27,109 - 11,03,888} \times 1 \\
 &= 25 + \frac{15998}{23221} \\
 &= 25 + 0.69 \\
 &= 25.69\%
 \end{aligned}$$

Comment

The project can be accepted. If a risk premium of 9% is considered, there will be no change in earlier decision

- 23. A project requires an investment of ₹ 1,44,000 and is expected to generate cash in flows of ₹ 54,000, ₹ 63,000, ₹ 72,000, ₹ 63,000 and ₹ 54,000 per annum for the next five years. The risk free rate is 10%.**

Evaluate the project using IRR method.

Year	1	2	3	4	5
C.E	0.96	0.92	0.88	0.82	0.79

Sol :

Step-1

Calculation of FPBP (Fake Pay Back Period)

$$\begin{aligned}
 \text{FPBP} &= \frac{\text{Initial investment}}{\text{Average CFAT's}} \\
 \text{Average CFATs} &= \frac{3,06,000}{5} \\
 &= 61,200 \\
 \text{Initial investment} &= 1,44,000 \\
 \text{FPBP} &= \frac{1,44,000}{61,200} = 2.3529
 \end{aligned}$$

Step-2

Present value annuity table indicates that, IRR lies between 31% and 32%.

Step 3

Calculation of present values.

Year	CFAT	P.V.@ 32%	P.V. of cash	P.V.@31%	P.V. of cash
1.	54,000	0.758	40,932	0.763	41,202
2.	63,000	0.574	36,162	0.583	36,729
3.	72,000	0.435	31,320	0.445	32,040
4.	63,000	0.329	20,727	0.340	21,420
5.	54,000	0.250	13,500	0.259	13,986
			1,42,641		1,45,377

Step-4

The exact rate will be obtained by the method of interpolation as given below.

$$\begin{aligned}
 \text{IRR} &= \text{L.R} + \frac{\text{NPV @ LR}}{\Delta \Sigma \text{PVs}} \times \Delta R \\
 &= 31 + \frac{1,45,377 - 1,44,000}{1,45,377 - 1,42,641} \times (32 - 31) \\
 &= 31 + \frac{1377}{2736} \times 1 \\
 &= 31 + 0.5 \\
 &= 31.5\%
 \end{aligned}$$

Comment

The project is profitable on the basis of a higher IRR and on the basis of CE approach also.

24. Form the following information, you are required to evaluate each of the following projects according to

(i) Pay-back method

(ii) Return on average investment and

(iii) Net present value with a cost of capital of 10% and capital outlay of Rs. 50,000

Years	Cash Inflows (Rs.)	
	Project - I (Rs.)	Project - II (Rs.)
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

Using the NPV method to suggest which project is preferable.

Sol :

(June-16)

(i) Payback Method

for Project - I

Year	Cashflows	Cumulative cashflows
1	15,000	15,000
2	20,000	35,000
3	25,000	60,000
4	15,000	75,000
5	10,000	85,000

Payback period = Base year

$$+ \frac{\text{Required CFAT}}{\text{CFAT after base year}}$$

$$= 2 + \frac{15,000}{25,000}$$

Payback period = 2.6 yrs.

for Project II :

Year	Cashflows	Cumulative cashflows
1	5,000	5,000
2	15,000	20,000
3	20,000	40,000
4	30,000	70,000
5	20,000	90,000

$$\text{PBP} = \text{Base year} + \frac{\text{Required CFAT}}{\text{CFAT after base year}}$$

$$= 3 + \frac{10,000}{30,000}$$

PBP = 3.33 yr

(ii) Accounting rate of return

Project-I

Year	Cash flows	- Dep	= PAT
1	15,000	- 10,000	= 5,000
2	20,000	- 10,000	= 10,000
3	25,000	- 10,000	= 15,000
4	15,000	- 10,000	= 5,000
5	10,000	- 10,000	= 0
			35,000

$$\text{ARR} = \frac{\text{Average PAT}}{\text{Average investment}}$$

$$\text{Average PAT} = \frac{35,000}{5} = 7,000$$

$$\text{ARR} = \frac{7000}{50,000} = 0.14 \text{ or } 14\%$$

Project-B

Year	Cash flows	- Depreciation	= PAT
1	5,000	- 10,000	= -5000
2	15,000	- 10,000	= 5000
3	20,000	- 10,000	= 10,000
4	30,000	- 10,000	= 20,000
5	20,000	- 10,000	= 10,000
			$\Sigma \text{PAT} = 40,000$

$$\text{Average PAT} = \frac{40,000}{5}$$

$$= 8000$$

$$\text{ARR} = \frac{8000}{50,000}$$

$$= 0.16 \text{ or } 16\%$$

(ii) Calculation of NPV

Year	CFAT	Pv@ 10%	Pv of CFAT
1	15,000	0.909	13635
2	20,000	0.826	16520
3	25,000	0.751	18775
4	15,000	0.683	10245
5	10,000	0.621	6210

$$\Sigma \text{pv of CFAT} = 65,385$$

$$\text{NPV} = \text{Cash inflow} - \text{Cash outflow}$$

$$= 65,385 - 50,000$$

$$\text{NPV} = 15,385$$

For Project-II

Year	CFAT	Pv@ 10%	pv of CFAT
1	5,000	0.909	4545
2	15,000	0.826	12390
3	20,000	0.751	15020
4	30,000	0.683	20,490
5	20,000	0.621	12420
			64,865

NPV = Cash inflow – Cash outflow

= 64,865 – 50,000

= 14,865

25. A Chemical Company is considering investment in a project that costs Rs. 5,00,000. The life of the project as 5 years and estimated salvage value is zero. Tax rate is 30%. The company uses straight line depreciation and proposed project has estimated earnings before depreciation and before tax as follows :

Year	1	2	3	4	5
Earnings before depreciation and tax (Rs.)	1,00,000	1,00,000	1,50,000	1,50,000	2,50,000

Determine the following :

(i) Pay-Back Period

(ii) Net Present Value at 15%

The following are the present value factors at 15% p.a.

Year	1	2	3	4	5
P.V. Factor	0.870	0.756	0.658	0.572	0.497

Sol :

(Dec.-16)

Calculation of CFAT

Yr	EBDT	- Dep.	= EBT	- Tax	= PAT	+ Dep	= CFAT
1	1,00,000	- 1,00,000	= 0	- 0	= 0	+ 1,00,000	= 1,00,000
2	1,00,000	- 1,00,000	= 0	- 0	= 0	+ 1,00,000	= 1,00,000
3	1,50,000	- 1,00,000	= 50,000	- 15,000	= 35,000	+ 1,00,000	= 1,35,000
4	1,50,000	- 1,00,000	= 50,000	- 15,000	= 35,000	+ 1,00,000	= 1,35,000
5	2,50,000	- 1,00,000	= 1,50,000	- 22,500	= 1,27,500	+ 1,00,000	= 2,27,500

Calculation of PBP :

Year	CFAT	Cumulative CFAT
1	1,00,000	1,00,000
2	1,00,000	2,00,000
3	1,35,000	3,35,000
4	1,35,000	4,70,000
5	2,27,500	6,97,500

$$\text{PBP} = \text{Base Year} + \frac{\text{Required CFAT}}{\text{Next year CFAT}}$$

$$= 4 + \frac{30,000}{2,27,500}$$

$$\text{PBP} = 4.13 \text{ yrs.}$$

Calculation of NPV

Year	CFAT	PV @ 15%	PV of CFAT
1	1,00,000	0.870	87,000
2	1,00,000	0.756	75,600
3	1,35,000	0.658	88,830
4	1,35,000	0.572	77,220
5	2,27,500	0.497	1,13,068
			$\Sigma \text{ PV of CFAT} = 4,41,718$

$$\text{NPV} = \text{Cash inflow} - \text{Cash outflow}$$

$$= 4,41,718 - 5,00,000$$

$$\text{NPV} = (58,282)$$

2.3 NPV vs. IRR**Q16. Explain the similarities and distinguish between NPV and IRR.***Ans :***(Jan-20, Imp.)**

A comparative study between net present value method and the internal rate of return method is presented under the following heads:

Similarities

Net Present value method and the Internal Rate of Return Method are similar in the sense that both are modern techniques of capital budgeting and both take into account the time value of money. Both these methods give similar selection decisions independent of investment proposals as well as in the case

of projects involving conventional cashflows. An independent investment proposal is one the acceptance of which does not eliminate the acceptance of others, so that all profitable projects can be accepted without constraints. On the other hand, conventional projects involve cash outflows only once in the beginning. Conventional investment proposal refers to an investment project in which the cashflow pattern is such that an initial investment or cash outlay is followed by a series of cash inflows.

In case of the NPV method, a proposal is accepted if its NPV is positive, i.e., when actual rate of return on investment is higher than the cut-off rate or the required rate of return. In the IRR method, a proposal is accepted only when the IRR is higher than the cut-off rate. As the projects which have positive NPV also have higher IRR than the cut-off rate, both of these methods give the identical accept-reject decision.

Differences

Although similar in certain respects, the NPV and IRR methods are different from each other in the following several respects:

1. Rate of Interest

The NPV method takes the rate of interest as a known factor whereas the IRR method takes it as an unknown factor.

2. Re-Investment

While the NPV method considers the re-investment of intermediate cash inflows at the cut-off rate, i.e., required rate of return which is usually cost of capital, the IRR method considers the intermediate cash inflows at the IRR itself. As different projects yield different rates of return, the same firm cannot re-invest the cash inflows at different rates. Hence, for ranking two or more capital investment proposals NPV method is more reliable than the IRR method.

3. Investment Amount

While the NPV method attempts to find-out the amount which can be invested in a particular project so that its projected earnings may suffice to repay this amount with interest at the market rate, the IRR method seeks to

find-out the maximum rate of interest at which the amount invested in the project could be repaid out of the cash inflows arising from that project.

4. Mutually Exclusive Projects

Both methods may give contradictory results in terms of acceptance or rejection in case of mutually exclusive projects. If the projects under consideration involve different initial cash outlays, different pattern of cash inflows and different expected lives; the NPV and IRR methods will give a different ranking. The ranking of mutually exclusive projects would be theoretically correct because it is consistent with the objective of maximization of shareholder's wealth. The IRR may be indeterminate or give multiple rates if the pattern of cashflow is non-conventional. To conclude, the NPV method is superior to the IRR method. It is the best technique of evaluating capital investment proposals.

2.4 CAPITAL RATIONING

Q17. What is Capital Rationing? Explain the factors influencing Capital Rationing.

Ans :

Generally, firms fix up maximum amount that can be invested in capital projects, during a given period of time. The firm then attempts to select a combination of investment proposals, that will be within the specific limits providing maximum profitability, and rank them in descending order according to their rate of return, such a situation is of capital rationing.

A firm should accept all investment projects with positive NPV, with an objective to maximise the wealth of shareholders. However, there may be resource constraints due to which a firm may have to select from among various projects. Thus there may arise a situation of capital rationing where there may be internal or external constraints on procurement of necessary funds to invest in all investment proposals with positive NPVs.

Capital rationing can be experienced due to external factors, mainly imperfections in capital markets which can be attributed to non-availability

of market information, investor attitude etc. Internal capital rationing is due to the self-imposed restrictions imposed by management like not to raise additional debt or laying down a specified minimum rate of return on each project.

There are various ways of resorting to capital rationing. For instance, a firm may effect capital rationing through budgets. It may also put up a ceiling when it has been financing investment proposals only by way of retained earnings. Since the amount it is said to be an example of capital rationing.

Factors

There are many factors, financial as well as nonfinancial which influence the capital expenditure decisions. The crucial factor that influence the capital expenditure is the profitability of the proposal. The other factors that influence are as follows:

i) Urgency

Sometimes an investment is to be made due to an urgency for the survival of the firm or to avoid heavy losses. In such circumstances, the proper evaluation of the proposal cannot be made through profitability tests.

E.g. Breakdown of some plant and machinery, fire, accident etc.

ii) Degree of certainty

Profitability is directly related to risk, higher the profits, greater is the risk or uncertainty. Sometimes, a project with some lower profitability may be selected due to constant flow of income as compared to another project with an irregular and uncertain flow of income.

iii) Intangible Factors

Sometimes a capital expenditures has to be made due to ceratin emotional and intangible factors such as safety and welfare of workers, prestigious project, social welfare, goodwill of the firm etc.

iv) Legal Factors

An investment which is required by the provisions of law is solely influenced by the factor and although the project may not be profitable yet the investment has to be made.

v) Availability of funds

As the capital expenditure requires large funds, the availability of funds is an important factor that influences the capital budgeting decisions. A project, however profitable may not be taken for want of funds and a project with a lesser profitability may be sometimes preferred due to lesser payback period for want of liquidity.

vi) Future Earnings

A project may not be profitable as compared to another today, but it may promise better future earnings. In such cases it may be preferred to increase earnings.

vii) Obsolescence

There are certain projects which have greater risk of obsolescence than others,. In case of projects with high rate of obsolescence, the project with a lesser playback period may be preferred than one which may have higher profitability but still longer payback period.

viii) Research and Development Projects

It is necessary for the long-term survival of the business to invest in research and development projects though it may not look to be profitable investment.

ix) Cost Consideration

Cost of capital project, cost of production, opportunity cost of capital, etc. are other considerations involved in the capital budgeting decisions.

2.5 RISK ANALYSIS IN CAPITAL BUDGETING DECISIONS

Q18. What is Risk ?

Ans :

Risk is uncertainty that a future event with a favourable outcome will occur. In other words, risk is the probability that an investment will not perform as expected and the investor will lose the money invested in the project. All business decisions and opportunities are based on this concept that future performance and returns are uncertain and rely on many uncontrollable variables.

Risk is inherent in any investment. Risk may relate to loss of capital, delay in repayment of capital, non-payment of return or variability of returns. The risk of an investment is determined by the investments, maturity period, repayment capacity, nature of return commitment and so on.

Risk implies future uncertainty about deviation from expected earnings or expected outcome. Risk measures the uncertainty that an investor is willing to take to realize a gain from an investment.

Total Risk

- = General Risk + Specific Risk
- = Market Risk + Issuer Risk
- = Systematic Risk + Non Systematic Risk

Definitions

- (a) **According to Emmett J. Vaughan** "Risk is condition in which there is a possibility of an adverse deviation from a desired outcome that is expected or hoped so far."
- (b) **According to Irving Fisher** "Risk may be defined as combinations of hazards measured by probability."
- (c) **According to Blomkvist** "The possible loss of something of value."
- (d) **According to Douglas** "Risk is the probability of an event combined with the magnitude of the losses and gains that it will entail."
- (e) **According to Merkhofer** "Risk allows for a number of possible outcomes, not all of which are bad."

Q19. What are the causes of Risk ?

Ans :

Causes of Risk

There are a number of factors which cause risk in the investments. Various factors influencing risk are business failure, market fluctuations, change in the interest rate inflation in the economy, fluctuations in exchange rates changes in the political situation etc.

- Wrong method of investment
- Wrong timing of investment
- Wrong quantity of investment
- Interest rate risk

- Nature of investment instruments
- Nature of industry in which the company is operating
- Creditworthiness of the issuer
- Maturity period or length of investment
- Terms of lending
- National and International factors
- Natural calamities etc.

Q20. What are the characterises of Risk ?

Ans :

The following are the basic characteristics of Risk :

- (a) Risk is related to loss of value
- (b) Risk can be financial or non financial
- (c) Risk reduces the return; hence there is a strong relationship between risk and return
- (d) Risk can be identified and measured
- (e) The risk is probabilistic and generic.
- (f) Risks in financial markets are events that are likely to happen.
- (g) Risks are ascertainable, although not always quantifiable.
- (h) Risk has a direct relationship with return, i.e., higher the risk higher the return and vice versa.
- (i) Risk is associated with every business activity. It is more prominent and pronounced in respect of financial sector in general and banks in particular.

2.5.1 Sources and Perspectives of Risk

Q21. What are the various Sources and Perspectives of Risk?

Ans :

(Jan-18)

'Risk refers to the possibility that the actual outcome of an investment will differ from the expected outcome. Put differently, risk refers to variability or dispersion. If an asset's return has no variability, it is risk-less.

To measure the risk, an investor should first understand the fact that risk cannot be measured accurately because it is surrounded with complex environmental, social, economic and political forces. The uncertainties make the measurement of risk an approximation or a fairly accurate estimation. The

analyst must be very cautious while making predictions because investors are much depends on the accuracy in predicting the risks. The quantification of risk ensures comparison as well as uniformity in measurement, analysis and interpretation.

Elimination guesses and hunches in measurement is possible by finding out the difference between actual return and estimated return that is the dispersion around the expected return.

Sources

The statistical tools often used to measure and used as a proxy for risk are as follows:

1. Range

The difference between the maximum and minimum values of the return may be defined as a range. It can used to indicate the amount of risk. Mathematically it can be stated as:

Range = Maximum Value of Return – Minimum Value of Return

2. Variance and Standard Deviation

It is measure of the values of the variables around its mean or it is the square root of the sum of the squared deviations from the mean divided by the number of observances. The arithmetic mean of the returns may be same for two companies but the returns may vary widely.

The variance and standard deviation of a historical return series are defined as follows:

$$\sigma^2 = \left[\frac{\sum_{i=1}^n (R_i - \bar{R})^2}{n-1} \right]$$

$$\sigma = \sqrt{\sigma^2}$$

Where,

σ^2 = Variance of return

σ = Standard deviation of return

R_i = Return from the stock in period
i (i = 1,....., n)

$\bar{R}$ = Arithmetic mean of return

n = Number of periods

Perspectives of Risk

A project can be looked at from three separate perspectives and they are the following:

1. Firm risk

Firm risk is also known as corporate risk. This denotes a share of all the risks of a firm contributed by a particular project

2. Stand-alone risk

This refers to the risk of a project at the time it is considered in isolation.

3. Market risk

This is a type of risk, which is taken into consideration from the standpoint of a diversified investor. This risk is also known as systematic risk.

As the principal objective of a company is the maximization of shareholder value, the ultimately important factor is the risk that is inflicted on the shareholders by the project. In case the shareholders are comprehensively diversified, the most suitable measurement method of risk is the market risk analysis.

2.6 TRADITIONAL TOOLS

2.6.1 Payback Period

Q22. What is Payback Period?

Ans :

Refer to Unit -II, Q.No. 10.

2.6.2 Risk Adjusted Discount Rate (RADR)

Q23. What is Risk Adjusted Discount Rate?

Ans :

(Imp.)

Risk-adjusted rate of return or risk-adjusted discount rate is a performance measure that adjusts for the initial risk an investor takes at the time of a purchase. Every investor works with risk, but if they can quantify it, they should be able to make more informed decisions about which risks are worth taking. Calculating risk-adjusted return enables investors to compare volatile stocks with steadier, lower-risk investments.

The risk-adjusted discount rate approach is one of the simplest and most widely-used methods for incorporating risk into the capital budgeting decision. Under this method, the amount of risk

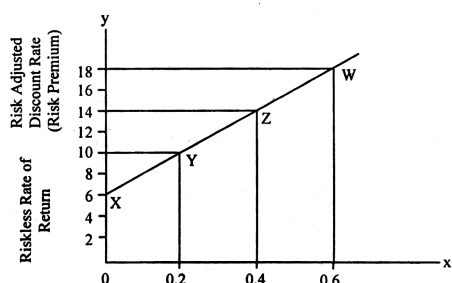


Fig. Risk (Coefficient of Variation)

inherent in a project is incorporated in the discount rate employed in the present value calculations. The relatively risky projects would have high discount rates and relatively safe projects would have relatively low discount rates.

The use of a single rate of discount without consideration to the differing risk of various projects would be logically inconsistent with the firm's goal of shareholders' wealth maximization.

The figure says the relationship between the amount of risk and the required cost of capital (k). It indicates that cash flows of project X with no risk will be discounted at the lowest rate (6%). But as the risk (measured in terms of coefficient of variation) increases, the cash flows of other projects (Y, Z and W) would have to be discounted at progressively higher rates, viz., 10%, 14% and 18% respectively.

Accept-Reject Decision

The risk-adjusted discount rate approach can be used with both the NPV and the IRR. If the NPV method is used to evaluate capital expenditure decisions, the NPV would be calculated using the risk-adjusted rate. If the NPV is positive, the proposal would qualify for acceptance. A negative NPV would signify that the project should be rejected. In case of the IRR as a decision criterion, the internal rate of return (r) would be compared with the risk-adjusted required rate of return. If the r exceeds the risk-adjusted rate, the proposal would be accepted, otherwise not. The following equation is used for the purpose of determining NPV under the RADR method:

$$NPV = \sum_{t=1}^n \frac{CF_t}{(1+r)^t} - CF_0$$

where,

CF_t = Cash inflow in year t

r = Risk-adjusted discount rate

CF_0 = Cash outflows

Thus, projects are evaluated on the basis of future cash flow projections and an appropriate discount rate.

2.6.3 Certainty Equivalent Coefficient of Variation

Q24. Explain briefly about Certainty Equivalent Coefficient of Variation.

Ans :

The certainty equivalent method is conceptually superior to the risk-adjusted discount rate method because it does not assume that the risk increases with time at a constant rate. Each year's certainty equivalent coefficient is based on the level of risk characterizing its cash flow.

In spite of its conceptual soundness it is not as popular as the risk-adjusted discount rate method. This is perhaps because it is inconvenient and difficult to specify a series of certainty equivalent coefficients but seemingly simply to adjust the discount rate.

Beta Coefficient

CAPM explain the behavior of security prices and provides mechanism, whereby investors could assess the impact of proposed security investment on their overall portfolio risk and return.

The risk falls into two groups :

- Systematic risk
- Unsystematic risk

Systematic risk can be measured in relation to the risk of a diversified portfolio known as market portfolio. Unsystematic risk is diversifiable risk which concerns the factors internal to the firm. Systematic risk affects all the firms.

Non diversifiable risk is assessed in terms of beta coefficient. Beta is a measure of volatility of a security return relating to the returns of a broad based portfolio.

If beta coefficient = 1, risk of specified security = market portfolio risk.

If beta coefficient = 0, no market related risk accrues of the investor.

If beta coefficient = -1, relationship is opposite.

With reference to the cost of capital CAPM draws the relationship between the rate of return and non diversifiable or relevant risk of the firm.

$$K_e = R_f + b(K_m - R_f)$$

Where K_e = Cost of equity

R_f = Risk of free return

b = Beta coefficient

K_m = market return.

2.6.4 Decision Tree Analysis

Q25. What is Decision Tree Analysis? Explain the steps involved in Decision Tree Analysis.

Ans :

(Imp.)

All the techniques have been in the nature of accept or reject decisions, which view current investments in isolation of subsequent decisions. However, in practice, the present investment decision has implications for future investment decisions, and affects future events and decisions.

Definition

According to Pierre Masse, "Since present choices modify future alternatives, industrial activity cannot be reduced to a single decision and must be viewed as sequence of decisions extending from the present time into the future".

According to this view, investment expenditure should be viewed not as isolated period commitments, but as links in chain of present and future commitments. Decision trees are an analytical technique employed to handle the sequential decisions.

A decision may be taken by comparing various alternative courses at present with the decision-maker, each alternative course being studied in the light of the future possible conditions, followed by future alternative decisions. The group of all these decisions, present as well as future, viewed in relation to one another is called a 'Decision Tree'. It is a graphical display of the relationship between a present decision and future events and future decisions and their consequences. The sequence of events is normally represented over time in a format similar to the branches of a tree.

Steps

While constructing a decision tree for a given problem the following steps may be required.

1. Break the Project into clearly defined stages. In some cases, this is fairly easy to do so. For example, a computer software company may take up the project of new package in different stages *i.e.*, research and development, market testing, limited production and then full production. Similarly, other capital budgeting decisions may also be broken up in different stages.
2. List all the possible outcomes at each stage. Specify the probability of each outcome at each stage based on information available. This task will become progressively more difficult as more and more stages are introduced.
3. Specify the effect of each outcome on the expected cash flows from the project.
4. Evaluate the optimal action to be taken at each stage in the decision tree, based on the outcome at the previous stage and its effect on cash flows.
5. Estimate the optimal action to be taken at the very first stage, based on the expected cash flows over the entire projects and all the likely outcomes of the cash flows.

PROBLEMS ON RISK ANALYSIS IN CAPITAL BUDGETING (RADR, CERTAINTY EQUIVALENT, DECISION TREE)

26. The Beta Company Ltd. is considering, the purchase of a new investment. Two alternative investments are available (A and B) each costing Rs.1,00,000. Cash inflows are expected to be as follows :

Year	Investment A Rs.	Investment B Rs.
1	40,000	50,000
2	35,000	40,000
3	25,000	30,000
4	20,000	30,000

The company has a target return on capital of 10%. Risk premium rates are 2% and 8% respectively for investments A and B. Which investment should be preferred?

Sol :

The profitability of the two investments can be compared on the basis of net present values cash inflows adjusted for risk premium rates as follows :

Investment A				Investment B		
Year	Discount Factor@ 10% + 2% = 12%	Cash Inflow Rs.	Present Value Rs.	Discount Factor@ 10% + 8% = 18%	Cash Inflows Rs.	Present Value Rs.
1	.893	40,000	35,720	.847	50,000	42,350
2	.797	35,000	27,895	.718	40,000	28,720
3	.712	25,000	17,800	.609	30,000	18,270
4	.635	20,000	12,700	.516	30,000	15,480
			94,115			1,04,820

	Investment A	Investment B
Net Present Value	Rs.94,115–100,000	1,04,820–1,00,000
	Rs.(–) 5,885	Rs. 4,820

27. Determine the risk adjusted net present value of the following project:

Particulars	A	B	C
Net cash outlays (`)	1,00,000	1,20,000	2,10,000
Project life	5 year	5 year	5 year
Annual cash inflow (`)	30,000	42,000	70,000
Coefficient of variation	0.4	0.8	1.2

Coefficient of Variation	Risk Adjusted Rate of Discount	PV Factors 1 to 5 years at Risk Adjusted Rate of Discount
0.0	10%	3.791
0.4	12%	3.605
0.8	14%	3.433
1.2	16%	3.274
1.6	18%	3.127
2.0	22%	2.864
More than 2.0	25%	2.689

Sol:

Statement showing the Determination of the Risk Adjusted Net Present Value

(Amount `)

Projects	Net Cash Outlays	Coefficient of Variation	Risk Adjusted Discount Rate	Annual Cash inflow	PV Factor 1-5 Years	Discounted Cash Inflow	Net Present Value
A	1,00,000	0.40	12%	30,000	3.605	1,08,150	8,150
B	1,20,000	0.80	14%	42,000	3.433	1,44,186	24,186
C	2,10,000	1.20	16%	70,000	3.274	2,29,180	19,180

28. There are 2 projects X and Y each involves an investment of Rs. 40,000/-. The expected cash inflows and certainty coefficient's are as follows :

Project X	Year	Cash flows	Certainty factor
	1	25,000	0.8
	2	20,000	0.7
	3	20,000	0.9

Project Y	Year	Cash flows	Certainty factor
	1	20,000	0.9
	2	30,000	0.8
	3	20,000	0.7

If the cost of capital is 10% suggest which project should be accepted.

Sol:

PROJECT - X

Year (1)	Cash in flows (2)	C.F (3)	Certain C.F (4) = 2 × 3	PV@10% (5)	PV. CFAT (6)
1	25,000	0.8	20,000	0.909	18,180
2	20,000	0.7	14,000	0.826	11,564
3	20,000	0.9	18,000	0.751	13,518
					43,262

$$NPV = 43,262 - 40,000$$

$$\therefore 3,262$$

PROJECT - Y

Year (1)	Cash in flows (2)	C.F (3)	Certain C.F (4) 2 × 3	PV@10% (5)	PV. CFAT (6)
1	20,000	0.9	18,000	0.909	16,362
2	30,000	0.8	24,000	0.826	19,824
3	20,000	0.7	14,000	0.751	10,514
					46,700

$$\begin{aligned}\text{NPV} &= 46,700 - 40,000 \\ &= 6,700\end{aligned}$$

∴ The NPV is more in project Y when compared to project X. So accept project Y i.e., (6700 > 3262).

29. Two mutually exclusive investment proposal are being considered the following information is available. The initial investment of both the project are 5,000/-

Project X			Project Y		
Year	Cash flows	CF	Year	Cash flows	CF
1	4000	0.2	1	8000	0.3
2	8000	0.4	2	9000	0.1
3	12000	0.1	3	9000	0.2
4	5000	0.2	4	7000	0.2
5	4000	0.1	5	6000	0.2

If cost of capital is 12% suggest which project should be acceptable.

Sol/:

Year	Cash in flows	C.F	Certain C.F	PV@12%	PV. CFAT
1	4000	0.2	800	0.893	714.4
2	8000	0.4	3,200	0.797	2550.4
3	12,000	0.1	1,200	0.712	854.4
4	5,000	0.2	1,000	0.636	636
5	4,000	0.1	400	0.567	226.8
					4,982

$$\text{NPV} = 4982 - 5000$$

∴ (18)

Year	Cash in flows	C.F	Certain C.F	PV@12%	PV. CFAT
1	8,000	0.3	2,400	0.893	2,143.2
2	9,000	0.1	900	0.797	717.3
3	9,000	0.2	1,800	0.712	1,281.6
4	7,000	0.2	1,400	0.636	890.4
5	6,000	0.2	1,200	0.567	680.4
					5,712.9

$$NPV = 5712.9 - 5000$$

$$\therefore 712.9$$

$\therefore$ The NPV is positive in project B. So project B is accepted.

30. X Co. Ltd., has given the following possible cash inflows of two of their projects X and Y. Both of their projects will require an equal investment of Rs. 5,000/- You are required to suggest which project should be accepted 10% discount rate.

Possible event	Project X		Project Y	
	Cash Inflow	Probability	Cash Inflow	Probability
A	4,000	.10	12,000	.10
B	5,000	.20	10,000	.15
C	6,000	.40	8,000	.50
D	7,000	.20	6,000	.15
E	8,000	.10	4,000	.10

Sol :

Calculation of expected cash flows for Project X and Project Y

Project X				Project Y		
Events	Cash Inflows (Rs)	Probability	Expected cash flow	Cash flow	Probability	Expected cash flow
A	4,000	.10	400	12,000	.10	1,200
B	5,000	.20	1,000	10,000	.15	1,500
C	6,000	.40	2,400	8,000	.50	4,000
D	7,000	.20	1,400	6,000	.15	900
E	8,000	.10	800	4,000	.10	400
Total			6,000	40,000		8,000

The above calculations show that project Y has higher expected cash flow as compared to project X. If expected cash/flow are discounted @ 10% the net present value for project X will be : Rs. $(6,000 \times .909) - 5,000/- = \text{Rs. } 454/-$. The net present value of project Y will be $(8000 \times .909) - 5000 = \text{Rs. } 2,272/-$. From the calculations it can be seen that NPV of project Y is more than project X. It is advisable to accept project Y.

31. ABC & Co. has funds of Rs. 2,00,000 which expectedly are not required for next few years and hence can be deposited in a bank @ 15% interest payable annually. Alternatively, the funds can be used to install a new machine for the production of a new item. For this, the firm has two options before it : Machine 1 costing Rs. 1,80,000 which is expected to give annual cash inflows of Rs. 1,00,000, Rs. 1,20,000 and Rs. 40,000 respectively for next three years. Machine 2 costing Rs. 1,90,000 which is expected to give annual cash inflows of Rs. 1,00,000, Rs. 1,00,000 and Rs. 50,000 respectively for next three years. Present the decision situation in a decision tree and evaluate the options.

Sol :

The above situation can be presented in the form of a decision tree as given in Figure.

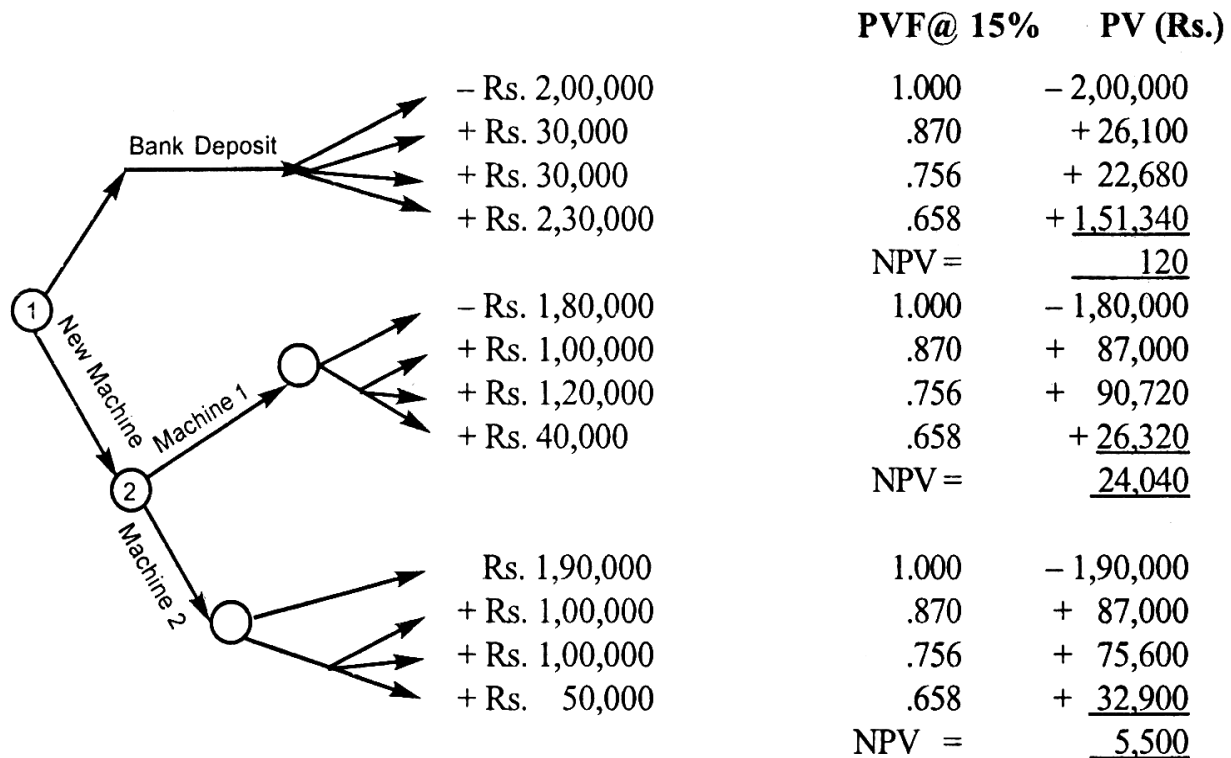


Fig.: Decision Tree of Two-stage Decision Process

On the basis of Figure above, it may be mentioned that the present situation is a two stage decision process. At stage 1, the firm has to decide whether to keep money in liquid form by depositing in a bank @ 12% or to buy 1 machine for the production of the new product. If the firm selects not to deposit the money in the bank, then to select, in the second stage whether to buy machine 1 or machine 2. It may be noted that if at stage I, the firm decides to go for bank deposit, then evaluation of machine 1 and machine 2 is not required at all.

32. A firm has an investment proposal, requiring an outlay of ₹ 40,000. The investment proposal is expected to have 2 years' economical life with no salvage value. In year I, there is a 0.4 probability that cash inflow after tax will be ₹ 25,000 and 0.6 probabilities that cash inflow after tax will be ₹ 30,000. The probability assigned to cash inflow after tax for the year II are as follows:

Cash Inflow Year I	₹ 25,000		₹ 30,000	
Cash Inflow Year II with probabilities	₹ 12,000	0.3	₹ 20,000	0.5
	₹ 16,000	0.5	₹ 25,000	0.1
	₹ 22,000	0.5	₹ 30,000	0.4

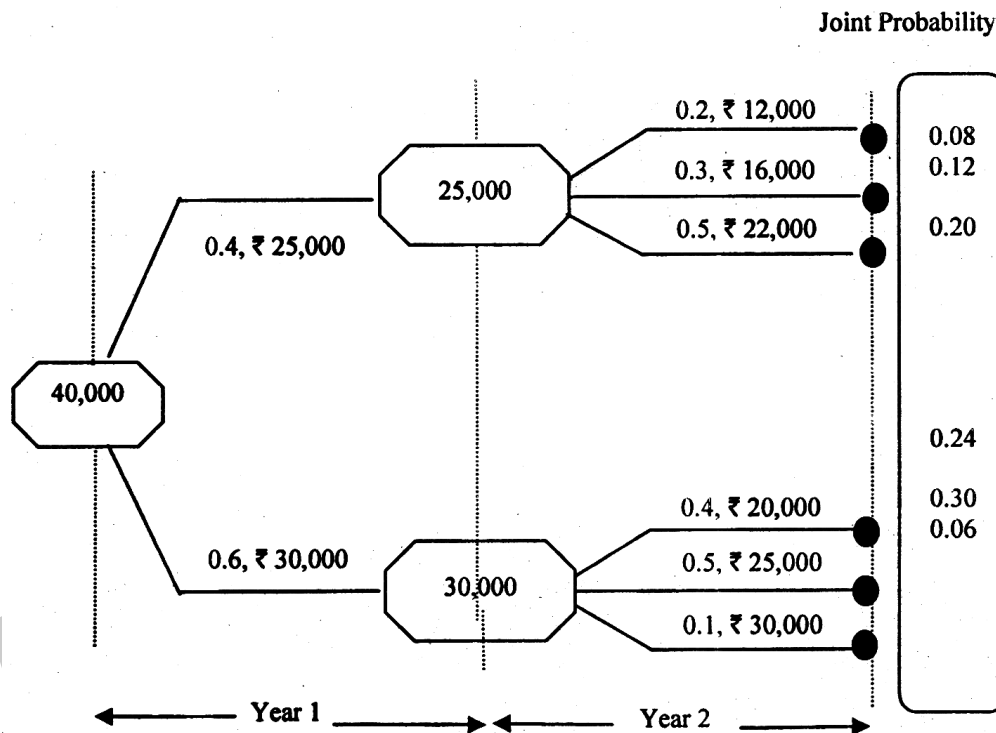
The firm uses a 10% discount rate for this type of investment.

Required: Construct a decision tree for the proposed investment project.

1. What net present value will the project yield if worst outcome is released? What is the probability of occurrence of this NPV?
2. What will be the best and the probability of that occurrence?
3. Will the project be accepted? [10% Discount factor: 1 year - 0.909; 2 year - 0.826]

Sol :

The decision tree given below, shows that there are six possible outcomes each represented by a path. The net present value of each path at 10% discount rate is given in the table below. Let us denote year 1 cash flows as CF₁ and year 2 cash flows as CF₂.



CF ₁ × PV Factor ([₹]) (a)	CF ₂ × PV Factor ([₹]) (b)	Total Inflow (c) = (a + b)	Outflow ([₹]) (d)	NPV (e) = (c) - (d) ([₹])
25,000 × 0.909 = 22,725	12,000 × 0.826 = 9,912	32,637	40,000	-7,363
25,000 × 0.909 = 22,725	16,000 × 0.826 = 13,216	35,941	40,000	-4,059
25,000 × 0.909 = 22,725	22,000 × 0.826 = 18,172	40,897	40,000	897
30,000 × 0.909 = 27,270	20,000 × 0.826 = 16,520	43,790	40,000	3,790
30,000 × 0.909 = 27,270	25,000 × 0.826 = 20,650	47,920	40,000	7,920
30,000 × 0.909 = 27,270	30,000 × 0.826 = 24,780	52,050	40,000	12,050

Statement Showing the Expected Net Present Value

Path	NPV @ 10% (a)	Joint Probability (b)	Expected Net Present Value (a) × (b)
1	-7,363	0.08	-589.04
2	-4,059	0.12	-487.08
3	897	0.20	179.40
4	3,790	0.24	909.60
5	7,920	0.30	2,376.00
6	12,050	0.06	723.00
		1.00	3,111.88

Observation

1. If the worst outcome (path 1) is realized, the net present value which the project will yield is ₹ 7,363 (negative). The probability of occurrence of this net present value is 8%.
2. The best outcomes will be path 6 when net present value is higher, i.e., ₹ 12,050 (positive). The probability of occurrence of this net present value is 6%.
3. Yes, the project will be accepted, since the expected net present value X probability sum total is positive.

Exercise Problems

1. A project cost ₹ 5,00,000 and yields annually a profit of ₹ 80,000 after depreciation @ 12% p.a. but before tax of 50%. Calculate the payback period.

[Ans: 7 years and 2 months (Apprx.)]

2. A project costs ₹ 10,00,000 and has a scrap value of ₹ 2,00,000 after 5 years. The net profit before depreciation and taxes for the five years period are expected to be ₹ 2,00,000, ₹ 2,40,000, ₹ 2,80,000, ₹ 3,20,000 and ₹ 4,00,000 respectively. You are required to calculate the Accounting rate of return, assuming 50% rate of tax and depreciation on straight line method.

[Ans: Profit after depreciation and tax = ₹ 64,000, ARR = 16%]

3. As a financial manager of TAJ Ltd, Hubli, you have to advise the board of directors on choosing between two competing project proposals, which require an equal investment of ₹ 1,00,000 and expected to generate cashflows as under:

Year	PV Factor at 10%	Project - I (₹)	Project - II (₹)
2007	0.909	48,000	20,000
2008	0.826	32,000	24,000
2009	0.751	20,000	36,000
2010	0.683	Nil	48,000
2011	0.621	24,000	16,000
2012	0.564	12,000	8,000

[Ans: Net Present Value Project I: ₹ 6,756 Project II: ₹ 12,272]

4. You are given the following information relating to ABC Ltd. for the year of recent performance of an asset.

Initial cash outlay ₹ 50,000

Life of the asset 5 years

Estimated annual cash flow ₹ 12,500

Calculate:

- i) Payback period
- ii) IRR

[Ans: Payback Period: 4 years; IRR: 8.07%]

5. The expected cash inflows of a new project are estimated as under:

Year	Cash Inflow (₹)
1	1,50,000
2	2,50,000
3	3,50,000
4	2,50,000
5	2,00,000

The initial investment required for the project is ₹ 7,00,000. The risk-adjusted discount rate is 12%. Evaluate as to whether the project proposal is worthwhile.

[Ans: NPV – ₹ 1,54,721]

Short Question and Answers

1. Capital budgeting

Ans :

Capital budgeting is the process of making investment decisions in capital expenditures. A capital expenditure may be defined as an expenditure the benefits of which are expected to be received over period of time exceeding one year. The main characteristic of a capital expenditure is that the expenditure is incurred at one point of time whereas benefits of the expenditure are realised at different points of time in future. In simple language we may say that a capital expenditure is an expenditure incurred for acquiring or improving the fixed assets, the benefits of which are expected to be received over a number of years in future. The following are some of the Examples of capital expenditure :

1. Cost of acquisition of permanent assets as land and building, plant and machinery, goodwill, etc.
2. Cost of addition, expansion, improvement or alteration in the fixed assets.
3. Cost of replacement of permanent assets.
4. Research and development project cost, etc.

Capital expenditure involves non-flexible long-term commitment of funds. Thus, capital expenditure decisions are also called as long term investment decisions. Capital budgeting involves the planning and control of capital expenditure. It is the process of deciding whether or not to commit resources to a particular long term project whose benefits are to be realised over a period of time, longer than one year. Capital budgeting is also known as Investment Decision Making, Capital Expenditure Decisions, Planning Capital Expenditure and Analysis of Capital Expenditure.

Definitions

According to Charles T. Horngreen has defined capital budgeting as, "Capital budgeting is long term planning for making and financing proposed capital outlays."

According to G.C. Philippatos, "Capital budgeting is concerned with the allocation of the firm's scarce financial resources among the available market opportunities. The consideration of investment opportunities involves the comparison of the expected future streams of earnings from a project with the immediate and subsequent streams of earning from a project, with the immediate and subsequent streams of expenditures for it".

According to Richard and Greenlaw have referred to capital budgeting as acquiring inputs with long-run return.". In the words of Lynch, "Capital budgeting consists in planning development of available capital for the purpose of maximising the long term profitability of the concern."

2. Features of Capital Budgeting Technique.

Ans :

Following are some of the features which a capital budgeting evaluation technique should posses :

1. The criterion must be able to incorporate all the cash flows associated with proposal.
2. It should also incorporate the time value of money i.e., the cash flows arising at different point of time must be differentiated in respect of their worth to the firm.
3. It should be capable of ranking different proposals in order of their worth to the firm.
4. It should be objective and unambiguous in its approach. There should not be any scope for subjectivity of the decision maker.
5. The last but the least, the technique must be in the line with the objective of maximisation of shareholders wealth.

3. Define Payback Period.

Ans :

The payback period is defined as the number of years required for the proposal's cumulative cash inflows to be equal to its cash outflows. In other

words, the payback period is the length of time required to recover the initial cost of the project. The payback period therefore, can be looked upon as the length of time required for a proposal to 'break even' on its net investment.

Calculation of the Payback Period

The payback period can be calculated in two different situations:

1. When Annual Inflows are Equal

When the cash inflows being generated by a proposal are equal per time period, i.e., the cash inflows are in the form of an annuity, the payback period can be computed by dividing the cash outflow by the amount of annuity.

2. When the Annual Cash Inflows are Unequal

In case the cash inflows from the proposal are not in annuity form then the cumulative cash inflows are raised to compute the payback period.

4. Disadvantages of Average Rate of Return Method

Ans :

The disadvantages of average rate of return method are as follows:

1. Ignores Time Value of Money

If we use ARR to compare two projects having equal initial investments. The project which has higher annual income in the latter years of its useful life may rank higher than the one having higher annual income in the beginning years, even if the present value of the income generated by the latter project is higher.

2. Cost of Project cannot be Determined Accurately

Future sales and anticipated cost of project over a long period cannot be determined accurately because they are influenced by a large number of outside factors.

3. Used as the Only Way to Appraise a Project

It can not be used as the only way to appraise a project. The net present value should be

also calculated as calculating only the return of a project can give a distorted image when projects that have significantly different capital expenditure are compared.

4. Uses Only Accounting Figures

It uses accounting figures which can be affected by judgment, accounting policies and non cash items (depreciation).

5. Problem of Comparability

There are two ways to calculate the accounting rate of return which causes a problem of comparability.

5. Advantages of NPV.

Ans :

The advantages of NPV method for evaluating investment proposals are as follows:

1. Recognition of Time Value of Money

The most significant advantage is that it explicitly recognizes the time value of money, e.g., total cash flows pertaining to two machines are equal but the net present value are different because of differences of pattern of cash streams. The need for recognizing the total value of money is thus satisfied.

2. Sound Method of Appraisal

It also fulfils the second attribute of a sound method of appraisal. In that it considers the total benefits arising out of proposal over its life time.

3. Selection of Mutually Exclusive Projects

It is particularly useful for selection of mutually exclusive projects.

4. Maximization of the Shareholder's Wealth

This method of asset selection is instrumental for achieving the objective of financial management, which is the maximization of the shareholder's wealth. In brief the present value method is a theoretically correct technique in the selection of investment proposals.

6. Define Profitability Index. How is it calculated?

Ans :

The profitability index (PI) refers to the ratio of discounted benefits over the discounted costs. It is an Evaluation of the profitability of an investment and can be compared with the profitability of other similar investments which are under consideration. The profitability index is also referred to as benefit-cost ratio, cost- benefit ratio, or even capital rationing.

Calculation of PI

The profitability index is one of the numerous ways used to quantify and measure the efficiency of a proposed investment. Calculation of PI is done by the following formula:

$$\text{Profitability Index} = \frac{\text{Present Value of Cashinflows}}{\text{Present Value of Cashoutflows}}$$

The profitability index may be found for net present values of inflows:

$$\text{P.I. (Net)} = \frac{\text{NPV (Net Present Value)}}{\text{Initial Cash outlay}} \text{ or P. I.} = \frac{\text{PV of Cash inflows}}{\text{Initia Cash outlay}}$$

7. Advantages of Profitability Index Method.

Ans :

Following are the advantages of profitability index method:

1. It is consistent with the goal of maximizing the shareholders wealth.
2. It recognizes the time value of money.
3. It considers analysis all cash flows of entire life.
4. It makes the right in the case of different amount of cash outlay of different project.
5. It ascertains the exact rate of return of the project.
6. It helps in ranking and picking projects while rationing of capital.

8. What is Capital Rationing?

Ans :

Generally, firms fix up maximum amount that can be invested in capital projects, during a given period of time. The firm then attempts to select a combination of investment proposals, that will be within the specific limits providing maximum profitability, and rank them in descending order according to their rate of return, such a situation is of capital rationing.

A firm should accept all investment projects with positive NPV, with an objective to maximise the wealth of shareholders. However, there may be resource constraints due to which a firm may have to select from among various projects. Thus there may arise a situation of capital rationing where there may be internal or external constraints on procurement of necessary funds to invest in all investment proposals with positive NPVs.

Capital rationing can be experienced due to external factors, mainly imperfections in capital markets which can be attributed to non-availability of market information, investor attitude etc. Internal capital rationing is due to the self-imposed restrictions imposed by management like not to raise additional debt or laying down a specified minimum rate of return on each project.

There are various ways of resorting to capital rationing. For instance, a firm may effect capital rationing through budgets. It may also put up a ceiling when it has been financing investment proposals only by way of retained earnings. Since the amount it is said to be an example of capital rationing.

9. What is Risk?

Ans :

Risk is uncertainty that a future event with a favourable outcome will occur. In other words, risk is the probability that an investment will not perform as expected and the investor will lose the money invested in the project. All business decisions and opportunities are based on this concept that future performance and returns are uncertain and rely on many uncontrollable variables.

Risk is inherent in any investment. Risk may relate to loss of capital, delay in repayment of capital, non-payment of return or variability of returns. The risk of an investment is determined by the investments, maturity period, repayment capacity, nature of return commitment and so on.

Risk implies future uncertainty about deviation from expected earnings or expected outcome. Risk measures the uncertainty that an investor is willing to take to realize a gain from an investment.

Total Risk

= General Risk + Specific Risk

= Market Risk + Issuer Risk

= Systematic Risk + Non Systematic Risk

Definitions of Risk

- (a) "Risk is condition in which there is a possibility of an adverse deviation from a desired outcome that is expected or hoped so far."

- Emmett J. Vaughan

- (b) "Risk may be defined as combinations of hazards measured by probability."

- Irving Fisher

- (c) "The possible loss of something of value."

- Blomkvist

- (d) "Risk is the probability of an event combined with the magnitude of the losses and gains that it will entail."

- Douglas

- (e) "Risk allows for a number of possible outcomes, not all of which are bad."

- Merkhofer

10. Characterises of Risk.

Ans :

The following are the basic characteristics of Risk :

- Risk is related to loss of value
- Risk can be financial or non financial
- Risk reduces the return; hence there is a strong relationship between risk and return
- Risk can be identified and measured
- The risk is probabilistic and generic.
- Risks in financial markets are events that are likely to happen.
- Risks are ascertainable, although not always quantifiable.
- Risk has a direct relationship with return, i.e., higher the risk higher the return and vice versa.

11. What is Decision Tree Analysis?

Ans :

All the techniques have been in the nature of accept or reject decisions, which view current investments in isolation of subsequent decisions. However, in practice, the present investment decision has implications for future investment decisions, and affects future events and decisions.

According to Pierre Masse, "Since present choices modify future alternatives, industrial activity cannot be reduced to a single decision and must be viewed as sequence of decisions extending from the present time into the future".

According to this view, investment expenditure should be viewed not as isolated period commitments, but as links in chain of present and future commitments. Decision trees are an analytical technique employed to handle the sequential decisions.

A decision may be taken by comparing various alternative courses at present with the decision-maker, each alternative course being studied in the light of the future possible conditions, followed by future alternative decisions. The group of all these decisions, present as well as future, viewed in relation to one another is called a 'Decision Tree'. It is a graphical display of the relationship between a present decision and future events and future decisions and their consequences. The sequence of events is normally represented over time in a format similar to the branches of a tree.

12. Distinguish between NPV and IRR.

Ans :

i) Rate of Interest

The NPV method takes the rate of interest as a known factor whereas the IRR method takes it as an unknown factor.

ii) Re-Investment

While the NPV method considers the re-investment of intermediate cash inflows at the cut-off rate, i.e., required rate of return which is usually cost of capital, the IRR method considers the intermediate cash inflows at the IRR itself. As different projects yield different rates of return, the same firm cannot re-invest the cash inflows at different rates. Hence, for ranking two or more capital investment proposals NPV method is more reliable than the IRR method.

iii) Investment Amount

While the NPV method attempts to find-out the amount which can be invested in a particular project so that its projected earnings may suffice to repay this amount with interest at the market rate, the IRR method seeks to find-out the maximum rate of interest at which the amount invested in the project could be repaid out of the cash inflows arising from that project.

13. Define Accounting / Average Rate of Return.

Ans :

According to this method, the capital investment proposals are judged on the basis of their relative profitability. For this purpose, capital employed and related income is determined according to commonly accepted accounting principles and practices over the entire economic life of the project and then the average yield is calculated. Such a rate is termed as Accounting Rate of Return.

The ARR is also known as Return on Investment (ROI). It is the ratio of average after tax profit to average investment.

Calculation of ARR

$$\text{ARR} = \frac{\text{Average Annual Profit after Tax}}{\text{Average (or) Initial Investment}} \times 100 = \frac{\text{Average EBIT} (1 - t)}{\text{Average Investment}} \times 100$$

Where,

$$\text{Average Investment} = \frac{\text{Initial Investment} + \text{Salvage Value}}{2}$$

(or)

$$\frac{\text{Initial investment} - \text{Scrap value}}{2} + \text{Addl.net working capital} + \text{Scrap value}$$

14. What are the different techniques of Capital Budgeting?

Ans :

The investment evaluation techniques play a vital role in evaluating a project. Profitability of a firm will increase if the proposal is profitable and vice-versa. Selection of a profitable project will help to maximise value of the firm through the maximisation of profits. Therefore, capital budgeting decisions form the framework for a firm's future development.

As we have seen in the analysis stage, project evaluation involves market analysis, financial analysis, technical analysis, economic analysis, and ecological analysis. In financial analysis, after estimation of the cash flows and required rate of return on the project then the next step is evaluation of various investment alternatives and selection of the most profitable project.

A wide range of criteria has been suggested to judge the worthiness of the investment alternatives. Evaluation techniques are divided into two broad categories, viz., (a) Traditional techniques or non-discounted techniques and (b) Modern techniques or discounted cash flow techniques. Figure shows the two techniques of evaluation of a project.

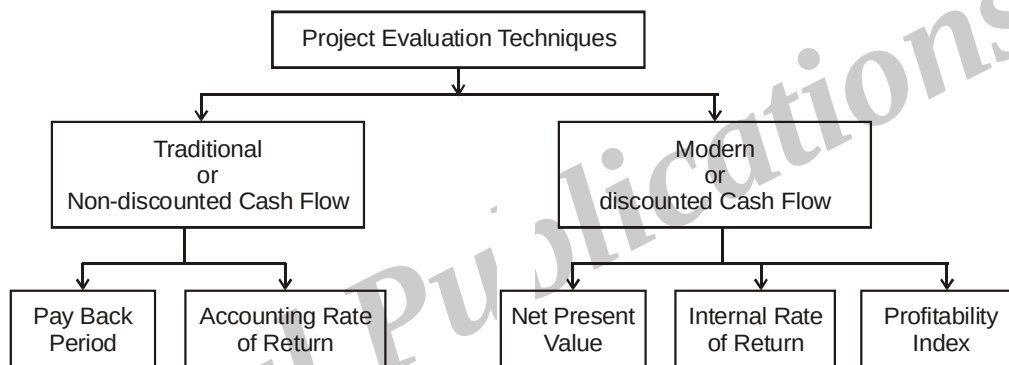


Fig.: Techniques of Project Evaluation

There are many methods of evaluating profitability of capital investment proposals. The various commonly used methods are as follows :

a) Traditional Methods

- i) Pay Back Period Method
- ii) Accounting Rate of Return

b) Time-adjusted Method/Discounted Methods

- i) Net Present Value Method (NPV)
- ii) Internal Rate of Return (IRR)
- iii) Profitability Index Method (PI).

Choose the Correct Answer

1. _____ on capital is called as “cost of capital”. [b]
(a) Lower expected return (b) Normal expected return
(c) Higher expected return (d) None of the above
2. The value of the future net income discounted by the cost of capital are called [d]
(a) Average capital cost (b) Discounted capital cost
(c) Net capital cost (d) NPV
3. Under net present value criterion, a project is approved is [c]
(a) Its net present value is positive (b) The funds are unlimited
(c) Both (a) and (b) (d) None of the above
4. Which of the following is mostly preferred [c]
(a) NPV (b) PI
(c) IRR (d) All of the above
5. A project is accepted when the [d]
(a) NPV is greater than zero
(b) IRR will be greater than cost of capital
(c) PI will be greater than unity
(d) Any of above
6. Which of the following investment rules does not use the time of the money concept [a]
(a) Payback period (b) Internal rate value
(c) Net present value (d) All the above
7. Capital budgeting methods has the value additive property [a]
(a) NPV (b) IRR
(c) Pay back period (d) Discounted payback period
8. IRR is defined as [a]
(a) The discount rate that makes NPV zero
(b) The difference b/w the cost of capital and present value of cash flows
(c) The discount rate usedh in NPV
(d) The discount rate used in discounted payback period

9. PI is the ratio of [b]
- (a) PV of cash flows to initial investments
 - (b) NPV cash flows to initial investments
 - (c) NPV of cash flow to IRR
 - (d) Present value of cash flow to IRe
10. Primary market is also called as [b]
- (a) New issue market
 - (b) Capital market
 - (c) Stock market
 - (d) None

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Fill in the blanks

1. Capital budgeting is the process of making investment decision in _____ expenditure
2. Capital budgeting involves the planning and _____ of capital expenditure.
3. The capital budgeting process begins with the identification of _____ proposal.
4. _____ involves planning and control of capital expenditure.
5. The _____ is defined as the number of years required for the proposal's cumulative cash inflow to be equal to its cash outflow.
6. _____ of an investment proposal is sum of present value cash inflows less. sum of present value cash outflows.
7. _____ is modern technique of capital budgeting.
8. _____ refers to distribution of capital favour of more accepted proposal.
9. _____ fixes the size of the annual capital expenditure budget.
10. _____ can be measure in relation to the risk of a diversified portfolio known as market portfolio.

ANSWERS

1. Capital
2. Control
3. Investment
4. Capital expenditure
5. Payback period
6. Net present value
7. IRR (internal rate of return)
8. Capital rationing
9. Top management
10. Systematic risk

UNIT III

WORKING CAPITAL MANAGEMENT:

Working Capital: Meaning – Kinds – Determinants – Sources and Levels – Estimation of Working Capital Requirements (Including Problems)

Cash Management: Nature of Cash – Motives of Holding Cash – Objectives of Cash Management – Factors Determining Cash Need – Cash Cycle – Facets of Cash Management – Cash Forecasting and Budgeting – Management of Cash Flows – Determination of Optimum Cash Balance (Including Problems)

Accounts Receivable Management: Meaning – Objectives – Cost Benefit Analysis – Credit Standards – Credit Terms – Collection of Receivables (Including Problems)

Inventory Management: Meaning – Components of Inventory – Motives of Holding Inventory – Objectives of Inventory Management – Tools and Techniques of Inventory Control (Including Problems)

3.1 WORKING CAPITAL

3.1.1 Meaning

Q1. Explain the meaning of working capital.
(OR)

Define working capital.

Ans : (Jan.-20, Jan.-18, Dec.-16, Imp.)

Meaning

Working Capital refers to the cash a business requires for day-to-day operations, or, more specifically, for financing the conversion of raw materials into finished goods, which the company sells for payment. Among the most important items of working capital are levels of inventory, debtors and creditors. These items are looked at for signs of a company's efficiency and financial strength.

Definitions

- (i) **According to Shubin**, "Working capital the amount of funds necessary to cover the cost of operating the enterprise".
- (ii) **According to Gerstenberg**, "Circulating capital means current assets of a company that are changed in the ordinary course of business from one form to another, as **for Example**, from cash to inventories, inventories to receivables, receivables into cash".
- (iii) **According to Hoagland**, "Working capital is descriptive of that capital which is not fixed. But, the more common use of working capital

is to consider it as the difference between the book value of the current assets and the current liabilities".

Working capital, in general practice, refers to the excess of current assets over current liabilities. Management of working capital therefore, is concerned with the problems that arise in attempting to manage the current assets, the current liabilities and the inter-relationship that exists between them. In other words it refers to all aspects of administration of both current assets and current liabilities. It is also known as revolving or circulating capital or short-term capital.

Working capital management is very important to ensure that the company has enough funds to carry on with its day-to-day operations smoothly. A business should not have a very long Cash Conversion Cycle. A cash conversion cycle measures the time period for which a firm will be deprived of funds if it increases its investments as a part of its business growth strategies.

3.1.2 Kinds

Q2. Explain different kinds of working capital.

(OR)

Discuss the various kinds of working capital.

Ans : (Dec.-14)

Working Capital may be classified in two ways:

- A) On the basis of concept
- B) On the basis of time.

A. On the Basis of Concept

On the basis of concept, working capital is classified as gross working capital and net working capital

1. Gross Working Capital

Gross working capital refers to the amount which the company has invested into the current assets. Examples of current assets are:

Constituents of Current Assets

1. Cash in hand and bank balances,
2. Bills Receivables,
3. Sundry Debtors (less provision for bad debts),
4. Short- term loans and advances.
5. Inventories of stocks, as:
 - i) Raw materials.
 - ii) Work-in-process,
 - iii) Stores and spares.
 - iv) Finished goods.
6. Temporary Investment of surplus funds,
7. Prepaid Expenses,
8. Accrued Incomes.

2. Net Working Capital

Net working capital refers to the difference between the current assets and current liabilities of the company.

Net Working Capital = Current Assets – Current liabilities

Examples of current liabilities are :

Constituents of Current Liabilities

1. Bills Payable,
2. Sundry Creditors or Accounts Payable,
3. Accrued or Outstanding Expenses,
4. Short-term loans, advances and deposits,

5. Dividends Payable,
6. Bank Overdraft,
7. Provision for taxation, if it does not amount to appropriation of profits.

As one can see from the above that both gross working capital and net working capital are different because under gross working capital one calculate the amount which the company has invested into current assets, which implies that current liabilities are excluded while calculating gross working capital, which is not the case under net working capital where one calculate the difference between current assets and current liabilities.

B. On the Basis of Time

On the basis of time, working capital is classified as

(a) Permanent or Fixed Working Capital:

Permanent or fixed working capital is the minimum amount which is required to ensure effective utilizations of fixed facilities and for maintaining the circulation of current assets. There is always a minimum level of current assets which is continuously required by the enterprise to carry out its normal business operations.

(b) Temporary or Variable Working Capital:

Temporary or variable Working Capital is the amount of Working Capital which is required to meet the seasonal demands and some special exigencies. Variable Working Capital can be further divided as seasonal Working Capital and special Working Capital.

Most of the enterprises have to provide additional Working Capital to meet special exigencies such as launching of extensive marketing campaigns for conducting research, etc.

Temporary Working Capital differs from permanent Working Capital in the sense that it is required for short periods and cannot be permanently employed gainfully in the business.

Q3. Explain the Importance of Working Capital.*Ans :*

Working capital is the life blood and nerve centre of a business. Working capital is very essential to maintain the smooth running of a business. No business can run successfully without an adequate amount of working capital. The main advantages of maintaining adequate amount of working capital are as follows :

- (a) **Solvency of the business:** Adequate working capital helps in maintaining solvency of the business providing uninterrupted flow of production.
- (b) **Goodwill :** Sufficient working capital enables a business concern to make prompt payments and hence helps in creating and maintaining goodwill.
- (c) **Easy Loans:** A concern having adequate working capital, high solvency and good credit standing can arrange loans from banks and others on easy and favorable terms.
- (d) **Cash Discounts:** Adequate working capital also enables a concern to avail cash discounts on the purchases and hence it reduces costs.
- (e) **Regular supply of raw materials:** Sufficient working capital ensures regular supply of raw materials and continuous production.
- (f) **Exploitation of favourable market conditions:** Only concerns with adequate working capital can exploit favourable market conditions such as purchasing its requirements in bulk when the prices are lower and by holding its inventories for higher prices.
- (g) **Ability to face crisis:** Adequate working capital enables a concern to face business crisis in emergencies such as depression because during such periods, generally, there is much pressure on working capital.
- (h) **Quick and regular return on investments:** Every investor wants a quick and regular return on his investments. Sufficiency of working capital enables a concern to pay quick and regular dividends to its investors as there may not be much pressure to plough back profits. This gains the confidence of its investors and creates a favourable market to raise additional funds in the future.
- (i) **High morale:** Adequacy of working capital creates an environment of security, confidence, high morale and creates overall efficiency in a business.

Q4. What are the differences between Gross Working Capital and Net Working Capital.*Ans :*

S.No.	Gross working capital (GWC)	S.No.	Net Working Capital (NWC)
1.	Gross Working Capital (GWC) refers to that amount of investment which has been invested by the firm in financing its current assets.	1.	Net Working Capital (NWC) refers to the net amount which could be obtained by deducting the current liabilities from the current assets. i.e., $NWC = \text{Current assets} - \text{Current liabilities}$
2.	As it mainly deals with current assets, they can be easily converted into cash within an accounting year (which is usually less than an year). Example : Cash, debtors, bills receivable, stock etc.	2.	As it represents a differential amount, which is actually the amount of investment made in current assets that have been financed by the long-term sources.
3.	Through, gross working capital the liquidity position of the firm can be determined. Because of this liability, it is found to be of managerial interest.	3.	Net working capital is highly significant as it enables the firm to meet its future needs.

4.	If high amount is vested in the maintenance of gross working capital, then the firm is exposed to high risk of obsolescence.	4.	If high amount is vested in the maintenance of net working capital, liquidity position of a firm can be considerably improved.
5.	It helps the firm in maintaining the right amount of working capital at the right time.	5.	It helps in maintaining the equilibrium or trade off between the current assets and the current liabilities.
6.	It is suitable to the company form of organization where in the ownership management is separated from its control.	6.	It is suitable for all types of business. However, its need varies based on the nature of a business.
7.	The gross concept is based on an assumption that a small increase in the amount of funds causes even the working capital to increase.	7.	It represents the liquidity position of a firm to their short-term creditors.

3.1.3 Determinants

Q5. Explain the factors determining the Working Capital requirements ?

(OR)

What are the factors affecting working capital.

(OR)

Discuss the factors influencing for determination of working capital of manufacturing concern.

Ans :

(Jan.-20, Dec.-16, Dec.-14, Imp.)

The Working Capital requirements of a concern depend upon a large number of factors such as nature and size of business, the character of their operations, the length of production cycles, the rate of stock turnover and the state of economic situation. It is not possible to rank them because all such factors are of different importance and the influence of individual factors changes for a firm over time. The following are the important factors generally influencing the Working Capital requirements:

(a) Nature or character of business

The Working Capital requirements of a firm basically depend upon the nature of its business. Public utility undertaking like Electricity, Water Supply and Railways need very limited Working Capital because they offer cash sales only and supply services, not products, and as such no funds are tied up in inventories and receivables. The trading and financial firms require less investment in fixed assets but have to invest large amounts in current assets like inventories, receivables and cash; as such they need large amount of Working Capital.

(b) Size of business / Scale of operations

The Working Capital requirements of a concern are directly influenced by the size of its business which may be measured in terms of scale of operations. Greater the size of a business unit, larger will be the requirements of Working Capital. In some cases even a smaller concern may need more Working Capital due to high overhead charges, inefficient use of available resources and other economic disadvantages of small size.

(c) Production policy

In certain industries the demand is subject to wide fluctuations due to seasonal variations. The requirements of Working Capital, in such cases depend upon the production policy. The production could be kept either steady by accumulating inventories during slack periods with a view to meet

high demand during the peak season or the production could be curtailed during the slack season and increased during the peak season. If the policy is to keep production steady by accumulating inventories it will require higher Working Capital.

(d) Manufacturing process/length of production cycle

In manufacturing business, the requirements of Working Capital increase in direct proportion to length of manufacturing process. Longer the process period of manufacture, larger is the amount of Working Capital required. The longer the manufacturing time, the raw materials and other supplies have to be carried for a longer period in the process with progressive increment of labour and service costs before the finished product is finally obtained. Therefore, if there are alternative processes of production, the process with the shortest production period should be chosen.

(e) Seasonal variations

In certain industries raw material is not available throughout the year. They have to buy raw materials in bulk during the season to ensure an uninterrupted flow and process them during the entire year. A huge amount is, thus, blocked in the form of material inventories during such season, which gives rise to more Working Capital requirements. During the busy season, a firm required larger Working Capital than in the slack season.

(f) Working capital cycle

In a manufacturing concern, the Working Capital cycle starts with the purchase of raw material and end with the realisation of cash from the sale of finished products. This cycle involves purchase of raw materials and stores, its conversion into stocks of finished goods through work-in-progress with progressive increment of labour and service costs, conversion of finished stock into sales, debtors and receivables and ultimately realization of cash and this cycle continues again from cash to purchase of raw material and so on.

(g) Rate of stock turnover

There is a high degree of inverse co-relationship between the quantum of Working Capital and the velocity or speed with which the sales are effected. A firm having a high rate of stock turnover will need lower amount of Working Capital as compared to a firm having a low rate of turnover.

(h) Credit Policy

The credit policy of a concern in its dealings with debtors and creditors influence considerably the requirements of Working Capital. A concern that purchases its requirements on credit and sells its products/ services on cash requires lesser amount of Working Capital. A concern buying its requirements for cash and allowing credit to its customers, shall need larger amount of Working Capital as very huge amount of funds are bound to be tied up in debtors or bills receivables.

(i) Business cycle

Business cycle refers to alternate expansion and contraction in general business activity. In a period of boom i.e. when the business is prosperous, there is a need for larger amount of Working Capital due to increase in sales, rise in prices, optimistic expansion of business etc. In the times of depression i.e. when there is a down swing of this cycle, the business contracts, sales decline, difficulties are faced in collections from debtors and firms may have a large amount of Working Capital lying idle.

(j) Rate of growth of business

The Working Capital requirements of a concern increase with the growth and expansion of its business activities. Although, it is difficult to determine the relationship between the growth in the volume of business and the growth in the Working Capital of a business, yet it may be concluded that for normal rate of expansion in the volume of business, we may have retained profits to provide for more Working Capital but in fast growing concerns, we shall require larger amount of Working Capital.

(k) Earning capacity and dividend policy

Some firms have more earning capacity than others due to quality of their products, monopoly conditions etc. Such firms with high earning capacity may generate cash profits from operations and contribute to their Working Capital. The dividend policy of a concern also influences the requirements of its Working Capital. A firm that maintains a steady high rate of cash dividend irrespective of its generation of profits needs more Working Capital than the firm that retains larger part of its profits and does not pay so high rate of cash dividend.

(l) Price level changes

Changes in the price level also affect the Working Capital requirements. The rising prices will require the firm to maintain large amount of working capital as more funds will be required to maintain the same current assets. The effect of rising prices may be different for different firms, Some firms may be affected much while some others may not be affected at all by the rise in prices.

Q6. What are the characteristics of Working Capital ?

Ans :

The features of working capital distinguishing it from the fixed capital are as follows :

1. Short Term Needs

Working capital is used to acquire current assets which get converted into cash in a short period. In this respect it differs from fixed capital which represents funds locked in long term assets. The duration of the working capital depends on the length of production process, the time that elapses in the sale and the waiting period of the cash receipt.

2. Circular Movement

Working capital is constantly converted into cash which again turns into working capital. This process of conversion goes on continuously. The cash is used to purchase current assets and when the goods are produced and sold out; those current assets

are transformed into cash. Thus it moves in a circular away. That is why working capital is also described as circulating capital.

3. An Element of Permanency

Though working capital is a short term capital, it is required always and forever. As stated before, working capital is necessary to continue the productive activity of the enterprise. Hence so long as production continues, the enterprise will constantly remain in need of working capital. The working capital that is required permanently is called permanent or regular working capital.

4. An Element of Fluctuation

Though the requirement of working capital is felt permanently, its requirement fluctuates more widely than that of fixed capital. The requirement of working capital varies directly with the level of production. It varies with the variation of the purchase and sale policy; price level and the level of demand also. The portion of working capital that changes with production, sale, price etc. is called variable working capital.

5. Liquidity

Working capital is more liquid than fixed capital. If need arises, working capital can be converted into cash within a short period and without much loss. A company in need of cash can get it through the conversion of its working capital by insisting on quick recovery of its bills receivable and by expediting sales of its product. It is due to this trait of working capital that the companies with a larger amount of working capital feel more secure.'

6. Less Risky

Funds invested in fixed assets get locked up for a long period of time and can not be recovered easily. There is also a danger of fixed assets like machinery getting obsolete due to technological innovations. Hence investment in fixed capital is comparatively more risky. As against this, investment in current assets is less risky as it is a short term investment. Working capital involves more of physical risk only, and that too is limited.

Working capital involves financial or economic risk to a much less extent because the variations of product prices are less severe generally. Moreover, working capital gets converted into cash again and again; therefore, it is free from the risk arising out of technological changes.

7. **Special Accounting System not Needed**

Since fixed capital is invested in long term assets, it becomes necessary to adopt various systems of estimating depreciation. On the other hand working capital is invested in short term assets which last for one year only. Hence it is not necessary to adopt special accounting system for them.

3.1.4 Sources and Levels

Q7. Explain the various sources and levels of working capital.

(OR)

What are the sources of working capital finance.

Ans :

(Jan.-20, Imp.)

The working capital requirements of a concern can be classified as :

- (a) Permanent or Fixed working capital requirements.
- (b) Temporary or Variable working capital requirements.

In any concern, a part of the working capital investments are as permanent investments in fixed assets.

This is so because there is always a minimum level of current assets which are continuously required by the enterprise to carry out its day-to-day business operations and this minimum cannot be expected to reduce at time. This minimum level of current assets gives rise to permanent or fixed working capital as this part of working capital is permanently blocked in current assets.

Similarly, some amount of working capital may be required to meet the seasonal demands and some special exigencies such as rise in prices, strikes, etc. this proportion of working capital gives rise to temporary or variable working capital which cannot be permanently employed gainfully in business.

The fixed proportion of working capital should be generally financed from the fixed capital sources while the temporary or variable working capital requirements of a concern may be met from the short term sources of capital.

The various sources for the financing of working capital are as follows :

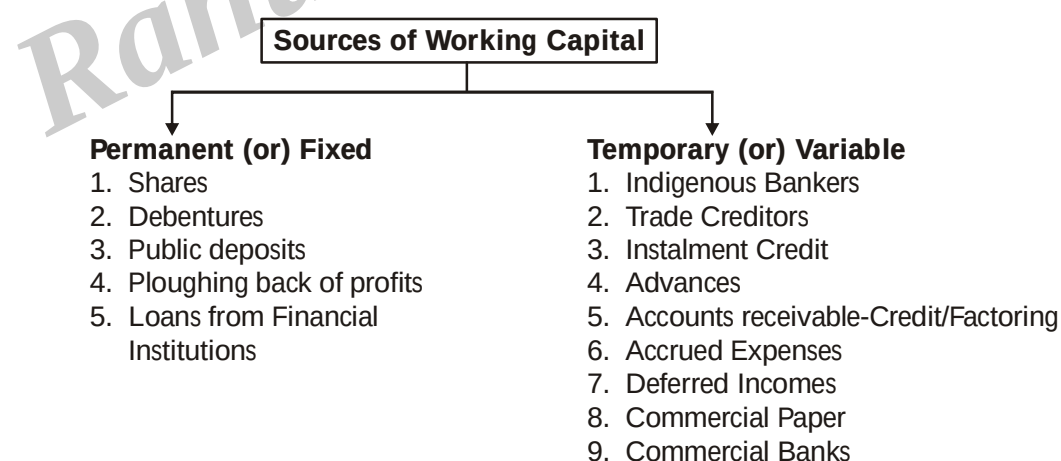


Fig.: Sources and Levels

(A) **Financing of Permanent / Fixed (or) Long-term Working Capital**

Permanent working capital should be financed in such a manner that the enterprise may have its interrupted use for a sufficiently long period. There are five important sources of permanent or long-term working capital.

1. Shares

Issue of shares is the most important source for raising the permanent or long-term capital. A company can issue various types of shares as equity shares, preference shares and deferred shares. According to the Companies Act, 1956, however, a public company cannot issue deferred shares.

Preference shares carry preferential rights in respect of dividend at a fixed rate and in regard to the repayment of capital 'the time of winding up the company. Equity shares do not have any fixed commitment charge and the dividend in these shares is to be paid subject to the availability of sufficient profits. As far as possible, a company should raise the maximum amount of permanent capital by the issue of shares.

2. Debentures

A debenture is an instrument issued by the company acknowledging its debt to its holder. It is also an important method of raising long-term or permanent working capital. The debenture-holders are the creditors of the company. A fixed rate of interest is paid on debentures. The interest on debentures is a charge against profit and loss account. The debentures are generally given floating charge on the assets of the company.

When the debentures are secured they are paid on priority to other creditors. The debentures may be of various kinds such as simple, naked or unsecured debentures, secured or mortgaged debentures, redeemable debentures, irredeemable debentures, convertible debentures and non-convertible debentures. The debentures as a source of finance have a number of advantages both to the investors and the company. Since interest on debentures have to be paid on certain predetermined intervals at a fixed rate and also debentures get priority on repayment at the time of liquidation, they are very well suited to cautious investors. The firm issuing debentures also enjoys a number of benefits such as trading on equity, retention of control, tax benefits, etc.

3. Public Deposits

Public deposits are the fixed deposits accepted by a business enterprise directly from the public. This source of raising short term and medium-term finance was very popular in the absence of banking facilities.

In the past, generally, public deposits were accepted by textile industries in Ahmedabad and Bombay for periods of 6 months to 1 year. But now-a-days even long-term deposits for 5 to 7 years are accepted by the business houses.

Public deposits as a source of finance have a large number of advantages such as very simple and convenient source of finance, taxation benefits, trading on equity, no need of securities and an inexpensive source of finance. But it is not free from certain dangers such as, it is uncertain, unreliable, unsound and inelastic source of finance. The Reserve Bank of India has also laid down certain limits on public deposits. Non-banking concerns cannot borrow by way of public deposits more than 25% of its paid-up capital and free reserves.

4. Ploughing Back of Profits

Ploughing back of profits means the reinvestments by concern of its surplus earnings in its business. It is an internal source of finance and is not suitable for an established firm for its expansion, modernisation and replacement etc.

This method of finance has a number of advantages as it is the cheapest rather cost-free source of finance ; there is no need to keep securities ; there is no dilution of control; it ensures stable dividend policy and gains confidence of the public. But excessive resort to ploughing back of profits may lead to monopolies, misuse of funds, over capitalization and speculation, etc.

5. Loans from Financial Institutions

Financial institutions such as Commercial Banks, Life Insurance Corporation, Industrial Finance Corporation of India, State Financial Corporations, State Industrial Development

Corporations, Industrial Development Bank of India, etc. also provide short-term, medium-term and long-term loans. This source of finance is more suitable to meet the medium-term demands of working capital. Interest is charged on such loans at a fixed rate and the amount of the loan is to be repaid by way of instalments in a number of years.

B) Financing of Temporary, Variable or Short-term Working Capital

The main source of short-term working capital are as follows :

1. Indigenous Bankers
2. Trade Credit
3. Instalment Credit
4. Advances
5. Accounts Receivable Credit or Factoring
6. Accrued Expenses
7. Deferred Incomes
8. Commercial Paper
9. Commercial Banks

1. Indigenous Bankers

Private money-lenders and other country bankers used to be the only source of finance prior to the establishment of commercial banks. They used to charge very high rates of interest and exploited the customers to the largest extent possible. Now-a-days with the development of commercial banks they have lost their monopoly. But even today some business houses have to depend upon indigenous bankers for obtaining loans to meet their working capital requirements.

2. Trade Credit

Trade credit refers to the credit extended by the suppliers of goods in the normal course of business. As present day commerce is built upon credit, the trade credit arrangement of a firm with its suppliers is an important source of short-term finance. The credit-worthiness of a firm and the confidence of its suppliers are the main basis of securing trade credit. It

is mostly granted on an open account basis whereby supplier sends goods to the buyer for the payment to be received in future as per terms of the sales invoice. It may also take the form of bills payable whereby the buyer signs a bill of exchange payable on a specified future date.

When a firm delays the payment beyond the due date as per the terms of sales invoice, it is called stretching accounts payable. A firm may generate additional short-term finances by stretching accounts payable, but it may have to pay penal interest charges as well as to forgo cash discount. If a firm delays the payment frequently, it adversely affects the credit worthiness of the firm and it may not be allowed such credit facilities in future.

The main advantages of trade credit as a source of short-term finance include :

- i) It is an easy and convenient method of finance.
- ii) It is flexible as the credit increases with the growth of the firm.
- iii) It is informal and spontaneous source of finance.

However, the biggest disadvantage of this method of finance is charging of higher prices by the suppliers and loss of cash discount.

3. Instalment Credit

This is another method by which the assets are purchased and the possession of goods is taken immediately but the payment is made in instalments over a pre-determined period of time. Generally, interest is charged on the unpaid price or it may be adjusted in the price. But, in any case, it provides funds for sometime and is used as a source of short-term working capital by many business houses which have difficult fund position.

4. Advances

Some business houses get advances from their customers and agents against orders and this source is a short-term source of finance for them. It is a cheap source of finance and in order to minimise their investment in working

capital, some firms having long production cycle, specially the firms manufacturing industrial products prefer to take advances from their customers.

5. Factoring or Accounts Receivable Credit

Another method of raising short-term finance is through accounts receivable credit offered by commercial banks and factors. A commercial bank may provide finance by discounting the bills or invoices of its customers. Thus, a firm gets immediate payment for sales made on credit. A factor is a financial institution which offers services relating to management and financing of debts arising out of credit sales.

Factoring is becoming popular all over the world on account of various services offered by the institutions engaged in it. Factors render services varying from bill discounting facilities offered by commercial banks to a total take over of administration of credit sales including maintenance of sales ledger, collection of accounts receivables, credit control and protection from bad debts, provision of finance and rendering of advisory services to their clients. Factoring may be on a recourse basis, where the risk of bad debts is borne by the client, or on a non-recourse basis, where the risk of credit is borne by the factor.

At present, factoring in India is rendered by only a few financial institutions on a recourse basis. However, the Report of the Working Group on Money Market (Vaghul Committee) constituted by the Reserve Bank of India has recommended that banks should be encouraged to set up factoring divisions to provide speedy finance to the corporate entities.

In spite of many services offered by factoring, it suffers from certain limitations. The most critical fall outs of factoring include; (i) the high cost of factoring as compared to other sources of short-term finance, (ii) the perception of financial weakness about the firm availing factoring services, and

(iii) adverse impact of tough stance taken by factor, against a defaulting buyer, upon the borrower resulting into reduced future sales.

6. Accrued Expenses

Accrued expenses are the expenses which have been incurred but not yet due and hence not yet paid also. These simply represent a liability that a firm has to pay for the services already received by it. The most important items of accruals are wages and salaries, interest, and taxes. Wages and salaries are usually paid on monthly, fortnightly or weekly basis for the services already rendered by employees.

The longer the payment-period, the greater is the amount of liability towards employees or the funds provided by them. In the same manner, accrued interest and taxes also constitute a short-term source of finance. Taxes are paid later collection and in the intervening period serve as a good source of finance. Even income-tax is paid periodically much after the profits have been earned. Like taxes, interest is also paid periodically while the funds are used continuously by a firm. Thus, all accrued expenses can be used as a source of finance.

The amount of accruals varies with the change in the level of activity of a firm. When the activity level expands, accruals also increase and hence they provide a spontaneous source of finance. Further, as no interest is payable on accrued expenses, they represent a free source of financing.

However, it must be noted that it may not be desirable or even possible to postpone these expenses for a long period. The payment period of wages and salaries is determined by provisions of law and practice in industry. Similarly, the payment dates of taxes are governed by law and delays may attract penalties. Thus, we may conclude that frequency and magnitude of accruals is beyond the control of managements. Even then, they serve as a spontaneous, interest free, limited source of short-term financing.

7. Deferred Incomes

Deferred incomes are incomes received in advance before supplying goods or services. They represent funds received by a firm for which it has to supply goods or services in future. These funds increase the liquidity of a firm and constitute an important source of short-term finance. However, firms having great demand for its products and services, and those having good reputation in the market can demand deferred incomes.

8. Commercial Paper

Commercial paper represents unsecured promissory notes issued by firms to raise short-term funds. It is an important money market instrument in advanced countries like U.S.A. In India, the Reserve Bank of India introduced commercial paper in the Indian money market on the recommendations of the Working Group on Money Market (Vaghul Committee). But only large companies enjoying high credit rating and sound financial health can issue commercial paper to raise short-term funds.

The Reserve Bank of India has laid down a number of conditions to determine eligibility of a company for the issue of commercial paper. Only a company which is listed on the stock exchange, has a net worth of at least Rs. 10 crores and a maximum permissible bank finance of Rs. 25 crores can issue commercial paper not exceeding 30 per cent of its working capital limit.

The maturity period of commercial paper, in India, mostly ranges from 91 to 180 days. It is sold at a discount from its face value and redeemed at face value on its maturity. Hence, the cost of raising funds, through this source, is a function of the amount of discount and the period of maturity and no interest rate is provided by the Reserve Bank of India for this purpose. Commercial paper is usually bought by investors including banks, insurance companies, unit trusts and firms to invest surplus funds for a short-period. A credit rating agency, called CRISIL, has been set up in India by ICICI and UTI to rate commercial papers.

Commercial paper is a cheaper source of raising short-term finance as compared to the bank credit and proves to be effective even during period of tight bank credit. However, it can be used as a source of finance only by large companies enjoying high credit rating and sound financial health. Another disadvantage of commercial paper is that it cannot be redeemed before the maturity date even if the issuing firm has surplus funds to pay back.

9. Working Capital Finance by Commercial Banks

Commercial banks are the most important source of short-term capital. The major portion of working capital loans are provided by commercial banks. They provide a wide variety of loans tailored to meet the specific requirements of a concern.

The different forms in which the banks normally provide loans and advances are as follows :

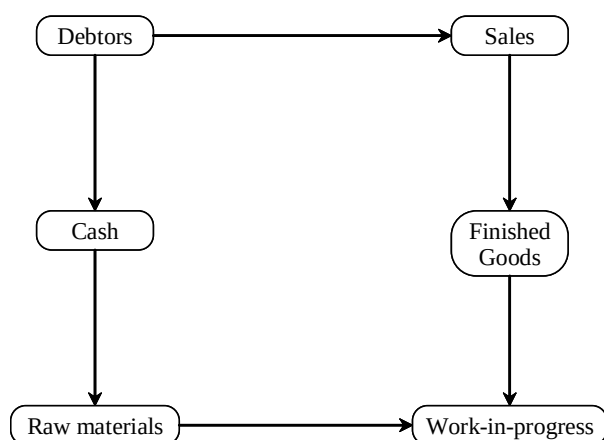
- (a) Loans
- (b) Cash Credits
- (c) Overdrafts
- (d) Purchasing and Discounting of bills.

3.1.5 Estimation of Working Capital Requirements**Q8. Discuss in detail about operating cycle.****(OR)**

How do you estimate the working capital requirements of the firm?

Ans : (Jan.-18)

The operating cycle implies the stages or processes through which the raw materials are processed to get the final product. If the process is lengthy and takes long time to get the finished products, the requirements of working capital will be much larger than that of a unit which has a relatively low operating cycle. The shortest manufacturing process will minimise the investment in the form of work-in-progress.

Operating cycle of a manufacturing firm**Permanent and Variable Working Capital**

In the similar way, the working capital requirements (current assets) of the concern can be divided into two portions – (i) permanent portion and (ii) variable portion.

i) Permanent Working Capital : The total fund requirements (both on fixed capital and working capital) increases with increased production over a period of time. A portion of the working capital remains the same throughout. In other words, there is a limit below which the current assets do not fall. This portion is the permanent working capital. This minimum level or lowest level of current assets that a company should hold. It is known as the 'hard core' or 'fixed' working capital. The Dehejia Committee and the Tandon Committee have referred to the permanent working capital as the 'core current assets'.

ii) Fluctuating Working Capital : There is a variable portion of current assets, over and above the permanent assets. It varies with production plans, seasonality etc. This portion, also known as the 'fluctuating' or 'temporary' working capital. It can be estimated in advance. The general principle is that the fixed asset and the permanent portion of the working capital should be financed by capital and reserves, long term debt and permanent portion of the current liabilities. The variable portion of working capital can be financed by short-term funds.

iii) Financing of Working Capital : The Tandon Committee recommended that the core portion of current assets should be financed by the company out of equity or by raising long term debt. But will recently, companies continued to rely on commercial banks as the major suppliers of working capital. However, due to tightening of bank credit and encouragement given to companies to tap capital market, companies have taken to issuing debentures for financing permanent working capital.

Judicious mix of short-term and long-term finances for working capital requirements has several advantages. If variable working capital is financed on a short-term basis, the company pays interest on funds only during the period of time they are needed. This reduces the interest cost. By utilising the long-term funds for permanent working capital the company ensures stability. The loan need not be repaid at frequent intervals. The repayment over a period can be planned depending on the surplus generated. The liquidity of the concern is increased.

Q9. Explain the different methods of working capital ?

Ans :

Working capital is an essential element of every business. It is necessary for a financial manager to estimate an adequate amount of working capital which is to be maintained in the business. Working capital requirements can be estimated with the help of following methods.

1. Percentage of Sales Method

The percentage of sales method is used to estimate the level of working capital requirement by considering past record. A relationship between sales and working capital is calculated for determining the quantum of working capital. This method is simple and easily understood but it is not appropriate in all situations. It is used for identifying short term changes in working capital in future.

2. Regression Analysis Methods

The regression analysis method is one of the statistical methods used for estimating working

capital requirements. In this method the average relationship between sales and working capital and its various components is identified with the help of least squares method and this relationship is expressed in following equation,

$$y = a + bx$$

Where,

a – Fixed component

b – Variable component

x – Sales

y – Inventory

n – Number of observation.

In order to find the values of a and b, firm needs to find the solution for the equation.

$$y = na + bx$$

3. Operating Cycle Approach

Requirements of working capital of a firm can be estimated by multiplying the duration of the operating cycle by cost of operations. The time period for completion of operating cycle is evaluated by,

$$O = R + W + F + A + P$$

Where,

O - Time period of operating cycle

R - Duration of raw material

W - Duration of work in progress

F - Duration of finished goods inventory

A - Duration of accounts receivable

P - Duration of accounts payable.

Formula to calculate the duration of raw material is,

$$R = \frac{\text{Average stock of raw materials}}{\text{Raw material consumption per day}}$$

Formula to calculate the duration of work in progress is,

$$W = \frac{\text{Average work-in-progress inventory}}{\text{Average production per day}}$$

Formula to calculate the duration of finished goods is,

$$F = \frac{\text{Average finished goods inventory}}{\text{Per day sale of goods}}$$

Formula to calculate the duration of accounts receivable is,

$$A = \frac{\text{Average book debts}}{\text{Average credit sales per day}}$$

Formula to calculate the duration of accounts payable is,

$$P = \frac{\text{Average trade creditors}}{\text{Average credit purchases per day}}$$

Formula to calculate operating cycle

$$\text{Operating cycle} = \text{ICP} + \text{ARP}$$

where,

OC = Operating Cycle

ICP = Inventory Conversion Period

ARP = Accounts Receivable Period

$$\text{ICP} = \frac{\text{Avg. Inventory}}{\text{Cost of goods sold} \div 365}$$

$$\text{ARP} = \frac{\text{Avg. Accounts Receivable}}{\text{Sales} \div 365}$$

4. Ratio of Fixed Investment

Every firm must maintain some amount of investment. In this method working capital requirement is calculated as a percentage of fixed investment. Rate of return of firm is also considered while estimating working capital in this method,

Rate to return

$$= \frac{\text{PBIT}}{\text{Net fixed investment} + \text{Working capital}}$$

Q10. Explain the advantages and disadvantages of working capital.

Ans :

Advantages

The main advantages of maintaining adequate amount of working capital are as follows:

1. Cash Discount

If a proper cash balance is maintained, the business can avail the advantage of cash discount by paying cash for the purchase of

raw materials and merchandise. It will result in reducing the cost of production.

2. Creates a Feeling of Security and Confidence

The proprietor or officials or management of a concern are quite carefree, if they have proper working capital arrangements because they need not worry for the payment of business expenditure or creditors. Adequate working capital creates a sense of security, confidence and loyalty, not only throughout the business itself, but also among its customers, creditors and business associates.

3. 'Must' for Maintaining Solvency and Continuing Production

In order to maintain the solvency of the business, it is but essential that the sufficient amount of fund is available to make all the payments in time as and when they are due. Without ample working capital, production will suffer, particularly in the era of cut throat competition, and a business can never flourish in the absence of adequate working capital.

4. Sound Goodwill and Debt Capacity

It is common experience of all prudent businessmen that promptness of payment in business creates goodwill and increases the debt of the capacity of the business. A firm can raise funds from the market, purchase goods on credit and borrow short-term funds from bank, etc. If the investor and borrowers are confident that they will get their due interest and payment of principal in time.

5. Easy Loans from the Banks

An adequate working capital i.e. excess of current assets over current liabilities helps the company to borrow unsecured loans from the bank because the excess provides a good security to the unsecured loans, Banks favour in granting seasonal loans, if business has a good credit standing and trade reputation.

6. Distribution of Dividend

If company is short of working capital, it cannot distribute the good dividend to its shareholders inspite of sufficient profits. Profits are to be retained in the business to make up the deficiency of working capital. On the

other contrary, if working capital is sufficient, ample dividend can be declared and distributed. It increases the market value of shares.

7. Exploitation of Good Opportunity

In case of adequacy of capital in a concern, good opportunities can be exploited e.g., company may make off-season purchases resulting in substantial savings or it can fetch big supply orders resulting in good profits.

8. Meeting Unseen Contingency

Depression shoots the demand of working capital because stock piling of finished goods become necessary. Certain other unseen contingencies e.g., financial crisis due to heavy losses, business oscillations, etc. can easily be overcome, if company maintains adequate working capital.

9. High Morale

The provision of adequate working capital improves the morale of the executive because they have an environment of certainty, security and confidence, which is a great psychological, factor in improving the overall efficiency of the business and of the person who is at the helm of affairs in the company.

10. Increased Production Efficiency

A continuous supply of raw material, research programme, innovations and technical development and expansion programmes can successfully be carried out if adequate working capital is maintained in the business. It will increase the production efficiency, which will, in turn increases the efficiency and morale of the employees and lower costs and create image among the community.

11. Regular Supply of Raw Materials

Sufficient working capital ensures regular supply of raw materials and continuous production.

12. Regular Payment of Salaries, Wages and Other Day-to-Day Commitments

A company which has ample working capital can make regular payment of salaries, wages and other day-to-day commitments which raises the morale of its employees, increases their efficiency, reduces wastage's and costs and enhances production and profits.

Disadvantages

The disadvantages suffered by a company with excessive working capital are as follows :

1. Heavy Investment in Fixed Assets

A concern may invest heavily in their fixed asset which is not justified by actual sales. This may create situation of over capitalisation.

2. Reckless Purchase of Materials

Inventory is purchased recklessly which results in dormant slow moving and obsolete inventory. At the same time it may increase the cost due to mishandling, waste, theft, etc.

3. Speculative Tendencies

Speculative tendencies may increase and if profit is increased dividend distribution will also increase. This will hamper the image of a concern in future when speculative loss may start.

4. Liberal Credit

Due to liberal credit, size of accounts receivables will also increase. Liberal credit facility can increase bad debts and wrong practices will start, regarding delay in payments.

5. Carelessness

Excessive working capital will lead to carelessness about costs which will adversely affect the profitability.

Q11. Explain the proforma of working capital.

Ans :

**Proforma of Working Capital Requirements
Statement of Working Capital Estimation**

Particulars	Amount (₹)	Amount (₹)
A. Estimation of Current Assets :		
i) Raw materials		XXX
ii) Work-in-process		
Raw materials (full cost)	XXX	
Direct labour (to the extent of completed stage)	XXX	
Overheads (to the extent of completed stage)	XXX	XXX
iii) Finished goods inventory		XXX
iv) Debtors		XXX
v) Cash balance required		
Total Current Assets (A)		XXX
B. Estimation of Current Liabilities :		
i) Creditors		XXX
ii) Expenses		XXX
iii) Overheads		XXX
Labour		XXX
Total Current Liabilities (B)		XXX
C. Working Capital (A-B)		XXX
Add: Contingency (Percentage on working capital)		XXX
D. Working Capital Required		XXXX

PROBLEMS ON WORKING CAPITAL MANAGEMENT

1. A proforma cost sheet of a company provides the following particulars :

Particulars	Amount per unit (Rs.)
Raw materials cost	100.00
Director labour cost	37.50
Overheads cost	75.00
Total cost	212.50
Profit	37.50
Selling Price	250.00

The company keeps raw material in stock, on average for one month; work-in-progress, on an average for one week; and finished goods in stock, on an average for two weeks. The credit allowed by suppliers is three weeks and company allows four weeks credit to its debtors. The lag in payment of wages is one week and lag in payment of overhead expenses in two weeks.

The company sells one-fifth of the output against cash and maintains cash-in-hand and at bank put together at Rs. 37,500.

Required : Prepare a statement showing estimate of Working Capital needed to finance an activity level of 1,30,000 units of production. Assume that production is carried on evenly throughout the year, wages and overheads accrue similarly and a time period of 4 weeks is equivalent to a month. Work-in-progress stock is 80% complete in all respects.

Sol.

Statement showing the estimate of working capital needed

Particulars	Rs.	Rs.
Current Assets :		
(i) Stock of raw materials (1 month) $1,30,000 \times 100 \times \frac{4}{52}$		10,00,000
(ii) Work-in-progress (1 week) :		
Raw materials $1,30,000 \times 100 \times \frac{1}{52} \times \frac{80}{100}$	2,00,000	
Direct labour $1,30,000 \times 37.50 \times \frac{1}{52} \times \frac{80}{100}$	75,000	
Overheads $1,30,000 \times 75 \times \frac{1}{52} \times \frac{80}{100}$	1,50,000	4,25,000

(iii) Stock of finished goods (2 weeks) :		
Raw materials $1,30,000 \times 100 \times \frac{2}{52}$	5,00,000	
Direct labour $1,30,000 \times 37.50 \times \frac{2}{52}$	1,87,500	
Overheads $1,30,000 \times 75 \times \frac{2}{52}$	3,75,000	10,62,500
(iv) Debtors at cost (4 weeks) $1,30,000 \times \frac{4}{5} \times 212.50 \times \frac{4}{52}$		
(As 1/5th of output is sold against cash only $\frac{4}{5}$ of output is considered)		17,00,000
(v) Cash in hand at bank (as given)		37,500
Total Current Assets (A)		42,25,000
Less : Current Liabilities		
(i) Creditors for raw material purchases		
(3 weeks) $1,30,000 \times 100 \times \frac{3}{52}$		7,50,000
(ii) Wages outstanding (1 week) $1,30,000 \times 37.50 \times \frac{1}{52}$		93,750
(iii) Lag in payment of overheads (2 weeks) $1,30,000 \times 75 \times \frac{2}{52}$		3,75,000
Total Current Liabilities (B)		12,18,750
Net Working Capital (A – B)		30,06,250

2. Determine the working required to finance a level of activity of 1,80,000 units of output for a year. The cost structure is as under :

Particulars	Cost per unit (Rs.)
Raw Materials	20
Direct Labour	5
Overheads (including depreciation of Rs. 5)	15
Total cost	40
Profit	10
Selling Price	50

Additional Information :

- Minimum desired cash balance is Rs. 20,000
- Raw materials are held in stock, on an average, for 2 months
- Work-in-progress (assume 50 per cent completion stage) will approximate to half-a-month production
- Finished goods remain in warehouse, on an average for a month
- Suppliers for materials extend a month's credit and debtors are provided 2 months credit. The cash sales are 25 per cent of total sales
- There is a time lag in payment of wages for a month and half-a-month in the case of overheads.

Sol.

(Imp.)

Estimation of Working Capital

Particulars	Amount (in Rs.)	Amount (in Rs.)
A. Estimation of Current Assets		
Raw materials : $(1,80,000 \times 20 \times 2 / 12)$	6,00,000	
Work-in-process: $\left(\frac{1,80,000 \times 35 \times 0.5}{12} \times \frac{50}{100} \right)$	1,31,250	
Finished Goods: $(1,80,000 \times 35 \times 1) / 12)$	5,25,000	12,56,250
Debtors (75% of total units produced): $(1,35,000 \times 35 \times 21 / 12)$		7,87,500
Cash Balance		20,000
Total Current Assets (A)		20,63,750
B. Estimation of Current Liabilities		
Suppliers: $(1,80,000 \times 20 \times 1 / 12)$		3,00,000
Wages: $(1,80,000 \times 5 \times 1 / 12)$		75,000
Overheads: $(1,80,000 \times 10 \times 0.5 / 12)$		75,000
Total Current Liabilities (B)		4,50,000
C. Working capital (A – B)		16,13,750

3. A Proforma cost sheet of R.R. & Co. Ltd., provides the following information. You are required to estimate the working capital needed to finance a level of activity of 52,000 units of production.

Particulars	Cost per unit (Rs.)
Raw materials	40
Direct labour	15
Overheads (excluding depreciation)	30
Total cost	85
Profit	30
Selling price	115

Additional information:

Average raw materials in stock: one month; average materials-in-process (RMs 100% and remaining 50 per cent completion stage): half a month; average finished goods in stock: one month.

Credit allowed by suppliers: one month; credit allowed to customers: two months; Time lag in payment of wages: one-and half-weeks; time lag in payment of overhead expenses: one month; half of the sales is on cash basis. Cash balance is expected to be Rs. 12,500. You may assume that production is carried on evenly throughout the year and wages and overhead expenses accrue similarly. 50% sales are on credit.

Sol.

Estimation of Working Capital

Particulars	Amount (in Rs.)	Amount (in Rs.)
A. Estimation of Current Assets		
(i) Raw materials inventory: one month: $\left(52000 \times 40 \times \frac{4}{52} \right)$		1,60,000
(ii) Work-in-process inventory: Half a month		
Raw materials $(52,000 \times 40 \times 2 / 52) =$	80,000	
Direct labour $(52,000 \times 7.5 \times 2 / 52) =$	15,000	
Overheads $(52,000 \times 15 \times 2 / 52) =$	30,000	
		1,25,000
(iii) Finished goods inventory: one month: $(52,000 \times 85 \times 4/52)$		3,40,000
(iv) Debtors: two months: $(26,000 \times 85 \times 8/52)$		3,40,000
(c) Cash balance required		12,500
Total Current Assets (A)		9,77,500

B. Estimation of Current Liabilities		
(i) Creditors: one month : $(52,000 \times 40 \times 4/52)$		1,60,000
(ii) Expenses: Labour $\left(52000 \times 15 \times \frac{1.5}{52}\right) =$	22,500	
Overheads $\left(52000 \times 30 \times \frac{4}{52}\right) =$	1,20,000	1,42,500
Total current liabilities (B)		3,02,500
Working capital (A – B)		6,75,000
Add: Contingency		Nil
Net Working Capital		6,75,000

4. While preparing a project report on behalf of a client you have collected the following information. Estimate the working capital required (for the level of activity 1,50,000 units) for the firm after adding 10 per cent contingency. You may assume that production is carried on evenly throughout the year and wages and overhead expenses accrue similarly.

Particulars	Cost per unit (Rs.)
Raw materials	38.5
Direct labour	11.8
Overheads (including depreciation Rs. 5)	32.0
Total Cost	82.3
Profit	17.7
Selling Price	100

Additional Information

Average raw materials in stock: four weeks; average materials-in-process (RMs 100% and remaining 50 per cent completion stage): Half of month; average finished goods in stock: four weeks; credit allowed by suppliers: one month; credit allowed to debtors: eight weeks; lag in payment of wages: two weeks. Cash at bank is expected to be Rs. 1,00,000. All sales are credit sales.

Sol.

Estimation of Working Capital

Particulars	Amount (in Rs.)	Amount (in Rs.)
A. Estimation of Current Assets		
(i) Raw materials inventory : four weeks $(1,50,000 \times 38.5 \times 4 / 52)$		4,44,230.77
(ii) Work-in-process inventory: Half a month		
Raw materials $(1,50,000 \times 38.5 \times 2/52)$	2,22,115.38	
Direct labour $(1,50,000 \times 5.9 \times 2/52)$	34038.46	
Overheads $(1,50,000 \times 13.5 \times 2/52)$	77884.62	3,34,038.46

(iii) Finished goods inventory: one month: $(1,50,000 \times 77.3 \times 4/52)$		8,91,923.07
(iv) Debtors: two months: $(1,50,000 \times 77.3 \times 8/52)$		17,83,846.1
(v) Cash balance required		1,00,000
Total Current Assets (A)		35,54,038.4
B. Estimation of Current Liabilities		
(i) Creditors: one month: $(1,50,000 \times 38.5 \times 4/52)$		4,44,230.76
(ii) Expenses: Wages $(1,50,000 \times 11.8 \times 2/52)$		68,076.92
Total Current Liabilities (B)		5,12,307.68
Working Capital (A – B)		30,41,730
Add : 10% Contingency		30,4173
Net Working Capital		33,45,903

Computation of overheads per unit : Overhead cost per unit Rs. 32 less depreciation Rs. 5 = Rs. 27

5. You are given the following estimates for estimating the working capital requirements of a business and you are instructed to add 10% to your computed figure to allow for cormgenries.

Particulars	Rs.
i) Amount blocked up for stocks	5,000
Stock of finished goods	8,000
ii) Average Credit given:	
Inland Sales (6 weeks Credit)	3,12,000
Export Sales (1½ weeks Credit)	78,000
iii) Lag in payment of outgoings:	
Wages (1½ weeks)	2,60,000
Stocks of materials (1½ month)	48,000
Rent (6 months)	10,000
Clerical Staff (½ month)	62,400
Manager (½ month)	4,800
Other (1½ month)	48,000
iv) Payment in Advance	
Sundry expenses paid quarterly in advance	8,000

Sol.

(Jan.-20)

Statement Showing Working Capital Requirement

Particulars	Rs.
Current Assets	
(i) (a) Amount blocked up for stocks	5,000
(b) Stock of finished goods	8,000
(ii) (a) Inland sales $\left(3,12,000 \times \frac{6}{52}\right)$	36,000
(b) Export sales $\left(78,000 \times \frac{1.5}{52}\right)$	2,250
(iii) Prepaid expenses $\left(8,000 \times \frac{3}{12}\right)$	2,000
Total (A)	53,250
Current Liabilities	
(a) Wages $\left(2,60,000 \times \frac{1.5}{52}\right)$	7,5000
(b) Stock $\left(48,000 \times \frac{1.5}{12}\right)$	6,000
(c) Rent $\left(10,000 \times \frac{6}{12}\right)$	5,000
(d) Clinical Staff $\left(62,400 \times \frac{0.5}{12}\right)$	2,600
(e) Manager $\left(4,800 \times \frac{0.5}{12}\right)$	2,000
(f) Other $\left(48,000 \times \frac{1.5}{12}\right)$	6,000
Total (B)	29,100
Working Capital (A – B)	24,150
(+) 10% Margin of contingencies (24150 × 10%)	2,415
Net working capital	26,565

6. From the following details, you are required to estimate an amount of working capital for the production of 300000 units per annum.

Cost Elements	Per Unit (Rs.)
Raw materials	20
Direct Labour	5
Overheads	15
Total	40
Profit	10
Selling price	50

- (i) Raw materials are held in stock for two months
- (ii) Work-in-process will be half months production
- (iii) Finished goods remain in warehouse for a month
- (iv) Suppliers of materials extend one month credit
- (v) Two months credit is allowed to customers
- (vi) A minimum cash balance of Rs. 25,000 is to be maintained.

Sol :

(June-16)

Statement showing estimation of working capital requirement

Particulars	Amount	Amount
Current Assets		
Rawmaterial $(3,00,000 \times 20 \times 2/12)$	10,00,000	
Work-in-progress		
Rawmaterial $(3,00,000 \times 20 \times 0.5/12)$	2,50,000	
Direct labour $(3,00,000 \times 5 \times 0.5/12 \times 50\%)$	31,250	
Overheads $(3,00,000 \times 15 \times 0.5/12 \times 50\%)$	93750	
Finished goods $(3,00,000 \times 40 \times 1/12)$	10,00,000	23,75,000
Debtors $(3,00,000 \times 40 \times 2/12)$		
Cash		25,000
Total current Assets		24,00,000
Less : Current liabilities		
Creditors $(3,00,000 \times 20 \times 1/2)$		5,00,000
Net working capital		19,00,000

7. PQR Limited sells its products on a gross profit of 20% on sales. The following information is extracted from its annual accounts for the year ended 31st March, 2016

Particulars	Amount (Rs.)
Sales (3 months credit)	40,00,000
Raw Materials	12,00,000
Wages (15 days in arrears)	9,60,000
Manufacturing expenses (one month in arrears)	12,00,000
Administration expenses (one month in arrears)	4,80,000
Sales promotion expenses (payable half yearly in advance)	2,00,000

The company enjoys one month's credit from suppliers of a raw materials and maintains 2 months stock of raw materials and one and half months finished goods. Cash balance is maintained at Rs. 1,00,000 as a precautionary balance.

Assuming a 10% margin, find out the working capital requirements of PQR Limited. Cost of sales for computation of debtors and stock of finished goods may be taken at sales minus gross profit as per rate of gross profit given.

Sol.

(Dec.-16)

Statement showing the working capital requirement of PQR Ltd.

Particulars	Amount	Amount
Current Assets		
Stock of Raw material $\left(12,00,000 \times \frac{2}{12}\right)$		2,00,000
Stock of finished goods $\left(40,00,000 \times \frac{80}{100} \times \frac{3}{2} \times \frac{1}{12}\right)$		4,00,000
Debtors $\left(40,00,000 \times \frac{80}{100} \times \frac{3}{2}\right)$		8,00,000
Advance Payment of Sales Promotion Expenses $\left(2,00,000 \times \frac{6}{12}\right)$		1,00,000
Cash Balance		1,00,000
Total Current Assets (A) →		16,00,000
Creditors for raw materials $\left(12,00,000 \times \frac{1}{12}\right)$	1,00,000	
O/S Wages $\left(9,60,000 \times \frac{1}{24}\right)$	40,000	
O/S Mfg. Exp. $\left(12,00,000 \times \frac{1}{12}\right)$	1,00,000	
Administrative Expenses $\left(4,80,000 \times \frac{1}{12}\right)$	40,000	2,80,000
Total Current Liabilities (B) →		13,20,000
Net working capital (A – B)		
(+) 10% Margin for contingencies		1,32,000
Working capital		14,52,000

PROBLEMS ON OPERATING CYCLE

- 8 ABC Company provided the following information and requested you to compute operating cycle :

Sales : ` 3,000

Inventory: Opening ` 640, closing ` 475

Receivable: Opening ` 915; closing ` 975

Cost of goods sold: ` 2,675

Sol.

$$OC = ICP + ARP$$

$$\text{Inventory Convention Period} = \frac{(640 + 475) / 2}{(2,675 \div 365)} = \frac{557.5}{7.328} = 76 \text{ days}$$

$$\text{Accounts Receivable Period} = \frac{(915 + 975) / 2}{3,000 \div 365} = \frac{945}{8.219} = 114.97 \text{ days}$$

$$\text{Operating Cycle} = 74 \text{ days} + 115 \text{ days} = 189 \text{ days}$$

Operating Cycle 189 days indicates that ABC company takes (requires) 189 days to convert raw materials into cash. In other words, some amount of cash is blocked for 189 days, therefore there is a need to have working capital.

9. DP Mills Limited has the following information as for the year 2003.

Sales - ` 3782.79

Cost of Goods sold - ` 3444.47

Opening inventory - ` 856.25

Closing inventory ` 1037.73

Accounts Receivables : Opening - ` 852

Closing - ` 636.88

Accounts Payables : Opening: ` 832.96

Closing: ` 84689

Sol.

$$\text{Operating Cycle} = \text{Inventory conversion period} + \text{Accounts receivable period}$$

$$\text{Inventory Conversion Period} = \frac{\text{Average Inventory}}{\text{Cost of goods} \div 365}$$

$$\text{Average Inventory} = \frac{\text{Opening Inventory} + \text{Closing Inventory}}{2}$$

$$= \frac{856.25 + 1037.73}{2}$$

$$= 946.99$$

$$\text{Cost of goods sold} = 3444.47 \div 365 = 9.436$$

$$\text{Inventory conversion period} = \frac{946.99}{9.436} = 100.35$$

Accounts Receivable Period (ARP)

$$= \frac{\text{Average accounts receivable}}{\text{Sales} \div 365}$$

$$\frac{852 + 636.88 / 2}{3782.79 \div 365} = \frac{744.44}{10.36} = 71.85$$

$$\text{Operating Cycle} = 100.35 + 71.85 = 172.2 \text{ days.}$$

3.2 CASH MANAGEMENT

3.2.1 Nature of Cash

Q12. Explain about cash management.

Ans :

Introduction

Cash is one of the current assets of a business. It is needed at all times to keep the business going. A business concern should always keep sufficient cash for meeting its obligations. Any shortage of cash will hamper the operations of a concern and any excess of it will be unproductive. Cash is the most unproductive of all the assets. While fixed assets like machinery, plant, etc. and current assets such as inventory will help the business in increasing its earning capacity, cash in hand will not add anything to the concern. It is in this context that cash management has assumed much importance.

Cash is the important current asset for the operations of the business. Cash is the basic input needed to keep the business running on a continuous basis; it is also the ultimate output expected to be realised by selling the service or product manufactured by the firm. The firm should keep sufficient cash, neither more nor less. Cash shortage will disrupt the firm's manufacturing operations while excessive cash will simply remain idle, without contributing anything towards the firm's profitability. Thus, a major function of the financial manager is to maintain a sound cash position.

Cash is the money which a firm can disburse immediately without any restriction. The term cash includes coins, currency and cheques held by the firm, and balances in its bank accounts. Sometimes near-cash items, such as marketable securities or bank time deposits, are also included in cash. The basic characteristic of near-cash assets is that they can readily be converted into cash. Generally, when a firm has excess cash, it invests it in marketable securities. This kind of investment contributes some profit to the family.

Meaning

The term cash which refer to cash management is the ready currency to which all liquid assets can be reduced.

These are basically used in two sense.

1. Narrow sense and
2. Broader sense

1. **Narrow Sense :** The Narrow sense is used broadly to cover currency and generally accept equivalents of cash such as coins, currency notes cheques, bank drafts and demand deposit in bank.
2. **Broader Sense :** The Broader sense also include "Near Cash Assets" such as marketable securities and time deposits with banks. The main character is the securities or deposits can immediately be sold or converted into cash. These are also include the short term investment out lets for excess cash. Thus the term "Cash Management" is generally used for management of both cash and near cash assets.

3.2.2 Motives of Holding Cash

Q13. Discuss various motives of holding cash.

(OR)

State Motives for Holding Cash.

Ans : **(June-16, Imp.)**

The motives for holding cash are as follows:

- (a) **Transaction Motive:** A firm needs cash for making transaction in the day to day operations. The cash is needed to make purchases, pay expense, taxes, dividend etc. The cash need arise due to the fact that there is no complete synchronization between cash receipts and payments. Sometimes cash receipts exceed cash payment or vice versa. The transaction needs of cash can be anticipated because the expected payments in near future can be estimated. The receipts in future may also be anticipated but the things do not happen as desired. If more cash is needed for payments than receipts, it may be raised through bank overdraft. If there are more cash receipts than payments, it may be spent on marketable securities. The maturity of securities may be adjusted to the payments in future such as interest payment, dividend payment etc.

(b) **Precautionary Motive:** A firm is required to keep cash for meeting various contingencies. Though cash inflows and cash outflows are anticipated but there may be variations in these estimates. A firm should keep some cash for such contingencies or it should be in a position to raise finances at a short period. The cash maintained for contingency needs is not productive or it remains ideal. Such cash may be invested in short-period or low-risk marketable securities which may provide cash as and when necessary.

(c) **Speculative Motive:** The speculative motive relates to holding of cash for investing in profitable opportunities as and when they arise. Such opportunities do not come in a regular manner. These opportunities cannot be scientifically predicted but only conjectures can be made about their occurrence. Such opportunities can be availed of if a firm has cash balance with it. These transactions are speculative because prices may not move in a direction in which we suppose them to move. The primary motive of a firm is not to indulge in speculative transactions but such investments may be made at times.

3.2.3 Objectives of Cash Management

Q14. Explain the objective of cash management.

Ans :

The basic objectives of cash management are two-fold :

1. Meeting the Payment Schedule: In the normal course of business firms have to make payments of cash on a continuous and regular basis to suppliers of goods, employees and so on. At the same time, there is a constant inflow of cash through collections from debtors. A basic objective of cash management is to meet the payment schedule, i.e., to have sufficient cash to meet the cash disbursement needs of a firm. The importance of sufficient cash to meet the payment schedule can hardly be over-emphasized. The advantages of adequate cash are:

- i) It prevents insolvency or bankruptcy arising out of the inability of a firm to meet its obligations
- ii) The relationship with the bank is not strained;
- iii) It helps in fostering good relations with trade creditors and suppliers of raw materials, as prompt payment may help their own cash management;
- iv) A trade discount can be availed of if payment is made within the due date;
- v) It leads to a strong credit rating which enables the firm to purchase goods on favourable terms and to maintain its line of credit with banks and other resources of credit;
- vi) To take advantage of favourable business opportunities that may be available periodically;
- vii) Finally, the firm can meet unanticipated cash expenditure with a minimum of strain during emergencies, such as strikes, fires or a new marketing campaign by competitors. Keeping large cash balances, however, implies a high cost; the advantages of prompt payment of cash can well be realized by sufficient and not excessive cash.

2. Minimizing Funds Committed to Cash Balances: The second objective of cash management is to minimize cash balances. In minimizing the cash balances two conflicting aspects have to be reconciled. A high level of cash balances will, as shown above, ensure prompt payment together with all the advantages. But it also implies that large funds will remain idle, as cash is a non-earning asset and the firm will have to forego profits. A low level of cash balances, on the other hand, may mean failure to meet the payment schedule. The aim of cash management should be to have an optimal amount of cash balances.

3.2.4 Factors Determining Cash Need

Q15. What are the factors determining cash need ?

Ans :

The amount of cash for transaction requirements is predictable and depends upon a variety of factors which are follows:

1. **Credit Position of the Firm:** The credit position influences the amount of cash required in two distinct ways:
 - (i) If a firm's credit position is sound, it is not necessary to carry a large cash reserve for emergencies.
 - (ii) If a firm finances its inventory requirements with trade credit, its cash requirements are considerably smaller, since the firm can synchronize the credit terms it gives to its customers with the terms it receives.
2. **Status of Firm's Receivable:** The amount of time required for a firm to convert its receivable into cash also affects the amount of cash needed and of course, reduces total working capital employed. In other words, the longer the credit terms, the slower the turn over. When flow out is not synchronized with turn over, a firm must carry amounts of cash relatively larger than would otherwise be required.
3. **Status of Firm's Inventory Account:** The status of a firm's inventory account also affects the amount of cash tied up at any one time.
For example, if one business firm carries two months inventory on hand and another firm carries only one month's supply, the former has twice as much investment in inventory and will normally be called upon to maintain a larger investment in cash in order to finance its acquisition.
4. **Nature of Business Enterprise:** The nature of a firm's demand definitely affects the volume of cash required.

For example, a firm whose demand is volatile needs a relatively larger cash reserve than one whose demand is stable. Public utility firms exhibit stable demand where as firms that deal with high fashion merchandize or goods that tend to be 'faddish' are subject to high degrees of volatility.

5. **Management's Attitude Towards Risk:** A more conservative management will hold a larger cash reserve than one that is less conservative. The former usually demands more liquidity than the latter and consequently does not experience the same degree of efficiency. A generalization is made that the firm that effectively plans its working capital policies is less conservative than one that does little or no planning. The obvious conclusion is that planning allows the firm to predict its requirements more accurately, there by eliminating uncertainty, which is the basis for large cash reserves.
6. **Amount of Sales in Relation to Assets:** Another characteristic affecting the level of cash is the amount of sales in relation to assets. Firms with large sales relative to fixed assets are required to carry larger cash reserves. This is the result of having larger sums invested in inventories (particularly finished goods) and receivables. It should be remembered, however, that cash requirements do not increase in the same proportion as sales. The rule is that as sales increase, cash also increases but at a decreasing rate, it is impossible to determine to what extent each characteristic affects the total volume of cash, but these examples indicate that different types of businesses have different cash requirements.
7. **Cash Inflows and Cash Outflows:** Every firm has to maintain cash balance because its expected inflows and outflows are not always synchronized. The timings of the cash inflows may not always match with the timing of the outflows. Therefore, a cash balance is required to fill up the gap arising out of difference in timings and quantum of inflows and outflows.

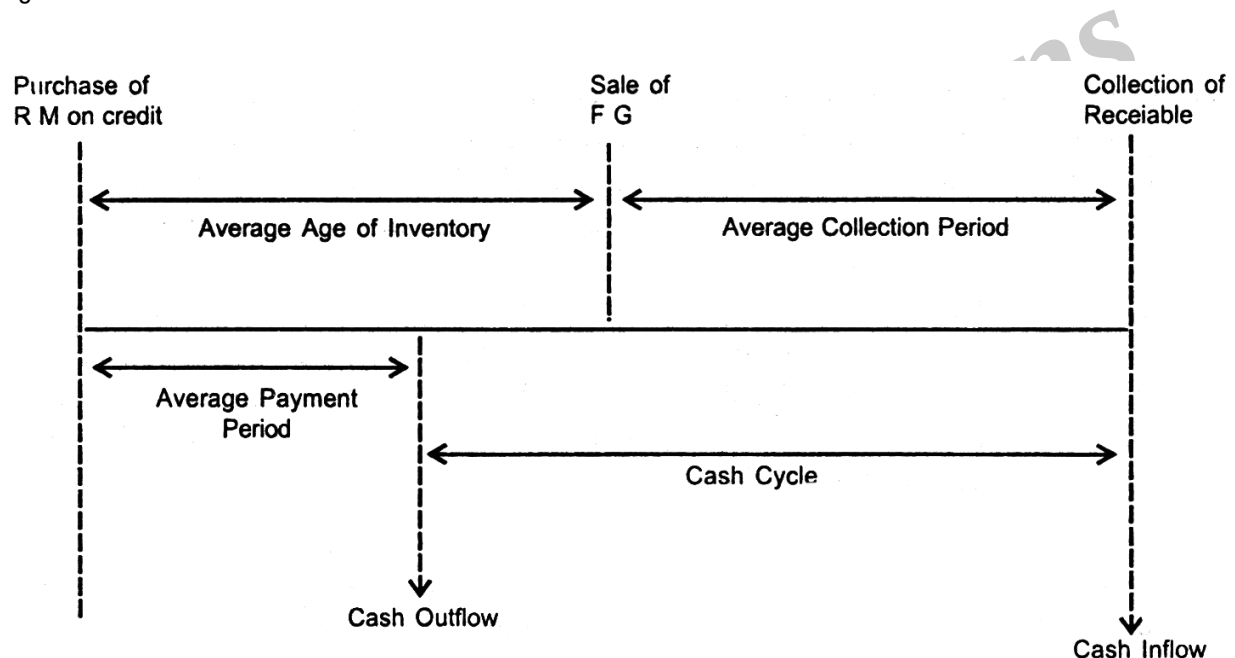
8. **Cost of Cash Balance:** Another factor to be considered while determining the minimum cash balance is the cost of maintaining excess cash or of meeting shortages of cash. There is always an opportunity cost of maintaining excessive cash balance. If a firm is maintaining excess cash then it is missing the opportunities of investing these funds in a profitable way.

3.2.5 Cash Cycle

Q16. What do you understand by Cash Cycle?

Ans :

The term cash cycle refers to the length of the time between the payment for purchase of raw material and the receipt of sales revenue. So, the cash cycle refers to the time that elapses from the point when the firm makes an outlay to purchase raw materials to the point when cash is collected from the sale of finished goods produced using that raw material. Different patterns of cash cycles and cash flows may be there depending upon the nature of the business. The concept of cash cycle has been depicted in Figure.



Cash management is concerned with the managing of: (i) cash flows into and out of the firm, (ii) cash flows within the firm, and (iii) cash balances held by the firm at a point of time by financing deficit or investing surplus cash. It can be represented by a cash management cycle as shown in Figure.

Sales generate cash which has to be disbursed out. The surplus cash has to be invested while deficit has to be borrowed. Cash management seeks to accomplish this cycle at a minimum cost. At the same time, it also seeks to achieve liquidity and control. Cash management assumes more importance than other current assets because cash is the most significant and the least productive asset that a firm holds.

It is significant because it is used to pay the firm's obligations. However, cash is unproductive. Unlike fixed assets or inventories, it does not produce goods for sale. Therefore, the aim of cash management is to maintain adequate control over cash position to keep the firm sufficiently liquid and to use excess cash in some profitable way.

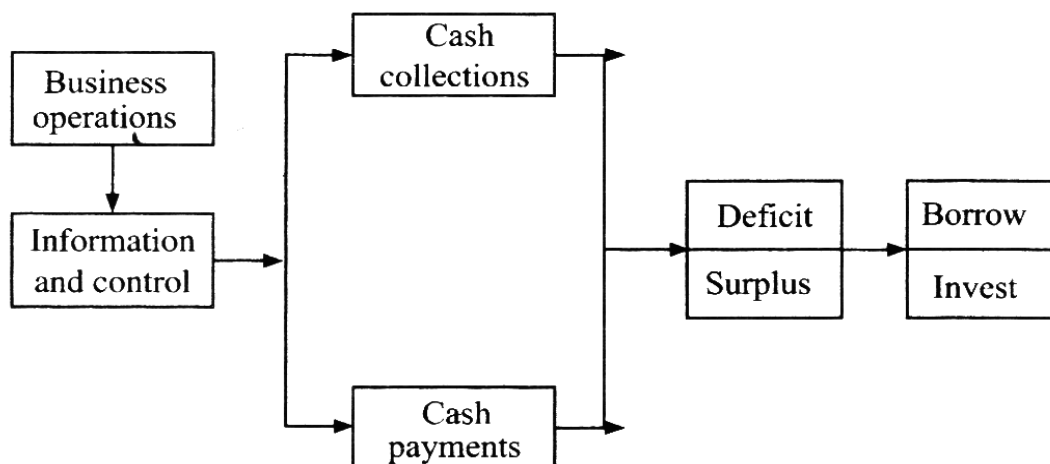


Fig.: Cash Management Cycle

Cash management is also important because it is difficult to predict cash flows accurately, particularly the inflows, and there is no perfect coincidence between the inflows and outflows of cash. During some periods, cash outflows will exceed cash inflows, because payments for taxes, dividends, or seasonal inventory build up. At other times, cash inflow will be more than cash payments because there may be large cash sales and debtors may be realised in large sums promptly. Further, cash management is significant because cash constitutes the smallest portion of the total current assets, yet management's considerable time is devoted in managing it.

In order to resolve the uncertainty about cash flow prediction and lack of synchronization between cash receipts and payments, the firm should develop appropriate strategies for cash management.

3.2.6 Facets of Cash Management

Q17. Explain the Facets of Cash Management.

Ans :

The firm should evolve strategies regarding the following four facets of cash management :

- **Cash planning** : Cash inflows and outflows should be planned to project cash surplus or deficit for each period of the planning period. Cash budget should be prepared for this purpose.
- **Managing the cash flows** : The flow of cash should be properly managed. The cash inflows should be accelerated while, as far as possible, the cash outflows should be decelerated.
- **Optimum cash level** : The firm should decide about the appropriate level of cash balances. The cost of excess cash and danger of cash deficiency should be matched to determine the optimum level of cash balances.
- **Investing surplus cash** : The surplus cash balances should be properly invested to earn profits. The firm should decide about the division of such cash balance between alternative short-term investment opportunities such as bank deposits, marketable securities, or inter-corporate lending.

3.2.7 Cash Forecasting and Budgeting**Q18. Define Cash Forecasting and Budgeting.**

Ans :

Cash budget is the most significant device to plan for and control cash receipts and payments. A cash budget is a summary statement of the firm's expected cash inflows and outflows over a projected time period. It gives information on the timing and magnitude of expected cash flows and cash balances over the projected period. This information helps the financial manager to determine the future cash needs of the firm, plan for the financing of these needs and exercise control over the cash and liquidity of the firm.

Cash forecasts are needed to prepare cash budgets. Cash forecasting may be done on short or long-term basis. Generally, forecasts covering periods of one year or less are considered short-term; those extending beyond one year are considered long-term.

(A) Short-term Cash Forecasts

It is comparatively easy to make short-term cash forecasts. The important functions of carefully developed short-term cash forecasts are :

- To determine operating cash requirements
- To anticipate short-term financing
- To manage investment of surplus cash.

To know the operating cash requirements, cash flow projections have to be made by a firm. As stated earlier, there is hardly a perfect matching between cash inflows and outflows. With the short-term cash forecasts, however, the financial manager is enabled to adjust these differences in favour of the firm.

It is well-known that, for their temporary financing needs, most companies depend upon banks. One of the significant roles of the short-term forecasts is to pinpoint when the money will be needed and when it can be repaid. With such forecasts in hand, it will not be difficult for the financial manager to negotiate short-term financing arrangements with banks. This in fact convinces

bankers about the ability of the management to run its business.

The third function of the short-term cash forecasts is to help in managing the investment of surplus cash in marketable securities. Carefully and skilfully designed cash forecast helps a firm to: (i) select securities with appropriate maturities and reasonable risk, (ii) avoid over and under-investing and (iii) maximise profits by investing idle money.

Short-run cash forecasts serve many other purposes. For example, multi-divisional firms use them as a tool to coordinate the flow of funds between their various divisions as well as to make financing arrangements for these operations. These forecasts may also be useful in determining the margins or minimum balances to be maintained with banks. Still other uses of these forecasts are:

- Planning reductions of short and long-term debt
- Scheduling payments in connection with capital expenditures programmes
- Planning forward purchases of inventories
- Checking accuracy of long-range cash forecasts
- Taking advantage of cash discounts offered by suppliers
- Guiding credit policies.

Short-term Forecasting Methods

Two most commonly used methods of short-term cash forecasting are :

- The receipt and disbursements method
- The adjusted net income method.

The Receipts and Disbursements Method

It is generally employed to forecast for limited periods, such as a week or a month. The adjusted net income method, on the other hand, is preferred for longer durations ranging between a few months to a year. Both methods have their pros and cons.

The cash flows can be compared with budgeted income and expense items if the receipts and disbursements approach is followed. On the

other hand, the adjusted income approach is appropriate in showing a company's working capital and future financing needs.

Three broad sources of cash inflows can be identified: (i) operating, (ii) non-operating, and (iii) financial. Cash sales and collections from customers form the most important part of the operating cash inflows. Developing a sales forecast is the first step in preparing a cash forecast. All precautions should be taken to forecast sales as accurately as possible. In case of cash sales, cash is received at the time of sale. On the other hand, cash is realised after sometime if sale is on credit. The time in realising cash on credit sales depends upon the firm's credit policy reflected in the average collection period. Consider an example.

Suppose that a firm makes 80 percent of its sales on a 30-day credit. Its actual experience shows that 80 percent of debtors are realised after one month and 20 percent after two months after goods are sold. With this information, the expected cash receipts from sales can be calculated if sales forecast are available. For example, sale receipts for January, February, March and April.

(Rs. '000)

	Actual		Forecast			
	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Total sales	500	600	550	660	700	1,000
Credit sales (80%)	400	480	440	528	560	800
Collections						
One month	–	320	384	352	422	448
Two months	–	–	80	96	88	106
Total collections			464	448	510	554
Cash sales			110	132	140	200
Total sales receipts			574	580	650	754

Table. : Estimated Sales Receipts

Non-operating cash inflows include sale of old assets and dividend and interest income. The magnitude of these items is generally small. When internally generated cash flows are not sufficient, the firm resorts to external sources Borrowings and issuance of securities are external financial sources. These constitute financial cash inflows.

The next step in the preparation of a cash budget is the estimate of cash outflows. Cash outflows include: (i) operating outflows: cash purchases, payments of payables, advances to suppliers, wages and salaries and other operating expenses, (ii) capital expenditures, (iii) contractual payments: repayment of loan and interest and tax payments; and (iv) discretionary payments: ordinary and preference dividend. In case of credit purchases, a time lag will exist for cash payments. This will depend on the credit terms offered by the suppliers.

It is relatively easy to predict the expenses of the firm over short run. Firms usually prepare capital expenditure budget therefore, capital expenditures are predictable for the purposes of cash budget. Similarly, payments of dividend do not fluctuate widely and are paid on specific dates. Cash outflow can also occur when the firm repays its long-term debt. Such payments are generally planned and, therefore, there is no difficulty in predicting them.

Once the forecasts for cash receipts and payments have been developed, they can be combined to obtain the net cash inflow or outflow for each month. The net balance for each month would indicate whether the firm has excess cash or deficit. The peak cash requirements would also be indicated. If the firm has a policy of maintaining some minimum cash balance, arrangements must be made to maintain this minimum balance in periods of deficit. The cash deficit can be met by borrowing from banks. Alternatively, the firm can delay its capital expenditures or payments to creditors or postpone payment of dividends.

(ii) Adjusted net income method

This method of cash forecasting involves the tracing of working capital flows. It is sometimes called the sources and uses approach. Two objectives of the adjusted net income approach are: (i) to project the company's need for cash at a future date and (ii) to show whether the company can generate the required funds internally, and if not, how much will have to be borrowed or raised in the capital market.

In preparing the adjusted net income forecasts items such as net income, depreciation, taxes, dividends etc., can easily be determined from the company's annual operating budget. Normally, difficulty is faced in estimating working capital changes; especially the estimates of accounts receivable (debtors) and inventory pose problem because they are influenced by factors such as fluctuations in raw material costs, changing demand for the company's products and possible delays in collections. Any error in predicting these items can make the reliability of forecast doubtful.

The benefits of the adjusted net income method are:

- It highlights the movements in the working capital items, and thus helps to keep a control on a firm's working capital.
- It helps in anticipating a firm's financial requirements. The major limitation of this method is:
- It fails to trace cash flows, and therefore, its utility in controlling daily cash operations is limited.

(B) Long-term Cash Forecasting

Long-term cash forecasts are prepared to give an idea of the company's financial requirements in the distant future. They are not as detailed as the short-term forecasts are. Once a company has developed long-term cash forecast, it can be used to evaluate the impact of, say, new product developments or plant acquisition? on the firm's financial condition three, five, or more years in the future. The major uses of the long-term cash forecasts are

- It indicates as company's future financial needs, especially for its working capital requirements.
- It helps to evaluate proposed capital projects. It pinpoint the cash required to finance these projects as well as the cash to be generated by the company to support them.
- It helps to improve corporate planning. Long-term cash forecasts compel each division to plan for future and to formulate projects carefully.

Long-term cash forecasts may be made for two, three or five years. As with the short-term forecasts, company's practices may differ on the duration of long-term forecasts to suit their particular needs.

The short-term forecasting methods, i.e., the receipts and disbursements method and the adjusted net income method, can also be used in long-term cash forecasting. Long-term cash forecasting reflects the impact of growth, expansion or acquisitions: it also indicates financing problems arising from these developments.

3.2.8 Management of Cash Flows

Q19. Explain the Management of Cash Flows.

Ans :

After estimating the cash flows, efforts should be made to adhere to the estimates of receipts and payments of cash. Cash management will be successful only if cash collections are accelerated and cash disbursements, as far as possible, are delayed. The following methods of cash management will help :

Methods of Accelerating Cash Inflows

1. Prompt Payment by Customers

In order to accelerate cash inflows, the collections from customers should be prompt. This will be possible by prompt billing. The customers should be promptly informed about the amount payable and the time by which it should be paid. It will be better if self addressed envelope is sent along with the bill and quick reply is requested. Another method for prompting customers to pay earlier is to allow them a cash discount. The availability of discount is a good saving for the customer and in an anxiety to earn it they make quick payments.

2. Quick Conversion of Payment into Cash

Cash inflows can be accelerated by improving the cash collecting process. Once the customer writes a cheque in favour of the concern the collection can be quickened by its early collection. There is a time gap between the cheque sent by the customer and the amount collected against it. This is due to many factors, (i) mailing time, i. e. time taken by post office for transferring cheque from customer to the firm, referred to as postal float; (ii) time taken in processing the cheque within the organization and sending it to bank for collection, it is called lethargy and, (iii) collection time within the bank, i.e. time taken by the bank in collecting the payment from the customer's bank, called bank float.

The postal float, lethargy and bank float are collectively referred to as deposit float. The term deposit float refers to the cheques written by the customers but the amount not yet usable by the firm. An efficient cash management will be possible only if the time taken in deposit float is reduced and make the money available for use. This can be done by decentralising collections.

3. Decentralised Collections

A big firm operating over wide geographical area can accelerate collections by using the

system of decentralised collections. A number of collecting centres are opened in different areas instead of collecting receipts at one place. The idea of opening different collecting centres is to reduce the mailing time from customer's despatch of cheque and its receipt in the firm and then reducing the time in collecting these cheques.

On the receipt of the cheque it is immediately sent for collection. Since the party may have issued the cheque on a local bank, it will not take much time in collecting it. The amount so collected will be sent in the central office at the earliest. Decentralised collection system saves mailing and processing time and, thus, reduces the financial requirements.

4. Lock Box System

Lock box system is another technique of reducing mailing, processing and collecting time. Under this system the firm selects some collecting centres at different places. The places are selected on the basis of number of consumers and the remittances to be received from a particular place. The firm hires a Post Box in a post office and the parties are asked to send the cheques on that post box number. A local bank is authorised to operate the post box.

The bank will collect the post a number of times in a day and start the collection process of cheques. The amount so collected is credited to the firm's account. The bank will prepare a detailed account of cheques received which will be used by the firm for processing purpose. This system of collecting cheques expedites the collection process and avoids delays due to mailing and processing time at the accounting department. By transferring clerical function to the bank, the firm may reduce its costs, improve internal control and reduce the possibility of fraud.

Methods of Slowing Cash Outflows

A company can keep cash by effectively controlling disbursements. The objective of controlling cash outflows is to slow down the payments as far as possible. Following methods can be used to delay disbursements :

1. Paying on Last Date

The disbursements can be delayed on making payments on the last due date only. If the credit is for 10 days then payment should be made on 10th day only. It can help in using the money for short periods and the firm can make use of cash discount also.

2. Payments through Drafts

A company can delay payments by issuing drafts to the suppliers instead of giving cheques. When a cheque is issued then the company will have to keep a balance in its account so that the cheque is paid whenever it comes. On the other hand a draft is payable only on presentation to the issuer. The receiver will give the draft to its bank for presenting it to the buyer's bank. It takes a number of days before it is actually paid. The company can economise large resources by using this method. The funds so saved can be invested in highly liquid low risk securities to earn income thereon.

3. Adjusting Payroll Funds

Some economy can be exercised on payroll funds also. It can be done by reducing the frequency of payments. If the payments are made weekly then this period can be extended to a month. Secondly, finance manager can plan the issuing of salary cheques and their disbursements. If the cheques are issued on Saturday then only a few cheques may be presented for payment, even on Monday all cheques may not be presented. On the basis of his past experience finance manager can deposit the money in bank because it may be clear to him about the average time taken by employees in encashing their pay cheques.

4. Centralisation of Payments

The payments should be centralised and payments should be made through drafts or cheques. When cheques are issued from the main office then it will take time for the cheques to be cleared through post. The benefit of cheque collecting time is availed.

5. Inter-bank Transfer

An efficient use of cash is also possible by inter-bank transfers. If the company has accounts with more than one bank then amounts can be transferred to the bank where disbursements are to be made. It will help in avoiding excess amount in one bank.

6. Making use of Float

Float is a difference between the balance shown in company's cash book (Bank column) and balance in pass book of the bank. Whenever a cheque is issued, the balance at bank in cash book is reduced. The party to whom the cheque is issued may not present it for payment immediately. If the party is at some other station then cheque will come through post and it may take a number of days before it is presented. Until the time, the cheques are not presented to bank for payment there will be a balance in the bank. The company can make use of this float if it is able to estimate it correctly.

3.2.9 Determination of Optimum Cash Balance**Q20. Explain the Determination of Optimum Cash Balance.**

Ans :

A firm has to maintain a minimum amount of cash for settling the dues in time. The cash is needed to purchase raw materials, pay creditors, day to day expenses, dividend, etc. The test of liquidity of the firm is that it is able to meet various obligations in time.

Some cash will be needed for transaction needs and amount may be kept as a safety stock. An appropriate amount of cash balance to be maintained should be determined on the basis of past experience and future expectations. If a firm

maintains less cash balance then its liquidity position will be weak. If higher cash balance is maintained then an opportunity to earn is lost. Thus, a firm should maintain an optimum cash balance, neither a small nor a large cash balance. For this purpose the transaction costs and risk of too small a balance should be matched with the opportunity costs of too large a balance.

There are basically two approaches to determine an optimal cash balance, namely, (i) Minimising Cost Models, and (ii) Preparing Cash Budget. Cash budget is the most important tool in cash management.

Q21. Define cash budget. Explain the objective of cash budget.

Ans :

Meaning

Cash budget is nothing but the written form of various forecasts relating to cash receipt and cash payments. In other words, to meet future obligations, forecasting the expected receipts and expected payments of cash is known as cash budget i.e., cash budget is a mere forecast of cash position of an undertaking for a definite period. In cash budget the budget period is normally daily, weekly, monthly or quarterly etc. There are two distinct parts of cash budgeting one is forecast the cash receipts and second forecast the cash disbursement/payments.

Definition

According to the Guthmen and Dougal, "Cash budget is an estimate of cash receipts and disbursements for a future period of time".

Characteristics

1. Cash budget is a statement of anticipated cash receipts and payments.
2. Cash budget is related to predetermined future period.
3. Cash budget is expressed in terms of monetary values.
4. Cash budget is forecast of financial aspirations of the enterprise.
5. Cash budget is an outline of future plans, policies and actions of the management.

Objectives

The main objectives of preparing cash budget are as under,

1. The probable cash position as a result of planned operations is indicated and thus the excess or shortages of cash is known. This helps in arranging short term borrowings in advance to meet the situation of shortage of cash or making investments in times of excess of cash.
2. Cash can be coordinated in relation to total working capital, sales, investment and debt.
3. A sound basis for credit and for current control of cash positioned is established.

Q22. Explain the advantages of cash budget.

Ans :

Cash budget is very useful tool for financial planning which is also helps in arranging new loans, borrowing replacing the existing debts cash outlays etc. Cash budget also helpful for those concern having adequate owned funds and to get maximum profit by considering the alternative uses and available resources. The following are the additional advantages of cash budgeting. They are,

1. Estimated cash position can be easily ascertained by using the planned operating system through cash budget.
2. Effective control on cash position can be done using the cash budget.

3. In a business, the cash budget also shows the fact whether the concern may be facing a situation of excess or shortage of cash.
4. Cash budget provides a sound basis for resorting to borrowing in terms of quantum and time.
5. The coordination between cash and working capital sales, investment or loan can be done by using this cash budgeting.
6. Whether the concern in a position to need borrowing or not is also known by the cash budget.

Q23. Explain the various methods to preparation of cash budget.

Ans :

The cash budget can be prepared by any of the following methods,

1. Receipts and payments method.
2. The adjusted profit and loss method.
3. The balance sheet method.

1. Receipts and Payments Method

In case of this method the cash receipts from various sources and the cash payments to various agencies are estimated. In the opening balance of cash, estimated cash receipts are added from the total, the total of estimated cash payments are deducted to find out the closing balance. If monthly/quarterly cash budgets are to be prepared, first of all the closing balance of first month/quarter will be computed which will be the opening balance for the next month/quarter.

Similarly the closing balance for 2nd month/quarter can be known and so on. The estimated receipts may be from cash sales, credit collections, interest, dividend, miscellaneous receipts, issue of share capital, loans etc. Estimated disbursements may be regarding materials, labour, overheads, granting loan or repayment of loan, payment of advance tax, purchase of assets etc.

2. Adjusted Profit and Loss Method

In case of this method the cash budget is prepared on the basis of opening cash and bank balances, projected profit and loss account and the balances of the various assets and liabilities.

Cash from operations is not that figure of profit which is shown by the profit and loss account, but is the figure of profit as adjusted in the light on non-cash items such as depreciation, loss on sale of capital assets, preliminary expenses written off from P & L A/c etc.

Since these items do not affect cash position though they have been charged to the profit and loss account, they are added back to the profit or deducted from loss, as the case may be. Issue of new shares, realization from sale of fixed assets or raising long term loans are taken as other sources of cash. Similarly, redemption of preference shares (in case of redeemable preference shares), payment of long term loans, purchase of fixed assets, payment of dividends etc., are taken as application of cash.

3. Balance Sheet Method

With the help of budgeted balances at the end except cash and bank balances, a budgeted balance sheet can be prepared and the balancing figure would be the estimated closing cash/bank balance. Thus, under this method, closing balances other than cash/bank will have to be found out first to be put in the budgeted balance sheet. This can be done by adjusting the anticipated transactions of the year in the opening balances.

Proforma of Cash Budget

Particulars	X Month	Y Month	Z Month
1) Opening Cash Balance			
2) Estimated Cash Receipts			
i) Cash Sales			
ii) Cash Collection from Debtors			
iii) Interest Received from Investments			
iv) Cash inflow on Issue of New Securities			
v) Raising of Loans			
vi) Sale of Assets			
vii) Dividend			
3) Total Receipts available during the month (1 + 2)			
4) Estimated Cash Payments			
i) Payment for Cash Purchases			
ii) Payment to Sundry Creditors for Creditors Purchases			
iii) Payment for Wages and Salaries			
iv) Payment for other Administrative Expenses			
v) Payment in the nature of Capital Expenditure			
vi) Loan Repayment			
vii) Dividend Payment			
viii) Payment of Interest on Loan			
Total Cash Payments			
5) Closing Cash Balance (3 - 4)			

Table : Format of cash budget

PROBLEMS

10. Prepare a cash budget for the month of May, June and July 2019 on the basis of the following information.

Month	Credit Sales	Credit Purchase	Wages	Manufacturing Expenses	Office Expenses	Selling Expenses
March	60,000	36,000	90,000	4,000	2,000	4,000
April	62,000	38,000	8,000	3,000	1,500	5,000
May	64,000	33,000	10,000	4,500	2,500	4,500
June	58,000	35,000	8,500	3,500	2,000	3,500
July	56,000	39,000	9,500	4,000	1,000	4,500
August	60,000	34,000	8,000	3,000	1,500	4,500

Additional Information :

- Cash balance on 1st May, 2019 \$8,000.
- Plant costing `16,000 is due for delivery in July, payable 10% on delivery and balance after 3 months.
- Advance tax of `8,000 each is payable in March and June.
- Period of credit allowed (i) by suppliers – two months and (ii) to customers – one month.
- Lag in payment of manufacturing expenses 1/2 month.
- Lag in payment of office and selling expenses – one month.

Sol.

Particulars	May 2019	June 2019	July 2019
Opening Balance	8,000	13,750	12,250
Estimated Cash Receipts :			
Debtors (Credit Sales)	62,000	64,000	58,000
Total (A)	70,000	77,750	70,250
Estimated Cash Payment			
Credits (Credit Purchase)	36,000	38,000	33,000
Wages	10,000	8,500	9,500
Manufacturing Expenses	3,750	4,000	3,750
Office Expenses	1,500	2,500	2,000
Selling Expenses	5,000	4,500	3,500
Plant Payment on delivery	–	–	1,600
Advance Tax	–	8,000	–
Total (B)	56,250	65,500	53,350
Closing Balance (A – B)	13,750	12,250	16,900

Note:

- (i) One-half of the manufacturing expenses of April and one-half of May shall be paid in May and so on.
- (ii) Office and selling expenses of April shall be paid in May and so on.

- 11. A newly started company Quick Co. Ltd., wishes to prepare cash budget from January. Prepare a cash budget for the first six months from the following estimated revenue and expenditure:**

Month	Total Sales	Material	Wages	Production Overheads	Selling and Distribution Overheads
1999	Rs.	Rs.	Rs.	Rs.	Rs.
January	20,000	20,000	4,000	3,200	800
February	22,000	14,000	4,400	3,300	900
March	24,000	14,000	4,600	3,300	800
April	26,000	12,000	4,600	3,400	900
May	28,000	12,000	4,800	3,500	900
June	30,000	16,000	4,800	3,600	1,000

- Cash balance on 1st January 1999 was Rs. 10,000. A new machine is to be installed at Rs. 30,000 on credit, to be repaid by two equal installments in March and April.
- Sales commission @ 5% on total sales is to be paid within the month following actual sales. Rs. 10,000 being the amount of 2nd call may be received in March. Share premium amounting to Rs. 2,000 is also obtainable with 2nd call.
- Period of credit allowed by suppliers 2 months
- Period of credit allowed to customers 1 month
- Delay in payment of overheads 1 month
- Delay in payment of wages 1/2 month
- Assume cash sales to be 50% of total sales.

Sol.

(Imp.)

Quick Co. Limited
Cash Budget
For the period January to June 1999

Particulars	Jan. Rs.	Feb. Rs.	Mar. Rs.	April Rs.	May Rs.	June Rs.
A. Balance B/d	10,000	18,000	29,800	20,000	6,100	8,800
B. Receipts :						
Cash Sales (50%)	10,000	11,000	12,000	13,000	14,000	15,000
Debtors –	–	10,000	11,000	12,000	13,000	14,000
Capital	–	–	10,000	–	–	–
Share Premium	–	–	2,000	–	–	–
Total (A + B)	20,000	39,000	64,800	45,000	33,100	37,800

(C) Payments :						
Material	–	–	20,000	14,000	14,000	12,000
Wages	2,000	4,200	4,500	4,600	4,700	4,800
Production Overheads	–	3,200	3,300	3,300	3,400	3,500
Selling and Distribution Overheads	–	800	900	800	900	900
Commission	–	1,000	1,100	1,200	1,300	1,400
Machinery	–	–	15,000	15,000	–	–
Total (C)	2,000	9,200	44,800	38,900	24,300	22,600
Balance (A + B + C)	18,000	29,800	20,000	6,100	8,800	15,200

- 12. Saurashtra Co. Ltd. wishes to arrange overdraft facilities with its bankers from the period August to October 2010 when it will be manufacturing mostly for stock. Prepare a cash budget for the above period from the following data given below:**

Month	Sales (Rs.)	Purchases (Rs.)	Wages (Rs.)	Mfg. Exp. (Rs.)	Office Exp. (Rs.)	Selling Exp. (Rs.)
June	1,80,000	1,24,800	12,000	3,000	2,000	2,000
July	1,92,000	1,44,000	14,000	4,000	1,000	4,000
August	1,08,000	2,43,000	11,000	3,000	1,500	2,000
September	1,74,000	2,46,000	12,000	4,500	2,000	5,000
October	1,26,000	2,68,000	15,000	5,000	2,500	4,000
November	1,40,000	2,80,000	17,000	5,500	3,000	4,500
December	1,60,000	3,00,000	18,000	6,000	3,000	5,000

Additional Information:

- (a) Cash on hand 1-08-2010 Rs.25,000.
- (b) 50% of credit sales are realized in the month following the sale and the remaining 50% in the second month following. Creditors are paid in the month following the month of purchase.
- (c) Lag in payment of manufacturing expenses half month.
- (d) Lag in payment of other expenses one month

Sol.

CASH BUDGET
For 3 months from August to October 2010

Particulars	August (Rs.)	September (Rs.)	October (Rs.)
Receipts:			
Opening balance	25,000	44,500	(66,750)
Sales	1,86,000	1,50,000	1,41,000
Total Receipts (A)	<u>2,11,000</u>	<u>1,94,500</u>	<u>74,250</u>
Payments:			
Purchases	1,44,000	2,43,000	2,46,000
Wages	14,000	11,000	12,000
Mfg. Exp.	3,500	3,750	4,750
Office Exp.	1,000	1,500	2,000
Selling Exp.	4,000	2,000	5,000
Total Payments (B)	<u>1,66,500</u>	<u>2,61,250</u>	<u>2,69,750</u>
Closing Balance (A-B)	<u>44,500</u>	<u>(66,750)</u>	<u>(1,95,500)</u>

Working Note:**1. Manufacturing Expense:**

Particulars	August	September	October
July (4000/2)	2000	—	—
August (3000/2)	1500	1500	—
September (4500/2)	—	2250	2250
October (5000/2)	—	—	2500
Total	<u>3500</u>	<u>3750</u>	<u>4750</u>

2. Sales

Particulars	August	September	October
June (1,80,000/2)	90,000	—	—
July (1,92,000/2)	96,000	96,000	—
August (1,08,000/2)	—	54,000	54,000
September (1,74,000/2)	—	—	87,000
Total	<u>1,86,000</u>	<u>1,50,000</u>	<u>1,41,000</u>

13. S. K. Brothers wish to approach the bankers for temporary overdraft facility for the period from October 2010 to December 2010. During the period of this period of these three months, the firm will be manufacturing mostly for stock. You are required to prepare a cash budget for the above period.

Month	Sales (Rs.)	Purchases (Rs.)	Wages (Rs.)
August	3,60,000	2,49,600	24,000
September	3,84,000	2,88,000	28,000
October	2,16,000	4,86,000	22,000
November	3,48,000	4,92,000	20,000
December	2,52,000	5,36,000	30,000

- (a) 50% of credit sales are realized in the month following the sales and remaining 50% in the second following.
 (b) Creditors are paid in the month following the month of purchase
 (c) Estimated cash as on 1-10-2010 is Rs.50,000.

Sol.

(Imp.)

CASH BUDGET
For 3 months from October to December 2010

Particulars	October (Rs.)	November (Rs.)	December (Rs.)
Receipts:			
Opening balance	50,000	1,12,000	(94,000)
Collection from Debtors	3,72,000	3,00,000	2,82,000
Total Receipts (A)	<u>4,22,000</u>	<u>4,12,000</u>	<u>1,88,000</u>
Payments:			
Payments to Creditors	2,88,000	4,86,000	4,92,000
Wages	22,000	20,000	30,000
Total payments (B)	<u>3,10,000</u>	<u>5,06,000</u>	<u>5,22,000</u>
Closing Balance (A-B)	1,12,000	(94,000)	(3,34,000)

Working Note: Collection from debtors

Particulars	October (Rs.)	November (Rs.)	December (Rs.)
Sales			
August	1,80,000	-	-
September	1,92,000	1,92,000	-
October	-	1,08,000	1,08,000
November	-	-	1,74,000
	<u>3,72,000</u>	<u>3,00,000</u>	<u>2,82,000</u>

14. TATA Co. Ltd. is to start production on 1st January 2011. The prime cost of a unit is expected to be Rs. 40 (Rs. 16 per materials and Rs. 24 for labour). In addition, variable expenses per unit are expected to be Rs. 8 and fixed expenses per month Rs. 30,000. Payment for materials is to be made in the month following the purchase. One-third of sales will be for cash and the rest on credit for settlement in the following month. Expenses are payable in the month in which they are incurred. The selling price is fixed at Rs. 80 per unit. The number of units to be produced and sold is expected to be:

January 900; February 1200; March 1800; April 2000; May 2,100 June 2400

Draw a Cash Budget indicating cash requirements from month to month.

Sol.

CASH BUDGET of TATA LTD.
For 6 months from January to June 2011

Particulars	Jan.	Feb.	March	April	May	June
Receipts						
Opening Balance		(34,800)	(37,600)	(32,400)	(5,867)	(27,600)
Cash sales	24,000	32,000	48,000	53,333	56,000	64,000
Collection from Debtors		48,000	64,000	96,000	1,06,667	1,12,000
Total Receipts (A)	24,000	45,200	74,400	1,16,933	1,56,800	1,48,400
Payments						
Creditors		14,400	19,200	288,00	32,000	33,600
Wages	21,600	28,800	43,200	48,000	50,400	57,600
Variable Exp.	7,200	9,600	14,400	16,000	16,800	19,200
Fixed Exp.	30,000	30,000	30,000	30,000	30,000	30,000
Total Payment (B)	58,800	82,800	1,06,800	1,22,800	1,29,200	1,40,400
Closing Balance	(34,800)	(37,600)	(32,400)	(5,867)	(27,600)	8,000

15. Prepare a Cash Budget from the data given below for a period of six months (July to December)

Month	Sales	Raw Materials
May	75,000	37,500
June	75,000	37,500
July	1,50,000	52,500
August	2,25,000	3,67,500
September	3,00,000	1,27,500
October	1,50,000	97,500
November	1,50,000	67,500
December	1,37,500	—

- (i) Collection estimates:
- Within the month of sale: 5%
 - During the month following the sale: 80%
 - During the second month following the sale: 15%
- (ii) Payment for raw materials is made in the next month.
- (iii) Salary Rs. 11,250, Lease payment Rs. 3750, Misc. Exp. Rs. 1150, are paid each month
- (iv) Monthly Depreciation Rs. 15,000
- (v) Income tax Rs. 26,250 each in September and December.
- (vi) Payment for research in October Rs.75,000
- (vii) Opening Balance on 1st July Rs.55,000.

Sol.

CASH BUDGET
For the six months from July to December

Particulars	July	Aug.	Sep.	Oct.	Nov.	Dec.
Receipts						
Opening Balance	55,000	80,100	1,53,950	(38450)	24150	83000
Collection from Debtors	78,750	1,42,500	2,17,500	2,81,250	1,725,00	1,49,375
Total receipts (A)	1,33,750	2,22,600	3,71,450	2,42,800	1,96,650	2,32,375
Payments						
Payment to suppliers	37,500	52,500	3,67,500	1,27,500	97,500	67,500
Salary	11,250	11,250	11,250	11,250	11,250	11,250
Lease payment	3750	3750	3750	3750	3750	3750
Misc. expense	1,150	1,150	1,150	1,150	1,150	1,150
Income tax			26,250			26,250
Payment for Research				75,000		
Total Payment (B)	53,650	68,650	4,09,900	2,18,650	1,13,650	1,09,900
Closing Balance	80,100	1,53,950	(38,450)	24,150	83,000	1,22,475

Note: Depreciation is a non-cash item. It does not involve cash flow. Hence, depreciation will not be considered as payment through cash.

16. Prepare a cash budget of R.M.C. Ltd. for April, May and June 2012.

Months	Sales (Rs.)	Purchases (Rs.)	Wages (Rs.)	Expenses (Rs.)
Jan. (Actual)	80,000	45,000	20,000	5,000
Feb. (Actual)	80,000	40,000	18,000	6,000
March (Actual)	75,000	42,000	22,000	6,000
April (Budget)	90,000	50,000	24,000	7,000
May (Budget)	85,000	45,000	20,000	6,000
June (Budget)	80,000	35,000	18,000	5,000

Additional Information:

- (i) 10% of the purchases and 20% of sales are for cash.
- (ii) The average collection period of the company is A month and the credit purchases are paid regularly after one month.
- (iii) Wages are paid half monthly and the rent of Rs. 500 included in expenses is paid monthly and other expenses are paid after one month lag.
- (iv) Cash balance on April 1, 2012 may be assumed to be Rs.15,000

Sol.

CASH BUDGET
(For the months ending April, May & June 2012)

Particulars	April (Rs.)	May (Rs.)	June (Rs.)
Receipts			
Opening Balance	15,000	27,200	35,700
Cash Sales	18,000	17,000	16,000
Collection from Debtors	66,000	70,000	66,000
Total Receipts (A)	99,000	1,14,200	1,17,700
Payments			
Cash Purchases	5,000	4,500	3,500
Payment to creditors	37,800	45,000	40,500
Wages	23,000	22,000	19,000
Rent	500	500	500
Other Exp.	5,500	6,500	5,500
Total Payments (B)	71,800	78,500	69,000
Closing balance (A-B)	27,200	35,700	48,700

3.3 ACCOUNTS RECEIVABLE MANAGEMENT

3.3.1 Meaning

Q24. What is Accounts Receivable Management?

Ans :

Meaning

Accounts receivables are simply extensions of credit to the firm's customers, allowing them a reasonable period of time in which to pay for the goods. Most firms treat accounts receivables as a marketing tool to promote sales and profits. The receivables (including the debtors & the bills) constitute a significant portion of the working capital and is an important element of it. The receivables emerge whenever goods are sold on credit & payments are deferred by customers. Receivable is a type of loan extended by a seller to the buyer to facilitate the purchase process. As against the ordinary type of loan, the trade credit in the form of receivables is not a profit making service but an inducement or facility to the buyer-customer of the firm.

Definitions

- (i) **According to Hampton**, "Receivables are asset accounts representing amount owned to firm as a result of sale of goods or services in ordinary course of business".
- (ii) **According to Robert N. Anthony**, "Accounts receivables are amounts owed to the business enterprise, usually by its customers. Sometimes it is broken down into trade accounts receivables; the former refers to amounts owed by customers, and the latter refers to amounts owed by employees and others".

Thus, receivables are forms of investment in any enterprise manufacturing and selling goods on credit basis, large sums of funds are tied up in trade debtors. Hence, a great deal of careful analysis and proper management is exercised for effective and efficient management of Receivables to ensure a positive contribution towards increase in turnover and profits.

3.3.2 Objectives

Q25. What are the Objectives of Accounts Receivable Management?

Ans :

The objectives of receivables management are to improve sales, eliminate bad debts, and reduce transaction 'costs incidental to maintenance of accounts and collection of sale proceeds and, finally, enhance profits of the firm. Credit sales help the organization to make extra profit. It is a known fact; firms charge a higher price, when sold on credit, compared to normal price.

1. **Book Debts are used as a Marketing Tool for Improvement of Business:** If the firm wants to expand business, it has to, necessarily, sell on credit. After a certain level, additional sales do not create additional production costs, due to the presence of fixed costs. So, the additional contribution, totally, goes towards profit, improving the profitability of the firm.
2. **Optimum Level of Investment in Receivables:** To support sales, it is necessary for the firm to make investment in receivables. Investment in receivables involves costs as funds are tied up in debtors. Further, there is also risk in respect of bad debts too. On the other hand, receivables bring returns. If so, till what level investment is to be made in receivables? Investment in receivables is to be made till the incremental costs are less than the incremental return.

In the other words, the objective of receivables management is 'to promote sales and profits until that point is reached where the return on investment in further funding receivables is less than the cost of funds raised to finance that additional credit (i.e. cost of capital).

Q26. Explain the factors affecting Accounts Receivable Management?

Ans :

The following factors directly and indirectly affect the size of receivables:

1. **Stability of Sales:** In the business of seasonal character, total sales and the credit sales will go up in the season and therefore volume of receivables will also be large. On the other hand, if a firm supplies goods on instalment basis, its balance in receivables will be high.
2. **Size and Policy of Cash Discount:** It is also an important variable in deciding the level of investment in receivables. Cash discount affects the cost of capital and the investment in receivables. If cost of capital of the firm is lower in comparison to the cash discount to be allowed, investment in receivables will be less. If both are equal, it will not affect the investment at all. If cost of capital is higher than cash discount, the investment in receivables will be larger.
3. **Bill Discounting and Endorsement:** If firm has any arrangement with the banks to get the bills discounted or if they re-endorsed to third parties, the level of investment in assets will be automatically low. If bills are honoured on due dates, the investment will be larger.
4. **Terms of Sale:** A firm may affect its sales either on cash basis or on credit basis. As a matter of fact credit is the soul of a business. It also leads to higher profit level through expansion of sales. The higher the volume of sales made on credit, the higher will be the volume of receivables and vice-versa.

5. **Volume of Credit Sales:** It plays the most important role in determination of the level of receivables. As the terms of trade remains more or less similar to most of the industries. So, a firm dealing with a high level of sales will have large volume of receivables.
6. **Credit Policy:** A firm practicing lenient or relatively liberal credit policy its size of receivables will be comparatively large than the firm with more rigid or signet credit policy. It is because of two prominent reasons:
 - (i) A lenient credit policy leads to greater defaults in payments by financially weak customers resulting in bigger volume of receivables.
 - (ii) A lenient credit policy encourages the financially sound customers to delay payments again resulting in the increase in the size of receivables.
7. **Collection Policy:** The policy, practice and procedure adopted by a business enterprise in granting credit, deciding as to the amount of credit and the procedure selected for the collection of the same also greatly influence the level of receivables of a concern. The more lenient or liberal to credit and collection policies the more receivables are required for the purpose of investment.
8. **Collection Collected:** If an enterprise is efficient enough in encasing the payment attached to the receivables within the stipulated period granted to the customer. Then, it will opt for keeping the level of receivables low. Whereas, enterprise experiencing undue delay in collection of payments will always have to maintain large receivables.
9. **Quality of Customer:** If a company deals specifically with financially sound and credit worthy customers then it would definitely receive all the payments in due time. As a result the firm can comfortably do with a lesser amount of receivables than in case where a company deals with customers having financially weaker position.

Q27. Explain the importance of Receivable Management?**Ans :**

The importance of receivables management is as follows:

1. Liberalised credit policy helps to increase the growth of sales.
2. It helps to increase the operating profits because of more credit sales.
3. Credit policy helps to meet the competition.
4. Credit sales helps to attract not only existing customer but also the new customers in the ordinary course of business.
5. It ensures higher investment in trade debtors, which will produce larger sales.
6. It helps to minimize bad debts without taking stringent measures.
7. It facilitates adequate working capital to meet its current obligations.
8. It gives guidance to the management for effective financial planning and control.
9. It helps to make effective coordination between finance, production, sales, profit and cost.

3.3.3 Cost Benefit Analysis**Q28. Define Cost Benefit Analysis.****Ans :**

The firm's operating profit is maximised when total cost is minimised for a given level of revenue. But it is not necessarily the optimum credit policy. Optimum credit policy is one which maximises the firm's value. The value of the firm is maximised when the incremental or marginal rate of return of an investment is equal to the incremental or marginal cost of funds used to finance the investment.

The incremental rate of return can be calculated as incremental operating profit divided by the incremental investment in receivable. The incremental cost of funds is the rate of return required by the suppliers of funds, given the risk of investment in accounts receivable. Note that the

required rate of return is *not* equal to the borrowing rate. Higher the risk of investment, higher the required rate of return. As the firm loosens its credit policy, its investment in accounts receivable becomes more risky because of increase in slow-paying and defaulting accounts. Thus the required rate of return is an upward sloping curve.

In sum, we may state that the goal of the firm's credit policy is to maximise the value of the firm. To achieve this goal, the evaluation of investment in accounts receivable should involve the following four steps :

- Estimation of incremental operating profit
- Estimation of incremental investment in accounts receivable
- Estimation of the incremental rate of return of investment
- Comparison of the incremental rate of return with the required rate of return.

Optimum Credit Policy: A Marginal Cost-benefit Analysis

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- Estimation of incremental investment in accounts receivable
- Estimation of the incremental rate of return of investment
- Comparison of the incremental rate of return with the required rate of return.

3.3.4 Credit Standards

Q29. Explain about Credit standards.

Ans :

Credit standards are the criteria which a firm follows in selecting customers for the purpose of credit extension. The firm may have tight credit standards; that is, it may sell mostly on cash basis, and may extend credit only to the most reliable and financially strong customers. Such standards will result in no bad-debt losses, and less cost of credit administration. But the firm may not be able to expand sales. The profit sacrificed on lost sales may be more than the costs saved by the firm.

On the contrary, if credit standards are loose, the firm may have larger sales. But the firm will have to carry larger receivable. The costs of administering credit and bad-debt losses will also increase. Thus, the choice of optimum credit standards involves a trade-off between incremental return and incremental costs. Credit analysis Credit standards influence the quality of the firm's customers.

There are two aspects of the quality of customers: (i) the time taken by customers to repay credit obligation and (ii) the default rate. The average collection period (ACP) determines the speed of payment by customers. It measures the number of days for which credit sales remain outstanding. The longer the average collection period, the higher the firm's investment in accounts receivable. Default rate can be measured in terms of bad-debt losses ratio—the proportion of uncollected receivable. Bad-debt losses ratio indicates default risk. Default risk is the likelihood that a customer will fail to repay the credit obligation.

On the basis of past practice and experience, the financial or credit manager should be able to form a reasonable judgment regarding the chances of default. To estimate the probability of default,

the financial or credit manager should consider three C's : (a) character, (b) capacity, and (c) condition.

(a) Character refers to the customer's willingness to pay. The financial or credit manager should judge whether the customers will make honest efforts to honour their credit obligations. The moral factor is of considerable importance in credit evaluation in practice.

(b) Capacity refers to the customer's ability to pay. Ability to pay can be judged by assessing the customer's capital and assets which he may offer as security. Capacity is evaluated by the financial position of the firm as indicated by analysis of ratios and trends in firm's cash and working capital position. The financial or credit manager should determine the real worth of assets offered as collateral (security).

(c) Condition refers to the prevailing economic and other conditions which may affect the customers' ability to pay. Adverse economic conditions can affect the ability or willingness of a customer to pay. An experienced financial or credit manager will be able to judge the extent and genuineness to which the customer's ability to pay is affected by the economic conditions.

Information on these variables may be collected from the customers themselves, their published financial statements and outside agencies which may be keeping credit information about customers. A firm should use this information in preparing categories of customers according to their creditworthiness and default risk. This would be an important input for the financial or credit manager in formulating its credit standards. The firm may categorise its customers, at least, in the following three categories :

- Good accounts; that is, financially strong customers.
- Bad accounts', that is, financially very weak, high risk customers.
- Marginal accounts, that is, customers with moderate financial health and risk (falling between good and bad accounts).

The firm will have no difficulty in quickly deciding about the extension of credit to good accounts and rejecting the credit request of bad accounts. Most of the firm's time be taken in evaluating marginal accounts; that is, customers who are not financially very strong but are also not so bad to be outrightly rejected. A firm can expand its sales by extending credit to marginal accounts. But the firm's costs and bad-debt losses may also increase. Therefore, credit standards should be relaxed upon the point where incremental return equals incremental cost.

3.3.5 Credit Terms

Q30. Explain about Credit Terms.

Ans :

The stipulations under which the firm sells on credit to customers are called credit terms. These stipulations include: (a) the credit period, and (b) the cash discount.

Credit period The length of time for which credit is extended to customers is called the credit period. It is generally stated in terms of a net date. For example, if the firm's credit terms are 'net 35', it is expected that customers will repay credit obligation not later than 35 days. A firm's credit period may be governed by the industry norms. But depending on its objective, the firm can lengthen the credit period. On the other hand, the firm may tighten its credit period if customers are defaulting too frequently and bad-debt losses are building up.

A firm lengthens credit period to increase its operating profit through expanded sales. However, there will be net increase in operating profit only when the cost of extended credit period is less than the incremental operating profit. With increased sales and extended credit period, investment in receivable would increase. Two factors cause this increase: (a) incremental sales result in incremental receivable and (b) existing customers will take more time to repay credit obligation (i.e., the average collection period will increase), thus increasing the level of receivable.

3.3.6 Collection of Receivables

Q31. Explain about Collection of Receivables.

Ans : (Imp.)

Receivables management involves the careful consideration of the following aspects :

1. Forming of credit policy.
2. Executing the credit policy.
3. Formulating and executing collection policy.

1. Forming of Credit Policy

For efficient management of receivables, a concern must adopt a credit policy. A credit policy is related to decisions such as credit standards, length of credit period, cash discount and discount period, etc.

(a) Quality of Trade Accounts or Credit Standards:

The volume of sales will be influenced by the credit policy of a concern. By liberalising credit policy the volume of sales can be increased resulting into increased profits. The increased volume of sales is associated with certain risks too. It will result in enhanced costs and risks of bad debts and delayed receipts. The increase in number of customers will increase the clerical work of maintaining the additional accounts and collecting of information about the credit-worthiness of customers.

There may be more bad debt losses due to extension of credit to less worthy customers. These customers may also take more time than normally allowed in making the payments resulting into tying up of additional capital in receivables. On the other hand, extending credit to only credit worthy customers will save costs like bad debt losses, collection costs, investigation costs, etc. The restriction of credit to such customers only will certainly reduce sales volume, thus resulting in reduced profits.

- (b) **Length of Credit Period:** Credit terms or length of credit period means the period allowed to the customers for making the payment. The customers paying well in time may also be allowed certain cash discount. There is no binding on fixing the terms of credit. A concern fixes its own terms of credit depending upon its customers and the volume of sales. The customs of industry act as constraints on credit terms of individual concerns. The competitive pressure from other firms compels to follow similar credit terms, otherwise customers may feel inclined to purchase from a firm which allows more days for paying credit purchases. Sometimes more credit time is allowed to increase sales to existing customers and also to attract new customers.

The length of credit period and quantum of discount allowed determine the magnitude of investment receivables.

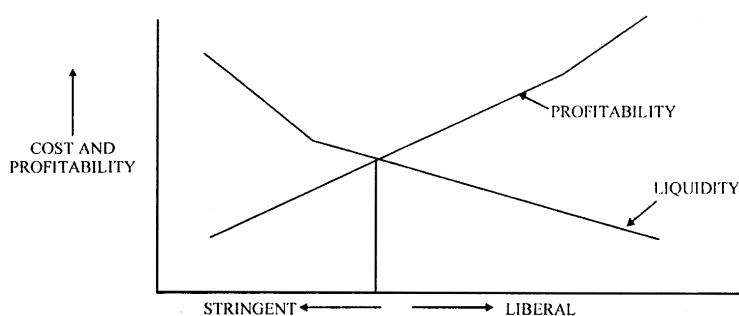


Fig.:

- c) **Cash Discount:** Cash discount is allowed to expedite the collection of receivables. The funds tied up in receivables are released. The concern will be able to use the additional funds received from expedited collections due to cash discount. The discount allowed involves cost. The financial manager should compare the earnings resulting from released funds and the cost of discount. The discount should be allowed only if its cost is less than the earnings from additional funds. If the funds cannot be profitably employed then discount should not be allowed.
- d) **Discount Period:** The collection of receivables is influenced by the period allowed for availing the discount. The additional period allowed for this facility may prompt some more customers to avail discount and make payments. This will mean additional funds released from receivables which may be alternatively used. At the same time the extending of discount period will result in late collection of funds because those who were getting discount and making payments as per earlier schedule will also delay their payments. For example, if the firm allowing cash discount for payments within seven days now extends it to payments within fifteen days. There may be more customers availing discount and paying early but there will be those also who were paying earlier within seven days will now pay in fifteen days. It will increase the collection period of the concern. Hence, this decision involves matching of the effect on collection period with the increased cost associated with additional customers availing the discount.

2. Executing Credit Policy

After formulating the credit policy, its proper execution is very important. The evaluation of credit applications and finding out the credit worthiness of customers should be undertaken.

- (a) **Collecting Credit Information:** The first step in implementing credit policy will be to gather credit information about the customers. This information should be adequate enough so that proper analysis about the financial position of the customers is possible. This type of investigation can be undertaken only upto a certain limit because it will involve cost. The cost incurred in collecting this information and the benefit from reduced bad debt losses will be compared. The credit information will certainly help in improving the quality of receivables but the cost of collecting information should not increase the reduction of bad debts losses.

(b) **Credit Analysis:** After gathering the required information, the finance manager should analyse it to find out the credit worthiness of potential customers and also to see whether they satisfy the standards of the concern or not. The credit analysis will determine the degree of risk associated with the account, the capacity of the customer to borrow and his ability and willingness to pay.

(c) **Credit Decision:** After analysing the creditworthiness of the customer, the finance manager has to take a decision whether the credit is to be extended and if yes then upto what level. He will match the creditworthiness of the customer with the credit standards of the company. If customer's creditworthiness is above the credit standards then there is no problem in taking a decision. It is only in the marginal cases that such decisions are difficult to be made. In such cases the benefit of extending the credit should be compared to the likely bad debt losses and then a decision should be taken.

In case the customer's are below the company's credit standards then they should not be outrightly refused. Rather they should be offered some alternative facilities. A customer may be offered to pay on delivery of goods, invoices may be sent through bank and released after collecting dues or some third party guarantee may be insisted. Such a course may help in retaining the customers at present and their dealings may help in reviewing their requests at a later date.

(d) **Financing Investments in Receivables and Factoring:** Accounts receivables block a part of working capital. Efforts should be made that funds are not tied up in receivables for longer periods. The finance manager should make efforts to get receivables financed so that working capital needs are met in time.

The banks allow raising of loans against security of receivables. Generally, banks supply between 60 to 80 per cent of the amount of receivables as loans against their security. The quality of receivables will determine the amount of loan. The banks

will accept receivables of dependable parties only. Another method of getting funds against receivables is their outright sale to the bank. The bank will credit the amount to the party after deducting discount and will collect the money from the customers later. Here too. The bank will insist on quality receivables only.

Besides banks, there may be other agencies which can buy receivables and pay cash for them. This facility is known as factoring. The factor will purchase only the accounts acceptable to him and may refuse purchase in certain cases. The factoring may be with or without recourse. If it is without recourse then any bad debt loss is taken up by the factor but if it is with recourse then bad debts losses will be recovered from the seller. The factor may suggest the customers for whom he will extend this facility. The factoring service varies from bill discounting facilities offered by commercial banks to a total take over of administration of the sales ledger and credit control functions.

3. Formulating and Executing Collection Policy

The collection of amounts due to the customers is very important. The concern should devise procedures to be followed when accounts become due after the expiry of credit period. The collection policy be termed as strict and lenient. A strict policy of collection will involve more efforts on collection. Such a policy has both plus and negative effects. This policy will enable early collection of dues and will reduce bad debt losses. The money collected will be used for other purposes and the profits of the concern will go up.

The collection policy should also devise the steps to be followed in collecting over due amounts. The objective is to collect the dues and not to annoy the customer. The steps should be like (i) sending a reminder for payments (ii) Personal request through telephone etc. (iii) Personal visits to the customers (iv) Taking help of collecting agencies and lastly (v) Taking legal action. The last step should be taken only after exhausting

all other means because it will have a bad impact on relations with customers. The genuine problems of customers should never be ignored while making collections. The aim should be to make collections and keep amiable relations with customers.

Q32. Explain the impact of the following changes on the level of the firms receivables.

Ans :

Impact of Changes on Level of Firm's Receivables :

(i) Increase in Interest Rates

When interest rate increases and becomes equal to the increased cost of capital which is used for financing the investment, then value of the firm is found to have increased. The risk involved in investment determines the rate of return. When risk in investment is high the rate of return (interest rate) will also be high.

(ii) Increase in Selling and Distribution Costs

Increase in selling and distribution costs indicate an increase in the level of sales. The sales can be increased by loosening the credit policy of the firm whereas, a tight credit policy results in sales decline.

(iii) The general economic conditions have slackened and its impact can be seen in the firm's sales. The economic conditions have impact on customer's ability to pay. When economic conditions slowdown the sales of the firm will also decrease, because the capability and willingness of customers to pay are highly influenced by economic conditions.

PROBLEMS ON RECEIVABLE MANAGEMENT

17. The following information is available for a company :

Monthly credit sales	Rs.10,00,000
Average maturity period	40 days
Factor fees/commission	1%
Interest rate charged by factor	15%
Collection department's cost (if there is no factoring)	Rs. 4,500 per month
Factor's average remittance period	10 days
The company's cost of raising funds (other than factor)	24%

Calculate the effective interest rate charged by the factor and advise the company ignoring all other factors including risk of default.

Sol.

- 1) Number of days for which the funds are advanced by the factor

$$= 40 - 10 = 30 \text{ days.}$$
- 2) Calculation of total costs of financing through factor :

Particulars	Amount
Factor's fee and commission $\left(10,00,000 \times \frac{1}{100}\right)$	10,000
Interest charges $\left(10,00,000 \times \frac{15}{100} \times \frac{30}{360}\right)$	12,500
Total of fee and interest charges	22,329
Less : Saving in collection department's cost	4,500
Total financing cost (Net)	17,829

- 3) Calculation of effective interest rate :

$$\frac{17,829}{10,00,000} \times \frac{365}{30} \times 100 = 21.69\%$$

- 4) As the effective rate of interest charged by the factor is 21.69% and the firm can raise funds from other sources at 24% p.a. it is advised that the firm should avail the services of the factor.

- 18. Bharat Ltd. decides to liberalise credit to increase its sales. The liberalised credit policy will bring additional sales of Rs. 3,00,000. The variable costs will be 60% of sales and there will be 10% risk for non-payment and 5% collection costs. Will the company benefit from the new credit policy ?**

Sol.

(Imp.)

Particulars	Amount
Additional Sales revenue	3,00,000
Less : Variable Cost (60%)	1,80,000
Incremental Revenue	1,20,000
Less : 10% for non-payment risk	30,000
	90,000
Less : 5% for costs of collection	15,000
Additional Revenue from increased sales due to liberal credit policy	75,000

The company will be benefitted from the new credit policy because the increase in revenue is more than the costs of providing additional credit. In fact, the profit of the company will increase by Rs. 75,000.

- 19. Dryson Ltd. provides the following informations :**

Particulars	Amount
Cash sales during the year	1,50,000
Credit sales during the year	2,70,000
Returns inward	20,000
Trade debtors in the beginning	55,000
Trade debtors at the end	45,000
Provision for bad and doubtful debts	5,000

Calculate :

(i) Debtors Turnover Ratio

(ii) Average Collection Period

Note : Take 360 days in a year and all returns are from credit sales.

Sol.

$$(i) \text{ Debtors Turnover Ratio} = \frac{\text{Net Credit Annual Sales}}{\text{Average Trade Debtors}} = \frac{2,70,000 - 20,000}{(55,000 + 45,000) \times \frac{1}{2}} = \frac{2,50,000}{50,000} = 5 \text{ times}$$

$$(ii) \text{ Average Collection Period} = \frac{\text{No. of Working Days}}{\text{Debtors Turnover Ratio}} = \frac{360}{5} = 72 \text{ days}$$

$$\begin{aligned} (\text{OR}) \text{ Average Collection Period} &= \frac{\text{Average Trade Debtors} \times \text{No. of Working Days}}{\text{Net Credit Sales}} \\ &= \frac{50,000 \times 360}{2,50,000} = 72 \text{ days.} \end{aligned}$$

3.4 INVENTORY MANAGEMENT

3.4.1 Meaning

Q33. Define the term inventory.

Ans :

Meaning

The dictionary meaning of inventory is 'stock of goods'. The word 'Inventory' is understood differently by Various authors. In accounting language it may mean stock of finished goods only. In a manufacturing concern, it may include raw materials, work in process and stores, etc.

Definitions

- i) International Accounting Standard Committee (I.A.S.C)** defines inventories as "Tangible property
 - Held for sale in the ordinary course of business,
 - In the process of production for such sale or,
 - To be consumed in the process of production of goods or services for sale".
- ii) According to The American Institute of Certified Public Account (AICPA)** defines "inventory in the sense of tangible goods, which are held for sale, in process of production and available for ready consumption".
- iii) According to Bolten S.E.,** "Inventory refers to stock-pile of product, a firm is offering for sale and components that make up the product'.

3.4.2 Components of Inventory

Q34. What are the Components of Inventory ?

Ans :

(Imp.)

1. Raw Materials

Raw materials are those inputs that are converted into finished goods through the manufacturing process. These form a major input for manufacturing a product. In other words, they are very much needed for uninterrupted production.

2. Work-in-Process

Work-in-process is that stage of stocks that are between raw materials and finished goods. Work-in-process inventories are semi-finished products. They represent the products that need to undergo some other process to become finished goods.

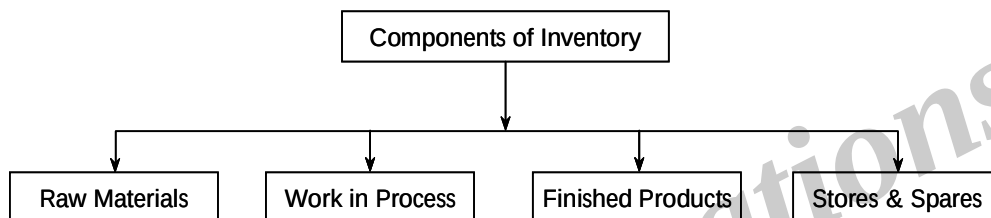


Fig.: Components of Inventory

3. Finished Products

Finished products are those products, which are ready for sale. The stock of finished goods provides a buffer between production and market

4. Stores & Spares

Stores & spares inventory (include office and plant cleaning materials like, soap, brooms, oil, fuel, light bulbs, etc..) are those purchased and stored for the purpose of maintenance of machinery.

Q35. Explain various types of inventory.

Ans :

There are various types of inventory which are as follows :

1. **Movement Inventories:** Movement inventories are also called transit or pipeline inventories. Their existence owes to the fact that transportation time is involved in transferring substantial amounts of resources.

For example, when coal is transported from the coalfield to an industrial town by trains, then the coal, while in the transit, cannot provide any service to the customers for power generation or for burning in furnaces.

2. **Buffer Inventories:** Buffer inventories are held to protect against the uncertainties of demand and supply. An organization generally knows the average demand for various items that it needs. However, the actual demand may not exactly match the average and could well exceed it. To meet this kind of a situation, inventories may be held in excess of the average for expected demand. Similarly, the average delivery time (that is, the time elapsing between placing an order and having the goods in stock ready for use, and technically called as the lead time) may be known. But unpredictable events could cause the actual delivery time to be more than the average.

Thus, excess stocks might be kept in order to meet the demand during the time for which the delivery is delayed. These inventories which are in excess of those necessary just to meet the average demand (during the average lead time period), held for protecting against the fluctuations in demand and lead-time are known also by the term **safety stocks**.

3. **Anticipation Inventories:** Anticipation inventories are held for the reason that a future demand for the product is anticipated. Production of specialized times like crackers well before Diwali, umbrellas and raincoats before rains set in, fans while summers are approaching; or the piling up of inventory stocks when a strike is on the anvil, are all examples of anticipation inventories.
4. **Decoupling Inventories:** The idea of the decoupling inventories is to decouple, or disengage, different parts of the production system. As we can observe easily, different machines/equipment and people normally work at different rates: some slower and some faster. A machine, **for example**, might be producing half the output of the machine on which the item being handled is to be processed the next. Inventories in between the various machines are held in order to disengage the processing on those machines. In the absence of such inventories, different machines and people cannot work simultaneously on a continuous basis. When such inventories are held, then, even if a machine breaks down, the work on others would not stop.
5. **Cycle Inventories:** Cycle inventories are held for the reason that purchases are usually made in lots rather than for the exact amounts which may be needed at a point of time. Of course, if all purchases are made exactly as and when the item is required, there would be no cycle inventories. But, practically, purchases are made in lots, the reason being that if purchases are made frequently and in small numbers, then the cost involved in obtaining the items would be very large.

6. **Independent Demand Inventory:** Inventory item whose demand is not related to (or dependent upon) some higher level item. Demand for such items is usually thought of as forecasted demand. Independent demand inventory items are usually thought of as finished products.

7. **Dependent Demand Inventory:** Inventory item whose demand is related to (or dependent upon) some higher level item. Demand for such items is usually thought of as derived demand. Dependent demand inventory items are usually thought of as the materials, parts, components, and assemblies that make up the finished products.

3.4.3 Motives of Holding Inventory

Q36. Explain the various Motives of Holding Inventory.

Ans :

The motives for holding inventories are as follows:

1. Transaction Motive

Every firm has to maintain some level of inventory to meet the day to day requirements of sales, production process, customer demand etc. This motive makes the firm to keep the inventory of finished goods as well as raw materials. The inventory level will provide smoothness to the operations of the firm. A business firm exists for business transactions which require stock of goods and raw materials.

2. Precautionary Motive

A firm should keep some inventory for unforeseen circumstances also.

For example, the fresh supply of raw material may not reach the factory due to strike by the transporters or due to natural calamities in a particular area. There may be labour problem in the factory and the production process may halt. So, the firm must have inventories of raw materials as well as finished goods for meeting such emergencies.

3. Speculative Motive

The firm may be tempted to keep some inventory in order to capitalize an opportunity to make profit e.g., sufficient level of inventory may help the firm to earn extra profit in case of expected shortage in the market.

3.4.4 Objectives of Inventory Management

Q37. What are the main Objectives of Inventory Management?

Ans : (Jan.-18)

The main objective of inventory management is to maintain inventory at appropriate level to avoid excessive or shortage of inventory because both the cases are undesirable for business. Thus, management is faced with the following conflicting objectives:

1. To keep inventory at sufficiently high level to perform production and sales activities smoothly.
2. To minimize investment in inventory at minimum level to maximize profitability.
3. To ensure that the supply of raw material & finished goods will remain continuous so that production process is not halted and demands of customers are duly met.
4. To minimize carrying cost of inventory.
5. To keep investment in inventory at optimum level.
6. To reduce the losses of theft, obsolescence & wastage etc.
7. To make arrangement for sale of slow moving items.
8. To minimize inventory ordering costs.

3.4.5 Tools and Techniques of Inventory Control

Q38. Explain the Tools and Techniques of Inventory Control.

Ans : (Imp.)

Effective Inventory management requires an effective control system for inventories. A proper inventory control not only helps in solving the acute

problem of liquidity but also increases profits and causes substantial reduction in the working capital of the concern. The following are the important tools and techniques of inventory management and control :

1. Determination of Stock Levels.
2. Determination of Safety Stocks.
3. Selecting a proper System of Ordering for Inventory.
4. Determination of Economic Order Quantity.
5. A.B.C. Analysis.
6. V E D Analysis
7. Inventory Turnover Ratios
8. Aging Schedule of Inventories
9. Classification and Codification of Inventories
10. Preparation of Inventory Reports
11. Lead Time
12. Preperctual Inventory System
13. JIT Control System

1. Determination of Stock Levels

Carrying of too much and too little of inventories is detrimental to the firm. If the inventory level is too little, the firm will face frequent stock-outs involving heavy ordering cost and if the inventory level is too high it will be unnecessary tie-up of capital. Therefore, an efficient inventory management requires that a firm should maintain an optimum level of inventory where inventory costs are the minimum and at the same time there is no stock-out which may result in loss of sale or stoppage of production. Various stock levels are discussed as such.

(a) **Minimum Level:** This represents the quantity which must be maintained in hand at all times. If stocks are less than the minimum level then the work will stop due to shortage of materials. Following factors are taken into account while fixing minimum stock level :

- **Lead Time.** A purchasing firm requires some time to process the order and time

is also required by the supplying firm to execute the order. The time taken in processing the order and then executing it is known as lead time. It is essential to maintain some inventory during this period.

- **Rate of Consumption.** It is the average consumption of materials in the factory. The rate of consumption will be decided on the basis of past experience and production plans.
- **Nature of Material.** The nature of material also affects the minimum level. If a material is required only against special orders of the customer then minimum stock will not be required for such materials. Minimum stock level can be calculated with the help of following formula :

$$\text{Minimum stock level} = \text{Re-ordering level} - (\text{Normal consumption} \times \text{Normal Re-order period})$$

- (b) **Re-ordering Level:** When the quantity of materials reaches at a certain figure then fresh order is sent to get materials again. The order is sent before the materials reach minimum stock level. Re-ordering level or ordering level is fixed between minimum level and maximum level. The rate of consumption, number of days required to replenish the stocks, and maximum quantity of materials required on any day are taken into account while fixing re-ordering level. Re-ordering level is fixed with the following formula :

$$\text{Re-ordering Level} = \text{Maximum Consumption} \times \text{Maximum Re-order period}$$

- (c) **Maximum Level:** It is the quantity of materials beyond which a firm should not exceed its stocks. If the quantity exceeds maximum level limit then it will be overstocking. A firm should avoid overstocking because it will result in high material costs. Overstocking will mean blocking of more working capital, more space for storing the materials, more wastage of materials and more chances of losses from obsolescence. Maximum stock level will depend upon the following factors :

- The availability of capital for the purchase of materials.
- The maximum requirements of materials at any point of time.
- The availability of space for storing the materials.
- The rate of consumption of materials during lead time.
- The cost of maintaining the stores.
- The possibility of fluctuations in prices.
- The nature of materials. If the materials are perishable in nature, then they cannot be stored for long.
- Availability of materials. If the materials are available only during seasons then they will have to be stored for the rest of the period.
- Restrictions imposed by the Government. Sometimes, government fixes the maximum quantity of materials which a concern can store. The limit fixed by the government will become the limiting factor and maximum level cannot be fixed more than this limit.
- The possibility of change in fashions will also affect the maximum level.

The following formula may be used for calculating maximum stock level :

$$\text{Maximum Stock Level} = \text{Re-ordering Level} + \text{Re-ordering Quantity} - (\text{Minimum Consumption} \times \text{Minimum Re-ordering period})$$

- (d) **Danger Level :** It is the level beyond which materials should not fall in any case. If danger level arises then immediate steps should be taken to replenish the stocks even if more cost is incurred in

arranging the materials. If materials are not arranged immediately there is a possibility of stoppage of work. Danger level is determined with the following formula:

$$\text{Danger Level} = \text{Average Consumption} \times \text{Maximum re-order period for emergency purchases}$$

(e) **Average Stock Level.** The average stock level is calculated as such :

$$\text{Average Stock Level} = \frac{\text{Minimum Stock Level} + \text{Maximum Stock Level}}{2}$$

2. Determination of Safety Stocks

Safety stock is a buffer to meet some unanticipated increase in usage. The usage of inventory cannot be perfectly forecasted. It fluctuates over a period of time. The demand for materials may fluctuate and delivery of inventory may also be delayed and in such a situation the firm can face a problem of stock-out. The stock-out can prove costly by affecting the smooth working of the concern. In order to protect against the stockout arising out of usage fluctuations, firms usually maintain some margin of safety or safety stocks.

The basic problem is to determine the level of quantity of safety stocks. Two costs are involved in the determination of this stock i.e. opportunity cost of stock-outs and the carrying costs. The stock-outs of raw materials cause production disruption resulting into higher cost of production. Similarly, the stock-outs of finished goods result into the failure of the firm in competition as the firm cannot provide proper customer service. If a firm maintains low level of safety frequent stock-outs will occur resulting into the larger opportunity costs. On the other hand, the larger quantity of safety stocks involve higher carrying costs.

3. Ordering Systems of Inventory

The basic problem of inventory is to decide the re-order point. This point indicates when an order should be placed. The re-order point is determined with the help of these things : (a) average consumption rate, (b) duration of lead time, (c) economic order quantity, when the inventory is depleted to lead time consumption, the order should be placed. There are three prevalent systems of ordering and a concern can choose any one of these :

- (a) Fixed order quantity system generally known as economic order quantity (EOQ) system ;
- (b) Fixed period order system or periodic re-ordering system or periodic review system ;
- (c) Single order and scheduled part delivery system.

4. Economic Order Quantity (EOQ)

A decision about how much to order has great significance in inventory management. The quantity to be purchased should neither be small nor big because costs of buying and carrying materials are very high. Economic order quantity is the size of the lot to be purchased which is economically viable.

This is the quantity of materials which can be purchased at minimum costs. Generally, EOQ is the point at which inventory carrying costs are equal to order costs. In determining economic order quantity it is assumed that cost of managing inventory is made up solely of two parts i.e. ordering costs and carrying costs.

(i) **Ordering Costs:** These are the costs which are associated with the purchasing or ordering of materials. These costs are also known as buying costs and will arise only when some purchases are made.

These costs will include costs of setting up machinery for manufacturing materials, time taken up in setting, cost of tools etc.

- (ii) **Carrying Costs:** These are the costs for holding inventories. These costs will not be incurred if inventories are not carried. The Planning Commission of India has estimated these costs between 15 percent to 20 percent of total costs. The longer the materials kept in stocks, the costlier it becomes by 20 percent every year.

The ordering and carrying costs have a reverse relationship. The ordering cost goes up with the increase in number of orders placed. On the other hand, carrying costs go down per unit with the increase in number of units, purchased and stored.

Assumptions of EOQ

While calculating EOQ the following assumptions are made.

- The supply of goods is satisfactory. The goods can be purchased whenever these are needed.
- The quantity to be purchased by the concern is certain.
- The prices of goods are stable. It results to stabilize carrying costs.

The EOQ can be calculated by using the following formula

$$EOQ = \sqrt{\frac{2AS}{I}}$$

Where

A = Annual consumption in rupees.

S = Cost of placing an order

I = Inventory carrying costs of one unit.

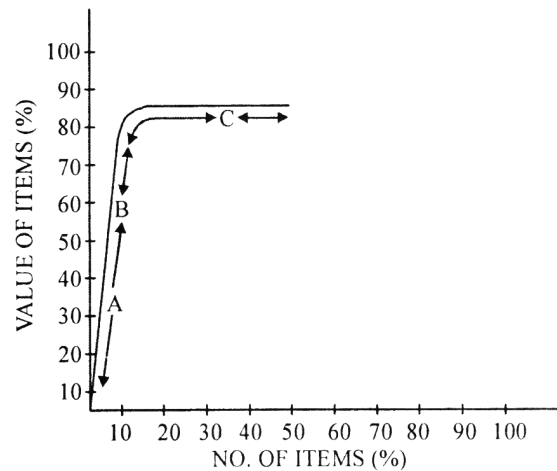
5. A-B-C Analysis

The materials are divided into a number of categories for adopting a selective approach for material control. It is generally seen that in manufacturing concern, a small percentage of items contribute a large percentage of value of consumption and a large percentage of items of materials contribute a small percentage of value. In between these two limits there are some items which have almost equal percentage of value of materials.

Under A-B-C analysis, the materials are divided into three categories **viz.**, A, B and C. Past experience has shown that almost 10 per cent of the items contribute to 70 per cent of value of consumption and this category is called 'A' Category. About 20 per cent of the items contribute about 20 per cent of value of consumption and this is known as category 'B' materials. Category 'C' covers about 70 per cent of items of materials which contribute only 10 per cent of value of consumption. There may be some variation in different organizations and an adjustment can be made in these percentages.

The information is shown in the following diagram :

Class	No. of Items %	Value of Items %
A	10	70
B	20	20
C	70	10



A-B-C analysis helps to concentrate more efforts on category A since greatest monetary advantage will come by controlling these items. An attention should be paid in estimating requirements, purchasing, maintaining safety stocks and properly storing of 'A' category materials.

These items are kept under a constant review so that a substantial material cost may be controlled. The control of 'C' items may be relaxed and these stocks may be purchased for the year. A little more attention should be given towards 'B' category items and their purchase should be undertaken at quarterly or half-yearly intervals.

The following example will explain the advantages of A-B-C analysis :

Suppose three items P, Q, R have been used and their consumption is Rs. 2,40,000, Rs. 24,000 and Rs. 2,400 respectively. Let us presume that A-B-C classification is not done and annual orders are 12 in number. Each item will be ordered 4 times and average inventory will be :

Item	Annual consumption (Rs)	No. of orders	Average working inventory (Rs.)
P	2,40,000	4	60,000
Q	24,000	4	6,000
R	2,400	4	600
	2,66,400	12	66,600

Suppose A-B-C analysis is followed and the number of orders will be according to the importance of the items. If the number of orders are 8, 3 and 1, for items P, Q and R respectively then the average inventory will be as follows :

Item	Annual consumption (Rs)	No. of orders	Average working inventory (Rs.)
P	2,40,000	8	30,000
Q	24,000	3	8,000
R	2,400	1	2,400
Total	2,66,400	12	40,400

When A-B-C analysis was not followed the average inventory was Rs. 66,600 and after following A-B-C analysis the average inventory came down to Rs. 40,400. Average value of inventory is nearly 1V4 times in the earlier situation, than as compared to the second situation.

6. VED Analysis

The VED analysis is used generally for spare parts. The requirements and urgency of spare parts is different from that of materials. A-B-C analysis may not be properly used for spare parts. The demand for spares depends upon the performance of the plant and machinery. Spare parts are classified as Vital (V), Essential (E) and Desirable (D).

The vital spares are a must for running the concern smoothly and these must be stored adequately. The non-availability of vital spares will cause havoc in the concern. The E type of spares are also necessary but their stocks may be kept at low figures. The stocking of D type of spares may be avoided at times. If the lead time of these spares is less, then stocking of these spares can be avoided.

The classification of spares under three categories is an important decision. A wrong classification of any spare will create difficulties for production department. The classification of spares should be left to the technical staff because they know the need, urgency and use of these spares.

7. Inventory Turnover Ratios

Inventory turnover ratios are calculated to indicate whether inventories have been used efficiently or not. The purpose is to ensure the blocking of only required minimum funds in inventory. The Inventory Turnover Ratio also known as stock velocity is normally calculated as sales/average inventory or cost of goods sold/average inventory cost. Inventory conversion period may also be calculated to find the average time taken for clearing the stocks.

Symbolically,
Net Sales

$$\text{Inventory Turn Over Ratio} = \frac{\text{Net Sales}}{(\text{Average}) \text{ Inventory}}$$

$$\text{and, Inventory Conversion Period} = \frac{\text{Day in a year}}{\text{Inventory Turnover Ratio}}$$

We have already discussed these ratios at length in the chapter of Ratio Analysis.

8. Aging Schedule of Inventories

Classification of inventories according to the period (age) of their holding also helps in identifying low moving inventories thereby helping in effective control and management of inventories. The following table shows aging of inventories of a firm.

Aging Schedule of Inventories

Item Name/Code	Age Classification	Date of Acquisition	Amount (Rs.)	% age to total
001	0-15 days	June 25,2005	30,000	15
002	16-30 days	June 10,2005	60,000	30
003	31-45 days	May 20,2005	50,000	25
004	46-60 days	May 5,2005	40,000	20
005	61 and above	April 12,2005	20,000	10
			2,00,000	100

9. Classification and Codification of Inventories

The inventories may be classified either according to their nature or according to their use. Generally, materials are classified according to their nature such as construction materials, consumable stocks, spares, lubricants, etc. After classification, the materials are given code numbers. The coding may be done alphabetically or numerically. The latter method is generally used for coding. The class of materials is assigned two digits and then two or three digits are assigned to the category of materials in that class. The third distinction is needed for the quality of goods and decimals are used to note this factor.

Example. A concern has two categories of items divided into 15 groups. Two numbers will be used for main category and two in the sub-groups (because the number is 15 i.e., more than 9) and then decimals will be used to the quality etc. If mobile oil is to be coded, two digits will be used in the category, i.e., lubricant oils say 12, two digits will be used for mobile oil, say 56 and one digit may be used for the quality of mobile oil, say. 1. The code of mobile oil will be 1256.1.

The classification and coding of inventories enables the introduction of mechanised accounting. It also helps in maintaining a secrecy of description. It also helps the prompt issue of stores.

10. Inventory Reports

From effective inventory control, the management should be kept informed with the latest stock position of different items. This is usually done by preparing periodical inventory reports. These reports should contain all information necessary for managerial action. On the basis of these reports management takes corrective action wherever necessary. The more frequently these reports are prepared the less will be the chances of lapse in the administration of inventories.

11. Lead Time

Lead time is the period that elapses between the recognition of a need and its fulfillment. There is a direct relationship between lead time and inventories. The level of inventory of an item depends upon the length of its lead time. Suppose, lead time is one month. Any action taken now will have an effect only one month later. So inventory for the current month must be in hand. During lead time there will be no delivery of materials and consuming departments will have to be served from the inventories held.

Lead time has two components : Lead time for company (administrative lead time) from initiation of procurement action until the placing of an order, and the lead time for the producer, known as delivery lead time from the placing of an order until the delivery of the ordered material. Administrative lead time also follows after the delivery is taken. The functions of inspection, material handling, transportation in the factory also take some time. Administrative lead time is in the hands of those who are dealing with material procurement. Delivery lead time has to be negotiated at the time of preparing purchase contract.

It is often seen that bulk of the lead time is taken up by administrative lead time. This is the time over which company has control but still too much time is taken up in receiving and dispecting of goods. A businessman may find to his frustration that the goods which he has persuaded a supplier to deliver in an extremely short time have been lying in his own goods inwards department after delivery. Stock control or purchase section of the organization should maintain lead time schedules for all groups of materials.

12. Perpetual Inventory System

The stock taking may either be done annually or continuously. In the latter method, the stock taking continues throughout the year. A schedule is prepared for stock taking of various bins (store rooms). One bin is selected at random and the goods are checked as per

shown in the bin card. Then some other bin is selected at random and so on. The personnel associated with store-keeping are not told of stock taking programme because store rooms are chosen at random. The Institute of Cost and Management Accountants, London defines perpetual inventory system as “ a system of records maintained by the controlling department, which reflects the physical movements of stocks and their current balance.” The stores ledger and bin cards are helpful in this system because these records help in knowing the movement of stores. This facilitates regular checking of stores without closing down the plant.

Procedure

The following procedure is followed for perpetual inventory system :

1. The upto date position in stores ledger and bin cards should be made to know the current balance of stores.
2. The stores are selected in rotation for checking the items physically. Some items are taken up every day for verification. The programme is planned in such a way that in a year every item is checked 3-4 times.
3. The stores which have not been inspected as yet should not be mixed with other stores because no entries are made for such items.
4. There is a surprise checking everytime. The store-keeper is informed of stock taking only one the day of checking. This promotes store-keepers to keep their records upto date.
5. The physical stock available in the store after counting, weighing etc. is recorded on sheets provided for this purpose.

Advantages

Perpetual inventory system has the following advantages :

1. **Quick Calculation of Closing Stock:** Under perpetual inventory system, the stock is checked regularly

throughout the year. It becomes easy to value stores at the end of financial year. It helps in preparing Profit and Loss A/c and Balance Sheet without loss of time.

2. **Helpful in Formulating Purchase Policies:**

This system of stock taking is also helpful in formulating purchase policies. The store-keeper is in know of the requirements of various departments. He can also tell the time, quantity and quality of materials needed by production departments. Such information is very useful in preparing purchase policies.

3. **Check on Stores Personnel:**

The system of continuous stock taking acts as a check on personnel incharge of stores. They are not told of checking programme in advance. Every store incharge will keep his stores properly because stock verification can be done anytime. This system also prevents pilferage of stores.

4. **Helpful in Production Planning:**

Production planning can be done according to the availability of materials in stores because management is constantly kept informed of stores position.

5. **Investments Under Check:**

This system helps in keeping investments in stock under check. There are minimum and maximum stock levels within which stock limits are maintained. This system helps in avoiding under stocking and over stocking of stores and investments in inventory are kept under check.

6. **Errors and Shortages Easily Detected:**

The regular checking of stocks helps in detecting errors and shortages in stores. There may be a wrong entry in either stores ledger or in bin card. Such mistakes will be detected while stocks are checked. Similarly the physical verification of stocks with entries in stores ledger will help in detecting shortage of stores.

7. Increasing Efficiency of Organization: This system will help in maintaining proper stocks in stores. The regular supply of stocks at proper time will enhance the efficiency of the whole organization.

13. Just In Time (JIT) Inventory Control System

Just in time philosophy, which aims at eliminating waste from every aspect of manufacturing and its related activities, was first developed in Japan. Toyota introduced this technique in 1950's in Japan, however, U.S. companies started using this technique in 1980's. The term JIT refers to a management tool that helps to produce only the needed quantities at the needed time.

According to the official terminology of C.I.M.A., JIT, is "a technique for the organization of workflows, to allow rapid, high quality, flexible production whilst minimizing manufacturing work and stock level." There are broadly two aspects of JIT (i) just in time production, and (ii) just in time purchasing. Schonberger defines, JIT as, "to produce and deliver finished goods just in time to be sold, sub-assemblies just in time to be assembled into finished goods, fabricates parts just in time to go into sub-assemblies and purchased materials just in time to be transformed into fabricated parts.

Just in time inventory control system involves the purchase of materials in such a way that delivery of purchased material is assured just before their use or demand. The philosophy of JIT control system implies that the firm should maintain a minimum (zero level) of inventory and rely on suppliers to provide materials just in time to meet the requirements. The traditional inventory control system, on the other hand, requires maintaining a healthy level of safety stock to provide protection against uncertainties of production and supplies.

Objectives

The ultimate goal of JIT is to reduce wastage and enhance productivity. The important objectives of JIT include :

- i) Minimum/zero inventory and its associated costs.
- ii) Elimination of non-value added activities and all wastes.
- iii) Minimum batch/lot size.
- iv) Zero breakdowns and continuous flow of production.
- v) Ensure timely delivery schedules both inside and outside the firm.
- vi) Manufacturing the right product at right time.

Features

The main features of JIT inventory control system are as follows :

- a) It emphasises that firms following traditional inventory control system overestimate ordering cost and underestimate carrying costs associated with holding of inventories.
- b) It advocates maintaining good relations with suppliers so as to enable purchases of right quantity of materials at right time.
- c) It involves frequent production/order runs because of smaller batch/lot sizes.
- d) It requires reduction in set up time as well as processing time.
- e) The major focus of JIT approach is to purchase or produce in response to need rather than as per the plans and forecasts.

Advantages

The following are the major advantages of just in time inventory control system :

- i) The right quantities of materials are purchased or produced at the right time.
- ii) Investment in inventory is reduced.
- iii) Wastes are eliminated.
- iv) Carrying or holding cost of inventory is also reduced because of reduced inventory.
- v) Reduction in costs of quality such as inspection, costs of delayed delivery, early delivery, processing documents etc. resulting into overall reduction in cost.

PROBLEMS ON INVENTORY MANAGEMENT

20. The finance department of a corporation provides the following information carrying cost per unit of inventory is Rs.10, cost per order is Rs.20. No. of units required is 30,000 units. Determine

- (i) EOQ,
 (ii) Total number of order to be place in year
 (iii) Time gap between 2 order.

Sol.

(Imp.)

$$EOQ = \sqrt{\frac{2AO}{C}}$$

A = 30,000 units

O = 20 Rs. per order

C = 10 Rs.

(i) $EOQ = \sqrt{\frac{2 \times 30,000 \times 20}{10}} = 346$

(ii) Total number of order = $\frac{A}{EOQ} = \frac{30,000}{346} = 86.7 = 87$ orders

(iii) Time gap between 2 consecutive order = $\frac{\text{No. of year}}{\text{No. of orders}} = \frac{12}{87} = 0.13$.

21. From the following information, calculate minimum stock level, maximum stock level and reordering level :

i) Maximum Consumption	200 units per day
ii) Minimum Consumption	150 units per day
iii) Normal Consumption	160 unit per day
iv) Re-order period	10 – 15 days
v) Re-order quantity	1,600 units.
vi) Normal re-order period	12 days

Sol.

$$\text{Re-ordering level} = \text{Maximum Consumption} \times \text{Maximum Re-order Period}$$

$$200 \times 15 = 300 \text{ units}$$

$$\text{Minimum Stock level} = \text{Re-ordering level} - (\text{Normal Consumption} \times \text{Normal Re-ordering Period})$$

$$= 3,000 - (160 \times 12) = 3000 - 1920 = 1,080 \text{ units.}$$

$$\text{Maximum stock level} = \text{Re-ordering Level} + \text{Re-order Quantity} - (\text{Minimum Consumption} \times \text{Minimum Re-order Period})$$

$$= 3,000 + 1,600 - (150 \times 10)$$

$$= 3,000 + 1,600 - 1,500 = 4600 - 1500 = 3100 \text{ units}$$

22. From the following information, find out economic order quantity.

Annual Usage, 10,000 units

Cost of placing and receiving one order Rs. 50.

Cost of materials per unit Rs. 25

Annual Carrying cost of one unit : 10% of inventory value.

Sol.

$$EOQ = \sqrt{\frac{2AO}{C}}$$

Where, A = Annual consumption in units

O = Cost of placing an order

C = Inventory carrying cost of one unit

$$\begin{aligned} EOQ &= \sqrt{\frac{2 \times 10,000 \times 50}{2.5}} \left[\text{as } I = \frac{25 \times 10}{100} = 2.5 \right] \\ &= \sqrt{4,00,000} = 632 \text{ units.} \end{aligned}$$

23. The annual demand for a product is 6,400 units. The unit cost is Rs. 6 and inventory carrying cost per unit per annum is 25% of the average inventory cost. If the cost of procurement is Rs. 75, determine :

- (a) Economic order quantity (EOQ)**
- (b) Number of orders per annum ; and**
- (c) Time between two consecutive orders.**

Sol.

(a) Economic order quantity (EOQ)

$$EOQ = \sqrt{\frac{2AO}{C}}$$

Where, A = Annual consumption in units = 6,400 units

S = Cost of placing an order = Rs. 75

I = Inventory carrying cost of one unit

$$= 6 \times \frac{25}{100} = \text{Rs. } 1.50$$

$$\begin{aligned} EOQ &= \sqrt{\frac{2 \times 6400 \times 75}{1.50}} = \sqrt{\frac{9,60,000}{1.50}} \\ &= \sqrt{6,40,000} = 800 \text{ units} \end{aligned}$$

(b) Number of orders per annum

$$= \frac{6,400}{800} = 8 \text{ orders}$$

(c) Time between two consecutive orders

$$= \frac{12 \text{ months}}{8 \text{ orders}}$$

$$= 1.5 \text{ months}$$

24. A manufacturing firm using 12 different types materials has given the following data,

Item	Units	Unit cost (Rs.)	Item	Unit	Unit cost (Rs.)
A	3,000	80	G	14,600	13.50
B	32,000	1	H	7,800	8
C	9,000	42	I	11,200	6.50
D	1,600	120	J	48,000	3
E	28,000	4	K	15,600	7.50
F	11,500	10	L	13,300	11.50

You are required to present an ABC plan and depict the same graphically.

Sol.

Step 1

Determination of Annual Consumption Value

Item	[Annual consumption (Units × Unit Price)]	Annual consumption Value (ACV)
A	3000 × 80	32,000
B	32,000 × 1	32,200
C	9,000 × 42	3,78,000
D	1,600 × 120	1,92,000
E	28,000 × 4	1,12,000
F	11,500 × 10	1,15,000
G	14,600 × 13.50	1,97,100
H	7,800 × 8	62,400
I	11,200 × 6.50	72,800
J	48,000 × 3	1,44,000
K	15,600 × 7.50	1,17,000
L	13,300 × 11.50	1,52,950
		18,15,250

Step 2

Rearrange the items in the descending order of annual consumption value and calculating the cumulative (ACV).

Items	Units	% of Cumulative Total	Unit cost	Total	% of Cumulative Total
C	9,000	4.6	42	3,78,000	20.8
A	3,000	1.5	80	2,40,000	13.2
G	14,600	7.5	13.50	1,97,100	10.8
D	1,600	0.8	120	1,92,000	10.5
L	13,300	6.7	11.50	1,52,950	8.4
J	48,000	24.5	3	1,44,000	7.9
K	15,600	7.9	7.50	1,17,000	6.4
F	11,500	5.8	10	1,15,000	6.3
E	28,000	14.3	4	1,12,000	6.1
I	11,200	5.7	6.50	72,800	4.0
H	7,800	3.9	8	62,400	3.4
B	32,000	16.3	1	32,000	1.7
	1,95,600			18,15,250	

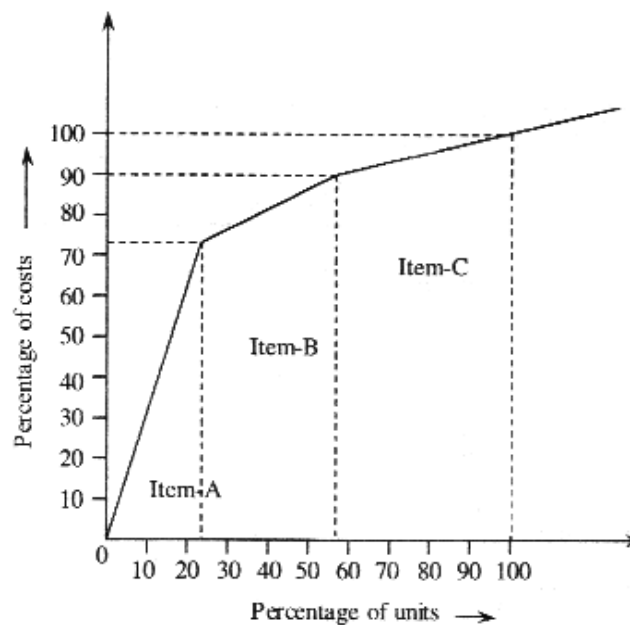
Step 3 : Construction of ABC Graph.

Fig.: Graphical Representation of ABC Analysis

In the tabular and graphical representation, it is clear that Item-A occupies 21.1% of total units and represents cost of 71.6% and Item-B occupies 59.3% of total units and represents 90.7% of cost. Finally Item-C occupies 40.2% of total units and 9.1% of total cost.

Exercise Problems

1. From the following details you are required to make an assessment of the average amount of working capital requirement of ABC Ltd.

Particulars	Average Period of Credit	Estimate for the 1st Year (₹)
Purchase of material	6 weeks	26,00,000
Wages	$1\frac{1}{2}$ weeks	19,50,000
Overheads		
Rent, rates, etc.	6 months	1,00,000
Salaries	1 month	8,00,000
Other overheads	2 months	7,50,000
Sales cash	2,00,000	
Credit sales	2 months	60,00,000
Average amount of stocks and work-in-progress		4,00,000
Average amount of undrawn profit		3,00,000

It is to be assumed that all expenses and income were made at even rate for the year.

[Ans: Net Working Capital Required = ₹ 5,02,083]

2. From the following projections of XYZ and Co. for the next year, you are required to determine the working capital required by the company:

Annual Sales	₹ 14,40,000
Cost of Production (Including depreciation of ₹ 1,20,000)	₹ 12,00,000
Raw Material Purchases	₹ 7,05,000
Monthly Expenditure	₹ 25,000
Estimated Opening Stock of Raw Materials	₹ 1,40,000
Estimated Closing Stock of Raw Materials	₹ 1,25,000
Inventory Norms:	
Raw Materials	2 months
Work-in-Process	$\frac{1}{2}$ month
Finished Goods	1 month

The firm enjoys a credit of half a month on its purchases and allows one month credit on its supplies. On sales orders the company receives an advance of ₹ 15,000.

You may assume that production is carried-out evenly throughout the year and minimum cash balance desired to be maintained is ₹ 10,000.

[Ans: Net Working Capital = ₹ 3,35,625]

Short Question and Answers

1. Working capital.

Ans :

Working Capital refers to the cash a business requires for day-to-day operations, or, more specifically, for financing the conversion of raw materials into finished goods, which the company sells for payment. Among the most important items of working capital are levels of inventory, debtors and creditors. These items are looked at for signs of a company's efficiency and financial strength.

Definitions

- (i) **According to Shubin**, "Working capital the amount of funds necessary to cover the cost of operating the enterprise".
- (ii) **According to Gerstenberg**, "Circulating capital means current assets of a company that are changed in the ordinary course of business from one form to another, as **for example**, from cash to inventories, inventories to receivables, receivables into cash".
- (iii) **According to Hoagland**, "Working capital is descriptive of that capital which is not fixed. But, the more common use of working capital is to consider it as the difference between the book value of the current assets and the current liabilities".

Working capital, in general practice, refers to the excess of current assets over current liabilities. Management of working capital therefore, is concerned with the problems that arise in attempting to manage the current assets, the current liabilities and the inter-relationship that exists between them. In other words it refers to all aspects of administration of both current assets and current liabilities. It is also known as revolving or circulating capital or short-term capital.

Working capital management is very important to ensure that the company has enough funds to carry on with its day-to-day operations smoothly. A business should not have a very long Cash Conversion Cycle. A cash conversion cycle measures the time period for which a firm will be deprived of funds if it increases its investments as a part of its business growth strategies.

2. Operating cycle.

Ans :

The operating cycle implies the stages or processes through which the raw materials are processed to get the final product. If the process is lengthy and takes long time to get the finished products, the requirements of working capital will be much larger than that of a unit which has a relatively low operating cycle. The shortest manufacturing process will minimise the investment in the form of work-in-progress.

3. Advantages of Working Capital

Ans :

The main advantages of maintaining adequate amount of working capital are as follows:

- i) **Cash Discount**
If a proper cash balance is maintained, the business can avail the advantage of cash discount by paying cash for the purchase of raw materials and merchandise. It will result in reducing the cost of production.
- ii) **Creates a Feeling of Security and Confidence**
The proprietor or officials or management of a concern are quite carefree, if they have proper working capital arrangements because they need not worry for the payment of business expenditure or creditors. Adequate working capital creates a sense of security, confidence and loyalty, not only throughout the business itself, but also among its customers, creditors and business associates.
- iii) **'Must' for Maintaining Solvency and Continuing Production**

In order to maintain the solvency of the business, it is but essential that the sufficient amount of fund is available to make all the payments in time as and when they are due. Without ample working capital, production will suffer, particularly in the era of cut throat

competition, and a business can never flourish in the absence of adequate working capital.

4. Disadvantages of Working Capital

Ans :

The disadvantages suffered by a company with excessive working capital are as follows :

i) Heavy Investment in Fixed Assets

A concern may invest heavily in their fixed asset which is not justified by actual sales. This may create situation of over capitalisation.

ii) Reckless Purchase of Materials

Inventory is purchased recklessly which results in dormant slow moving and obsolete inventory. At the same time it may increase the cost due to mishandling, waste, theft, etc.

iii) Speculative Tendencies

Speculative tendencies may increase and if profit is increased dividend distribution will also increase. This will hamper the image of a concern in future when speculative loss may start.

iv) Liberal Credit

Due to liberal credit, size of accounts receivables will also increase. Liberal credit facility can increase bad debts and wrong practices will start, regarding delay in payments.

v) Carelessness

Excessive working capital will lead to carelessness about costs which will adversely affect the profitability.

5. Define cash management.

Ans :

Cash is one of the current assets of a business. It is needed at all times to keep the business going. A business concern should always keep sufficient cash for meeting its obligations. Any shortage of cash will hamper the operations of a concern and any excess of it will be unproductive. Cash is the most unproductive of all the assets. While fixed assets like machinery, plant, etc. and current assets such as inventory will help the business in increasing its earning capacity, cash in hand will not add anything

to the concern. It is in this context that cash management has assumed much importance.

Cash is the important current asset for the operations of the business. Cash is the basic input needed to keep the business running on a continuous basis; it is also the ultimate output expected to be realised by selling the service or product manufactured by the firm. The firm should keep sufficient cash, neither more nor less. Cash shortage will disrupt the firm's manufacturing operations while excessive cash will simply remain idle, without contributing anything towards the firm's profitability. Thus, a major function of the financial manager is to maintain a sound cash position.

Cash is the money which a firm can disburse immediately without any restriction. The term cash includes coins, currency and cheques held by the firm, and balances in its bank accounts. Sometimes near-cash items, such as marketable securities or bank time deposits, are also included in cash. The basic characteristic of near-cash assets is that they can readily be converted into cash. Generally, when a firm has excess cash, it invests it in marketable securities. This kind of investment contributes some profit to the family.

Meaning of Cash

The term cash which refer to cash management is the ready currency to which all liquid assets can be reduced.

These are basically used in two sense.

1. Narrow sense and
2. Broader sense

1. **Narrow Sense** : The Narrow sense is used broadly to cover currency and generally accept equivalents of cash such as coins, currency notes cheques, bank drafts and demand deposit in bank.

2. **Broader Sense** : The Broader sense also include "Near Cash Assets" such as marketable securities and time deposits with banks. The main character is the securities or deposits can immediately be sold or converted into cash. These are also include the short term investment out lets for excess cash. Thus the term "Cash Management" is generally used for management of both cash and near cash assets.

6. Motives of holding cash.*Ans :*

- (a) **Transaction Motive:** A firm needs cash for making transaction in the day to day operations. The cash is needed to make purchases, pay expense, taxes, dividend etc. The cash need arise due to the fact that there is no complete synchronization between cash receipts and payments. Sometimes cash receipts exceed cash payment or vice versa. The transaction needs of cash can be anticipated because the expected payments in near future can be estimated. The receipts in future may also be anticipated but the things do not happen as desired. If more cash is needed for payments than receipts, it may be raised through bank overdraft. If there are more cash receipts than payments, it may be spent on marketable securities. The maturity of securities may be adjusted to the payments in future such as interest payment, dividend payment etc.
- (b) **Precautionary Motive:** A firm is required to keep cash for meeting various contingencies. Though cash inflows and cash outflows are anticipated but there may be variations in these estimates. A firm should keep some cash for such contingencies or it should be in a position to raise finances at a short period. The cash maintained for contingency needs is not productive or it remains ideal. Such cash may be invested in short-period or low-risk marketable securities which may provide cash as and when necessary.
- (c) **Speculative Motive:** The speculative motive relates to holding of cash for investing in profitable opportunities as and when they arise. Such opportunities do not come in a regular manner. These opportunities cannot be scientifically predicted but only conjectures can be made about their occurrence. Such opportunities can be availed of if a firm has cash balance with it. These transactions are speculative because prices may not move in a direction in which we suppose them to move. The primary motive of a firm is not to indulge in speculative transactions but such investments may be made at times.

7. Optimum Cash Balance.*Ans :*

A firm has to maintain a minimum amount of cash for settling the dues in time. The cash is needed to purchase raw materials, pay creditors, day to day expenses, dividend, etc. The test of liquidity of the firm is that it is able to meet various obligations in time.

Some cash will be needed for transaction needs and amount may be kept as a safety stock. An appropriate amount of cash balance to be maintained should be determined on the basis of past experience and future expectations. If a firm maintains less cash balance then its liquidity position will be weak. If higher cash balance is maintained then an opportunity to earn is lost. Thus, a firm should maintain an optimum cash balance, neither a small nor a large cash balance. For this purpose the transaction costs and risk of too small a balance should be matched with the opportunity costs of too large a balance.

There are basically two approaches to determine an optimal cash balance, namely, (i) Minimising Cost Models, and (ii) Preparing Cash Budget. Cash budget is the most important tool in cash management.

8. Accounts Receivable Management*Ans :*

Accounts receivables are simply extensions of credit to the firm's customers, allowing them a reasonable period of time in which to pay for the goods. Most firm treat account receivables as a marketing tool to promote sales and profits. The receivables(including the debtors & the bills) constitute a significant portion of the working capital and is an important element of it. The receivables emerge whenever goods are sold on credit & payments are deferred by customers. Receivable is a type of loan extended by a seller to the buyer to facilitate the purchase process. As against the ordinary type of loan, the trade credit in the form of receivables is not a profit making service but an inducement or facility to the buyer- customer of the firm.

According to Hampton, "Receivables are asset accounts representing amount owned to firm as a result of sale of goods or services in ordinary course of business".

According to Robert N. Anthony, "Accounts receivables are amounts owed to the business enterprise, usually by its customers. Sometimes it is broken down into trade accounts receivables; the former refers to amounts owed by customers, and the latter refers to amounts owed by employees and others".

Thus, receivables are forms of investment in any enterprise manufacturing and selling goods on credit basis, large sums of funds are tied up in trade debtors. Hence, a great deal of careful analysis and proper management is exercised for effective and efficient management of Receivables to ensure a positive contribution towards increase in turnover and profits.

Meaning of Receivables Management

Receivables management is the process of making decisions relating to investment in trade debtors. Certain investment in receivables is necessary to increase the sales and the profits of a firm. But at the same time investment in this asset involves cost considerations also. Further, there is always a risk of bad debts too.

The term receivables management may be defined as collection of steps and procedure required to properly weigh the costs and benefits attached with the credit policies. The receivables management consists of matching the cost of increasing sales (particularly credit sales) with the benefits arising out of increased sales with the objective of maximizing the return on investment of the firm.

9. Importance of Receivable Management?

Ans :

The importance of receivables management is as follows:

1. Liberalised credit policy helps to increase the growth of sales.
2. It helps to increase the operating profits because of more credit sales.
3. Credit policy helps to meet the competition.
4. Credit sales helps to attract not only existing customer but also the new customers in the ordinary course of business.

5. It ensures higher investment in trade debtors, which will produce larger sales.
6. It helps to minimize bad debts without taking stringent measures.
7. It facilitates adequate working capital to meet its current obligations.
8. It gives guidance to the management for effective financial planning and control.
9. It helps to make effective coordination between finance, production, sales, profit and cost.

10. Explain briefly about Credit Terms.

Ans :

Credit terms The stipulations under which the firm sells on credit to customers are called credit terms. These stipulations include: (a) the credit period, and (b) the cash discount.

Credit period The length of time for which credit is extended to customers is called the credit period. It is generally stated in terms of a net date. For example, if the firm's credit terms are 'net 35', it is expected that customers will repay credit obligation not later than 35 days. A firm's credit period may be governed by the industry norms. But depending on its objective, the firm can lengthen the credit period. On the other hand, the firm may tighten its credit period if customers are defaulting too frequently and bad-debt losses are building up.

A firm lengthens credit period to increase its operating profit through expanded sales. However, there will be net increase in operating profit only when the cost of extended credit period is less than the incremental operating profit. With increased sales and extended credit period, investment in receivable would increase. Two factors cause this increase: (a) incremental sales result in incremental receivable and (b) existing customers will take more time to repay credit obligation (i.e., the average collection period will increase), thus increasing the level of receivable.

11. What are the Components of Inventory ?

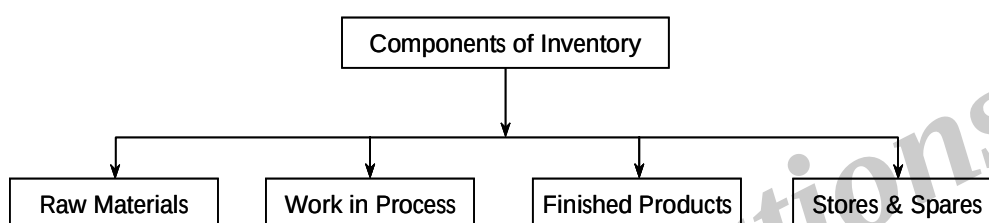
Ans :

1. Raw Materials

Raw materials are those inputs that are converted into finished goods through the manufacturing process. These form a major input for manufacturing a product. In other words, they are very much needed for uninterrupted production.

2. Work-in-Process

Work-in-process is that stage of stocks that are between raw materials and finished goods. Work-in-process inventories are semi-finished products. They represent the products that need to undergo some other process to become finished goods.

**3. Finished Products**

Finished products are those products, which are ready for sale. The stock of finished goods provides a buffer between production and market

4. Stores & Spares

Stores & spares inventory (include office and plant cleaning materials like, soap, brooms, oil, fuel, light bulbs, etc.,) are those purchased and stored for the purpose of maintenance of machinery.

12. Objectives of Inventory Management?

Ans :

The main objective of inventory management is to maintain inventory at appropriate level to avoid excessive or shortage of inventory because both the cases are undesirable for business. Thus, management is faced with the following conflicting objectives:

1. To keep inventory at sufficiently high level to perform production and sales activities smoothly.
2. To minimize investment in inventory at minimum level to maximize profitability.
3. To ensure that the supply of raw material & finished goods will remain continuous so that production process is not halted and demands of customers are duly met.
4. To minimize carrying cost of inventory.
5. To keep investment in inventory at optimum level.
6. To reduce the losses of theft, obsolescence & wastage etc.
7. To make arrangement for sale of slow moving items.
8. To minimize inventory ordering costs.

13. Explain different kinds of working capital.

Ans :

A. On the Basis of Concept

On the basis of concept, working capital is classified as gross working capital and net working capital

1. Gross Working Capital

Gross working capital refers to the amount which the company has invested into the current assets. Examples of current assets are:

Constituents of Current Assets

1. Cash in hand and bank balances,
2. Bills Receivables,
3. Sundry Debtors (less provision for bad debts),
4. Short- term loans and advances.
5. Inventories of stocks, as:
 - i) Raw materials.
 - ii) Work-in-process,
 - iii) Stores and spares.
 - iv) Finished goods.
6. Temporary Investment of surplus funds,
7. Prepaid Expenses,
8. Accrued Incomes.

2. Net Working Capital

Net working capital refers to the difference between the current assets and current liabilities of the company.

Net Working Capital = Current Assets – Current liabilities

Examples of current liabilities are :

Constituents of Current Liabilities

1. Bills Payable,
2. Sundry Creditors or Accounts Payable,
3. Accrued or Outstanding Expenses,
4. Short-term loans, advances and deposits,

5. Dividends Payable,
6. Bank Overdraft,
7. Provision for taxation, if it does not amount to appropriation of profits.

As one can see from the above that both gross working capital and net working capital are different because under gross working capital one calculate the amount which the company has invested into current assets, which implies that current liabilities are excluded while calculating gross working capital, which is not the case under net working capital where one calculate the difference between current assets and current liabilities.

B. On the Basis of Time

On the basis of time, working capital is classified as

(a) Permanent or Fixed Working Capital:

Permanent or fixed working capital is the minimum amount which is required to ensure effective utilizations of fixed facilities and for maintaining the circulation of current assets. There is always a minimum level of current assets which is continuously required by the enterprise to carry out its normal business operations.

(b) Temporary or Variable Working Capital:

Temporary or variable Working Capital is the amount of Working Capital which is required to meet the seasonal demands and some special exigencies. Variable Working Capital can be further divided as seasonal Working Capital and special Working Capital.

Most of the enterprises have to provide additional Working Capital to meet special exigencies such as launching of extensive marketing campaigns for conducting research, etc.

14. What are the sources of working capital finance.

Ans :

The working capital requirements of a concern can be classified as :

- (a) Permanent or Fixed working capital requirements.
- (b) Temporary or Variable working capital requirements.

In any concern, a part of the working capital investments are as permanent investments in fixed assets.

This is so because there is always a minimum level of current assets which are continuously required by the enterprise to carry out its day-to-day business operations and this minimum cannot be expected to reduce at time. This minimum level of current assets gives rise to permanent or fixed working capital as this part of working capital is permanently blocked in current assets.

Similarly, some amount of working capital may be required to meet the seasonal demands and some special exigencies such as rise in prices, strikes, etc. this proportion of working capital gives rise to temporary or variable working capital which cannot be permanently employed gainfully in business.

The fixed proportion of working capital should be generally financed from the fixed capital sources while the temporary or variable working capital requirements of a concern may be met from the short term sources of capital.

The various sources for the financing of working capital are as follows:

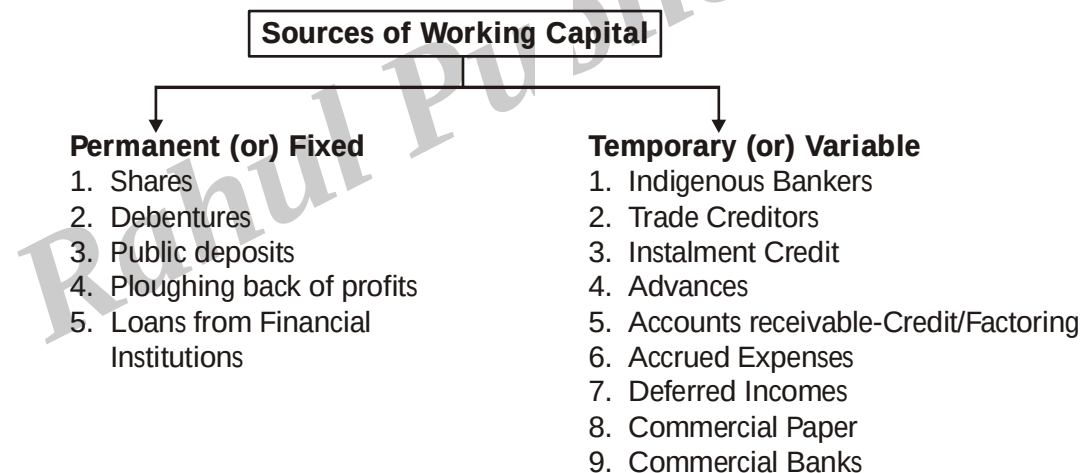


Fig.: Sources and Levels

15. Short-term Working Capital

Ans :

1. Indigenous Bankers

Private money-lenders and other country bankers used to be the only source of finance prior to the establishment of commercial banks. They used to charge very high rates of interest and exploited the customers to the largest extent possible. Now-a-days with the development of commercial banks they have lost their monopoly. But even today some business houses have to depend upon indigenous bankers for obtaining loans to meet their working capital requirements.

2. Trade Credit

Trade credit refers to the credit extended by the suppliers of goods in the normal course of business. As present day commerce is built upon credit, the trade credit arrangement of a firm with its suppliers is an important source of short-term finance. The credit-worthiness of a firm and the confidence of its suppliers are the main basis of securing trade credit. It is mostly granted on an open account basis whereby supplier sends goods to the buyer for the payment to be received in future as per terms of the sales invoice. It may also take the form of bills payable whereby the buyer signs a bill of exchange payable on a specified future date.

When a firm delays the payment beyond the due date as per the terms of sales invoice, it is called stretching accounts payable. A firm may generate additional short-term finances by stretching accounts payable, but it may have to pay penal interest charges as well as to forgo cash discount. If a firm delays the payment frequently, it adversely affects the credit worthiness of the firm and it may not be allowed such credit facilities in future.

The main advantages of trade credit as a source of short-term finance include :

- i) It is an easy and convenient method of finance.
- ii) It is flexible as the credit increases with the growth of the firm.
- iii) It is informal and spontaneous source of finance.

However, the biggest disadvantage of this method of finance is charging of higher prices by the suppliers and loss of cash discount.

3. Instalment Credit

This is another method by which the assets are purchased and the possession of goods is taken immediately but the payment is made in instalments over a pre-determined period of time. Generally, interest is charged on the unpaid price or it may be adjusted in the price. But, in any case, it provides funds for sometime and is used as a source of short-term working capital by many business houses which have difficult fund position.

Choose the Correct Answers

1. In finance, "working capital" means the same thing as [b]
 (a) Total assets (b) Current assets
 (c) Fixed assets (d) Current assets Current liability
2. _____ varies inversely with profitability [a]
 (a) Liquidity (b) Return
 (c) Risk (d) None
3. Permanent working capital [c]
 (a) varies with seasonal needs
 (b) Includes fixed assets
 (c) Is the amount of current asset required to meet a firm long term minimum needs
 (d) Includes accounts payable
4. Net working capital refers [b]
 (a) Total assets minus fixed asset
 (b) Current asset less current liability
 (c) Current asset less inventories
 (d) Current asset
5. The working capital requirement CWCR is [c]
 (a) Inventories plus receivables less payables
 (b) Working capital less short term debt less cash
 (c) Inventories plus receivables less payables plus prepayment less accruals
 (d) Working capital plus short term debt plus cash
6. Which of the following would not be financed from working capital [d]
 (a) Cash float (b) Account receivable
 (c) Credit sales (d) A new personal computer for the office
7. What is the difference between current ratio and quick ratio? [a]
 (a) The current ratio includes inventories and the quick ratio does not
 (b) The current ratio does not include inventories, quick ratio does
 (c) The current ratio includes physical capital by quick ratio not
 (d) None of the above
8. Which one of the following equation describes the operating cash cycle [c]
 (a) Average stock turnover period + Average creditors payment – Average debt collection period
 (b) Average stock turnover period + Average debt collection period – Average creditors payment period
 (c) Average cash balance + Average debt collection period – average creditor payment period
 (d) Average cash balance – Average debt collection period
9. Which of the following is key aspect of a company accounts receivable credit policy [a]
 (a) Assessing credit worthiness
 (b) Checking credit limit
 (c) Involving promptly and collecting overdue debt
 (d) Delaying payments
10. Which of the following is not among the daily activities of financial management [c]
 (a) Sale of shares (b) Credit management
 (c) Inventory control (d) Distribution of funds

Fill in the blanks

1. Current ration formula _____ .
2. Average receivables payment period formula _____ .
3. Working capital capital turnover _____ .
4. Raw material holding period _____
5. _____ are a guide to thye risk of cash flow problem and insolvency
6. Quick ration is also called as _____ .
7. What is the working capital requirement of a company _____ .
8. The ability of firm to convert an asset to cash is called _____ .
9. Which of the following is not identified as one of the some mainfinancial obejectives of a firm _____ .
10. _____ is the ability of a firm to earn a profit.

Answers

1. $\left(\frac{\text{Current assest}}{\text{Current liabilities}} \right)$
2. $\left(\frac{\text{Current assest} - \text{Inventtories}}{\text{Credit sales turnovers}} \right) \times 365 \text{ days}$
3. $\left(\frac{\text{Sales Revenue}}{\text{Current assets} - \text{Current liabilities}} \right) \times 365 \text{ days}$
4. $\frac{\text{Average raw material}}{\text{Annual purchase}} \times 365 \text{ days}$
5. Liquidity ratio
6. Acid test ratio
7. Cash and bank balance
8. Liquidity
9. Timeliness
10. Profitability

UNIT IV

FINANCIAL DECISIONS:

Cost of Capital: Meaning – Significance – Classification of Costs – Computation of Specific Cost of Capital – Cost of Debt – Cost of Preference Share Capital – Cost of Equity Share Capital and Cost of Retained Earnings – Computation of Weighted Average and Marginal Cost of Capital

Leverages: Meaning – Types – EBIT-EPS Analysis – Degree of Operating Leverage – Degree of Financial Leverage – Degree of Combined Leverage – Indifference Point

Capital Structure Theories: Meaning – Determinants – Theories – Net Income Approach – Net Operating Income Approach – Traditional Approach – MM Approach

4.1 COST OF CAPITAL

4.1.1 Meaning

Q1. What is Cost of Capital ?

(OR)

Define the term Cost of Capital.

Ans : (Jan.-20, Dec.-16, Imp.)

Meaning

The cost of capital of a firm is the minimum rate of return expected by its investors. It is the weighted average cost of various sources of finance used by a firm. The capital used by a firm may be in the form of debt, preference capital, retained earnings and equity shares. The concept of cost of capital is very important in the financial management. A decision to invest in a particular project depends upon the cost of capital of the firm or the cut off rate which is the minimum rate of return expected by the investors.

In case a firm is not able to achieve even the cut off rate, the market value of its shares will fall. In fact, cost of capital is the minimum rate of return expected by its investors which will maintain the market value of shares at its present level. Hence, to achieve the objective of wealth maximisation, a firm must earn a rate of return more than its cost of capital. Further, optimal capital structure maximises the value of a firm and hence the wealth of its owners and minimises the firm's cost of capital. The cost of capital of a firm or the minimum rate of return

expected by its investors has a direct relation with the risk involved in the firm. Generally, higher the risk involved in a firm, higher is the cost of capital.

Cost of capital for a firm may be defined as the cost of obtaining funds, i.e., the average rate of return that the investors in a firm would expect for supplying funds to the firm.

Definitions

- (i) **According to Hunt, William and Donaldson**, "Cost of capital may be defined as the rate that must be earned on the net proceeds to provide the cost elements of the burden at the time they are due".
- (ii) **According to James C. Van Home** defines cost of capital as, "a cut-off rate for the allocation of capital to investments of projects. It is the rate of return on a project that will leave unchanged the market price of the stock."
- (iii) **According to Solomon Ezra**, "Cost of capital is the minimum required rate of earnings or the cut-off rate of capital expenditures."
- (iv) **According to Hampton, John J.** defines cost of capital as, "the rate of return the firm requires from investment in order to increase the value of the firm in the market place".

Thus, we can say that cost of capital is that minimum rate of return which a firm, must and, is expected to earn on its investments so as to maintain the market value of its shares.

From the definitions given above we can conclude three basic aspects of the concept of cost of capital:

- i) Cost of capital is not a cost as such. In fact, it is the rate of return that a firm requires to earn from its projects.
- ii) It is the minimum rate of return. Cost of capital of a firm is that minimum rate of return which will at least maintain the market value of the shares.
- iii) It comprises of three components. As there is always some business and financial risk in investing funds in a firm, cost of capital comprises of three components :
 - a) the expected normal rate of return at zero risk level, say the rate of interest allowed by banks;
 - b) the premium for business risk ; and
 - c) the premium for financial risk on account of pattern of capital structure.

Symbolically cost of capital may be represented as :

$$K = r_0 + b + f$$

where, K = Cost of capital

r_0 = Normal rate of return at zero risk level

b = Premium for business risk.

f = Premium for financial risk.

4.1.2 Significance

Q2. Explain the Significance of cost of capital.

Ans :

The concept of cost of capital is a very important concept in financial management decision making. The concept, is however, a recent development and has relevance in almost every financial decision making but prior to that development, the problem was ignored or by-passed.

The progressive management always takes notice of the cost of capital while taking a financial decision. The concept is quite relevant in the following managerial decisions.

1. Capital Budgeting Decision

Cost of capital may be used as the measuring rod for adopting an investment proposal. The firm, naturally, will choose the project which gives a satisfactory return on investment which would in no case be less than the cost of capital incurred for its financing. In various methods of capital budgeting, cost of capital is the key factor in deciding the project out of various proposals pending before the management. It measures the financial performance and determines the acceptability of all investment opportunities.

2. Designing the Corporate Financial Structure

The cost of capital is significant in designing the firm's capital structure. The cost of capital is influenced by the changes in capital structure. A capable financial executive always keeps an eye on capital market fluctuations and tries to achieve the sound and economical capital structure for the firm. He may try to substitute the various methods of finance in an attempt to minimise the cost of capital so as to increase the market price and the earning per share.

3. Deciding about the Method of Financing

A capable financial executive must have knowledge of the fluctuations in the capital market and should analyse the rate of interest on loans and normal dividend rates in the market from time to time. Whenever company requires additional finance, he may have a better choice of the source of finance which bears the minimum cost of capital. Although cost of capital is an important factor in such decisions, but equally important are the considerations of relating control and of avoiding risk.

4. Performance of Top Management

The cost of capital can be used to evaluate the financial performance of the top executives. Evaluation of the financial

performance will involve a comparison of actual profitabilities of the projects and taken with the projected overall cost of capital and an appraisal of the actual cost incurred in raising the required funds.

5. Other Areas

The concept of cost of capital is also important in many others areas of decision making, such as dividend decisions, working capital policy etc.

4.1.3 Classification of Costs

Q3. Explain the different types of costs.

(OR)

Classify the different types of costs.

Ans :

The classification of cost is given as follows:

1. Future Cost vs. Historical Cost

Financial decisions are based on the future costs and not on the historical costs. The decisions relate to the future and hence the costs likely to be incurred in future are more significant than the costs which have already been incurred. Historical costs act simply as guides to estimate the future costs.

2. Specific Cost vs. Composite Cost

The cost of individual source of capital is referred to as the specific cost and the cost of capital of all the sources combined is termed as composite cost or overall cost. It is thus the weighted cost of capital. The cost of debentures, preference shares, equity shares, retained earnings etc. is to be separately calculated first and then only the combined cost can be computed. Since the combined cost considers the quantum of financing through each source, the cost is known as the weighted cost.

3. Average Cost vs. Marginal Cost

Average cost of capital refers to the weighted average cost of capital calculated on the basis of cost of each source of capital and weights are assigned to the ratio of their share to total capital funds. Marginal cost of capital may be defined as the 'Cost of obtaining another rupee of new capital.'

When a firm raises additional capital from only one source (not different sources), then marginal cost is the specific or explicit cost. Marginal cost is considered more important in capital budgeting and financing decisions. Marginal cost tends to increase proportionately as the amount of debt increases.

4. Implicit Cost vs. Explicit Cost

The implicit cost is the rate of return associated with the best investment opportunity for the firm and its shareholders that will be foregone if the projects presently under consideration by the firm were accepted. It is thus the opportunity cost.

For example, the implicit cost of retained earnings is the rate of return available to the shareholders had the funds been distributed to them.

The explicit cost of any source of capital is the discount rate that equates the present value of the cash inflows that are incremental to the taking of the financial opportunity with present value of its incremental outflows.

Q4. What are the differences between Average cost of capital and Marginal cost of capital?*Ans :*

S.No.	Average Cost of Capital	S.No.	Marginal Cost of Capital
1.	ACC is the total average cost of capital to company which is calculated by taking into account the weights of all type of capital existed at a particular date in the capital structure of the company (Equity, Debt, bonds, debentures etc).	1.	MCC is the incremental cost of capital which comes into existence when fresh capital is raised. It will depend on the type of capital raised, its weight and its cost.
2.	Average cost of capital generally cannot be a component of marginal cost of capital.	2.	Marginal cost of capital is a component of weighted average cost of capital.

Q5. What are the differences between Explicit cost and Implicit cost?*Ans :*

S.No.	Explicit Cost	S.No.	Implicit Cost
1.	Explicit cost involves immediate cash payments like, interest on loan.	1.	Implicit costs do not involve any immediate cash payments.
2.	Explicit costs are recorded in the books of accounts	2.	Implicit costs are not recorded in the books of accounts.
3.	Explicit costs are also known as out of pocket costs	3.	Implicit costs are known as economic costs.
4.	Explicit cost are easily measured.	4.	Implicit cost are not easily measured.

Q6. Explain the factors affecting cost of capital.*Ans :***1. General Economic Conditions**

General economic conditions determine the demand for and supply of capital within the economy as well as the level of expected inflation. This economic variable is reflected in the riskless rate of return. This rate represents the rate of return on risk-free investments such as the interest rate on short term, if the demand for money increases without an equivalent increase in the supply, lenders will raise their required interest rate. At the same time, if inflation is expected to deteriorate the purchasing power of the rupee, investors require a higher rate of return to compensate for this anticipated loss.

2. Market Conditions

If an investor is purchasing a security where the risk of the investment is significant, the opportunity for additional returns is necessary to make the investment attractive. Essentially, as risk increases, the investor requires a higher rate of return. This increase is called risk premium. If investors increase their required rate of return this will simultaneously cause a higher cost of capital. If the security is not readily marketable when the investor wants to sell or even if a continuous demand for the security exists but the price varies significantly, an investor will require a relatively high rate

of return. On the other hand, if a security is readily marketable and the price of the security is reasonably stable, the investor will have a lower required rate of return and the company's cost of capital will be lower.

3. Firm's Operation and Financing Decisions

Risks or the variability of return also results from decisions made within the company. Risk resulting from these decisions is generally divided into two types - Business risk and financial risk.

Business risk is the variability in returns on assets and is affected by the company's investment decisions.

Financial risk is the increased variability in returns to the common stock holders as a result of using debt and preferred stock.

As business risk and financial risk increase or decrease, the investor's required rate of return and the cost of capital will move in the same direction.

4. Amount of Financing

As the financing requirements of the firm become larger, the weighted cost of capital increases for several reasons. For instance, as more securities are issued, additional flotation cost (cost of selling securities) will affect the percentage cost of the funds to the firm. Also as management approaches the market for large amounts of capital relative to the firm's size, the investor's required rate of return may rise.

Suppliers of capital become hesitant to grant relatively large sums without evidence of management's capability to absorb this capital into the business. This concern is reflected in the proverbial "too much too soon" as the size of the issue increases, there is greater difficulty in placing it in the market without reducing the price of security, which also increases the firm cost of capital.

Q7. What are the problems in determination of cost of capital?

Ans :

The problems in determining cost of capital are as follows:

1. Controversy Regarding the Dependence of Cost of Capital Upon the Method and Level of Financing:

There is a major controversy whether or not the cost of capital dependent upon the method and level of financing by the company. According to the traditional theorists, the cost of capital of a firm depends upon the method and level of financing. In other words, according to them, a firm can change its overall cost of capital by changing its debt-equity mix. On the other hand, the modern theorists such as Modigliani and Miller argue that the firm's total cost of capital is independent of the method and level of financing. In other words, the change in the debt-equity ratio does not affect the total cost of capital. An important assumption underlying MM approach is that there is perfect capital market. Since perfect capital market does not exist in practice, hence the approach is not of much practical utility.

2. Computation of Cost of Equity

The determination of the cost of equity capital is another problem. In theory, the cost of equity capital may be defined as the minimum rate of return that accompany must earn on that portion of its capital employed, which is financed by equity capital so that the market price of the shares of the company remains unchanged.

3. Computation of Cost of Retained Earnings and Depreciation Funds

The cost of capital raised through these sources will depend upon the approach adopted for computing the cost of equity capital. Since there are different views, therefore, a finance manager has to face difficult task in subscribing and selecting an appropriate approach.

4. Future Costs versus Historical Costs

It is argued that for decision-making purposes, the historical cost is not relevant. The future costs should be considered. It, therefore, creates another problem whether to consider marginal cost of capital, i.e., cost of additional funds or the average cost of capital, i.e., the cost of total funds.

5. Problem of Weights

The assignment of weights to each type of funds is a complex issue. The finance manager has to make a choice between the risk value of each source of funds and the market value of each source of funds. The results would be different in each case. It is clear from the above discussion that it is difficult to calculate the cost of capital with precision. It can never be a single given figure. At the most it can be estimated with a reasonable range of accuracy. Since the cost of capital is an important factor affecting managerial decisions, it is imperative for the finance manager to identify the range within which his cost of capital lies.

4.2 COMPUTATION OF SPECIFIC COST OF CAPITAL
4.2.1 Cost of Debt**Q8. Define Cost of Debt.**

Ans :

The rate of interest which is paid on debt is termed as cost of debt. For calculation of the cost of debt following are required - net proceeds of debenture, amount of interest paid periodically and the principal value of debt. The cost of debt before tax is calculated from following formula,

$$K_{dh} = \frac{1}{P}$$

Where,

K_{dh} = Before tax cost of debt

I = Interest

P = Principal.

When firm raises debt at premium or discount, then P is not the face value of securities but it is the amount of net proceeds received from the issue. In this case the formula will be,

$$K_{dh} = \frac{1}{NP}$$

Where, NP = Net proceeds.

When firm raises capital from debt a sufficient amount of tax is saved because interest is treated as a deductible expense in calculation of tax. Hence it reduces cost of debt. The cost of debt after tax is calculated as,

$$K_{dh} = K_{dh}(1 - t) = \frac{1}{NP}(1 - t)$$

Where,

K_{dh} = After tax cost of debt

t = Rate of tax.

Cost of Redeemable Debt

The debt which is issued to be redeemed after specific period of time is known as redeemable debt. The cost of redeemable debt capital is calculated as,

The cost of redeemable debt before tax is calculated as,

$$K_{dh} = \frac{1 + \frac{1}{n}(RV - NP)}{\frac{1}{2}(RV + NP)}$$

Where,

I = Annual interest

n = Number of years in which debt is to be redeemed

RV = Redeemable value of debt

NP = net proceeds of debentures.

The cost of redeemable debt after tax is calculated as,

$$K_{dh} = \frac{1(1 - t) + \frac{1}{n}(RV - NP)}{\frac{1}{2}(RV + NP)}$$

Where,

I = Annual interest t - Tax rate

n = Number of years in which debt is to be redeemed

RV = Redeemable value of debt

NP = Net proceeds of debentures.

4.2.2 Cost of Preference Share Capital

Q9. Explain the term Cost of Preference Share Capital.

Ans :

Preference shares are the fixed cost bearing securities. In case of preference shares, the rate of dividend is fixed in advance at the time of the issue. Preference shareholders have a preferential rights unlike equity shareholders with regard to payment of dividend and return of principal amount. Preference dividend is paid from after tax profits, so adjustments are not made in tax at the time of calculating cost of preference shares. Preference dividend is considered as an appropriation of profits and not as a charge on profits.

There are two types of preference capital,

- Irredeemable preference capital
- Redeemable preference capital,

(a) Irredeemable Preference Capital

Irredeemable preference capital involves perpetual payment of dividend to preference shareholders at a prescribed rate.

$$K_p = \frac{D_p}{P}$$

K = Cost of preference capital

D = Annual preference dividend

P = Net proceeds of preference share capital.

[or]

$$K_p = \frac{D_p}{N_p}$$

[When preference shares are issued at a premium or discount]

(b) Redeemable Preference Capital

Redeemable preference shares are those which can be redeemed or recovered on maturity of issue or after specific period of time.

$$K_p = \frac{D_p + \left(\frac{P_n - P}{n} \right)}{(P_n + P)} \quad (\text{or})$$

$$P = \sum_{i=1}^x \frac{D_{pi}}{(1 + K_p)^i} + \dots + \frac{P_n}{(1 + K_p)^x}$$

Where,

K = Cost of preference capital

D = Annual preference dividend

P = Net proceeds of preference share capital.

D_p = Annual preference dividend

P_n = Amount payable at time of redemption

n = Redemption period of preference shares.

4.2.3 Cost of Equity Share Capital

Q10. What do you understand by Cost of Equity Share Capital?

Ans :

The cost of equity capital is the return which is expected by its investors. In order to provide expected returns to the equity shareholders, company must earn minimum rate of return which is necessary to have a constant market price of the shares. The expectations of the shareholders must be considered before issuing new equity shares for raising additional capital.

The calculation of cost of equity shares is a complicated process because interest or dividend is not paid on fixed rate and also there is no legal commitment to pay dividend to equity shareholders. Hence market value of shares depends on the amount of dividend paid and the rate of dividend depends on the degree of business and financial risk. Following are the approaches or methods through which cost of equity shares can be computed,

- (a) Dividend yield method or dividend/price ratio method
- (b) Dividend yield with annual growth rate
- (c) Earning yield method
- (d) CAPM approach (Capital Asset Pricing Model)
- (e) Bond yield with risk premium
- (f) Realized yield method.

(a) Dividend Yield Method or Dividend/Price Ratio Method

In this method, the cost of equity capital is considered as a discount rate at which current value of expected future dividends per share is equal to net proceeds or market price of a share. In this approach the cost of equity shares will be,

$$K_e = \frac{D}{NP} \times 100 \text{ or } \frac{D}{MP} \times 100$$

Where,

K = Cost of equity capital

D = Expected dividend per share

NP = Net proceeds per share

MP = Market price per share.

Dividend yield method involves some assumptions,

- i) It does not consider any growth in dividend
- ii) Capital gains and retained earnings are also not considered.

This method is applicable to the companies which have constant profits and constant dividend policy throughout the period of time.

(b) Dividend Yield with Annual Growth Rate

The dividend yield with annual growth rate method is used in the situation where dividend-pay-out ratio remains constant and dividends are expected to grow at a constant

rate in the firm, then this method is suitable to calculate cost of equity capital. In this method, dividends are the growth rate form the basis for the cost of equity capital.

$$K_e = \frac{D_1}{NP} + G = \frac{D_0(1+g)}{NP} + G$$

Where,

K_e = Cost of equity capital

D_1 = Expected dividend per share at the end of the year

NP = Net proceeds per share

G = Rate of growth in dividend

D_0 = Previous year's dividend.

When cost of existing equity share capital is calculated, then net must be replaced with market price.

$$K_e = \frac{D_1}{MP} + G$$

(c) Earning Yield Method

In this method, the cost of equity capital is considered as the discount rate at which the current value of expected future EPS (earnings per share) is equal to the prevailing market price or net proceeds of the shares. In this method the cost of equity capital is,

$$K_e \frac{\text{Earnings per share}}{\text{Net proceeds}} = \frac{EPS}{NP}$$

When, cost of existing equity capital is calculated.

The earning yield method is applicable in following situations for calculating cost of equity capital,

- i) When it-is expected that earnings per share remains constant.
- ii) In times when the dividend pay out ratio is 100% or retention ratio is zero, i.e., when firm distributes all its profits as dividends.
- iii) When market price of the share is effected only by the earnings per share.

- iv) When firm expects that earnings on new equity shares capital is equal to present rate of earnings.

(d) Capital Asset Pricing Model : [CAPM] Approach

The cost of equity is also calculated with the help of CAPM model. It separates the cost of equity into risk-free return which is available for investing in government bonds and an additional risk premium which is for investing in a specific share or investment. The risk premium involves the average return on the overall market portfolio and the beta factor i.e., the risk factor of the particular investment. The cost of equality for an investment with the help of CAPM approach is calculated as follows,

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

Where,

K_e = Cost of equity

R_f = Risk free rate of return

b_i = Beta of the investment

R_m = Average market return.

(e) Bond Yield with Risk Premium Approach

According to bond yield with risk premium approach, the required rate of return of the equity shareholders of a firm is equal to the returns on long term bonds and risk premium.

K_e = Return on long term bonds + Risk premium

This approach explains that risk of equity investors is much greater than risk of bond investors. Hence required rate of return of the equity investor involves premium for higher risk. There is no theoretical basis to calculate the risk premium.

(f) Realized Yield Method

The problem of evaluating the expectations of the investors relating to future dividends and earnings can be solved with the help of realized yield method. It is difficult to calculate

accurate future dividends and earnings because they are dependent on many uncertain factors. Hence the realized yield method is suitable, which considers the actual average rate of return realized in the past to calculate the cost of equity share capital. In order to calculate the average rate of return realized, the dividend received in the past and the gain realized at the time of sale of shares must be taken into consideration. The realized yield method involves following assumptions,

- The firm will have constant risk for a specific period of time.
- The expectations of the shareholders are dependent on past realized yield.
- Investors assume that they get same rate of return as the realized yield even if they invest somewhere else.
- It is assumed that there are no remarkable changes in market price of shares.

4.2.4 Cost of Retained Earnings

Q11. Define Cost of Retained Earnings.

Ans :

As firms do not pay any dividends on retained earnings, hence no cost is involved in retained earnings.

The cost of retained earnings can be evaluated as rate of return acquired by the shareholders from an alternative by investing after-tax dividends. It is similar to the opportunity cost of dividends which is scarified by the shareholders.

The cost of retained earnings can be calculated as follows,

$$k_r = \frac{D_1}{MP} + G$$

Where,

K_r = Cost of retained earnings

D_1 = Expected dividend

MP = Market price per share

G = Growth rate.

In spite of 100% payout ratio, shareholders are unable to get whole amount of retained earnings in the form of dividends. Shareholders need to pay tax on dividend income. Some alternative way is to be made with regard to tax, following formula is useful,

$$K_r = \left[\frac{D}{NP} + G \right] \times (1 - t) \times (1 - b)$$

$$K_r = k_e(1 - t)(1 - b)$$

Where,

K_r = Cost of retained earnings

D = Expected dividend

G = Growth rate

NP = Net proceeds of equity issue

t = Tax rate

b = Cost of purchasing new securities

k_e = Rate of return available to shareholders.

PROBLEMS

1. A company has 15% perpetual Debt of Rs.1,00,000. The Tax rate is 35%. Determine cost of capital (Before tax and After tax) assuming Debt is issued
 - (a) at par
 - (b) at 10% discount
 - (c) at 10% premium

Sol :

- (a) at par

Before Tax

$$K_d = \frac{I}{P - f} \times 100$$

$$I = \text{Interest} = \left[\text{Face value} \times \frac{\text{Rate}}{100} \right]$$

$$= 1,00,000 \times \frac{15}{100} = 15,000$$

$$P = \text{Issue price} \rightarrow \text{At par} \rightarrow P = FV$$

$$\therefore P = 1,00,000$$

$$t = \text{Tax Rate} = 35\% \text{ (or) } 0.35$$

$$f = \text{Flotation cost} = \text{NIL}$$

$$\therefore K_d = \frac{15,000}{1,00,000 - \text{NIL}} \times 100$$

$$= \frac{15,000}{1,00,000} \times 100$$

$$\therefore K_d = 15\%$$

After Tax

$$K_d = \frac{(1-t)I}{p-f} \times 100 = \frac{(1-0.35)15000}{100,000 - \text{NIL}} \times 100 = \frac{9,750}{100,000} \times 100$$

$$\therefore K_d = 9.75\%$$

(b) Issue at 10% Discount**i. Before Tax**

$$K_d = \frac{I}{p-f} \times 100 \quad P = \text{Issue Price} \rightarrow \text{face value} - \text{Discount}$$

$$(1,00,000 - 10,000) \quad (1,00,000 \times 10\%)$$

$$\therefore P = 90,000$$

$$K_d = \frac{15000}{90,000 - \text{NIL}} \times 100$$

$$\therefore K_d = 16.67\%$$

ii. After Tax

$$K_d = \frac{(1-t)I}{p-f} \times 100$$

$$K_d = \frac{(1-0.35)1500}{90,000 - \text{Nil}} \times 100$$

$$K_d = \frac{9,750}{90,000} \times 100$$

$$\therefore K_d = 10.83\%$$

(c) Issue At premium**i. Before Tax**

$$K_d = \frac{I}{p-f} \times 100 \quad P = \text{Face value} + \text{Premium}$$

$$K_d = \frac{15000}{110,000 - \text{NIL}} \times 100 \quad P = 100,000 + 10,000 \left(100,000 \times \frac{10}{100} \right)$$

$$K_d = \frac{15000}{110,000} \times 100 \quad \therefore P = 110,000$$

$$\therefore K_d = 13.64\%$$

ii. After Tax

$$K_d = \frac{(1-t)I}{p-f} \times 100 \quad P = \text{Issue Price}$$

$$K_d = \frac{(1-0.35)1500}{110,000 - \text{Nil}} \times 100 \quad \text{Face value + Premium}$$

$$100,000 + 10,000$$

$$K_d = \frac{9750}{110,000} \times 100 \quad \therefore p = 110,000$$

$$\therefore K_d = 8.86\%.$$

2. A company issued 10,000 debentures at Rs.100/- each estimated floatation cost 5% on issue value. Tax rate is 50%. Calculate cost of Debt rate of interest is 8%.

- a) If Issue at par
b) If issued at discount at 10%
c) If issued with premium at 20%

Sol :

(a) Issue at par

$$K_d = \frac{(1-t)I}{p-f} \times 100$$

$$I = \text{Interest} = \text{Face Value} \times \frac{\text{Rate}}{100}$$

$$= 100 \times \frac{8}{100} = \text{Rs.8/-}$$

$$P = \text{Issue price} = \text{at par} = 100$$

f = flotation cost

$$= 100 \times \frac{5}{100} = \text{Rs.5}$$

$$K_d = \frac{(1-0.5)8}{100-5} \times 100$$

$$K_d = \frac{4}{95} \times 100$$

$$\therefore K_d = 4.21\%$$

(b) Issued at discount at 10%

$$K_d = \frac{(1-t)I}{p-f} \times 100$$

$$I = \text{Interest} \left(\text{Face Value} \times \frac{\text{Rate}}{100} \right)$$

$$P = \text{Issue Price at discount } 100 \times \frac{90}{100} = \text{Rs. } 90$$

$$f = \text{Issue Price} = P \times \frac{\text{Rate}}{100}$$

$$= 90 \times \frac{5}{100} = 4.5$$

$$\therefore K_d = \frac{(1-0.5)8}{90-4.5} \times 100$$

$$K_d = \frac{(1-0.5)8}{85.5} \times 100$$

$$\therefore K_d = \frac{4}{85.5} \times 100$$

$$K_d = 4.68\%$$

(c) Issued at premium at 20%

$$K_d = \frac{(1-t)I}{p-f} \times 100$$

$$I = \text{Interest} = \text{Rs. } 8 \left(\text{Face Value} \times \frac{\text{Rate}}{100} \right)$$

$$P = \text{Issue price at premium} \\ = 100 \times 120\% = 120$$

$$f = \text{Flotation cost} = P \times \frac{\text{Rate}}{100}$$

$$= 120 \times \frac{5}{100} = 6$$

$$K_d = \frac{(1-0.5)8}{120-6} \times 100$$

$$= \frac{4}{114} \times 100$$

$$\therefore K_d = 3.51\%$$

- 3. A company issued 1000, 10% debentures of Rs. 100/- each these debentures will redeemable after 7 years. Corporate tax rate is 35% calculate cost of debt.**

Under the following situation.

- (i) If redeemable at par flotation cost is 5%**
- (ii) If redeemable at premium of 5% with no flotation cost.**
- (iii) If issued at discount at 10%, flotation cost 2%, and redeemable at 5% Premium.**
- (iv) Issued at premium of 10%, flotation cost 2%, and the redeemable value is 10% premium.**

Sol :

(i) If Redeemable at Par

$$K_d = \frac{(1-t)I + \frac{1}{n}[(R-p) + f]}{\frac{R+p-f}{2}} \times 100$$

$$t = \text{Tax Rate} = 0.35$$

$$I = FV \times \frac{\text{Rate}}{100} = 100 \times \frac{10}{100} = \text{Rs. } 10/-$$

$$P = \text{Issue value} = \text{at par} = \text{Rs. } 100$$

$$R = \text{Redeemable value} \\ = \text{at par} = \text{Rs. } 100$$

$$F = \text{Flotation cost} = P \times \frac{\text{Rate}}{100}$$

$$= 100 \times \frac{5}{100} = \text{Rs. } 5/-$$

= Number of years (or)
maturity period = 7 years

$$K_d = \frac{(1-0.35)10 + \frac{1}{7}[(100-100)+5]}{\frac{100+100-5}{2}} \times 100$$

$$K_d = \frac{6.5 + \frac{1}{7}(5)}{\frac{200-5}{2}} \times 100 = \frac{6.5 + 0.714}{\frac{195}{2}} \times 100$$

$$= \frac{7.214}{97.5} \times 100$$

∴ $K_d = 7.40\%$.

(ii) If redeemable at Premium of 5% with no flotation cost.

$$K_d = \frac{(1-t)I + \frac{1}{n}(R - P + f)}{\frac{R + P - f}{2}} \times 100$$

t = Tax Rate = 0.35

$$I = FV \times \frac{\text{Rate}}{100} = 100 \times \frac{10}{100} = \text{Rs.10}$$

P = Face Value → at par = Rs.100

R = Redeemable value → at premium
i.e., $FV + \text{premium}$

$$100 + 5 = 105$$

f = Flotation cost = NIL

n = Maturity period = 7 years

$$K_d = \frac{(1-0.35)10 + \frac{1}{7}(105-100)+0}{\frac{105+100-0}{2}} \times 100$$

$$K_d = \frac{(0.65)10 + \frac{1}{7}(5)}{\frac{205}{2}} \times 100$$

$$K_d = \frac{6.5 + 0.714}{102.5} \times 100$$

$$K_d = \frac{7.214}{102.5} \times 100$$

$$K_d = 7.04\%.$$

(iii) If Issued at discount of 10%, flotation cost at 2%, and redeemable at 5% premium.

$$K_d = \frac{(1-t)I + \frac{1}{n}[R - P + f]}{\frac{R + P - f}{2}} \times 100$$

$$I = \text{Interest} = FV \times \frac{\text{Rate}}{100}$$

$$= 100 \times \frac{10}{100} = \text{Rs.10}$$

P = Issue Price - at discount

= i.e. $FV - \text{discount}$

$$100 - 10 = 90$$

R = Redeemable value → at premium i.e.

= $FV + \text{premium}$

$$100 + 5$$

$$\therefore R = 105$$

$$F = \text{Flotation cost} = P \times \frac{\text{Rate}}{100}$$

$$90 \times \frac{2}{100} = 1.8$$

n = Maturity period = 7 years

$$K_d = \frac{(1-0.35)10 + \frac{1}{7}[(105-90)+1.8]}{\frac{105+90-1.8}{2}} \times 100$$

$$K_d = \frac{(0.65)10 + \frac{1}{7}[(105-90)+1.8]}{\frac{105+90-1.8}{2}} \times 100$$

$$K_d = \frac{6.5 + \frac{1}{7}(16.8)}{\frac{193.2}{2}} \times 100$$

$$K_d = \frac{6.5 + 2.40}{96.6} \times 100$$

$$K_d = \frac{8.90}{96.6} \times 100$$

$$K_d = 9.21 \%$$

- (iv) Issued at premium of 10% flotation cost 2% and the redeemable value is 10% premium.

$$K_d = \frac{(1-t)I + \frac{1}{n}[(R-P) + f]}{\frac{R+P-f}{2}} \times 100$$

$$T = \text{tax rate} = 0.35$$

$$I = \text{Interest} = FV \times \frac{\text{Rate}}{100}$$

$$= 100 \times \frac{10}{100} = \text{Rs } 10/-$$

$$n = \text{Maturity period} = 7 \text{ years}$$

$$R = \text{Redeemable value}$$

$$\text{i.e., } = FV + \text{Premium}$$

$$100 + 10 = \text{Rs. } 110$$

$$P = \text{Face value} + \text{premium}$$

$$100 + 10 = 110$$

$$f = \text{flotation cost} = P \times \frac{\text{Rate}}{100}$$

$$110 \times \frac{2}{100} \Rightarrow 2.2$$

$$K_d = \frac{(1-0.35)10 + \frac{1}{7}[(110-110) + 2.2]}{\frac{110+110-2.2}{2}} \times 100$$

$$K_d = \frac{(0.65)10 + \frac{1}{7}(2.2)}{\frac{110+110-2.2}{2}} \times 100$$

$$K_d = \frac{6.5 + 0.314}{\frac{220-2.2}{2}} \times 100$$

$$K_d = \frac{6.5 + 0.314}{\frac{217.8}{2}} \times 100$$

$$K_d = \frac{6.814}{108.9} \times 100$$

$$K_d = 6.26\%$$

4. A company issues 14% irredeemable preference shares of the face value of Rs. 100 each flotation cost are estimated about 5% of the expected sale price.

What is the cost if preference shares are issued at

- (i) Par value
- (ii) 10% premium and
- (iii) 5% discount.

Sol :

(Imp.)

- i) At - PAR - VALUE

$$K_p = \frac{D_p}{P-f} \times 100$$

$$D_p = \text{Preference Dividend}$$

$$\text{Face Value} \times \text{Rate} / 100$$

$$100 \times 14/100$$

$$\Rightarrow \text{Rs. } 14.$$

$$P = \text{Issue price /sale value}$$

$$f = \text{flotation cost } 100 \times \frac{5}{100}$$

$$\Rightarrow \text{Rs. } 5$$

$$K_p = \frac{14}{100-5} \times 100$$

$$K_p = \frac{14}{95} \times 100 = 14.74\%$$

ii) At 10% Premium

$$K_p = \frac{D_p}{P-f} \times 100$$

D_p = Preference Dividend

$$= 100 \times \frac{14}{100} = \text{Rs. } 14$$

P = Issue Price $\rightarrow$ at premium of 10%
 $100 \times 110\% = \text{Rs. } 110$

$$F = \text{Flotation cost} = P \times \frac{\text{Rate}}{100}$$

$$= 110 \times \frac{5}{100}$$

$$\Rightarrow \text{Rs. } 5.50$$

$$K_p = \frac{14}{110-5} \times 100$$

$$K_p = \frac{14}{105} \times 100 = 13.33.$$

iii) Issued at discount of 5%

$$K_p = \frac{D_p}{P-f} \times 100$$

K_p = Cost of preference

D_p = Preference of Dividend

$$\text{Face value} \times \frac{\text{Rate}}{100}$$

P = Issue Price

Face value – Discount

$$100 - 5\% = \text{Rs. } 95$$

$$f = \text{flotation cost} = P \times \frac{\text{Rate}}{100}$$

$$95 \times \frac{5}{100}$$

$$\Rightarrow \text{Rs. } 4.75$$

$$K_p = \frac{14}{95-5} \times 100$$

$$K_p = \frac{14}{90} \times 100 = 15.55\%.$$

4.3 COMPUTATION OF WEIGHTED AVERAGE AND MARGINAL COST OF CAPITAL

Q12. Discuss about Weighted Average Cost of Capital.

(OR)

How do you compute the weighted average cost of capital.

Ans : (Jan.-18, Imp.)

The average cost of the costs of several means of financing, is known as weighted average cost of capital. It can also be termed as overall cost of capital, composite cost of capital or average cost of capital.

Weighted average cost of capital can be easily evaluated, if cost of a particular source of finance is evaluated.

WACC can be computed as follows,

$$WACC = w_e k_e + w_d k_d + w_p k_p$$

Where,

w_e = Proportion of equity capital

w_d = Proportion of debt capital

w_p = Proportion of preference capital

k_e = Cost of equity capital

k_d = Cost of debt after tax

k_p = Cost of preference capital.

Following steps are involved in evaluation process of weighted average cost of capital :

- Assigning weights to individual costs.
- Multiplying the cost of each of the sources by the appropriate weights.
- Dividing the total weighted cost by the total weights.

Alternatively, weighted average cost of capital can be assessed as follows,

$$k_w = \frac{\sum XN}{\sum W}$$

Where,

k_w = Weighted average cost of capital

X = Cost of individual source of finance

W = Weight, proportion of specific source of finance.

Assignment of Weights

The weights used in evaluation of overall cost of capital are,

- (a) Marginal weights method and
- (b) Historical weights method

(a) Marginal Weights Method

In case of this method, weights are assigned to each source of funds, in proportions of financing inputs that the firm aims to raise. The method is based on capital and not with capital raised in the past. In case, the weights are applied in a ratio different from the ratio in which the new capital is to be raised, the WACC calculated may be different from the actual cost of capital. This may lead to wrong capital investment decisions.

The marginal weighting system consists some weak points. One of the major drawback in usage of marginal weights is that it does not evaluate the long-term results of current financing of the firm. A firm must give due attention to long-term implications while designing the firm's financing strategy.

Example

A firm may accept a project giving an after-tax return of 6% because it intends to raise the funds required by issue of debentures having an after-tax cost of 5%. In case next year, the firm intends to raise funds by issue of equity shares having a cost of 9%, it will have to reject the project which gives a return of only 8%. Thus, marginal weighting method does not consider the fact that today's financing tomorrow's cost.

(b) Historical Weights Method

Several sources of the prevailing capital structure are taken in comparative proportion to assign weights in historical weights method. This method is based on the funds which were already raised by the firm. The application of

historical weights is based on belief that prevailing capital structure of the firm is optimal and it must be continued in future also. Weights under historical system will be either book value weights or market value weights. Book values are operationally suitable and market values are based on theoretical consistency.

Use of historical weights suffer from some practical difficulties and also include the problem of choice between book value and market value weights.

Q13. State the merits and demerits of weighted average cost of capital.

Ans :

Merits

Following are the importance or significance of weighted average cost of capital (WACC):

1. In case of determination of future project profitability, WACC is treated as cut off rate.
2. If firm earn more percentage of profit than WACC, therefore the market value of the firm will increased. Profit taken or not decision is depending on this point. A project considered valuable only if the return from it is higher than WACC.
3. Business unit used different source of finance and invested in the project. So individual cost of capital is not enough for project selection process. Therefore overall cost of capital is considered for project selection process.
4. WACC is widely used to selection project among the option available.
5. WACC is useful in making Economic value Added (EVA) calculation.
6. WACC indicate the minimum rate of return at which business unit create the investors value. If return on capital employed (ROCE) is higher than WACC, business unit will create the investors value, otherwise business unit will fail to create the investors Value.

Demerits

The disadvantages of weighted average cost of capital are as follows:

1. Determining the Weights

The first & foremost difficulty in computing the average cost is to assign weights to different components of capital structure.

2. Choice of Capital Structure

The choice of capital structure is to be used for determining the average is not an easy job. These types of capital structure are these, i.e., current capital structure, marginal capital structure or optimum capital structure. Generally current capital structure is regarded as the optimum capital structure but it is not always correct.

3. Other Limitations:

- (i) Average cost of capital can't be used in following circumstances
 - (a) When the company is trying to bring about radical changes in its debt policy.
 - (b) When the dividend policy of the company is being changed.
 - (c) When the growth objective of the company are being changed.
 - (d) When there is a change in capital structure involving a change in debt equity mix.
 - (ii) It is presumed that the cost of raising funds is in dependent to the value funds raised. The presumption does not hold well in practices.
 - (iii) The specific costs are based upon the existing capital structure and these will change when additional funds have been raised. A firm cannot measure its cost directly on additional capital, it can only be estimated. If additional financing capital structure changes the effective rate of capital will also change.
-

Q14. What is marginal cost of capital.

Ans :

The marginal cost of capital (MCC) is a concept used in financial management for capital budgeting purposes. Actually, it is the weighted average cost of the last Rs 1 of new capital raised.

Companies can raise new capital from:**1. Retained earnings**

Retained earnings are the only source of financing to maintain the target capital structure without issuing new stock. Therefore, the marginal cost of capital remains the same if new capital is raised. The drawback of this financing source is that the amount of new capital is limited by the amount of retained earnings.

2. Issuing new stock

Issuing new stock causes the dilution of earnings per share (EPS). In other words, net profit is distributed among more shareholders, so earnings per share is lower. As a consequence, the stock price will decline, and investors will accept a higher required rate of return. Thus, the marginal cost of capital raised by the issue of new stock is getting higher as the amount of stock outstanding grows.

3. Issuing new debt

Issuing new debt usually has a negative effect on a company's creditworthiness. As a result, lenders will compensate for increasing credit risk by raising interest rates. Thus, the marginal cost of debt will increase as the proportion of debt in total capital grows.

PROBLEMS ON WEIGHTED AVERAGE COST OF CAPITAL

5. Your given the capital structure of XY company calculate weight average cost of capital

Source of fund	Amount	Cost
Equity share capital	4,00,000	14%
Retained Earnings	2,00,000	13%
Preference capital	1,00,000	12%
Debt	3,00,000	9%
Cost of Capital	10,00,000	

Sol :

(Imp.)

A Statement showing weighted average cost of capital

1 Sources of Fund	2 Amount	3 Proportion	4 Cost of Capital	5 WACC (3 × 4)
Equity	4,00,000	0.414	14	5.6
Retained earnings	2,00,000	0.213	13	2.6
Preference capital	1,00,000	0.112	12	1.2
Debt.	3,00,000	0.31	9	2.7
Cost of Capital	10,00,000			12.1%

∴ Overall cost of capital = 12.4

6. The following is the capital structure of "X" limited Co.,

Particulars	Book Value	Market Value
Debentures	300,000	300,000
Preference capital	200,000	200,000
Equity share capital	400,000	700,000
Retained earnings	100,000	-

Sol :

After tax cost of capital are as follows :

Cost of debt. = 4.77%

Cost of preference = 10.53%

Cost of equity = 14.59%

Cost of Retained = 14%

Calculate average cost of capital using

(a) Book Value (b) Market Value

(a) Book Value

1	2	3	4	5
Source of Fund	Amount	Proportion	Cost of Capital	WACC (3 × 4)
Debentures	3,00,000	0.3	4.77 %	1.431
Pref. share capital	2,00,000	0.2	10.53 %	2.106
Equity share capital	4,00,000	0.4	14.59 %	5.836
Retained earnings	1,00,000	0.1	14 %	1.400
Total cost of capital	10,00,000			10.773

Overall Cost of Capital = 10.773%

(b) Market Value

1	2	3	4	5
Source of Fund	Amount	Proportion	Cost of	WACC (3 × 4)
Debentures	300,000	0.25	4.77 %	1.1925
Pref. share capital	200,000	0.17	10.53 %	1.7901
Equity share capital	5,60,000	0.47	14.59 %	6.4622
Retained Earning	1,40,000	0.12	14 %	1.6800
Total Cost of Capital	12,00,000			13.1248

Overall cost of capital = 13.12.

7. From the following capital structure of a company, calculate the overall cost of capital using

i) Book value weights, and

ii) Market value weights

Source	Book value (₹)	Market value (₹)
Equity share capital (₹ 10 shares)	45,000	90,000
Retained earnings	15,000	Nil
Preference share capital	10,000	10,000
Debentures	30,000	30,000

The after tax cost of different source of finance is as follows: Equity share capital 14%, Retained earnings 13%, preference capital 10%, Debentures 5%

Sol :

(i) Computation of Weighted Average Cost of Capital Using Book Value Weights

Source	Amount (₹)	After Tax Cost (₹)	Total Cost (₹) (4) = (2) × (3)
(1)	(2)	(3)	(4)
Equity share capital	45,000	14%	6,300
Retained earnings	10,000	13%	1,950
Preference share capital	10,000	10%	1,000
Debentures	30,000	5%	1,500
	1,00,000		10,750

$$\text{Weighted Average Cost of Capital} = \frac{10,750}{1,00,000} \times 100 = 10.75\%$$

(ii) Computation of Weighted Average Cost of Capital Using Market Value Weights

Source	Amount (₹)	After Tax Cost (%)	Total Cost (₹) (4) = (2) × (3)
1	(2)	(3)	(4)
Equity share capital	90,000	14%	12,600
Preference share capital	10,000	10%	1,000
Debentures	30,000	5%	1,500
	1,30,000		15,150

$$\text{Weighted Average Cost Capital} = \frac{15,100}{1,30,000} \times 100 = 11.615$$

8. From the following details, compute the weighted average cost of capital before and after by assuming tax rate as 50%.

Source of Funds	Amount (Rs.)	Specific cost before tax
Debt	15,00,000	5%
Preference Shares	12,00,000	10%
Equity Shares	18,00,000	12%
Retained Earnings	15,00,000	11%

Sol :

(Jan.-20)

Weighted Average Cost of Capital

Sources of funds	Amount	Weight	Cost of capital	WACC
Debt	15,00,000	0.25	2.5	0.625
Pref shares	12,00,000	0.20	5	1.0
Equity shares	18,00,000	0.30	6	1.8
Retained earning	15,00,000	0.25	5.5	1.375
	60,00,000			4.8

$$\therefore \text{WACC} = 4.8\%$$

9. The following is the capital structure of Ajantha Co. Limited.

Sources of Capital	Book Value (Rs.)	Market Value (Rs.)
Equity Share @ Rs. 100 each	8,00,000	16,00,000
9% Cumulative Preference Shares @ Rs. 100 each	2,00,000	2,40,000
11% Debentures	6,00,000	6,60,000
Retained Earnings	4,00,000	Nil
Total	20,00,000	25,00,000

The current market price of the company's equity share is Rs. 200. For the last year the company had paid equity dividend at 25% and its dividend is likely to grow 5% every year. The corporate tax rate is 30% and shareholders personal income tax rate is 20%.

You are required to calculate :

- Cost of capital for each source of capital
- Weighted average cost of capital on the basis of book value weights.
- Weighted average cost of capital on the basis of market value weights.

Sol :

(Dec.-16)

$$\begin{aligned}
 \text{Cost of equity} &= \frac{D}{NP} + G \\
 &= \frac{25}{100} + 0.05 \\
 &= \frac{25(1+0.05)}{200}
 \end{aligned}$$

Cost of equity = 13%

$$\begin{aligned}
 \text{Cost of retained earnings} &= K_e (1 + t) (1 - b) \\
 &= 13 (1 - 0.3)
 \end{aligned}$$

$$K_r = 9.1$$

Calculation of WACC using Book Values

Sources	Book Value	W_i	X_i	$WACC = \sum W_i X_i$
Equity capital	8,00,000	0.4	13%	5.2
Preference capital	2,00,000	0.1	9%	0.1
Debentures	6,00,000	0.3	11%	3.3
Retained earnings	4,00,000	0.2	9%	1.8
	20,00,000		WACC	10.4

Calculation of WACC using Market Value :

Sources	Market Value	W_i	X_i	$WACC = \sum W_i X_i$
Equity capital	10,66,667	0.49	13	6.37
Preference capital	2,40,000	0.01	9	0.09
Debentures	6,60,000	0.3	11	3.3
Retained earnings	5,33,333	0.2	9	1.8
	25,00,000			11.56

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

Net operating income Rs. 2,00,000

Total Investment Rs. 10,00,000

Equity Capitalization Rate :

(i) If the firm use no debt – 10%

(ii) If the firm uses Rs. 4,00,000 Debentures – 11%

(iii) If the firm uses Rs. 6,00,000 Debentures – 13%

Assume that Rs. 4,00,000 Debentures can be raised at 5% rate of interest where as Rs. 6,00,000 debentures can be raised at 6% rate of interest.

Sol :

(June.-16)

Calculation of Value of firm

Particulars	No debt	Debt of 4,00,000	Debt of 6,00,000
Operating income	2,00,000	2,00,000	2,00,000
(-) Interest	–	20,000	36,000
Net Income (NI)	2,00,000	1,80,000	1,64,000
Value of firm = $\frac{NI}{K_e}$			
K_e	10%	11%	13%
$V = \frac{NI}{K_e}$	20,00,000	16,36,364	12,61,338
(-) Debt	–	4,00,000	6,00,000
Market value of equity	20,00,000	12,36,364	6,61,338
Cost of equity = $\frac{NI - I}{V} \times 100$	$\frac{2,00,000 - 0}{20,00,000} \times 100$ = 10%	$\frac{2,00,000 - 20,000}{12,36,364} \times 100$ = 14.56%	$\frac{2,00,000 - 36,000}{6,61,338} \times 100$ = 24.79%

4.4 LEVERAGES

4.4.1 Meaning

Q15. Define Leverage ?

(OR)

What do you mean by leverage ?

Ans :

(Jan.-20, June-16, Imp.)

Meaning

Leverage is the capability of a firm to make use of fixed cost assets or funds in order to increase the returns to the equity shareholders.

Definition

(i) **According to James Home, leverage is defined as** "The employment of an asset or sources of funds for which the firm has to pay a fixed cost or fixed return".

There exists a direct relationship between degree of leverage, risk and return to the shareholders. Leverage can be classified into, operating and financial leverage.

Income Statement Format

Operating leverage	Sales	xxx	Total leverage
	– variable	<u>– xx</u>	
	Cost	xxx	
	– Fixed cost	<u>– xx</u>	
	EBIT	xxx	
Financial leverage	– Interest	<u>– xx</u>	
	EBT/PBT	xxx	
	– Taxes	<u>– xx</u>	
	EAT/PAT	xxx	
	– Dividend	<u>– xx</u>	
	Retained earning	xxx	

4.4.2 Types of Leverage

4.4.2.1 Degree of Operating Leverage

Q16. What is operating leverage ? How does it help in magnifying revenue of concern?

Ans :

The operating leverage is defined as the capability of firm to use fixed operating costs to increase the effect of changes in sales on its earnings before interest and taxes. When fixed operating costs exist in a firm then it leads to operating leverage.

Operating leverage evaluates the effect of change in sales quantity and operating capacity on earnings before interest and taxes. The Degree of Operating Leverage (DOL) computes operating leverage.

DOL at Q units of output,

$$= \frac{\text{Percentage change in PBIT}}{\text{Percentage change in output(Q)}}$$

If there is any change in level of output then the, degree of operating leverage will also change.

The degree of operating leverage can be calculated alternatively with the help of following formula,

$$DOL_Q = \frac{Q(P - V)}{Q(P - V) - F} = \frac{\text{Contribution}}{\text{PBIT}}$$

Where,

Q = Output

P = Profit

V = Variable cost

F = Fixed cost

Example

The calculation of DOL is explained in following example,

Information of Thomson Ltd.

Profit = Rs. 25,000

Variable cost = Rs. 20,000

Fixed cost = Rs. 1,00,000

The DOL computed for 8,000 and 10,000 units.

Sol :

For 8,000 units,

$$\begin{aligned} DOL &= \frac{Q(P - V)}{Q(P - V) - F} \\ &= \frac{8000(25,000 - 20,000)}{8000(25,000 - 20,000) - 1,00,00,000} \\ &= \frac{4,00,00,000}{3,00,00,000} = 1.33 \end{aligned}$$

For 10,000 units,

$$\begin{aligned} &= \frac{10,000(25,000 - 20,000)}{10,000(25,000 - 20,000) - 1,00,00,000} \\ &= \frac{5,00,000}{4,00,000} = 1.25 \end{aligned}$$

DOL and Production Planning

In production planning, DOL is an essential component which must be considered. Firm can use labour- saving machinery in order to change its cost structure. It helps in reducing variable labour costs, but increases fixed operating costs. When there is an increase in operating costs and decrease in variable costs, it normally increases the DOL.

A simplified formula for DOL is obtained from the following,

$$\frac{\Delta \text{PBIT} / \text{PBIT}}{\Delta Q / Q} = \frac{\Delta [Q(P - V) - F] / Q(P - V) - F}{\Delta Q / Q}$$

4.4.2.2 Degree of Financial Leverage

Q17. Why must the financial manager keep in mind the degree of financial leverage in evaluating various financial plans? When does financial leverage become favourable and unfavourable ?

Ans :

Financial leverage is concerned with financing activities of a firm.

Definition

According to Gitman, it is defined as the "ability of a firm to use fixed financial charges to magnify the effects of changes in EBIT on the earnings per share". It results from the use of fixed cost financing and also specify the extent to which the Earnings Per Share (EPS) will be affected with the change in Earning Before Interest and Tax (EBIT).

Favourable of Financial Leverage

The impact of financial leverage can be favourable or unfavourable. When firm yields more profits on the assets acquired with the funds than the fixed cost of their use. Then it is a favourable or positive leverage and when firm does not earn profits even equal to the cost of funds then it is called as unfavourable (or) negative leverage.

The degree of financial leverage evaluates the effect of change in operating income (EBIT) on change in earning capital or on equity share. Degree of financial leverage is calculated as,

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

Alternatively, it can be calculated as,

$$DFL = \frac{EBIT}{EBT (EBIT - I)}$$

Financial leverage is used to plan the proportion of debt and equity in order to increase earning per share. Some of the importance of financial leverage are explained below.

1. Designing of Capital Structure

The capital structure involves raising of long-term funds, which can be raised from shareholders and long-term creditors. The financial manager is responsible to ascertain the proportion of fixed cost funds and equity share capital. The consequences of borrowing on cost of capital and financial risk involved must be considered before finalizing a capital structure.

2. Profit Planning

The degree of financial leverage have an impact on earning per share. With the increase in profitability of the firm, the availability of profits for equity stockholders increase with the help of fixed cost funds. Hence, financial leverage is an important element in profit planning.

Drawbacks of Financial Leverage

Following are some of the limitations of financial leverage,

1. Double-edged Weapon

Financial leverage is similar to a double-edged weapon. In order to employ it effectively to increase the earnings of the shareholders, the rate of earnings of the firm must be more than fixed rate of interest or dividend on debentures. Financial leverage have a negative impact when its profits is not equal to the cost of interest bearing securities.

2. Useful to Companies with Stable Earnings

Financial leverage is useful only to those companies which have constant and regular earnings. In order to pay interest on debentures, company must have regular income.

3. Increases Risk and Rate of Interest

Financial leverage leads to increase in risk and rate of interest which are the results of extra debt.

4. Hindrances from Financial Institutions

The companies which are utilizing excess of financial leverage are restricted by financial institutions, due to risk factor and in order to maintain balance in capital structure of the company.

4.4.2.3 Degree of Combined Leverage

Q18. Define combined leverage ?

Ans :

Operating leverage measure percentage change in operating profit due to percentage change in sales. It explains the degree of operating risk. Financial leverage measures percentage change in taxable profit (or EPS) on account of percentage change in operating profit (i.e., EBIT).

Thus, it explains the degree of financial risk. Both these leverages are closely concerned with the firm's capacity to meet its fixed costs (both operating and financial). In case both the leverages are combined, the result obtained will disclose the effect of change in sales over change in taxable profit (or EPS).

Composite leverage, thus, expresses the relationship between revenue on account of sales (i.e., contribution or sales less variable cost) and the taxable income. It helps in finding out the resulting percentage change in taxable income on account of percentage change in sales. This can be computed as follows:

Composite Leverage = Operating Leverage × Financial Leverage

$$= \frac{C}{OP} \times \frac{OP}{PBT} = \frac{C}{PBT}$$

where,

C = Contribution (i.e., Sales – Variable cost),

OP = Operating Profit or Earning Before Interest & Tax (EBIT),

PBT = Profit before Tax but After Interest.

PROBLEMS ON LEVERAGES

11. Calculate the operating leverage ratio for each of the four firms.

Particulars	A	B	C	D
Sales price per unit	Rs. 20	Rs. 32	Rs. 50	Rs. 70
Variable cost per unit	Rs. 6	Rs. 16	Rs. 20	Rs. 50
Fixed operating cost	Rs. 80,000	Rs. 40,000	Rs. 200,000	–

For the purpose of perfect calculation use a base level of 5,000 units in each case.

Sol :

Calculation of Contribution and Earnings before

Interest and tax [EBIT]

Particulars	A	B	C	D
Sales (Selling price × units)	Rs.1,00,000	Rs.1,60,000	Rs.2,50,000	Rs.3,50,000
Less : Variable cost (Variable cost per unit × units)	Rs.30,000	Rs.80,000	Rs.1,00,000	Rs.2,50,000
Contribution (S-V)	Rs.70,000	Rs.80,000	Rs.1,50,000	Rs.1,00,000
Less : Fixed cost	Rs.80,000	Rs.40,000	Rs.2,00,000	–
EBIT	Rs.–10,000	Rs.40,000	Rs.– 50,000	Rs.1,00,000

Calculation of Operating leverage

$$\text{Operating leverage} = \frac{\text{Contribution}}{\text{EBIT}}$$

$$A = \frac{70,000}{(-)10,000} = -7$$

$$B = \frac{80,000}{40,000} = 2$$

$$C = \frac{150,000}{-50,000} = -3$$

$$D = \frac{100,000}{100,000} = 1$$

12. From the following selected operating data determine the Break-even sales and operating leverage.

Particulars	Company A	Company B
Sales	Rs. 25,00,000	Rs. 30,00,000
Fixed cost	Rs. 7,50,000	Rs. 15,00,000

variable expenses as a percentage of sales for company A = 50% and company B = 25%.

Sol :

Calculation of contribution and EBIT

Particulars	Company - A	Company - B
Sales	Rs. 25,00,000	Rs. 30,00,000
Less : Variable cost (50% and 25% of sales)	Rs. 12,50,000	Rs. 7,50,000
Contribution (S – V)	Rs. 12,50,000	Rs. 22,50,000
Less : Fixed cost	Rs. 7,50,000	Rs. 15,00,000
EBIT [Earnings before interest & tax]	Rs. 5,00,000	Rs. 7,50,000

Calculation of Operating Leverage (OL)

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}}$$

$$\text{Company A} = \frac{12,50,000}{5,00,000} = 2.5$$

$$\text{Company B} = \frac{22,50,000}{7,50,000} = 3$$

Calculation of Break-even point (BEP)

$$\text{BEP} = \frac{\text{Fixed cost} \times \text{sales}}{\text{sales} - \text{variable cost}}$$

$$\begin{aligned} \text{Company A} &= \frac{\text{Rs. } 7,50,000 \times \text{Rs. } 25,00,000}{\text{Rs. } 25,00,000 - \text{Rs. } 12,50,000} \\ &= \frac{\text{Rs. } 7,50,000 \times \text{Rs. } 25,00,000}{\text{Rs. } 12,50,000} = \text{Rs. } 15,00,000 \end{aligned}$$

$$\begin{aligned} \text{Company B} &= \frac{\text{Rs. } 15,00,000 \times \text{Rs. } 30,00,000}{\text{Rs. } 30,00,000 - \text{Rs. } 750,000} \\ &= \frac{\text{Rs. } 15,00,000 \times 30,00,000}{\text{Rs. } 22,50,000} = \text{Rs. } 20,00,000. \end{aligned}$$

13. Calculate the Degree of operating leverage.

Particulars	1987	1988
Sales	Rs. 200,000	Rs. 250,000
EBIT	Rs. 60,000	Rs. 75,000

Sol :

Calculation of Degree of operation leverage [DOL]

$$\text{DOL} = \frac{\text{Percentage change in EBIT}}{\text{Percentage change in sales}}$$

$$\text{DOL} = \frac{0.25}{0.25} = 1 \quad (\text{or}) \quad \frac{25\%}{25\%} = 1$$

Working Notes :

$$(1) \quad \text{Percentage change in EBIT} = \frac{\text{Difference in EBIT}}{\text{Base year EBIT}} = \frac{\text{Rs. } 15,000}{\text{Rs. } 60,000} \times 100 = 25\%$$

$$\begin{aligned} (2) \quad \text{Percentage change in sales} &= \frac{\text{Differences in sales}}{\text{Base year sales}} \\ &= \frac{\text{Rs. } 50,000}{\text{Rs. } 200,000} \times 100 = 25\%. \end{aligned}$$

14. Calculate Degree of operating leverage.

Particulars	At 5,000 units	At 6,000 units
Sales	Rs. 100,000	Rs. 1,20,000
EBIT	Rs. – 10,000	Rs. 4000

*Sol :***Calculation of Degree of Operating leverage.**

$$\text{DOL} = \frac{\text{Percentage change in EBIT}}{\text{Percentage change in sales}}$$

$$\text{DOL} = \frac{-140\%}{20\%} \therefore \text{DOL} = -7.$$

Note :

$$1) \text{ Percentage change in EBIT} = \frac{\text{Differences in EBIT}}{\text{Base year EBIT}}$$

$$= \frac{\text{Rs.14,000}}{\text{Rs. -10,000}} \times 100 = -140\%$$

$$2) \text{ Percentage change in sales} = \frac{\text{Differences in sales}}{\text{Base year sales}} \times 100 = \frac{\text{Rs. 20,000}}{\text{Rs.100,000}} \times 100 = 20\%.$$

15. Determine Break even point and operating leverage and which firm would you consider more risky.

Particulars	Firm - X	Firm - Y	Firm - Z
Sales price per unit	Rs. 90	Rs. 60	Rs. 20
Variable cost	Rs. 60	Rs. 18	Rs. 10
Fixed operating cost	Rs. 3,00,000	Rs. 4,20,000	Rs. 2,00,000

Number of units produced and sold = 12,000 units.*Sol :*

Calculation of contribution and EBIT

Particulars	FIRM X	FIRM Y	FIRM Z
Sales [selling price per unit × No.of units]	Rs.10,80,000	Rs. 7,20,000	Rs. 2,40,000
Less : Variable cost [Variable cost per unit× No. of units]	Rs. 7,20,000	Rs. 2,16,000	Rs. 1,20,000
Contribution (S – V)	Rs. 3,60,000	Rs. 5,04,000	Rs. 1,20,000
Less : Fixed cost	Rs. 3,00,000	Rs. 4,20,000	Rs. 2,00,000
EBIT	Rs. 60,000	Rs 84,000	(-) Rs. 80,000

Calculation of Break even point (BEP)

$$\text{BEP} = \frac{\text{Fixed cost} \times \text{sales}}{\text{sales} - \text{variable cost}}$$

$$X = \frac{3,00,000 \times 10,80,000}{10,80,000 - 720,000} = 9,00,000$$

$$Y = \frac{4,20,000 \times 7,20,000}{7,20,000 - 2,16,000} = 6,00,000$$

$$Z = \frac{2,00,000 \times 2,40,000}{2,40,000 - 1,20,000} = 4,00,000$$

Calculation of Operating Leverage

$$\text{Operating leverage} = \frac{\text{Contribution}}{\text{EBIT}}$$

$$\text{Firm 'X'} = \frac{360,000}{60,000} = 6$$

$$\text{Firm 'Y'} = \frac{504,000}{84,000} = 6$$

$$\text{Firm 'Z'} = \frac{120,000}{-80,000} = -1.5$$

Decision : Project 'Z' is more risky with compare to project 'X' and 'Y'. Because it is having Negative operating leverage.

- 16. Following information is taken from the records of hypothetical company. Install capacity 1000 units.**

Operating capacity = 800 units.

Selling price per unit = Rs. 10

Variable cost per unit = Rs. 7

Calculate the operating leverage under the following situation.

Situation	Fixed cost
A	Rs. 800
B	Rs. 1200
C	Rs. 1500

Sol :

Calculation of contribution and EBIT

Particulars	Situation A	Situation B	Situation C
Sales (800 units) × 10 `.	Rs. 8000	Rs. 8000	Rs. 8000
Less : Variable cost (1200 × 8)	Rs. 5600	Rs. 5600	Rs. 5600
Contribution (S – V)	Rs. 2400	Rs. 2400	Rs. 2400
Less : Fixed cost	Rs. 800	Rs. 1200	Rs. 1500
EBIT	Rs. 1600	Rs. 1200	Rs. 900

Calculation of operating leverage (OL)

$$\text{Operating leverage} = \frac{\text{Contribution}}{\text{EBIT}}$$

$$\text{Situation A} = \frac{\text{Rs. 2400}}{\text{Rs. 1600}} = 1.5$$

$$\text{Situation B} = \frac{\text{Rs. 2400}}{\text{Rs. 1200}} = 2$$

$$\text{Situation C} = \frac{\text{Rs. 2400}}{\text{Rs. 900}} = 2.67$$

17. Calculate the operating, financial and combined leverages from the following information.

Interest	= Rs. 5000
Sales	= Rs. 50,000
Variable cost	= Rs. 25,000
Fixed cost	= Rs. 15,000

Sol :

Calculation of contribution, EBIT and EBT

Particulars	Amt (in Rs)
Sales	50,000
Less : Variable cost	25,000
Contribution →	25,000
Less : Fixed cost	15,000
EBIT →	10,000
Less : Interest	5000
EBT →	5000

Note :

1) EBIT = Earnings before Interest and tax

2) EBT = Earning before tax.

1) Calculation of operating leverage.

$$OL = \frac{\text{Contribution}}{\text{EBIT}} = \frac{25,000}{10,000} = 2.5$$

2) Calculation of Financial leverage (FL)

$$FL = \frac{\text{EBIT}}{\text{EBT}} \text{ (or) } \frac{\text{EBIT}}{\text{EBIT} - \text{Interest}}$$

$$= \frac{10,000}{5,000} = 2$$

3) Calculation of Combined leverage

Operating leverage × financial leverage

$$\Rightarrow 2.5 \times 2 = 5.$$

18. Calculate the operating, financial and combined leverage from the following situation.

Interest	Rs. 7,500
Sales	Rs. 75,000
Variable cost	Rs. 37,500
Fixed cost	Rs. 20,000

*Sol :***Calculation of contribution, EBIT and EBT**

Particulars	Amt(in Rs)
Sales	75,000
Less : Variable cost	37,500
Contribution →	37,500
Less : Fixed cost	20,000
EBIT →	17,500
Less : Interest	7,500
EBT →	10,000

Calculation of Operating leverage (OL)

$$OL = \frac{\text{Contribution}}{\text{EBIT}}$$

$$= \frac{37500}{17500} = 2.14$$

Calculation of Financial Leverage (FL)

$$FL = \frac{\text{EBIT}}{\text{EBT}}$$

$$= \frac{\text{Rs.}17500}{\text{Rs.}10,000} = 1.75$$

Calculation of Combined leverage (CL)

$$CL = \text{Operating leverage} \times \text{Financial Leverage}$$

$$CL = 2.14 \times 1.75$$

$$CL = 3.745$$

19. The installed capacity of factory is 800 units. Actual capacity used is 500 units. Selling price of the units is Rs. 10/- variable costs per units is Rs. 6. Calculate the operating leverage in each of the following three situations :

- i) When fixed costs are Rs. 500
- ii) When fixed costs are Rs. 1,000
- iii) When fixed costs are Rs. 1,500

Sol :

Calculation of contribution, EBIT and EBT

Particulars	Situation I	Situation II	Situation III
Sales	Rs. 5,000	Rs. 5,000	Rs. 5,000
Less : Variable cost (6 × 500)	Rs. 3,000	Rs. 3,000	Rs. 3,000
Contribution (S – V) →	Rs. 2,000	Rs. 2000	Rs. 2000
Less : Fixed cost	Rs. 500	Rs. 1000	Rs. 1500
EBIT →	Rs. 1500	Rs. 1000	Rs. 500

Calculation of Operating Leverage

$$\text{Operating leverage} = \frac{\text{Contribution}}{\text{EBIT}}$$

$$\text{Situation No : I} = \frac{\text{Rs.}2000}{\text{Rs.}1500} = 1.33$$

$$\text{Situation No : II} = \frac{\text{Rs.2000}}{\text{Rs.1000}} = 2$$

$$\text{Situation No : III} = \frac{\text{Rs.2000}}{\text{Rs.500}} = 4$$

20. A company has a choice of the following three financial plans you are required to calculate the financial leverages in each case and Interpret it.

Particulars	A	B	C
Equity Capital	Rs. 3,000	Rs. 2,000	Rs. 4,000
Debt	Rs. 3,000	Rs. 4,000	Rs. 2,000
Operating profit [EBIT]	Rs. 500	Rs. 500	Rs. 500
Interest	10%	10%	10%

Sol :

Calculation of Earnings before tax [EBT]

Particulars	A	B	C
EBIT	Rs. 500	Rs. 500	Rs. 500
Less : Interest 10%	Rs. 300	Rs. 400	Rs. 200
Earnings before tax [EBT]	Rs. 200	Rs. 100	Rs. 300

Calculation of financial leverage [FL]

$$\text{Operating leverage} = \frac{\text{EBIT}}{\text{EBT}}$$

$$A = \frac{\text{Rs.500}}{\text{Rs.200}} = 2.5$$

$$B = \frac{\text{Rs.500}}{\text{Rs.100}} = 5$$

$$C = \frac{\text{Rs.500}}{\text{Rs.300}} = 1.67.$$

21. A company has the following structure.

10% preference share capital Rs. 200,000

Equity share capital Rs. 200,000

8% Debentures Rs. 150,000

The present EBIT is Rs. 100,000 calculate the financial leverage assuming that company is in 50% tax bracket.

Sol :

Calculation of EBT

Particulars	Amt (in Rs)
EBIT	Rs. 1,00,000
Less : Interest on debenture (2,00,000 × 10%)	Rs. 20,000
	Rs. 80,000
Less : Preference share dividend (Pre tax basis)	Rs. 40,000
EBT →	Rs. 40,000

Calculation of Financial Leverage

$$\text{Financial leverage} = \frac{\text{EBIT}}{\text{EBT}}$$

$$= \frac{\text{Rs.100,000}}{\text{Rs.40,000}} = 2.5.$$

22. A company has sales of Rs. 200,000. Variable costs are 40% of the sales while the fixed operating costs amount to Rs. 50,000.

The amount of Interest on long term debt is Rs. 10,000.

You are required to calculate the composite leverage and illustrate the impact if sales increase by 5%.

Sol :

Calculation of Earnings before tax [EBT]

Particulars	Amt (in Rs)
Sales	Rs. 2,00,000
Less : Variable cost (40% of sales)	Rs. 80,000
Contribution [C]	Rs. 120,000
Less : Fixed cost	Rs. 50,000
EBIT →	Rs. 70,000
Less : Interest [Debenture]	Rs. 10,000
EBT →	Rs. 60,000

Composite leverage (or) combined leverage

$$\frac{\text{Contribution}}{\text{EBT}} = \frac{\text{Rs.120,000}}{\text{Rs.60,000}} = 2$$

If Sales increased by 5%

Particulars	Amt (in Rs)
Sales $\left(2,00,000 \times \frac{105}{100}\right)$	Rs. 210,000
Less : Variable cost $\left[80,000 \times \frac{105}{100}\right]$	Rs. 84,000
Contribution [C]	1,26,000
Less : Fixed cost	50,000
EBIT →	76,000
Less : Interest	10,000
EBT →	66,000

Calculation of Combined leverage

$$\text{Combined leverage} = \frac{\text{Contribution}}{\text{EBT}}$$

$$= \frac{\text{Rs.}126,000}{\text{Rs.}66,000}$$

$$= 1.91$$

23. Calculate operating leverage and financial leverage under situation A and B and financial plans 1 and 2 respectively from the following information relating to the operation and capital structure of X Ltd.

Installed capacity 1,200 units

Actual production and sales 800 units

Selling price per unit Rs. 15

Variable cost per unit Rs. 10

Fixed cost

Situation - A Rs. 1,000

Situation - B Rs. 2,000

Capital structure

Particulars	Financial Plan 1 Rs.	Financial Plan 2 Rs.
Equity	5,000	7,500
Debt	5,000	2,500

Cost of debt for (plan 1 and 2) 12%

Sol :

Determination of Operating Leverage

Particulars	Situations	
	A	B
Sales level (units)	800	800
Sales revenue (800 x 15)	Rs. 12,000	Rs. 12,000
Less: Variable cost (800 x 10)	8,000	8,000
Less: Fixed cost	1,000	2,000
Operating profit (EBIT)	3,000	2,000

Degree of Operating Leverage

$$\frac{\text{Sales} - \text{Variable cost}}{\text{EBIT}}$$

$$A = \frac{12000 - 8000}{3000} = 1.33$$

$$B = \frac{12000 - 8000}{2000} = 2$$

Determination of Financial Leverage

Particulars	Financial Plan	
	Plan 1	Plan 2
Situation-A		
EBIT	3,000	3,000
Less : Interest on debt	(5000 × 12%) = 600	(2500 × 12%) = 300
Earnings after interest	2,400	2,700
Financial leverage (EBIT/EBIT-I)	1.25	1.11
Situation-B		
EBIT	2,000	2,000
Less : Interest on debt	(5000 × 12%) = 600	(2500 × 12%) = 300
Earnings after interest	1,400	1,700
Financial leverage	1.43	1.18

24. A company has sales of ₹ 1,00,000. The variable costs are 40% of the sales while the fixed operating costs amount to ₹ 30,000. The amount of interest on long-term debt is ₹ 10,000.

You are required to calculate the composite leverage and illustrate its impact if sales increase by 5%

Sol :

Particulars	₹
Sales	1,00,000
Less : Variable costs (40% of sales)	40,000
Contribution (C)	60,000
Less : Fixed Operating costs	30,000
Earning before interest and tax (EBIT) or Operating profit (OP)	30,000
Less : Interest	10,000
Taxable Income (PBT)	20,000

$$\text{Composite Leverage} = \frac{C}{PBT} = \frac{60,000}{20,000} = 3$$

The composite leverage of '3' indicates that with every increase of Re. 1 in sales, the taxable income will increase by ₹ 3 (i.e., 1 × 3)

This can be verified by the following computations when the sales increase by 5%

Particulars	₹
Sales	1,05,000
Less : Variable costs (40% of sales)	42,000
Contribution (C)	63,000
Less : Fixed Operating costs	30,000
Earning before interest and tax (EBIT) or Operating profit (OP)	33,000
Less : Interest	10,000
Taxable Income (PBT)	23,000

It is clear from the above computation that on account of increase in sales by 5% the profit before tax has increased by 15%. This can be verified as follows :

$$\text{Increase in Percentage Profits} = \frac{\text{Increase in Profit}}{\text{Base Profit}} \times 100 = \frac{3,000}{20,000} \times 100 = 15\%$$

25. Calculate the Degree of Operating Leverage (DOL), Degree of Financial Leverage (DFL), and the Degree of Combined Leverage (DCL) for the following firms :

Particulars	Firm A	Firm Y	Firm Z
Output (Units)	60,000	15,000	10,000
Fixed Costs (₹)	7,000	14,000	1,500
Variable Cost Per Unit (₹)	0.20	1.50	0.02
Interest on Borrowed Funds (₹)	4,000	8,000	–
Selling Price Per Unit (₹)	0.60	5.00	0.10

Sol :

Particulars	Firm A	Firm Y	Firm Z
Output (Units)	60,000	15,000	10,000
Selling Price Per Unit (₹)	0.60	5.00	0.10
Variable Cost Per Unit (₹)	0.20	1.50	0.02
Contribution Per Unit (₹)	0.40	3.50	0.80
Total Contribution (₹)	24,000	52,500	8,000
Less : Fixed Costs	7,000	14,000	1,500
EBIT	17,000	38,500	6,500
Less : Interest	4,000	8,000	–
Profit Before Tax (PBT)	13,000	30,500	6,500

$$\text{Degree of Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} \quad \frac{24,000}{17,000} = 1.41 \quad \frac{52,500}{38,000} = 1.36 \quad \frac{8,000}{6,500} = 1.23$$

$$\text{Degree of Financial Leverage} = \frac{\text{EBIT}}{\text{PBT}} \quad \frac{17,000}{13,000} = 1.31 \quad \frac{38,500}{30,500} = 1.26 \quad \frac{6,500}{6,500} = 1.00$$

$$\text{Degree of Combined Leverage} = \frac{\text{Contribution}}{\text{PBT}} \quad \frac{24,000}{13,000} = 1.85 \quad \frac{52,500}{30,500} = 1.72 \quad \frac{8,000}{6,500} = 1.23$$

4.5 EBIT AND EPS ANALYSIS

Q19. Explain briefly about EBIT- EPS Analysis.

Ans :

(Imp.)

In order to analyze the effect of leverage, EBIT - EPS analysis is used which involves different methods of financing under various assumptions of EBIT. The EBIT - EPS approach to capital structure involves selecting the capital structure that maximizes EPS over an expected range of earnings before interest and taxes.

Indifference Point

Indifference point indicates the level of EBIT at which the EPS is same for two different financial plans. The indifference point is defined as the level of EBIT above which benefits of financial leverage starts functioning with respect to Earnings Per Share (EPS).

The indifference point between two alternative methods of financing is calculated by two methods. They are :

1. Algebraic approach
2. Graphic approach

1. Algebraic approach

This is a thematical approach in which the indifference point can be computed with the help of follow :

In Case of New Company

(i) Equity shares Vs Debentures

$$\frac{X(1-t)}{N_1} = \frac{(X-1)(1-t)}{N_2}$$

(ii) (a) Equity shares Vs preferences shares,

$$\frac{X(1-t)}{N_1} = \frac{X(1-t)-P}{N_3}$$

(b) Equity shares Vs Preference shares with tax on preference dividend.

$$\frac{X(1-t)}{N_1} = \frac{X(1-t)-P(1+D_1)}{N_3}$$

(iii) Equity shares Vs preference shares and debentures

$$\frac{X(1-t)}{N_1} = \frac{(X-1)(1-t)-P}{N_4}$$

In Case of Existing Company

$$\frac{(X-I_1)(1-t)}{N_1} = \frac{(X-I_1-I_2)(1-t)}{N_2}$$

Where,

X = EBIT at the indifference point.

N₁ = Number of equity shares outstanding, if only equity shares are issued.

N₂ = Number of equity shares outstanding, if both debentures and equity shares are issued.

N₃ = Number of equity shares outstandingly, if both preference and equity shares are issued.

N₄ = Number of equity shares outstanding, if both preference shares and debentures are issued.

I = The amount of interest on debentures.

P = Dividend on preference shares.

t = Income-tax rate.

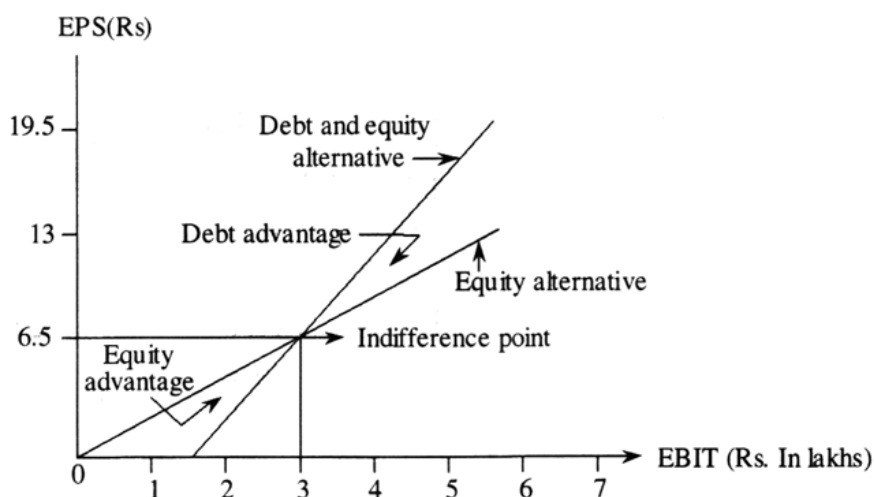
D_t = Tax on preference dividend.

I_1 = Interest paid on existing debt.

I_2 = Interest paid on additional debt.

2. Graphic Approach

The indifference point can be ascertained with the help of graphic approach. EBIT is taken on X-axis, whereas EPS is taken on Y-axis. The point of intersection of lines is the indifference point. It can be graphically obtained by plotting the relationship between EBIT and EPS under the two alternatives and noting the point of intersection i.e., indifference point.



Alternatively, indifference point is calculated on the basis of market value. The level of EBIT ensures the market price for two different plans as same and the indifference point is calculated as,

$$P / E_1 \left[\frac{X(1-t)}{N_1} \right] = P / E_2 \left[\frac{(X-1)(1-t) - D_p}{N_2} \right]$$

Where,

P / E_1 = P/E ratio of unlevered plan

P / E_2 = P/E ratio of levered plan.

PROBLEMS ON EBIT EPS ANALYSIS

26. A Ltd. who has an EBIT of Rs. 1,60,000/- capital structure consist of 10% debentures of Rs. 5,00,000/-, equity shares of 4,00,000/- (Rs. 100 each), 12% preference shares of Rs. 1,00,000/-. The tax rate is 55% calculate (i) EPS, (ii) DFL, (iii) % change in EPS associate with 30% increase & 30% decrease in EBIT ?

Sol :

Particulars	Amount
EBIT	1,60,000
(-) Interest (5,00,000 × 10%)	50,000
EBT	1,10,000
(-) Tax @ 55%	60,500
EAT / PAT	49,500
(-) Preference Dividend (1,00,000 × 12%)	12,000
EAES (earning Available to Equity Shareholders)	37,500

$$\text{No. of Equity Shares} = \frac{4,00,000}{100}$$

$$= 4000 \text{ shares}$$

$$(i) \text{ EPS} = \frac{\text{EAES}}{\text{No. of eq. shares}} = \frac{37,500}{4000} = 9,375$$

$$(ii) \text{ DFL} = \frac{\text{EBIT}}{\text{EBT}} = \frac{1,60,000}{1,10,000} = 1.45\%$$

(iii) Statement showing % change in EPS

Particulars	30% ↑ in EBIT	30% ↓ in EBIT
EBIT	2,08,000 (1,60,000 + 30%) = (1,60,000 + 48,000)	1,12,000 (1,60,000 - 48,000)
(-) Interest @ 10%	50,000	50,000
EBT	1,58,000	62,000
(-) Tax @ 55%	86,900	34,100
EAT	71,100	27,900
(-) Preference Dividend	12,000	12,000
EAES	59,100	15,900

$$(i) \quad EPS = \frac{EAES}{\text{No. of Equity Shares}} = \frac{59,100}{4,000} = 14.775$$

$$(ii) \quad EPS = \frac{EAES}{\text{No. of Equity Shares}} = \frac{15,900}{4,000} = 3.975$$

$$\% \text{ change in EPS} = \frac{\Delta EPS}{EPS}$$

Actual EPS ↑ in 30% EPS ↓ in 30% EPS

$$\therefore EPS = 9.375 \quad \therefore EPS = 14.775 \quad \therefore EPS = 3.975$$

$$\% \text{ Change in EPS} = \frac{\Delta EPS}{EPS} = \frac{14.775 - 9.375}{9.375} = \frac{3.975 - 9.375}{9.375}$$

$$\therefore 0.576 = 0.576$$

27. XYZ Co. is having an EBIT of Rs. 2,00,000/-. The capital structure consist of 10% debentures of Rs. 5,00,000/-, equity shares of Rs. 2,00,000/- (50 Rs. each), 10% pref. shares of Rs. 1,00,000/-, tax rate is 50%. Calculate (i) EPS, (ii) DFL, (iii) % change in EPS associated with 15% ↑ and 15% ↓ in EBIT.

Sol :

Calculation of Number of Equity Shares

$$\frac{2,00,000}{50} = 4,000 \text{ shares}$$

Particular	Amount
EBIT	2,00,000
(-) Interest @ 10%	50,000
EBT	1,50,000
(-) Tax @ 50%	75,000
EAT	75,000
(-) Preference Dividend @ 10%	10,000
EAES	65,000

$$i) \quad EPS = \frac{EAES}{\text{No. of equity shares}}$$

$$= \frac{65,000}{4,000} = 16.25.$$

$$\text{ii) } DFL = \frac{EBIT}{EBT} = \frac{2,00,000}{1,50,000} = 1.33\%$$

iii) % Change in EPS

Particulars	15% ↑	15% ↓
EBIT	2,30,000 (2,00,000 + 30,000)	1,70,000
(-) Interest @ 10%	50,000	50,000
EBIT	1,80,000	1,20,000
(-) Tax @ 50%	90,000	60,000
EAT	90,000	60,000
(-) Preference dividend @ 10%	10,000	10,000
EAES	80,000	50,000

$$\therefore \text{EPS} = \frac{\text{EAES}}{\text{No. of shares (eq.)}}$$

$$= \frac{80,000}{4,000} = 20$$

$$\therefore \text{EPS} = \frac{\text{EAES}}{\text{No. of shares (eq.)}}$$

$$= \frac{50,000}{4,000} = 12.5$$

$$\% \text{ change in EPS} = \frac{\Delta \text{EPS}}{\text{EPS}}$$

$$= \uparrow \text{ in } 15\% = \frac{20 - 16.25}{16.25} = 0.23$$

$$= \downarrow \text{ in } 15\% = \frac{12.5 - 16.25}{16.25} = -0.230$$

28. International Ltd., has a capital structure (all equity) comparisons Rs. 5,00,000 each share of Rs. 10. The firm wants to raise an additional Rs. 2,50,000 for expansion programme. The firm has four alternative financial plans I, II, III and IV. If the firm is able to earn an operating profit at Rs. 80,000 after additional investment and 50 per cent tax rate. Calculate EPS for all four alternatives and select the preferable financial plan. Financial plans

I. Raise the entire amount by issue of new equity capital.

II. Raise 50 per cent as equity capital and 50 per cent as 10 per cent debt capital.

III. Raise the entire amount as 12 per cent debentures.

IV. Raise 50 per cent equity capital and 50 per cent preference share capital at 10 per cent.

Sol :

Calculation of EPS under four Financial Plans

Particulars	Financial Plan			
	I Rs.	II Rs.	III Rs.	IV Rs.
EBIT	80,000	80,000	80,000	80,000
Less: Interest	-----	12,500	30,000	-----
EBT	80,000	67,500	50,000	80,000
Less: Tax 50%	40,000	33,750	25,000	40,000
EAT	40,000	33,750	25,000	40,000
Less: Preference dividend	-----	-----	-----	12,500
Earnings available to shareholders	40,000	33,750	25,000	27,500
No. of shares (equity) outstanding	75,000	62,500	50,000	62,500
EPS (Rs.)	0.53	0.54	0.50	0.44

Financial Plan II is preferable since EPS in that plan is high when compared to other.

29. **Earnings before Interest Tax (EBIT)** = **100,000**
Bonds (Debt part) = **300,000**
Cost of Bonds issued (Debt) = **10%**
WACC = **12.5%**

Sol :

Calculating the value of the company :

(EBIT) = 100,000
WACC = 12.5%
= EBIT/WACC
= 100,000/12.5%
Market value of the company = 8,00,000
Total Debt = 3,00,000
= Total market value - total debt
= 8,00,000 – 3,00,000
Total Equity = 5,00,000
= EBIT - interest on debt

	=	1,00,000 – 10% of 3,00,000
Share holder's earnings	=	70,000
Cost of equity	=	70,000/5,00,000

Now, assume that the proportion of debt increases from 3,00,000 to 4,00,000 and everything else remains same.

(EBIT)	=	1,00,000
WACC	=	12.5%
	=	EBIT/WACC
	=	100,000/12.5%
Market value of the company	=	8,00,000
Total Debt	=	4,00,000
	=	Total market value - total debt
	=	8,00,000 – 4,00,000
Total Equity	=	4,00,000
	=	EBIT – interest on debt
	=	1,00,000 – 10% of 4,00,000
Shareholder's earnings	=	60,000
	=	60,000/4,00,000
Cost of equity	=	15%

As observed, in the case of Net Operating Income Approach, with the increase in debt proportion, the total market value of the company remains unchanged, but the cost of equity increases.

- 30. Two firms L and U are identical in all respect except for the debt equity mix from L has issued 12% debenture of ₹ 15,00,000, firm U has no debt. Both L and U earn 30% before Interest and Taxes on their total assets of ₹ 20,00,000. Their Tax rate is 50% and Equity Capitalization rate 20%. Compute the value of firm using Net Income approach.**

Sol :

(Imp.)

Valuation of Firm under Net Income Approach

Particulars	Firm L	Firm U
EBIT (30% of 20,00,000)	6,00,000	6,00,000
Less : Interest (12% of 15,00,000)	1,80,000	–
Taxable income	4,20,000	6,00,000
Less : Taxes (50%)	2,10,000	3,00,000
Earnings for equity holders	2,10,000	3,00,000
Equity capitalization rate (K_e)	0.20	0.20
Market value of equation (E)	10,50,000	15,00,000
Market value of debt (D)	15,00,000	–
Total value of firm (V) = (E + D)	25,50,000	15,00,000

Working Note :

$$\text{Market Value of Equity (E)} = \frac{\text{Earnings for equity holders}}{\text{Equity capitalisation rate (K}_e\text{)}}$$

$$\text{Firm L} = \frac{2,10,000}{0.20} = 10,50,000$$

$$\text{Firm U} = \frac{3,00,000}{0.20} = 15,00,000.$$

31. XYZ Ltd. intends to set-up a project with capital cost of ₹ 50,00,000. It is considering the three alternative proposals of financing.

Alternative 1 = 100% equity financing

Alternative 2 = Debt-equity 1 : 1

Alternative 3 = Debt-equity 3 : 1

The estimated annual net cash inflow is @ 24%, i.e., ₹ 12,00,000 on the project. The rate of interest on debt is 15%. Calculate the weighted average cost of capital for three different alternatives and analyze the capital structure decision.

Sol :

Evaluation of three different alternatives of Financing a Project

Particulars	Alternative 1 (₹)	Alternative 2 (₹)	Alternative 3 (₹)
Equity	50,00,000	25,00,000	12,50,000
Debt	–	25,00,000	37,50,000
Total project cost	50,00,000	50,00,000	50,00,000
Net cash inflow from Project @ 24% p.a.	12,00,000	12,00,000	12,00,000
Less: Interest on debt @ 15%	–	3,75,000	5,62,500
	12,00,000	8,25,000	6,37,500
1) Return on equity			
$\frac{\text{Dividend payments}}{\text{Total equity}} \times 100$	24%	33%	51%
2) Return on Debt	–	15%	15%
WACC*	24%	24%	24%
Total Value of Company	50,00,000	50,00,000	50,00,000

* **WACC = (Cost of equity x % equity) + (Cost of debt x % debt).**

It can be observed from the example given above that at different levels of leverage, the WACC is same and the value of firm will also be same.

4.6 INDIFFERENCE POINT

Q20. What do you understand by Indifference Point?

Ans :

The EPS, earnings per share, 'equivalency point' (or) 'point of indifference' refers to that EBIT, earnings before interest and tax, level at which EPS remains the same irrespective of different alternatives of debt-equity mix. At this level of EBIT, the rate of return on capital employed is equal to the cost of debt and this is also known as break even level of EBIT for alternative financial plans.

The equivalency or point of indifference can be calculated algebraically, as below :

$$\frac{(X - I_1)(1 - T) - PD}{S_1} = \frac{(X - I_2)(1 - T) - PD}{S_2}$$

Where, X = Equivalency Point or Point of Indifference or Break Even EBIT Level.

I_1 = Interest under alternative financial plan 1.

I_2 = Interest under alternative financial plan 2.

T = Tax Rate

PD = Preference Dividend

S_1 = Number of equity shares or amount of equity share capital under alternative 1.

S_2 = Number of equity shares or amount of equity share capital under alternative 2.

The point of indifference can also be determined by preparing the EBIT chart or range of earnings chart. This chart shows the expected earnings per share (EPS) at various levels of earnings before interest and tax (EBIT) which may be plotted on a graph and straight line representing the EPS at various levels of EBIT may be drawn. The point where this line intersects is known as point of indifference or break-even point.

Point of Indifference and Uncommitted Earnings per Share

We have discussed above that the point of indifference refers to that EBIT level at which earnings per share (EPS) remains the same irrespective of different alternatives of debt-equity mix. While calculating the equivalency point, the provision for repayment of debt or obligation towards sinking fund has not been considered so far. However, sinking fund appropriations for redemption of debt decrease the amount of earnings available for equity shareholders. Thus, a finance manager may be interested to determine the level of EBIT at uncommitted earnings per share (UEPS) after deducting sinking fund appropriation would be the same. The equivalency point for uncommitted earnings per share can be calculated as below :

$$\frac{(X - I_1)(1 - T) - PD - SF}{S_1} = \frac{(X - I_2)(1 - T) - PD - SF}{S_2}$$

Where,

- X = Equivalency point or point of indifference or break even EBIT level
 I_1 = Interest under alternative financial plan 1
 I_2 = Interest under alternative financial plan 2.
 T = Tax rate
 PD = Preference dividend
 SF = Sinking fund obligations
 S_1 = Number of equity shares or amount of share capital under plan 1.
 S_2 = Number of equity shares or amount of share capital under plan 2.

PROBLEM

- 32. The financial manager of a company has formulated various financial plans to finance Rs. 30,00,000 required to implement various capital budgeting process. You are required to determine the indifference plan for each financial plans assuming 55% corporate tax rate, Higher equity capital of Rs. 30,00,000 (face value Rs. 100) OR Rs. 15,00,000, 10% Debentures and Rs. 15,00,000 equity.**

Sol :

Calculation of Indifference point

[Equity Vs Equity and Debentures]

$$\frac{(X - I)(1 - t) - P}{n_1} = \frac{(X - I)(1 - t) - P}{n_2}$$

X = EBIT

t = tax rate @ 55%

P = Preference dividend

I = Interest

n_1 = number of equity shares in plan - 1

n_2 = number of equity shares in plan - 2

$$\frac{(X - I)(1 - t) - P}{n_1} = \frac{(X - I)(1 - t) - P}{n_2}$$

$$= \frac{(X - 0)(1 - 0.55) - 0}{30,000} = \frac{(X - \text{Rs.}150,000)(1 - 0.55) - 0}{15,000}$$

$$\frac{X - 0.45}{30,000} = \frac{(X - \text{Rs.}150,000)(0.45)}{15,000}$$

$$\frac{X - 0.45}{2} = \frac{(X - 150,000)(0.45)}{1}$$

$$\frac{X}{2} = \frac{X - 150,000}{1}$$

$$X = 2(X - 150,000)$$

$$X = 2X - 300,000$$

$$X - 2X = -300,000$$

$$X = \text{Rs. } 300,000$$

$$\therefore \text{EBIT} = \text{Rs. } 300,000$$

Particulars	Financial Plan 1	Financial Plan 2
EBIT	Rs. 300,000	Rs. 300,000
Less : Interest	—	Rs. 150,000
Earnings before tax (EBT)	Rs. 300,000	Rs. 150,000
Less : Tax @ 55%	Rs. 165,000	Rs. 82,500
Earnings After tax [EAT]	Rs. 135,000	Rs. 67,500
Less : Preference Dividend	—	—
Earnings available to equity share holders	Rs. 135,000	Rs. 67,500

Calculation of Earning per share [EPS]

$$\text{EPS} = \frac{\text{Earnings available to equity share holders}}{\text{Number of equity shares}}$$

$$\text{Plan} \rightarrow 1 = \frac{\text{Rs. } 135,000}{30,000} = 4.5$$

$$\text{Plan} \rightarrow 2 = \frac{\text{Rs. } 67,500}{15,000} = 4.5$$

4.7 CAPITAL STRUCTURE

4.7.1 Meaning

Q21. Define capital structure ? Explain the features of capital structure.

Ans :

(Jan.-20, June-16, Imp.)

Meaning

Capital structure in simple words refers to debt equity ratio of a company. In other words it refers to the proportion of debt in the investments of the company. It is important for a company to have an appropriate capital structure. Estimation of capital requirements is necessary, but the formation of capital structure is important.

Definition

- (i) **According to Gerestenbeg**, "Capital structure of a company refers to the composition or make-up of its capitalization and it includes all long term capital resources i.e., loans, reserves, shares and bonds.

The capital structure is made up of debt and equity securities and refers to permanent financing of a firm. It is composed of long term debt, preference share capital and share holder's funds.

Financial Manager should develop an appropriate capital structure, which is helpful to maximize shareholders wealth. This can be possible when all factors which are relevant to the company's capital structure are properly analysed, balanced and considered.

(i) Profitability

The company should make maximum use of leverage at a minimum cost. In other words, it should generate maximum returns to owners without adding additional cost.

(ii) Flexibility

Flexible capital structure means it should allow the existing capital structure to change according to the changing conditions without increasing cost. It should be possible for the company to provide funds whenever needed to finance its possible activities. The company should be able to raise funds whenever the need arises and also retire debts whenever it becomes too costly to continue with that particular source.

(iii) Solvency

The use of excessive debt threatens the solvency of the company. Debt should be used till the point where debt does not add significant risk, otherwise use of debt should be avoided.

(iv) Control

The capital structure should involve minimum dilution of the control of the company. A company that issues more and more equity, dilutes the power of existing shareholders as number of shareholders increases. Also raising of additional funds through public issue may lead to dilution of control.

(v) Cost of capital

If cost of any component of capital structure of the company like interest payment on debt

is very high then it can increase the overall cost of capital of the company. In such case the company should minimize the use of that component of capital structure in its total capital structure.

(vi) Flotation costs

It is the cost involved in issuing a security or a debt. If such cost is too high for new issue of any component of capital structure, then the use of such a source of fund should be minimised.

Different forms of Capital Structure

The different forms of capital structure

1. equity share capital only
2. equity share capital + preference share capital
3. equity share capital + long term debentures
4. equity share capital + preference share capital + long term debentures.

Q22. What is optimal capital Structure ?

(OR)

Explain the traditional approach relating to optimal capital structure.

Ans :

(Jan.-18)

An optimal or sound capital structure can be properly defined as that combination of debt and equity that attains, the stated managerial goal in the most relevant manner-the maximization of the firm's market value. Moreover, the optimal capital structure is also defined as the combination of debt and equity that minimizes the firms cost of capital.

Hence the optimal capital structure is concerned with the two important variables at one time-the minimisation of cost as well as maximisation of worth. These desired objectives can be achieved only with the help of a sound capital structure possessing the following characteristics :

1) A Conservative Capital Structure

An attempt should be made to secure as far as possible a conservative capital structure consisting of high grade securities. By doing

so, the management should decide on the form of securities to be issued only after a thorough consideration of the possible effects of the proposed securities on the firm, its credit, value of other securities Issue of securities in the future, maintenance of profits and future rearrangement of its financial structure etc.

Such capital structure offers certain decisive advantages to the company, namely, the company's cost of financing is the least, its prospects for raising capital even in unfavourable views are good and it can maintain healthy relations with security holders.

2) A Simple Capital Structure

As far as possible, a simple capital structure should be preferred to A complicated one. It is easy to manage it The investors have a very clear picture of their rights and worth of their investments.

3) Minimum Remuneration

As far as possible, the fixed cost burden on the income statement of the firm must be low. To achieve this aim, a proper policy of trading on equity should be followed.

4) Profitability

The capital structure of the company should be most advantageous. Within the constraints, maximum use of average at a minimum cost should be made.

5) Solvency

The use of excessive debt threatened the solvency of the firm. Hence, its judicious mix should be perfect with the equity.

6) Flexibility

It should be possible for a company to adapt its capital structure with a minimum cost and delay if warranted by a changed situation.

7) Conservation

The debt Capacity of the company should not be exceeded. The debt capacity of a company depends on its ability to generate future cash flows.

8) Control

The capital structure should involve minimum risk of loss of control of the company.

9) Economy

Securities should be issued in such a manner as to entail the least cost of sale, cost of financing and so on. Generally, spread is the lowest in case of issue of debenture, and the highest in case of equity shares.

10) Attractive for Investors

Various securities proposed to be issued should offer certain attractions to the investors either relating to income, control, or convertibility etc.

4.7.2 Determinants

Q23. Explain the factors determining capital structure.

(OR)

Explain the major determinants of capital structure.

Ans : (June-16, Dec.-16, Imp.)

1. Cost Principle

An ideal capital structure is one that tends to minimize cost of financing and maximize earnings per share. Cost of capital is subject to interest rate at which the company has borrowed, tax status of the company and the required rate of return of the equity share holders. Debt capital is cheaper than equity capital due to the fixed rate of interest, bond holders can not participate in superior profits. Hence the rate of interest on debentures is usually much less than the dividends. Apart from this, interest on debt is a deductible expense for income tax purpose, Debt financing gives tax shelter which enhanced the value of the firm.

2. Risk Principle

Debt involves commitment for a long period to pay interest regularly and repayment of principal. This may expose the equity share holders to risk when the earnings decline to such low level that debt servicing is not

possible. It may result in foreclosure or losing part of assets of the equity share holders. The concept of fixed charge burden on earnings is called as financial risk arising from the use of debt funds in capital structure.

3. Control Principle

In designing appropriate financing plan the manager should also try to keep the control / sovereignty over the Corporate wealth undisturbed. Since additional issue of equity share dilutes the voting right of existing share holders, a share holder who had predominant control over the affairs of the company would lose his position because new share holders would share control with him.

4. Flexibility principle

As per the principle of flexibility management should strive for combination of securities, which can be changed in tune with the developments in money market., capital market and the internal operations. Capital structure should assure maneuverability i.e.. Possibility of shifting to more favourable / cheaper terms of loan/debt, early retirement call option provision and excess resources at the command of the company etc.

5. Timing Principle

Timing also plays an important role in capital structure decision. In order to choose right type of instruments and seize the market opportunities for minimizing the cost of raising capital and obtaining substantial savings, timing of the issue of shares/debentures is also an important factor. In times of boom, due to all round business expansion and prosperity investors have strong desire to invest, hence easy to sell equity share/debentures.

6. Legal Requirements

The promoters of the company have also to keep in view the legal requirements while deciding about the capital, structure of the company. This is particularly true in case of banking companies which are not allowed to issue any other type of security for raising funds except equity share capital on account of the Banking Regulation Act.

7. Loan Covenants

Restrictive covenants are commonly included in long term loan agreements and debentures. These restrictions curtail the company's freedom in dealing with the financial matters and put it in an inflexible position. Covenants in loan agreements may include restrictions to distribute cash dividends, to incur capital expenditure, to raise additional external finances or to maintain working capital at a particular level..

8. Market sentiments

The Market sentiments also decide the capital structure of the company. Some times people want to have absolute safety. In such cases, it will be appropriate to raise funds by issue of debentures. At some other instance , people may be interested in earning high speculative incomes, at such times, it will be appropriate to raise funds, by issue of equity shares. Thus, it must take into account market sentiments, otherwise its issue may not be successful.

9. Characteristics of the company

Companies which are of small size have to rely considerably upon the owners' fund for financing. Such companies find it difficult to obtain long term debt. Large companies are generally considered to be less risky by the investors and, therefore, they can issue different types of securities and collect their funds from different sources other characteristics like technology credit standing, age of the company, stability and track record of earnings, management attitude also have significant bearing on the capital structure decision.

10. Government Policy

Government policy is also an important factor in planning the company's capital structure. For example a change in the lending policy of financial institutions may mean a complete change in the financial pattern. Similarly, by virtue of the securities & Exchange Board of India Act, 1992 and the Rules made thereunder, guide lines issued by SEBI are mandatory in this regard.

11. Industry characteristics

the management should attach more significance to maneuverability risk principles in choosing the financial instruments for the firms whose sales fluctuate more closely with the business cycle. Similarly degree of competition decides the degree of business risk. Capital structure is also influenced by the life cycle of the industry to which the company belongs.

Thus, there are many factors which are to be considered while designing an appropriate capital structure of the company.

4.7.3 Capital Structure Theories**Q24. Explain different theories of capital structure.**

Ans :

There are different views on how capital structure influences the value of the firm. Some argued that other things being equal, increase in financial leverage (debt) increases the value of the firm [Relevant Theory] few others opine that there is no relationship between capital structure and value of the firm [Irrelevant theory] and some others believe that use of debt in capital structure has a positive effect on the value of the firm upto a certain level and have negative effect thereafter (neutral theory).

The total capital structure theories can be categorised into two: Relevant and Irrelevant theories.

The following are the main theories/ Approaches of capital structure:

1. Net income (theory) Approach (Relevant)
2. Net operating income Approach (Irrelevant)
3. Modigliani and Miller Approach (Irrelevant)
4. Traditional Approach (Neutral)

Assumptions of Capital Structure Theories

To study the relationship between capital structures (use of debt) and value of the firm, the following assumptions are generally made :

- (i) Firm uses only two sources of funds: perpetual riskless debt and equity;

- (ii) There are no corporate or income or personal tax;
- (iii) The dividend payout ratio is 100% [There are no retained earnings];
- (iv) The firm's total assets are given and do not change [Investment decision is assumed to be constant],
- (v) The firm's total financing remains constant. [Total capital is the same, but proportion of debt and equity may be changed];
- (vi) The firm's operating profits (EBIT) are not expected to grow;
- (vii) The business risk remains constant and is independent of capital structure and financial risk;
- (viii) All investors have the same subjective probability distribution of the expected EBIT for a given firm; and
- (ix) The firm has perpetual life.

4.7.3.1 Net Income Approach**Q25. Explain Net Income Approach.**

(OR)

Describe briefly about Net Income approach.

Ans : (Jan.-20, Imp.)

This approach has been developed by Durand. It is a relevant theory. According to this approach, capital structure decision is relevant to the valuation of the firm. In other words, a change in debt proportion in capital structure will lead to a corresponding change in cost of capital (K_o) as well as total value of the firm.

Assumptions

Net income approach is based on the following assumptions :

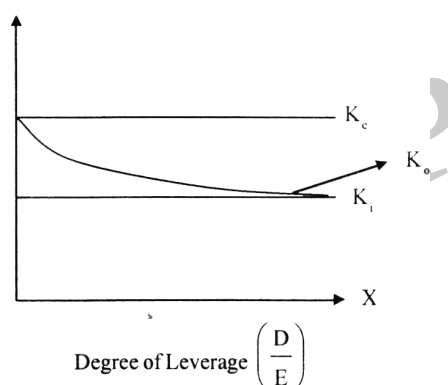
- i) There are no taxes;
- ii) Cost of debt is less than the cost of equity;

- iii) Use of debt in capital structure does not change the risk perception of investors.
- iv) Cost of debt and cost of equity remains constant;

NI approach argument based on the above three assumptions. Increase of debt (cheapest source of long-term finance) in capital structure reduces cost of capital (K_o), due to, which there is 10 change in the cost of equity [Risk perception of investors] leading to an increase in the total value of the firm.

When cost of debt (K) and cost of equity (K_e) are constant, with the increased use of debt in the capital structure it will magnify the equity shareholder's earnings and thereby market value of the firm and equity shares. Value of the firm based on NI approach is as follows:

$$E = NI \div K_e$$



4.7.3.2 Net Operating Income (NOI)

Approach

Q26. What do you understand by Net Operating Income (NOI) Approach?

Ans : (Jan.-20, Imp.)

This is another approach, which has been suggested by Durand. It is just-opposite to the net income approach. According to this approach, the capital structure decisions of a firm are irrelevant. It says that any change in debt proportion in capital structure (leverage) will not lead to any change in the value of the capital (K_o). They (V , K_o and share price) are independent of financial leverage.

Assumptions

NOI approach is based on the following assumptions:

- (i) Overall Cost of Capital (K_o) remains unchanged for all degrees of leverage.

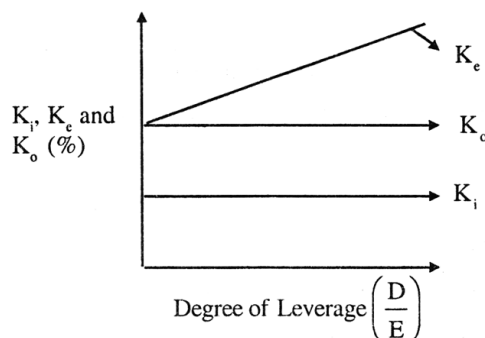


Fig. : Effect of leverage on ' K_o '

- (ii) The market capitalises the total value of the firm as a whole and no importance is given for split of value of firm between debt and equity;
- (iii) The market value of equity is residue [i.e., Total value of the firm minus market value of debt];
- (iv) The use of debt funds increases the received risk of equity investors, thereby K_e increases;
- (v) The debt advantage is set off exactly by an increase in cost of equity;
- (vi) Cost of debt (K_i) remains constant;
- (vii) There are no corporate taxes.

The total value of the firm according to NOI is calculated as follows :

$$V = EBIT \div K_o$$

One of the assumptions says that market value of equity is residual. Symbolically:

$$E = V - D$$

Optimum Capital Structure

- (i) **According to NOI approach**, there is no optimum capital structure because the total value of the firm (V), market price of equity share and cost of capital (K_o) remains unaffected with the change in financial leverage (change in debt proportion)

4.7.3.3 Modigliani-Miller Approach (MM Hypothesis)

Q27. Explain briefly about Modigliani-Miller Approach (MM Hypothesis).

(OR)

Critically examine the MM Model relating to capital structure decisions of a corporate entity.

Ans : **(Dec.-14)**

This approach was developed by Professors, Franco Modigliani and Merton Miller. [MM, hereafter] in their classic contribution on capital structure, which has been called the most influential finance article ever written, who later became Nobel Laureates in economics.

MM Approach is identical to the NOI approach. In other words, the total value of the firm is independent of its capital structure. However, there is a basic difference between NOI and MM approach. The NOI approach is purely definitional, which does not provide operational justification for irrelevance of the capital structure in the valuation of the firm. On the other hand, MM approach supports the NOI approach in behavioural justification for the independence of the cost of capital and value of the firm at any level of degree of leverage. MM argues that, in the absence of taxes, firm's total market value and overall cost of capital remains constant to the change of debt capital proportion in capital structure. This has been proved by operational justification.

Assumptions

MM approach is based on the following assumptions:

- Information is available at free of cost
- The same information is available for all investors
- Securities are infinitely divisible
- Investors are free to buy or sell securities
- There is no transaction cost
- There are no bankruptcy costs

- Investors can borrow without restriction on the same terms on which a firm can borrow
- Dividend payout ratio is 100 per cent
- EBIT is not affected by the use of debt

Basic Propositions

The propositions of MM approach are as follows:

I. Based on the above listed assumptions, MM's first proposition is

The overall cost of capital (K_o) and the value of the firm (V) are independent of capital structure. In other words, K_o and V are constant for any proportion of debt-equity mix. The total value is given by capitalising the expected net operating income by the discount rate appropriate to its risk class. Symbolically:

$$V = S + D = \text{NOI} \div k_o$$

II. The second proposition is

Cost of equity capital (k_e) to capitalization rate of the pure equity plus a premium for the financial risk. Cost of equity (k_e) capital increases with use of more debt in capital structure. The increase in k_e offsets exactly the use of a less expensive source of funds represented by debt.

III. And the Third is

The cut-off rate for investment purposes is completely independent of the way in which an investment is financed.

We discuss here proposition I only, because we need to see the relationship between leverage and valuation.

Proposition I

According to this proposition the total value of the firm must be constant for all degrees of leverage [deb-equity mix]. As a result, the K_o and market price of share is same, irrespective of what debt-equity may be.

MM proved the proposition I based on "arbitrage process". The following discussion explains the arbitrage process.

Arbitrage Process

The term 'arbitrage' refers to an act of buying an asset or security in one market at a lower price and selling it in another market at a higher price. As a result of such action [buying and selling] equilibrium is restored in the market price of an asset that is unequal in the markets. The arbitrage process involves purchase of assets or securities whose prices are lower [undervalued securities] and sale of assets or securities whose prices are high in market where prices are out of equilibrium. Arbitrage process is a balancing operation.

MM explains the arbitrage mechanism, by taking two firms which are exactly similar in all respects except (leverage) in their capital structures. One firm uses debt in its capital structure [Levered firm 'L'], while the other does not [unlevered firm UL] or completely financed by equity capital. Such homogenous firms are perfect substitutes. The value of the firm differs just because of leverage, but cannot be different (always) because of arbitrage process.

Investors of a firm whose share value is high will sell their shares and buy shares of the firm whose share value is low (under valued share). Investors will be able to earn some income at less investment and with the same risk [perceived risk], this is because the investors would borrow in the proportion of degree of leverage in the present firm. The use of debt in the arbitrage process by investors is called as "personal or home-made leverage". Use of personal leverage is based on of assumption that investors can borrow funds without any restriction on the same terms on which a firm can borrow. Investors will be able to substitute, by borrowing (debt) funds himself/herself.

The arbitrage process comes to an end when two identical firm's share price is equal. But practically the share prices of two identical firm? never become equal, hence there is no end for arbitrage process.

Limitations of MM Approach

As we have read above that arbitrage process provides operational justification to the MM approach. The arbitrage process depends on the

perfect capital market assumptions. But all the assumptions are not realistic, so arbitrage process becomes only a theoretical approach.

- **Investor's inability to borrow funds on the same terms and conditions as corporates can.** General financial institutions put additional terms and conditions for sanctioning loan to an individual investor. Hence, it may not be possible to raise funds on same terms and conditions as firms can.
- **Personal leverage is not substitute for corporate leverage**

MM approach assumes that personal leverage is a perfect substitute for corporate leverage. The perceived risk exposure in corporate leverage is less when compared to personal home made leverage, because the liability of investors is limited to the proportionate share holdings in case the company is forced to liquidate. On the other hand; the (risk) liability is unlimited in personal leverage, and his/her personal assets are liable to use for payment of personally borrowed funds. With these reasons personal leverage cannot be a substitute for corporate leverage, consequently the operation of arbitrage process will not be able to prove MM approach.

- **Existence of Transaction costs**

The investor cannot buy and sell securities free of cost. There exists transaction costs. The effect of the existence of transaction costs, makes investors to (receive) realise less amount than the actual market value. It will lead to invest a large amount in order to earn same return.

- **Institutional Restrictions**

Institutional restrictions do not allow the smooth operation of arbitrage process. Generally, institutional investors viz., insurance companies; mutual funds, commercial banks, etc., are not allowed to raise personal leverage. Hence, for this type of institutional investors, it will not be possible to switch from levered to unlevered firm and vice-versa.

➤ **Asymmetric Information**

MM hypothesis assumes that the same information is available for all investors, that is not correct. But the manager of a firm knows more about a firm's operations and future prospects than investors do. It is known as asymmetric information. Generally, managers take decisions with a goal of maximising the existing shareholders wealth, then asymmetric information can affect the capital structure decisions that the manager makes.

➤ **Existence of Corporate Tax**

The approach assumes that there are no corporate taxes. But there are corporate taxes, if corporate tax is considered, MM approach will fail to explain the relationship between leverage and the total value of the firm. When there is tax, interest charges are allowed to be deducted before paying tax. It leads to the borrowing cost becoming less when compared to actual (contractual rate of interest).

As a result, the return to equity shareholders of a levered firm is always higher than the unlevered firm. Thus, the total market value of a levered firm always exceeds the value of the unlevered firm, which will show that MM approach is a theoretical one and not a practical one.

4.7.3.4 Traditional Approach**Q28. Explain the concept of Traditional Approach.**

Ans :

This traditional approach was given by Solomon. In the preceding approaches of capital structure we have discussed that the Net Income (NI) approach and Net Operating Income (NOI) approach requirements two extreme views with regard to the relation between leverage (use of debt) and value of the firm (cost of capital). According to the NI approach, use of debt in capital structure affects both cost of capital (K_o) and total value of the firm, on the other hand, NOI approach suggests that the use of debt in capital structure is irrelevant to the value of the firm and cost of capital. Another approach given by MM support the NOI approach,

but validity of MM approach is doubtful due to the imperfect assumptions.

Traditional approach is the mid-way between the NI and NOI approaches. It is a compromise between the two approaches. It is also known as "Intermediate Approach". Traditional approach partly takes some features of NI approach and NOI approach.

Traditional approach is similar to NI approach in a way that cost of capital and value of the firm which are dependent of capital structure (that is leverage) affects the cost of capital and value of the firm. But it does not accept that the value of the firm will necessarily increase for all degrees of leverage.

Traditional approach supports the view of NOI approach, that beyond a certain degree of leverages the overall cost of capital increases, leading to decrease in the total value of the firm.

But it differs from NOI approaches in the sense that the overall cost of capital will not remain stable for all degrees of leverages.

Traditional approach views that judicious use of debt-equity mix helps to increase the firm's total value and reduce the overall cost of capital. The rational behind this view is that debt is relatively cheaper [due to tax benefit] source of long-term fund when compared to raising funds by issue of equity shares. In other words, the overall cost of capital (K_o) will decrease with the use of debt.

Main Propositions

The following three are the main propositions of traditional approach

1. The pre-tax cost of debt (K_d) remains more or less constant upto a certain degree of leverage and /but rises thereafter at an increasing rate,
2. The cost of equity capital (K_e) remains more or less constant rises slightly upto a certain degree of leverage and rises sharper thereafter, due to increased perceived risk,
3. The overall cost of capital (K_o), as a result of the behaviour of pre-tax cost of debt (K_d) and cost of equity (K_e) behaves in the following manner:

- (a) Decreases upto a certain point level of degree of leverage [stage I increasing firm value];
- (b) Remains more or less unchanged for moderate increase in leverage thereafter [stage II optimum value of firm], and
- (c) Rises sharply beyond certain degree of leverage [stage III decline in firm value].

The above three propositions suggest that the cost of capital (K_q) is dependent on capital structure. It declines with leverage [in stage I] upto a certain point, increases moderately with moderate increase in leverage [stage II], and increases sharply beyond a safe point [stage III]. The relationship between leverage and cost of capital (K) is shown in figure below.

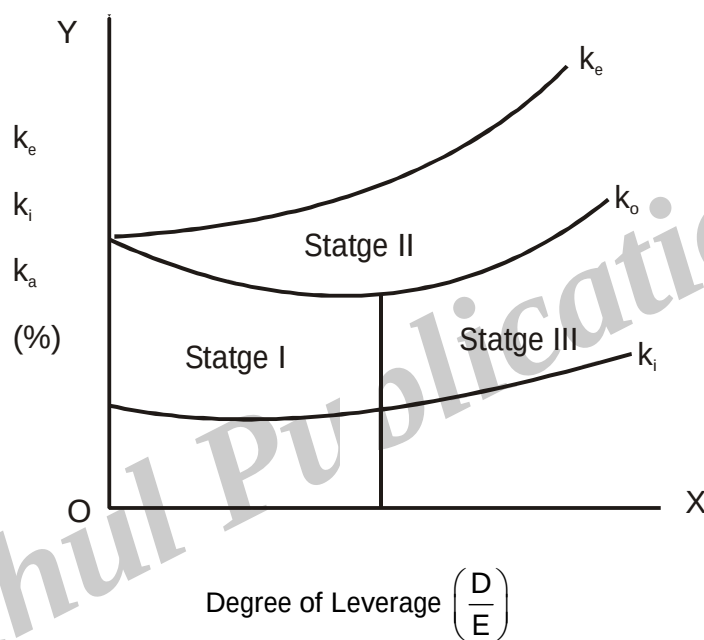


Fig. : Relationship between Leverage and Cost of Capital

The above figure (Traditional Approach) suggests that there is a range of capital structure in which the cost of capital (K_o) is the minimum and the value of the firm is maximum. There are many variations of the traditional approach, but all the supporters of the traditional approach agree that the cost of capital declines and value of firm increases with use of debt in capital structure.

Exercise Problems

1. From the following selected data determine the value of firms M (levered) and (unlevered) which are belonging to the homogenous risk class under (i) NI and (ii) NOI approach ?

Particulars	Firm - M (Levered) (₹)	Firm - N(Unlevered) (₹)
EBIT	4,00,000	4,00,000
Interest at 10%	1,00,000	—
Equity capital cost	15%	15%
Corporate tax	50%	50%

Which of the two firms is optimal capital structure?

[Ans : K_e Under NI : Firm – M (Levered) - 20%; Firm – N (Unlevered) 30%. K_e Under NOI : Firm – M(Levered) – 22%; Firm – N(Unlevered – 30%]

2. From the following data, find out the value of firms Excel Ltd. and Howell Ltd. belonging to the same risk class :

Particulars	Excel Limited	Howell Limited
EBIT	₹ 4,50,000	₹ 4,50,000
Interest at 15%	1,50,000	—
Equity Capitalisation Rate (K_e)	20%	—
Corporate Tax Rate	50%	—

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

[Ans : Use MM Model with taxes; Firm Excel has optimal capital structure. Its K_e = 29% and $K_e = 13.85\%$; Value ₹ 16,25,000 and 11, 25,000]

3. The capital structure of a textile company is as follows :

Particulars	₹
10% Debentures	5,00,000
12% Preference Shares	1,00,000
Equity shares of ₹ 10 each	4,00,000
Operating profit (EBIT)	1,60,000

Corporate tax rate is at 50%

Determine :

- i) The firm's EPS
- ii) The degree of financial leverage,
- iii) The percentage change in EPS associated with 30% decrease in EBIT.

[Ans : EPS = ₹ 1.075; Degree of Financial Leverage = 1.86; Change in EPS with 30% increase = 55.81% with 30% decrease = (-) 55.81%]

4. Calculate the Degree of Operating Leverage (DOL), Degree of Financial Leverage (DFL), and the Degree of Combined Leverage (DCL) for the following firms :

Particulars	Firm X	Firm Y	Firm Z
Output (Units)	60,000	15,000	1,00,000
Fixed Costs (₹)	7,000	14,000	1,500
Variable Cost Per Unit (₹)	0.20	1.50	0.02
Interest on Borrowed Funds (₹)	4,000	8,000	-
Selling Price Per Unit (₹)	0.60	5.00	0.10

[Ans : Degree of Operating Leverage Firm X-1.41; Y-1.36; Z-1.23 Degree of Financial Leverage Firm X - 1.31; Y - 1.26; Z - 1.00 Degree of Combined Leverage Firm X - 1.85; Y - 1.72; Z - 1.23]

5. The following figures relate to two companies.

Particulars	P. Ltd (₹ in lac)	Q. Ltd (₹ in lac)
Sales	500	1,000
Variable costs	200	300
Contribution	300	700
Fixed costs	150	400
EBIT	150	300
Interest	50	100
Profit before tax	100	200

You are required to calculate the operating, financial and combined leverage for the two companies.

[Ans : Degree of Operating Leverage, P-2; Q-2.33;

Degree of Financial Leverage P-1.5; Q-1.5;

Degree of Combined Leverage P-3; Q-3.5]

Short Question and Answers

1. What is Cost of Capital?

Ans :

Meaning

The cost of capital of a firm is the minimum rate of return expected by its investors. It is the weighted average cost of various sources of finance used by a firm. The capital used by a firm may be in the form of debt, preference capital, retained earnings and equity shares. The concept of cost of capital is very important in the financial management. A decision to invest in a particular project depends upon the cost of capital of the firm or the cut off rate which is the minimum rate of return expected by the investors.

In case a firm is not able to achieve even the cut off rate, the market value of its shares will fall. In fact, cost of capital is the minimum rate of return expected by its investors which will maintain the market value of shares at its present level. Hence, to achieve the objective of wealth maximisation, a firm must earn a rate of return more than its cost of capital. Further, optimal capital structure maximises the value of a firm and hence the wealth of its owners and minimises the firm's cost of capital. The cost of capital of a firm or the minimum rate of return expected by its investors has a direct relation with the risk involved in the firm. Generally, higher the risk involved in a firm, higher is the cost of capital.

Cost of capital for a firm may be defined as the cost of obtaining funds, i.e., the average rate of return that the investors in a firm would expect for supplying funds to the firm.

Definitions

- (i) **According to Hunt, William and Donaldson**, "Cost of capital may be defined as the rate that must be earned on the net proceeds to provide the cost elements of the burden at the time they are due".
- (ii) **According to James C. Van Home** defines cost of capital as, "a cut-off rate for the allocation of capital to investments of projects. It is the rate of return on a project that will leave unchanged the market price of the stock."
- (iii) **According to Solomon Ezra**, "Cost of capital is the minimum required rate of earnings or the cut-off rate of capital expenditures."
- (iv) **According to Hampton, John J.** defines cost of capital as, "the rate of return the firm requires from investment in order to increase the value of the firm in the market place".

2. What are the differences between implicit cost and explicit cost?

Ans :

S.No.	Explicit Cost	S.No.	Implicit Cost
1.	Explicit cost involves immediate cash payments like, interest on loan.	1.	Implicit costs do not involve any immediate cash payments.
2.	Explicit costs are recorded in the books of accounts	2.	Implicit costs are not recorded in the books of accounts.
3.	Explicit costs are also known as out of pocket costs	3.	Implicit costs are known as economic costs.
4.	Explicit cost are easily measured.	4.	Implicit cost are not easily measured.

3. Weighted Average Cost of Capital.**Ans :**

The average cost of the costs of several means of financing, is known as weighted average cost of capital. It can also be termed as overall cost of capital, composite cost of capital or average cost of capital.

Weighted average cost of capital can be easily evaluated, if cost of a particular source of finance is evaluated.

WACC can be computed as follows,

$$WACC = w_e k_e + w_d k_d + w_p k_p$$

Where,

w_e = Proportion of equity capital

w_d = Proportion of debt capital

w_p = Proportion of preference capital

k_e = Cost of equity capital

k_d = Cost of debt after tax

k_p = Cost of preference capital.

Following steps are involved in evaluation process of weighted average cost of capital :

- Assigning weights to individual costs.
- Multiplying the cost of each of the sources by the appropriate weights.
- Dividing the total weighted cost by the total weights.
- Alternatively, weighted average cost of capital can be assessed as follows,

$$k_w = \frac{\sum XN}{\sum W}$$

Where,

k_w = Weighted average cost of capital

X = Cost of individual source of finance

W = Weight, proportion of specific source of finance.

4. Merits and Demerits of weighted average cost of capital.**Ans :****Advantages**

Following are the importance or significance of weighted average cost of capital (WACC):

1. In case of determination of future project profitability, WACC is treated as cut off rate.

2. If firm earn more percentage of profit than WACC, therefore the market value of the firm will increased. Profit taken or not decision is depending on this point. A project considered valuable only if the return from it is higher than WACC.
3. Business unit used different source of finance and invested in the project. So individual cost of capital is not enough for project selection process. Therefore overall cost of capital is considered for project selection process.
4. WACC is widely used to selection project among the option available.
5. WACC is useful in making Economic value Added (EVA) calculation.
6. WACC indicate the minimum rate of return at which business unit create the investors value. If return on capital employed (ROCE) is higher than WACC, business unit will create the investors value, otherwise business unit will fail to create the investors Value.

Disadvantages

The disadvantages of weighted average cost of capital are as follows:

1. Determining the Weights

The first & foremost difficulty in computing the average cost is to assign weights to different components of capital structure.

2. Choice of Capital Structure

The choice of capital structure is to be used for determining the average is not an easy job. These types of capital structure are these, i.e., current capital structure, marginal capital structure or optimum capital structure. Generally current capital structure is regarded as the optimum capital structure but it is not always correct.

5. What is marginal cost of capital?**Ans :**

The marginal cost of capital (MCC) is a concept used in financial management for capital budgeting purposes. Actually, it is the weighted average cost of the last Rs 1 of new capital raised.

Companies can raise new capital from:**1. Retained earnings**

Retained earnings are the only source of financing to maintain the target capital structure without issuing new stock. Therefore, the marginal cost of capital remains the same if new capital is raised. The drawback of this financing source is that the amount of new capital is limited by the amount of retained earnings.

2. Issuing new stock

Issuing new stock causes the dilution of earnings per share (EPS). In other words, net profit is distributed among more shareholders, so earnings per share is lower. As a consequence, the stock price will decline, and investors will accept a higher required rate of return. Thus, the marginal cost of capital raised by the issue of new stock is getting higher as the amount of stock outstanding grows.

3. Issuing new debt

Issuing new debt usually has a negative effect on a company's creditworthiness. As a result, lenders will compensate for increasing credit risk by raising interest rates. Thus, the marginal cost of debt will increase as the proportion of debt in total capital grows.

6. What is meant by Leverage ?

Ans :

Leverage is the capability of a firm to make use of fixed cost assets or funds in order to increase the returns to the equity shareholders.

According to James Home, leverage is defined as "The employment of an asset or sources of funds for which the firm has to pay a fixed cost or fixed return".

There exists a direct relationship between degree of leverage, risk and return to the shareholders. Leverage can be classified into, operating and financial leverage.

Income Statement Format

Operating leverage	Sales	xxx	Total leverage
	– variable	<u>– xx</u>	
	Cost	xxx	
	– Fixed cost	<u>– xx</u>	
Financial leverage	EBIT	xxx	
	– Interest	<u>– xx</u>	
	EBT/PBT	xxx	
	– Taxes	<u>– xx</u>	
	EAT/PAT	xxx	
	– Dividend	<u>– xx</u>	
	Retained earning	xxx	

7. Drawbacks of Financial Leverage.

Ans :

Following are some of the limitations of financial leverage,

1. Double-edged Weapon

Financial leverage is similar to a double-edged weapon. In order to employ it effectively to increase the earnings of the shareholders, the rate of earnings of the firm must be more than fixed rate of interest or dividend on debentures. Financial leverage have a negative impact when its profits is not equal to the cost of interest bearing securities.

2. Useful to Companies with Stable Earnings

Financial leverage is useful only to those companies which have constant and regular earnings. In order to pay interest on debentures, company must have regular income.

3. Increases Risk and Rate of Interest

Financial leverage leads to increase in risk and rate of interest which are the results of extra debt.

4. Hindrances from Financial Institutions

The companies which are utilizing excess of financial leverage are restricted by financial institutions, due to risk factor and in order to maintain balance in capital structure of the company.

8. EBIT- EPS Analysis.**Ans :**

In order to analyze the effect of leverage, EBIT - EPS analysis is used which involves different methods of financing under various assumptions of EBIT. The EBIT - EPS approach to capital structure involves selecting the capital structure that maximizes EPS over an expected range of earnings before interest and taxes.

Indifference Point

Indifference point indicates the level of EBIT at which the EPS is same for two different financial plans. The indifference point is defined as the level of EBIT above which benefits of financial leverage starts functioning with respect to Earnings Per Share (EPS).

The indifference point between two alternative methods of financing is calculated by two methods. They are :

1. Algebraic approach
2. Graphic approach

9. Indifference Point**Ans :**

The EPS, earnings per share, 'equivalency point' or 'point of indifference' refers to that EBIT, earnings before interest and tax, level at which EPS remains the same irrespective of different alternatives of debt-equity mix. At this level of EBIT, the rate of return on capital employed is equal to the cost of debt and this is also known as break even level of EBIT for alternative financial plans.

The equivalency or point of indifference can be calculated algebraically, as below :

$$\frac{(X - I_1)(1 - T) - PD}{S_1} = \frac{(X - I_2)(1 - T) - PD}{S_2}$$

Where,

X = Equivalency Point or Point of Indifference or Break Even EBIT Level.

I_1 = Interest under alternative financial plan 1.

I_2 = Interest under alternative financial plan 2.

T = Tax Rate

PD = Preference Dividend

S_1 = Number of equity shares or amount of equity share capital under alternative 1.

S_2 = Number of equity shares or amount of equity share capital under alternative 2.

10. Define capital structure.**Ans :****Meaning**

Capital structure in simple words refers to debt equity ratio of a company. In other words it refers to the proportion of debt in the investments of the company. It is important for a company to have an appropriate capital structure. Estimation of capital requirements is necessary, but the formation of capital structure is important.

Definition

According to Gerestenbeg, "Capital structure of a company refers to the composition or make-up of its capitalisation and it includes all long term capital resources i.e., loans, reserves, shares and bonds.

The capital structure is made up of debt and equity securities and refers to permanent financing of a firm. It is composed of long term debt, preference share capital and share holder's funds.

Financial Manager should develop an appropriate capital structure, which is helpful to maximize shareholders wealth. This can be possible when all factors which are relevant to the company's capital structure are properly analysed, balanced and considered.

Choose the Correct Answers

1. A single, over all cost of capital is often used to evaluate project because. [a]
 - (a) To Avoid the problem of computing the required rate of return for each investment and investment proposal.
 - (b) It is the only way to measure a firm's required return.
 - (c) It acknowledges that most new investment project have about the same degree of risk.
 - (d) It acknowledges that most new investment project offer expected return.
2. During planning period, D marginal cost for raising a new debt is classified as : [b]
 - (a) Debt cost
 - (b) Relevant cost
 - (c) Borrowing cost
 - (d) Embedded cost
3. In weighted average cost of capital, a company. [d]
 - (a) Policy of capital structure
 - (b) Policy of dividends
 - (c) Policy of investment
 - (d) All of the above
4. A risk associated with project. and way consideration by well diversified stock holder is classified as. [b]
 - (a) Expected risk
 - (b) Beta risk
 - (c) Industry risk
 - (d) Returning risk
5. Cost of capital is equal to required return rate on equity in case if investors are only. [b]
 - (a) Valuation Manager
 - (b) Common stock holder
 - (c) Asset seller
 - (d) Equity dealers
6. Methods uses for an estimation of cost of capital and equity is classified as [c]
 - (a) Market cash flow
 - (b) Future cash flow method
 - (c) Discounted cash flow
 - (d) Present cash flow method
7. Lower financial Leverage is related to the use of additional _____. [b]
 - (a) Fixed cost
 - (b) Variable cost
 - (c) Debt financing
 - (d) Common equity financing
8. The maximum amount of debt that a firm can adequately service is referred as _____. [c]
 - (a) Debt capacity
 - (b) Debt service burden
 - (c) Adequacy capacity
 - (d) Fixed charge burden
9. Which of the following cost would be considered a fixed cost . [b]
 - (a) Raw materials
 - (b) Depreciation
 - (c) Bad-debt losses
 - (d) Production labour
10. The term capital structure refers to : [a]
 - (a) Long term debt, stock, and common equity
 - (b) Current assets and Liabilities
 - (c) Total assets -Liabilities
 - (d) Share holders equity

Fill in the blanks

1. Cost of capital is the _____ required rate of return expected by investors.
2. Cost of capital, is the measurement sacrifice made by _____ in order to capital formation.
3. _____ is associated with particular component of capital structure.
4. Cost of capital is not useful in capital budgeting if a firm is depending on _____ methods.
5. _____ is the cost associated with particular component of capital structure.
6. Cost of capital $(k_0) = r_f + \text{_____} + \delta$.
7. Financial leverage formula _____.
8. Operating Leverage formula _____.
9. Combined Leverage formula _____.
10. _____ is considered to be mostly risky investment.

ANSWERS

1. Minimum
2. Investors
3. Specific cost
4. Traditional approach
5. Marginal cost
6. 'b' business risk premium
7. EBIT/ EBT
8. Contribution/ operating profit
9. Operating /Financial
10. Equity shares

UNIT V

DIVIDEND DECISIONS:

Dividend Policy: Meaning – Types of Dividend Policies – Factors Influencing Dividend Policy – Forms of Dividends (Theory)

Dividend Theories: Relevance Theories – Walter=s Model – Gordon=s Model – Irrelevance Theory – MM Hypothesis (Including Problems).

5.1 DIVIDEND POLICY

5.1.1 Meaning

Q1. Define Dividend Policy.

Ans : (Dec.-16, Imp.)

Meaning

The term dividend policy refers to the policy concerning quantum of profit to be distributed as dividend. The “concept of dividend policies implies that companies through their Board of Directors evolve a pattern of dividend payment which has a bearing on future action.

Definition

According to Weston and Brigham, “Dividend policy determines the division of earnings between payments to shareholders and retained earnings”.

The management should develop a dividend policy which divides net earnings into dividends and retained earnings in an optimum way so as to achieve the objective of wealth maximization for shareholders.

The management of an enterprise has an important financial decision to decide about the disposition of income left after meeting all business expenses. Generally, of the total business profits, a portion is retained for reinvestment in the business and rest is distributed to shareholders as dividend. The important issue is to decide the portion of profit to declare for dividend pay out and for retaining in business. The percentage is decided after considering the factors such as market price of the shares the trend in earnings, the tax position and the profitability use of funds.

The dividend policy decision involves two questions:

1. What fraction of earnings should be paid out, on average, over time? and
2. Should the firm maintain a steady, stable dividend growth rate?

5.1.2 Types of Dividend Policies

Q2. Explain the classification of Dividend Policies.

(OR)

State the types of dividend policies.

Ans : (Jan.-20, Jan-18, June-16, Imp.)

The types/classification of dividend policy is as follows:

1. Regular Dividend Policy

In this type of dividend policy the investors get dividend at usual rate. Here the investors are generally retired persons or weaker section of the society who want to get regular income. This type of dividend payment can be maintained only if the company has regular earning.

Merits

- i) It helps in creating confidence among the shareholders.
- ii) It stabilizes the market value of shares.
- iii) It helps in maintaining the goodwill of the company.
- iv) It helps in giving regular income to the shareholders.

2. Stable Dividend Policy

In this type the payment of certain sum of money is regularly paid to the shareholders. It is of three types:

- i) **Constant Dividend per Share:** In this reserve fund is created to pay fixed amount of dividend in the year when the earning of the company is not enough. It is suitable for the firms having stable earning.
- ii) **Constant Pay out Ratio:** It means the payment of fixed percentage of earning as dividend every year.
- iii) **Stable Rupee Dividend Plus Extra Dividend:** It means the payment of low dividend per share constantly plus extra dividend in the year when the company earns high profit.

Merits

- i) It helps in creating confidence among the shareholders.
- ii) It stabilizes the market value of shares.
- iii) It helps in maintaining the goodwill of the company.
- iv) It helps in giving regular income to the shareholders.

3. Irregular Dividend Policy

As the name suggests here the company does not pay regular dividend to the shareholders. The company uses this practice due to following reasons:

- i) Due to uncertain earning of the company.
- ii) Due to lack of liquid resources.
- iii) The company sometime afraid of giving regular dividend.
- iv) Due to not so much successful business.

4. No Dividend Policy

The company may use this type of dividend policy due to requirement of funds for the growth of the company or for the working capital requirement.

5.1.3 Factors Influencing Dividend Policy**Q3. What are the Factors Influencing Dividend Policy?****(OR)**

Explain the factors influencing for the determination of dividend policy of firm.

Ans : **(June-16, Dec.-14, Imp.)**

1. Legal Restrictions

In deciding on the dividend, the directors take the legal requirements too into consideration. In order to protect the interests of creditors and outsiders, the companies Act 1956 prescribes certain guidelines in respect of the distribution and payment of dividend. Moreover, a company is required to provide for depreciation on its fixed and tangible assets before declaring dividend on shares. It proposes that Dividend should not be distributed out of capital, in any case. Likewise, contractual obligation should also be fulfilled, for example, payment of dividend on preference shares in priority over ordinary dividend.

2. Size of the Earnings

Practically and truly speaking, the upper ceiling on dividend is dictated by the earnings of the business. If the amount and the nature of earnings are relatively stable a firm is better able to predict what its future earnings will be and is, therefore, more likely to pay-out a higher percentage of profits. A rational dividend policy should take into account both the amount and nature of earnings from year to year.

3. Investment Opportunities and Shareholder's Preferences

Management should adopt a dividend policy which strikes a balance between the shareholder's preference for dividends and financing investment opportunities with retained profits. Having a large number of profitable projects in hand, a company should give preference to the retention of earnings over the payment of dividends. The preference of shareholders for dividends and capital gains needs to be paid full need. To a

great extent the preference for dividends or capital gain is determined by the economic status of the shareholders and the tax bracket to which he belongs. The capital gains tax rate is generally lower than the dividend tax rate. As against current dividends a financially better-off shareholder in a high income tax bracket may be interested in capital gains. A prudent dividend policy should take full care of these aspects.

4. Liquidity Position

Because the payment of dividends involves outflow of cash from the business, the dividend policy must take into account the liquidity position of the firm. Even if a firm has had a good record of earnings, it may not be able to pay cash dividends due to its liquidity position. Even a very profitable business has a pressing need for funds. Hence a firm may elect not to pay cash dividends.

5. Management's Attitude towards Control

As a matter of policy, some companies expand only to the extent of their internal earnings. This is justified on the ground that raising funds by selling additional shares would dilute the control of the company. Selling debentures will increase the risks of fluctuating earnings to the detriment of the present members of the company. The management's attitude towards control would reduce the dividend pay-out and increase reliance on internal financing.

6. State of Capital Market and Access to it

The corporate management may be tempted to follow a liberal policy if the fund position in the capital market of the country is comfortable and the firm can take recourse to it due to its good earnings position. If the capital market funds position is comfortable but the firm has no access to it due to high cost of capital it would compel the company to rely on retained earnings and follow a conservative dividend policy.

7. Contractual Restrictions

Sometimes a firm's ability to pay cash dividends is restricted by certain specific conditions in loan agreements. When the finances are raised from external sources,

creditors may impose various restrictions to immunize themselves for possible insolvency of the firm. While formulating the dividends policy, the financial manager must keep in mind various contractual requirements. The creditors may withdraw their money from the firm if these requirements are violated.

8. Profit Rate and Stability of Earnings

A firm with a large rate of return on its investment will have larger profits. It can pay more dividends to its shareholders as compared to a firm with lesser return. Again, if the earnings are relatively stable and do not fluctuate from time to time, a firm can predict its future earnings and pay a higher rate of dividend than a firm with fluctuating earnings. An unstable firm cannot determine what will be its actual future earnings. Therefore, to meet adverse future conditions, it is likely to plough back more profits.

9. Inflation

It increases the replacement cost of assets which are being depreciated every year at the book value. Funds generated from providing depreciation may be insufficient to meet the rising cost of assets which might become obsolete and have to be replaced in future. Therefore the management should reduce the rate of dividend during a period of inflation to maintain the earning power of the firm.

To conclude, every firm should establish a general policy about the payment of dividends. An appropriate dividend policy can be shaped by a multiplicity of considerations. The financial manager should bring about a balance among various factors.

5.1.4 Forms of Dividends

Q4. Explain different forms of dividends.

Ans : (Imp.)

Dividends can be classified in various forms.

- 1) Dividends paid in the ordinary course of business are known as Profit dividends.
- 2) Dividends paid out of capital are known as Liquidation dividends.

A dividend which is declared between two annual general meeting is called interim dividend, while the dividend which is recommended to the shareholders at the annual general meeting is known as final dividend.

Dividends may also be classified on the basis of medium in which they are paid :

(a) Cash Dividend

A cash dividend is a usual method of paying dividends. Payment of dividend in cash results in outflow of funds and reduces the company's net worth, though the shareholders get an opportunity to invest the cash in any manner they desire. This is why the ordinary shareholders prefer to receive dividends in cash. But the firm must have adequate liquid resources at its disposal or provide for such resources so that its liquidity position is not adversely affected on account of cash dividends.

(b) Scrip (or) Bond Dividend

A scrip dividend promises to pay the shareholders at a future specific date. In case a company does not have sufficient funds to pay dividends in cash, it may issue notes or bonds for amounts due to the shareholders. The objective of scrip dividend is to postpone the immediate Payment of cash. A scrip dividend bears interest and is accepted as a collateral security.

(c) Property Dividend

Property dividends are paid in the form of some assets other than cash. They are distributed under exceptional circumstances and are not popular in India.

(d) Stock Dividend

Stock dividend means the issue of bonus shares to the existing shareholders. If a company does not have liquid resources it is better to declare stock dividend. Stock dividend amounts to capitalization of earnings and distribution of profits among the existing shareholders without affecting the cash position of the firm. This has been discussed in detail under "Bonus Issue".

Q5. Define Bonus Issue? What are the objectives of Bonus Issue?

Ans :

Meaning

A company can pay bonus to its shareholders either in cash or in the form of shares. Many a times, a company is not in a position to pay bonus in cash inspite of sufficient profits because of unsatisfactory cash position or because of its adverse effects on the working capital of the company. In such cases, if the company so desires and the articles of association of the company provide, it can pay bonus to its shareholder in the form of shares by making partly paid shares as fully paid or by the issue of fully paid bonus shares.

The dictionary meaning of bonus shares is : 'a premium or gift, usually of stock, by a corporation to shareholders' or "an extra dividend paid to shareholders in a joint stock company from surplus profit." However, in legal context the meaning is not the same. A bonus share is neither dividend nor a gift.

Issue of bonus shares in lieu of dividend is not allowed as according to Section 205 of the Companies Act, 1956, no dividend can be paid except in cash. It cannot be termed as a gift also because it only represents the past sacrifice of the shareholders.

Effects and Objects of Bonus Issue

When a company accumulates huge profits and reserves, its balance sheet does not reveal a true picture about the capital structure of the company and the shareholders do not get fair return on their capital. Thus, if the Articles of Association of the company so permit, the excess amount can be distributed among the existing shareholders of the company by way of issue of bonus shares.

The effect of bonus issue is two-fold, viz.,

- i) It amounts to reduction in the amount of accumulated profits and reserves.
- ii) There is a corresponding increase in the paid up share capital of the company.

By the issue of bonus shares, the accumulated profits and reserves of the company are converted into share capital which is used permanently in the

business and hence it is also known as Capitalization of Profits and Reserves.

The following circumstances warrant the issue of bonus shares.

- 1) When a company has accumulated huge profits and reserves and it desires to capitalise these profits so as to use them on a permanent basis in the business.
- 2) When the company is not able to declare a higher rate of dividend on its capital, in spite of sufficient profits, due to restrictions imposed by the Government in regard to payment of dividend.
- 3) When a higher rate of dividend is not advisable for the reason that the shareholder may expect the same higher rate of dividend in the future also.
- 4) When the company cannot declare a cash bonus because of an unsatisfactory cash position and its adverse effects on the working capital of the company.
- 5) When there is a large difference in the nominal value and market value of the shares of the company.

Objectives

- 1) To bring the amount of issued and paid up capital in line with the capital employed so as to depict a more realistic earning capacity of the company.
- 2) To bring down the abnormally high rate of dividend on its capital so as to avoid labour problems such as demand for higher wages and to restrict the entry of new entrepreneurs due to the attraction of abnormal profits.
- 3) To pay bonus to the shareholders of the company without affecting its liquidity and the earning capacity of the company.
- 4) To make the nominal value and the market value of the shares of the company comparable.
- 5) To correct the balance sheet so as to give a realistic view of the capital structure of the company.

Q6. Explain the Advantages and Disadvantages of Issue of Bonus Shares.

Ans :

Advantages

A) Advantages from the viewpoint of the company

- 1) It makes available capital to carry on a larger and more profitable business.
- 2) It is felt that financing helps the company to get rid of market influences.
- 3) When a company pays bonus to its shareholders in the value of shares and not in cash, its liquid resources are maintained and the working capital of the company is not affected.
- 4) It enables a company to make use of its profits on a permanent basis and increases credit worthiness of the company.
- 5) It is the cheapest method of raising additional capital for the expansion of the business.
- 6) An abnormally high rate of dividend can be reduced by issuing bonus shares which enables a company to restrict entry of new entrepreneurs into the business and thereby reduces competition.
- 7) The balance sheet of the company will reveal a more realistic picture of the capital structure and the capacity of the company.

B) Advantages from the viewpoint of investors or shareholders

The advantages to the shareholders are :

- 1) The bonus shares are a permanent source of income to the investors.
- 2) Even if the rate of dividend falls, the total amount of dividend may increase as the investor gets dividend on a larger number of shares.
- 3) The investors can easily sell these shares and get immediate cash, if they so desire.

Disadvantages of Issue of Bonus Shares

In spite of many advantages, the issue of bonus shares suffers from the following disadvantages :

- 1) The issue of bonus shares leads to a drastic fall in the future rate of dividend as it is only the capital that increases and not the actual resources of the company. The earnings do not usually increase with the issue of bonus shares.
- 2) The fall in the future rate of dividend results in the fall of the market price of shares considerably, this may cause unhappiness among the shareholders.
- 3) The reserves of the company after the bonus issue decline and leave lesser security to investors.

5.2 DIVIDEND THEORIES

5.2.1 Relevance Theories

5.2.1.1 Walter's Model

Q7. Explain about Walter's Model with an example.

(OR)

Discuss the Walter's model relating to dividend theories.

Ans : (Jan-20, Dec.-14, Imp.)

Walter's model believes that dividends are relevant because dividends influence the value of the firm. According to Walter, firm cannot be isolated from its dividend policy because they are associated with each other.

The Walter's model is supported by important statements like there exists a relationship between internal rate of return (r) and cost of capital (k) which influence an optimum dividend policy of a firm. When internal rate of return is more than the cost of capital ($r > k$) then firm must preserve its earnings and when internal rate of return is less than cost of capital ($r < k$) then firm must distribute its earnings to shareholders as dividends. In the situation when $r > k$, the optimum pay out will be zero which results

in increase in the value of the shares. And when $r < k$, the firm distributes all its earnings and optimum pay out will be 100%.

Assumptions

1. Walter's model assumes that all the investments made by the firm are financed through retained earnings and not from any external sources of funds like debt (or) new equity.
2. It is assumed that business risk of the firm does not change which implies that internal rate of return and cost of capital remain constant.
3. It is assumed that firm is a going concern with perpetual life.
4. At the time of determining the value, earnings and dividends remains constant.

The formula for determining the market price of the share is,

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e}$$

Where,

P = Market price of share

D = Dividend per share

r = Internal rate of return

K_e = Cost of capital

E = Earnings per share.

Example

Earnings = 15 per share

Dividend paid = 5 per share

IRR = 30%

Cost of capital = 22%

What is the market price of the share ?

Sol. :

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e}$$

$$P = \frac{5 + \frac{0.30}{0.22}(15 - 5)}{0.22}$$

$$= \frac{5 + 1.36 (10)}{0.22}$$

$$= \frac{18.6}{0.22} = 84.54$$

Criticism

1. In Walter's model, all investments are financed through retained earnings which is possible only in all-equity firms.
2. The firm's cost of capital (K_e) remains constant is not acceptable. Since, pattern of financing changes, cost of capital also changes.
3. The internal rate of return remains constant is not possible in real world when investments of the firm increases, its internal rate of return changes.

5.2.1.2 Gordon Model

Q8. Explain about Gordon Model with an example.

(OR)

Discuss the Gordon's model relating to dividend theories.

Ans :

(Jan-20, Imp.)

Gordon's model was developed by Myron Gordon. This model believes that dividends are relevant and dividend decision has an impact on firm value. Gordon supports Walter's model in analysis of relationship between dividend policy and valuation of firm. Gordon's model is based on following assumptions,

1. It is assumed that firm is an all-equity firm and all investments are financed through retained earnings.
2. It is assumed that firm has a perpetual life and there are no corporate taxes.
3. The cost of capital is constant and more than the growth rate.
4. The internal rate of return remains constant.
5. Firm decides a retention ratio and it remains constant.

According to Gordon's model, the market value of the share is equal to the current value of future dividends. It can be mathematically represented as,

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

Where,

P = Market price of the share

K_e = Cost of capital

E = Earnings per share

b = Retention ratio

br = Growth rate

r = Earnings rate.

Implications

1. When internal rate of return exceeds cost of capital ($r > k$), then price of the share increases and the dividend payout ratio decreases.
2. When internal rate of return is same as cost of capital then dividend policy is not influenced and price of the share remains constant.
3. When internal rate of return is less than cost of capital ($r < k$) it leads to increase in both price of the share and also the dividend payout ratio.

Example

If earnings rate = 12%

Cost of capital = 8%

Value of share = Rs. 12 per share

If 60% is paid out as dividend.

Earnings per share = $0.12 \times 12 = 1.44$

b = retention ratio

= 40%

K_e = 8%

Sol. :

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

$$= \frac{1.44 (1 - 0.4)}{0.08 - (0.04 \times 0.12)}$$

$$= \frac{0.864}{0.032} = 27$$

The present value of share = ₹ 27.

Limitations

1. This model is purely quantitative as it does not consider qualitative factors such as industry trends or trends in management strategy.
2. The Gordon growth model is highly sensitive to the inputs having an impact on growth rate.
3. If Gordon model is not used properly then it may generate misleading and irrational results. Due to the fact that value of dividends may become infinite when the growth rate converges on the discount rates.
4. This model is suitable only when growth rate is constant and if growth rate exceeds the required rate of return then Gordon model may not be suitable for the determination of value of dividends.
5. In Gordon model, calculations are based on the assumption that future dividends will grow at a constant rate forever.
6. This model is not suitable for rapidly growing industries which have less predictable dividend patterns.

5.2.2 Irrelevance Theory

5.2.2.1 MM Hypothesis

Q9. Explain about Modigliani-Miller approach relating to dividend theories with an example.

Ans : (Imp.)

This theory states that dividend decision will not have any impact either on shareholder's wealth or share prices, as it is not related to valuation of the firm.

According to this theory, investors don't separate their dividends and capital gains. The main aim of investors is to yield more and more return in their investment.

In case, the company has profitable investment opportunities, it will retain the earnings to finance them, otherwise distribute them.

The Modigliani - Miller Approach

The Modigliani-Miller theorem forms the basis for modern thinking on capital structure. The basic theorem states that, in the absence of taxes, bankruptcy costs, and asymmetric information, and in an efficient market, the value of a firm is unaffected by how that firm is financed. It does not matter if the firm's capital is raised by issuing stock or selling debt. It does not matter what the firm's dividend policy is. Therefore, the Modigliani-Miller theorem is also often called the capital structure irrelevance principle.

They argued "under conditions of perfect capital markets, rational investors, absence of tax discrimination between dividend income and capital appreciation, given the firm's investment policy its dividend policy may have no influence on the market price of the shares."

They argued that whatever increase in shareholders wealth results from dividend payment, will be exactly offset by the effect of raising additional capital. For instance if a company having investment opportunities can distribute all its earnings among the shareholders. Then it will raise the capital required from outside. This will result in increasing the number of shares, resulting in fall in the future earning per share. So, whatever a shareholder has gained as a result of increased dividends may be neutralized completely on account of fall in the value of shares due to decline in the expected earnings per share.

Assumptions

M.M. hypothesis is based on the following assumptions :

- Capital markets are perfect. The conditions are:
 - Investors behave rationally,
 - Information is freely available to them and
 - There are no floatation and transaction costs.
- There are either no taxes (or) there are no differences in the tax rates applicable to capital gains and dividends.
- The firm has a fixed investment policy.
- Risk or uncertainty does exist. Investors are able to forecast future prices and dividends with certainty.

Determination the share

According to M.M. hypothesis, the market value of a share in the beginning of the period is equal to the present value of dividends paid at the end of the period plus the market price of the share at the end of the period. It is shown in the following equation :

$$P_0 = \frac{D_1 + P_1}{(1 + k_e)}$$

where,

P_0 = Present market price of a share

k_e = cost of equity capital

D_1 = Dividend to be received at the end of period one

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

Computation of number of new shares to be issued

According to M.M. hypothesis, the investment plan of a company can be financed either by retained earnings or by issue of new shares or both. The number of new shares to be issued can be determined by the following formula :

$$m \times P_1 = I_1 - (X - nD_1)$$

Where,

m = number of new shares to be issued

P_1 = price at which new issue is to be made

I_1 = amount of investment required

X = net profit during the period

nD_1 = Total dividends paid during the period

Criticisms

- M.M.hypotheses assumes that taxes do not exist, it is far from reality,. In practical life not only the shareholders has to pay tax but there are different rates of tax for capital gains and dividends. Capital gains are subject to a lower rate of tax as compared to dividends. The cost of internal financing will, therefore be cheaper as compared to cost of external financing. So, shareholders will favour a dividend policy with retention of earnings as against the payment of dividends on account of tax differential.
- Floatation costs** : A firm has always to pay floatation costs in term of under writing fee and brokers commission whenever it wants to raise funds from outside. As a result of external financing is costlier than internal financing.
- Shareholders prefer current income than future income. M.M states that both are equal.
- Dividends have informational content, it is not considered by M.M.

Q10. Enumerate the legal and procedural aspects of the payment of dividend.

Ans : (Dec.-16)

Legal and Procedural Aspects of Payment of Dividend:

- Source of Declaring Dividend.
- Transfer to Reserves.
- Declaration of Dividend out of Past Profits or Reserves.
- Other Provisions and Aspects of Payment of Dividend

1. Source of Declaring Dividend

- (a) **Out of current profits:** Dividend can be declared by a company out of profits for the current year arrived at after providing depreciation.
- (b) **Out of past profits:** Dividend can also be declared out of the undistributed profits of the company for any previous financial year or years arrived at after providing depreciation in accordance with the provisions of the Act.
- (c) **Out of moneys provided by the Government:** A company may also declare dividend out of the moneys provided by the Central Government for the payment of dividend in pursuance of a guarantee by the government.

2. Transfer to Reserves

- (a) Where the dividend proposed exceeds 10 per cent but does not exceed 12.5 per cent of the paid up capital, the amount to be transferred to the reserves shall not be less than 2.5 per cent;
- (b) Where the dividend proposed exceeds 12.5 per cent but does not exceed 15 per cent of the paid up capital, the amount to be transferred to reserves shall not be less than 5 per cent;
- (c) Where the dividend proposed exceeds 15 per cent but does not exceed 20 per cent of the paid up capital, the amount to be transferred to reserves shall not be less than 7.5 per cent; and
- (d) Where the proposed dividend exceeds 20 per cent of the paid up capital, the amount to be transferred to reserves shall not be less than 10 per cent of the current year's profits.

It may, however, be noted that a company may voluntarily transfer a higher percentage of profits to reserves.

3. Declaration of Dividend out of Past Profits or Reserves

- If a company wants to declare dividend out of accumulated profit or reserves, it

has to comply with the following conditions:

- The rate of dividend should not exceed the average of the rates at which dividend was declared by it in 5 years immediately preceding that year or 10% of its paid up capital, whichever is less.
- The total amount to be drawn for the declaration of dividend from the accumulated profit should not exceed an amount equal to one-tenth of the sum of its paid up capital and free reserves and the amount so drawn should be utilized to set off the losses incurred in the financial year.
- The balance of reserves if term such drawl should not fall below 15% of its paid up capital

4. Other Provisions and Aspects of Payment of Dividend

- The decision in regard to the payment of final dividend is taken at the annual general meeting of the shareholders only on the recommendation of the director. The shareholder themselves cannot declare dividend
- Dividend on equity shares can be paid only after the declaration of dividend on preference shares.
- When dividend is declared by a company, it must be paid by the company within 30 days of declaration.
- Any dividend payable in cash may be paid by cheque or warrant sent through the post directed to the registered address of the shareholder.
- No dividend can be paid on calls in advance.
- In the absence of any specific provision in the articles of association of the company, dividend is paid on the paid up capital of the company. If there are calls in arrears, dividend is paid on the amount paid by the shareholders.

PROBLEMS

1. The following information available in respect of the rate of return on investment (r), the capitalization are (k_e) and earnings per share (E) of Hypothetical Ltd.,

$$r = 12 \text{ percent}$$

$$E = 20 \text{ percent}$$

Determine the value of its shares, assuming the following.

S.No.	D/P Ratio (1 - b)	Retention Ratio (b)	K_e (%)
(i)	10	90	20
(ii)	20	80	19
(iii)	30	70	18
(iv)	40	60	17
(v)	50	50	16
(vi)	60	40	15
(vii)	70	30	14

Sol :

$$\text{Gordon's Model} = \frac{E(1 - b)}{k_e - br}$$

- i) **D/P Ratio 10**

Retention Ratio 90

$$br = 0.9 \times 0.12 = 0.108$$

$$P = \frac{\text{Rs. } 20(1 - 0.9)}{0.20 - 0.108}$$

$$= \frac{\text{Rs. } 2}{0.092} = \text{Rs. } 21.74$$

- ii) **D/P Ratio 20**

Retention ratio 80

$$br = 0.8 \times 0.12 = 0.096$$

$$P = \frac{\text{Rs. } 20(1 - 0.8)}{0.19 - 0.096} = \text{Rs. } 42.55$$

- iii) **D/P Ratio 30**

Retention ratio 70

$$br = 0.7 \times 0.12 = 0.084$$

$$P = \frac{\text{Rs. } 20(1 - 0.7)}{0.18 - 0.084} = \text{Rs. } 62.50$$

iv) D/P Ratio 40**Retention ratio 60**

$$br = 0.6 \times 0.12 = 0.07$$

$$P = \frac{\text{Rs. } 20(1 - 0.6)}{0.17 - 0.07} = \text{Rs. } 81.63$$

v) D/P Ratio 50**Retention ratio 50**

$$br = 0.5 \times 0.12 = 0.060$$

$$P = \frac{\text{Rs. } 20(1 - 0.5)}{0.16 - 0.060} = \text{Rs. } 100$$

vi) D/P Ratio 60**Retention ratio 40**

$$br = 0.4 \times 0.12 = 0.048$$

$$P = \frac{\text{Rs. } 20(1 - 0.4)}{0.16 - 0.060} = \text{Rs. } 117.65$$

vii) D/P Ratio 70**Retention ratio 30**

$$br = 0.3 \times 0.12 = 0.036$$

$$P = \frac{\text{Rs. } 20(1 - 0.3)}{0.14 - 0.036} = \text{Rs. } 134.62$$

Gordon thus, contents that the dividend decision has a bearing on the market price of the share.

The market price of the share is favorable affected with more dividends.

- 2. A company has total investment of Rs. 5 lakhs assets and 50,000 outstanding equity shares of Rs. 10 each. It earn a rate of 15% on its investment and has a policy of retaining 50% of the earnings. If the appropriate discount rate for the firm is 10% determine the price of its share using Gordon Model. What shall happen to the price, if the company has a payout of 80% and 20%.**

Sol :

According to Gordon's model,

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

Retention rate (b) = 0.50 (or) 0.20 (or) 0.80

Discount rate (k_e) = 0.10

Rate of return (r) = 0.15

Earning per share (E) = Rs. 1.50 (0.15 × 10)

i) For 50% Payment

$$P = \frac{1.50(1 - 0.50)}{0.10 - (0.50 \times 0.15)}$$

$$= \frac{0.75}{0.025} = \text{Rs. } 30$$

ii) For 20% Payment

$$P = \frac{1.50(1 - 0.20)}{0.10 - (0.20 \times 0.15)}$$

$$= \frac{1.2}{0.7} = \text{Rs. } 17.14$$

iii) For 80% Payment

$$P = \frac{1.50(1 - 0.80)}{0.10 - (0.80 \times 0.15)}$$

$$= \frac{0.3}{0.02} = \text{Rs. } 15$$

- 3. A company earns Rs. 10 per share at an internal Rate of 15%. The firms policy of paying 40% earnings as dividends if the required Rate of Return 10%. Determine price of Share under Gordon's model and walters model.**

Sol :

Given Eps = Rs. 10

IRR (r) = 15% (or) 0.15

K = 10% (or) 0.10

Pay out Ratio = 40%

$$\begin{aligned} b &= \text{Retention Ratio} \\ &= 1 - \text{pay out Ratio} \\ &= 1 - 0.4 \\ &= 0.6 \end{aligned}$$

$$P_0 = \frac{E(1-b)}{k_e - br}$$

$$= \frac{10(1-0.6)}{0.10 - (0.6 \times 0.15)}$$

$$= \frac{10(0.4)}{0.10 - (0.6 \times 0.15)}$$

$$= \frac{4}{0.10 - 0.09}$$

$$= \frac{4}{0.01} = 400$$

Walter's Model

$$P_0 = \frac{\text{Div} + \left(\frac{r}{K}\right)(\text{Eps} - \text{Div})}{K_e}$$

Div = Dividend per share

$$= \text{Eps} \times \frac{\text{Rate}}{100}$$

$$= 10 \times 40\%$$

$$= \text{Rs. 4.}$$

r = Internal Rate of Return = 0.15

k = Cost of Capital = 0.10

Eps = Earning per share 10

$$P_0 = \frac{4 + \left(\frac{0.15}{0.10}\right)(10 - 4)}{0.10}$$

$$P_0 = \frac{4 + 1.5(6)}{0.10}$$

$$P_0 = \frac{4 + 9}{0.10}$$

$$= \frac{13}{0.10}$$

$$\therefore P_0 = \text{Rs. 130}$$

4. The earnings per share of company is Rs. 8 and the rate of capitalization applicable is 10%. The company has before it an option of adoption.

i) 50%

ii) 75% and

iii) 100% dividend payout ratio.

Compute the market price of the company's quoted shares as per Walter's model if it can earn a return of,

i) 15%

ii) 10% and

iii) 5% on its retained earnings.

Sol :

(Imp.)

Rate of Return

When 50%, EPS = 8

$$D = \frac{8 \times 50}{100} = 4$$

When Rate of Return 75% EPS = 8

$$D = \frac{8 \times 75}{100} = 6$$

When Rate of Return = 100% EPS = 8

$$D = \frac{8 \times 100}{100} = 8.$$

According to the Walter's model,

$$P_0 = \frac{D + \frac{r}{k_e}(E - D)}{k_e}$$

Rate of Return	50%	75%	100%
15%	$\frac{4 + \frac{0.15}{0.10}(8-4)}{0.10} = 100$	$\frac{6 + \frac{0.15}{0.10}(8-6)}{0.10} = 90$	$\frac{8 + \frac{0.15}{0.10}(8-8)}{0.10} = 95$
10%	$\frac{4 + \frac{0.10}{0.10}(8-4)}{0.10} = 80$	$\frac{6 + \frac{0.10}{0.10}(8-6)}{0.10} = 80$	$\frac{8 + \frac{0.10}{0.10}(8-8)}{0.10} = 80$
5%	$\frac{4 + \frac{0.05}{0.10}(8-4)}{0.10} = 60$	$\frac{6 + \frac{0.05}{0.10}(8-6)}{0.10} = 70$	$\frac{8 + \frac{0.05}{0.10}(8-8)}{0.10} = 85$

5. Calculate Market price Walter's model and comment.

r = 10%, K = 10% Eps = 100

Different pay out Ratio = 10%, 50 %, 80 %, 100%

Sol :

Walter's model

$$P_0 = \frac{\text{Div} + \left(\frac{r}{K_e}\right)(\text{Eps} - \text{Div})}{K_e}$$

P_0 = Market price per share

Div = Dividend per share

r = Rate of Return

K_e = Cost of capital

EPs = Earning per share

i) At 10% pay out Ratio

$$P_0 = \frac{\text{Div} + \left(\frac{r}{K_e}\right)(\text{Eps} - \text{Div})}{K_e}$$

P_0 = Market price per share

Div = Dividend per share

$$= \text{Eps} \times \frac{\text{Rate}}{100}$$

$$= 100 \times \frac{10}{100}$$

$$= \text{Rs. } 10$$

r = Internal Rate of Return

k = Cost of capital

Eps = Earnings per share.

$$P_0 = \frac{10 + \left(\frac{0.10}{0.10}\right)(100 - 10)}{0.10}$$

$$P_0 = \frac{10 + (1)(90)}{0.10} = \frac{10 + 90}{0.10}$$

$$P_0 = \frac{100}{0.10}$$

$$\therefore P_0 = \text{Rs. } 1000$$

ii) At 50% pay out Ratio

$$P_0 = \frac{\text{Div} + \left(\frac{r}{K_e}\right)(\text{Eps} - \text{Div})}{K_e}$$

P_0 = Market price per share

Div = Dividend per share

$$= \text{Eps} \times \frac{\text{Rate}}{100}$$

$$= 100 \times \frac{50}{100} = \text{Rs. } 50$$

r = Internal Rate of Return 0.10

k = Cost of capital 0.10

Eps = Earnings per share. Rs.100

$$P_0 = \frac{50 + \left(\frac{0.10}{0.10}\right)(100 - 50)}{0.10}$$

$$P_0 = \frac{50 + (1)(50)}{0.10}$$

$$= \frac{50 + 50}{0.10} = \frac{100}{0.10}$$

$$P_0 = \frac{100}{0.10}$$

$$\therefore P_0 = 1000$$

iii) At 80% pay out Ratio

$$P_0 = \frac{\text{Div} + \left(\frac{r}{K_e}\right)(\text{Eps} - \text{Div})}{K_e}$$

Div = Dividend per share

$$= \text{Eps} \times \frac{\text{Rate}}{100}$$

$$= 100 \times \frac{80}{100} = \text{Rs. } 80$$

$$P_0 = \frac{80 + \left(\frac{0.10}{0.10}\right)(100 - 80)}{0.10}$$

$$P_0 = \frac{80 + (1)(20)}{0.10}$$

$$= \frac{80 + 20}{0.10}$$

$$P_0 = \frac{100}{0.10}$$

$$\therefore P_0 = 1000$$

iv) At 100% pay out Ratio

$$P_0 = \frac{\text{Div} + \left(\frac{r}{K_e}\right)(\text{Eps} - \text{Div})}{K_e}$$

Div = Dividend per share

$$= \text{Eps} \times \frac{\text{Rate}}{100}$$

$$= 100 \times \frac{100}{100} = \text{Rs. } 100$$

$$P_0 = \frac{100 + \left(\frac{0.10}{0.10}\right)(100 - 100)}{0.10}$$

$$P_0 = \frac{100 + (1)(0)}{0.10}$$

$$= \frac{100}{0.10}$$

$$\therefore P_0 = 1000$$

6. Market price per share Rs. 60 at the optimum pay out Ratio under walter's model. Eps Rs = 5, $K_e = 10\%$ Calculate Rate of return on investment.

Sol :

$$P_0 = \frac{\text{Div} + \left(\frac{r}{K_e}\right)(\text{Eps} - \text{Div})}{K_e}$$

$$60 = \frac{0 + \left(\frac{r}{10}\right)(5 - 0)}{0.10}$$

$$60 \times 0.10 = 0 + \left(\frac{r}{0.10}\right)^5$$

$$6 = \left(\frac{r}{0.10}\right)^5$$

$$6 \times 0.10 = 5r$$

$$0.6 = 5r$$

$$\therefore r = \frac{0.6}{5} = 0.12$$

Rate of Return = 12%.

7. Market price per share at 0% redemption ratio is Rs. 100, Eps Rs. 10, $r = 8\%$ calculate Cost of Capital assume the firm is declining firm.

Sol :

$$\text{mp} = 100 \text{ Eps} = \text{Rs. } 10, \quad r = 8\%, \quad K_e = ?$$

$$\text{Div} = 10 \times \frac{10}{100} = 10\%$$

$$P_0 = \frac{\text{Div} + \left(\frac{r}{K_e}\right)(\text{Eps} - \text{Div})}{K_e}$$

$$100 = \frac{10 + \left(\frac{0.08}{K_e}\right)(10 - 10)}{K_e}$$

$$100 K_e = 10 + \left(\frac{0.08}{K_e}\right)(0)$$

$$100 K_e = 10 + 0$$

$$K_e = \frac{10}{100} = 0.10 \times 100$$

$$= 10\%.$$

8. At 50% pay out Ratio on cost of capital 10% market price is Rs. 90 per share and Eps is Rs. 10. Calculate Ratio of return on investment using walters model assume the firm is decline firm.

Sol :

$$K_e = 10\% \text{ or } 0.10$$

$$P_0 = \text{Rs. } 90$$

$$\text{Eps} = \text{Rs. } 10$$

$$\text{Div} = 50\%; \quad \text{Eps} \times \frac{\text{Rate}}{100} = 10 \times \frac{50}{100} = \text{Rs. } 5$$

$$P_0 = \frac{\text{Div} + \left(\frac{r}{K_e}\right)(\text{Eps} - \text{Div})}{K_e}$$

$$90 = \frac{5 + \left(\frac{r}{0.10}\right)(10 - 5)}{0.10}$$

$$90 \times 0.10 = 5 + \left(\frac{r}{0.10} \right) (5) = 9$$

$$= 5 + \left(\frac{r}{0.10} \right) (5) = 9$$

$$9 = 5 + \left(\frac{5r}{0.10} \right)$$

$$9 \times 0.10 = 5 + 5r$$

$$0.9 = 10r$$

$$r = \frac{0.9}{10} \times 100 = 9\%$$

9. The Following data relating to a firm

Eps = Rs. 10

$K_e = 10\%$

Retention Ratio = 40%

Calculate market Price under Gordon's Model if

(i) $r = 15\%$ (ii) $r = 10\%$ (iii) $r = 8\%$

Sol :

(i) If $r = 15\%$

EPS = Rs. 10

$k = 0.10$

$r = 0.15$

$$P_0 = \frac{E(1-b)}{K_e - b_r}$$

$$= \frac{10(1-0.40)}{0.10 - (0.40 \times 0.15)}$$

$$= \frac{10(0.6)}{0.10 - 0.06} = \frac{6}{0.04} = 150$$

(ii) If $r = 10\%$

$K = 0.10$

Retention Ratio = 40%

$$P_0 = \frac{E(1-b)}{K_e - br}$$

$$P_0 = \frac{10(1-0.4)}{0.10 - (0.4 \times 0.10)}$$

$$= \frac{10(0.6)}{0.10 - 0.04}$$

$$= \frac{6}{0.06}$$

$$= \text{Rs. } 100$$

iii) If $r = 8\%$

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

$$P = \frac{10(1-0.4)}{0.10 - (0.4 \times 0.08)}$$

$$= \frac{10(0.6)}{0.10 - 0.032}$$

$$= \frac{6}{0.068}$$

$$\therefore P_0 = \frac{6}{0.068}$$

$$= \text{Rs. } 88.24.$$

10. An engineering company has a cost of equity capital of at 15%. The current market price per share Rs. 30. Assume the new investment Rs. 9,00,000 earnings Rs. 5,00,000 total dividend Rs. 3,00,000 no of shares 1,00,000 existing shares. Show that under m. on assumption the payment of dividend does not effect the value of the firm no. of new shares 30,000.

Sol :

When dividends are not declared

Step 1

Calculation of market price per share (P_1)

$$P_1 = P_0 (1 + K) - \text{Div}$$

$$P_1 = 30 (1 + 0.15) - 0$$

$$P_1 = 30 (1.15) - 0$$

$$P_1 = 34.5$$

Step 2 :

Calculation of new no. of shares (m) = 30,000 shares

Step 3 :

Calculation of value of the firm (v)

$$V = \frac{n \cdot \text{Div} + (n + m)P_1 - mP_1}{(1 + K)}$$

$$V = \frac{10,00,000(0) + (30,000 + 1,00,000)34.5 - 30,000(34.5)}{1.15}$$

$$V = \frac{0 + 1,30,000(34.5) - 30,000(34.5)}{1.15}$$

$$V = \frac{44,85,000 - 10,35,000}{1.15}$$

$$V = \frac{34,50,000}{1.15}$$

$$V = \frac{34,50,000}{1.15} = \text{Rs. } 30,00,000$$

When dividends are declared i.e Dividend = Rs. 3**Step 1:** Calculation of market price per share (P_1)

$$P_1 = P_0(1 + K) - \text{Div}$$

$$P_1 = 30 (1 + 0.15) - 3$$

$$P_1 = 30 (1.15) - 3$$

$$P_1 = 34.5 - 3$$

$$= 31.5$$

Step 2: Calculation of No. of new shares (m) = 30,000 shares.**Step 3:** Calculation of value of the firm (V)

$$\begin{aligned}
 V &= \frac{n.DIV + (m+n)P_1 - mp_1}{(1+k)} \\
 &= \frac{Rs.100,000(3) + (30,000 + 100,000)31.5 - 30,000(31.5)}{1.15} \\
 &= \frac{Rs.300,000 + (130,000)31.5 - 945000}{1.15} \\
 &= \frac{Rs.4395000 - 945000}{1.15} \\
 &= \frac{Rs.3450000}{1.15} = Rs. 30,00,000
 \end{aligned}$$

11. The following information is available in respect of a firm.

Earnings per Share (EPS) ` 40

Capitalisation rate (K_0 or K_e) 10 per cent

Assumed rate of return on investment (r) (a) 13 per cent; (b) 10 per cent; (c) 8 per cent.

You are required, to show the effect of dividend payment on the market price per share using Walter's model, when dividend payout ratio is (a) 0 percent (b) 25 percent (c) 37.5 percent (d) 50 percent (e) 75 percent (f) 100 percent.

Sol :

$\text{Walter Model} = \frac{D + \frac{r}{k_e}(\text{Eps} - \text{Dividend})}{k_e}$

Dividend Policy : Value of Share Price

$r > K_0$ 13 > 10%	$r = K$ 10 = 10%	$r < K_0$ 8 < 10%
a) When DPR 0% $P = \frac{0 + \frac{0.13}{0.10}(\text{`40} - \text{`0})}{0.10}$ $= \text{`520}$	$P = \frac{0 + \frac{0.10}{0.10}(\text{`40} - \text{`0})}{0.10}$ $= \text{`400}$	$P = \frac{0 + \frac{0.08}{0.10}(\text{`40} - \text{`0})}{0.10}$ $= \text{`320}$
b) When DPR 25% $P = \frac{0 + \frac{0.13}{0.10}(\text{`40} - \text{`10})}{0.10}$ $= \text{`490}$	$P = \frac{10 + \frac{0.10}{0.10}(\text{`40} - \text{`10})}{0.10}$ $= \text{`400}$	$P = \frac{10 + \frac{0.08}{0.10}(\text{`40} - \text{`10})}{0.10} m$ $= \text{`340}$

c) When DPR 37.5% $PP = \frac{15 + \frac{0.13}{0.10}(\text{₹}40 - \text{₹}15)}{0.10}$ $= \text{₹}475$	$PP = \frac{15 + \frac{0.10}{0.10}(\text{₹}40 - \text{₹}15)}{0.10}$ $= \text{₹}400$	$PP = \frac{15 + \frac{0.08}{0.10}(\text{₹}40 - \text{₹}15)}{0.10}$ $= \text{₹}350$
d) When DPR 50% $PP = \frac{20 + \frac{0.13}{0.10}(\text{₹}40 - \text{₹}20)}{0.10}$ $= \text{₹}460$	$PP = \frac{20 + \frac{0.10}{0.10}(\text{₹}40 - \text{₹}20)}{0.10}$ $= \text{₹}400$	$PP = \frac{20 + \frac{0.08}{0.10}(\text{₹}40 - \text{₹}20)}{0.10}$ $= \text{₹}360$
e) When DPR 75% $PP = \frac{30 + \frac{0.13}{0.10}(\text{₹}40 - \text{₹}30)}{0.10}$ $= \text{₹}430$	$PP = \frac{30 + \frac{0.10}{0.10}(\text{₹}40 - \text{₹}30)}{0.10}$ $= \text{₹}400$	$PP = \frac{30 + \frac{0.08}{0.10}(\text{₹}40 - \text{₹}30)}{0.10}$ $= \text{₹}380$
f) When DPR 100% $PP = \frac{40 + \frac{0.13}{0.10}(\text{₹}40 - \text{₹}40)}{0.10}$ $= \text{₹}400$	$PP = \frac{40 + \frac{0.10}{0.10}(\text{₹}40 - \text{₹}40)}{0.10}$ $= \text{₹}400$	$PP = \frac{40 + \frac{0.08}{0.10}(\text{₹}40 - \text{₹}40)}{0.10}$ $= \text{₹}400$

12. From the following information of Sai co. Ltd., Calculate company share value

Earnings per Share (EPS) ₹ 10

Cost of Capital = 15 per cent

Rate of return on investment (r) 16 per cent (b) 15 per cent (c) 14 per cent

Particular	i	ii	iii	iv	v	vi
Dividend Payment Ratio (I-b)	10	20	30	40	50	80
Retention Ratio	90	80	70	60	50	20

Sol :

$$\text{Gordon's} = \frac{\epsilon(1-b)}{k_e - br}$$

Dividend Policy : Value of Sai Co. Ltd. Share

$r > K_0$ (16%)	$r = K$ (15%)	$r < K_0$ (14%)
i) D/P Ratio 10% (Retention ratio 90%) $P = \frac{10(1-0.9)}{0.15 - (0.9 \times 0.16)}$ $= ₹ 166.67$	$P = \frac{10(1-0.9)}{0.15 - (0.9 \times 0.15)}$ $= ₹ 66.67$	$P = \frac{10(1-0.9)}{0.15 - (0.9 \times 0.14)}$ $= ₹ 41.67$
ii) DP Ratio 20% (Retention 80%) $P = \frac{10(1-0.8)}{0.15 - (0.8 \times 0.16)}$ $= ₹ 90.91$	$P = \frac{10(1-0.8)}{0.15 - (0.8 \times 0.15)}$ $= ₹ 66.67$	$P = \frac{10(1-0.8)}{0.15 - (0.8 \times 0.14)}$ $= ₹ 52.63$
iii) DP Ratio 30% (Retention 70%) $P = \frac{10(1-0.7)}{0.15 - (0.7 \times 0.16)}$ $= ₹ 78.95$	$P = \frac{10(1-0.7)}{0.15 - (0.7 \times 0.15)}$ $= ₹ 66.67$	$P = \frac{10(1-0.7)}{0.15 - (0.7 \times 0.14)}$ $= ₹ 57.69$
iv) DP Ratio 40% (Retention 60%) $P = \frac{10(1-0.6)}{0.15 - (0.6 \times 0.16)}$ $= ₹ 74.07$	$P = \frac{10(1-0.6)}{0.15 - (0.6 \times 0.15)}$ $= ₹ 66.67$	$P = \frac{10(1-0.6)}{0.15 - (0.6 \times 0.14)}$ $= ₹ 60.61$
v) D/P Ratio 50% (Retention ratio 50%) $P = \frac{10(1-0.5)}{0.15 - (0.5 \times 0.16)}$ $= ₹ 71.4$	$P = \frac{10(1-0.5)}{0.15 - (0.5 \times 0.15)}$ $= ₹ 66.67$	$P = \frac{10(1-0.5)}{0.15 - (0.5 \times 0.14)}$ $= ₹ 62.50$
vi) DP Ratio 80% (Retention 20%) $P = \frac{10(1-0.2)}{0.15 - (0.2 \times 0.16)}$ $= ₹ 67.80$	$P = \frac{10(1-0.2)}{0.15 - (0.2 \times 0.15)}$ $= ₹ 66.67$	$P = \frac{10(1-0.2)}{0.15 - (0.2 \times 0.14)}$ $= ₹ 65.57$

13. From the following information, compute market price of the company share as per Walter's Model, if it can earn a return of (i) 20; (ii) 15 and (iii) 10 per cent on its investments

Earnings per Share (EPS) ₹ 10

Dividends payout Ratios are (a); (b) 50 (c) 75; (d) 100 per cent

The Company's capitalisation is 15 per cent

Sol :

(Imp.)

$$\text{Walter Model} = \frac{D + \frac{r}{k_e} (\text{Eps} - \text{Dividend})}{k_e}$$

Dividend Policy and Value of Share as per Walter Model

$r > K_0$ (20%)	$r = K_0$ (15%)	$r < K_0$ (10%)
a) DPR 25% $PP = \frac{₹ 2.5 + \frac{0.2}{0.15} (₹ 10 - 2.5)}{0.15}$ $= ₹ 83.33$	$PP = \frac{₹ 2.5 + \frac{0.15}{0.15} (₹ 10 - 2.5)}{0.15}$ $= ₹ 66.67$	$PP = \frac{₹ 2.5 + \frac{0.10}{0.15} (₹ 10 - 2.5)}{0.15}$ $= ₹ 50$
b) DPR 50% $PP = \frac{₹ 5 + \frac{0.2}{0.15} (₹ 10 - 5)}{0.15}$ $= ₹ 77.78$	$PP = \frac{₹ 5 + \frac{0.15}{0.15} (₹ 10 - 5)}{0.15}$ $= ₹ 66.67$	$PP = \frac{₹ 5 + \frac{0.10}{0.15} (₹ 10 - 5)}{0.15}$ $= ₹ 55.66$
c) DPR 75% $PP = \frac{₹ 7.5 + \frac{0.2}{0.15} (₹ 10 - 7.5)}{0.15}$ $= ₹ 72.2$	$PP = \frac{₹ 7.5 + \frac{0.15}{0.15} (₹ 10 - 7.5)}{0.15}$ $= ₹ 66.67$	$PP = \frac{₹ 7.5 + \frac{0.10}{0.15} (₹ 10 - 7.5)}{0.15}$ $= ₹ 61.11$
d) DPR 100% $PP = \frac{₹ 10 + \frac{0.2}{0.15} (₹ 10 - 10)}{0.15}$ $= ₹ 66.67$	$PP = \frac{₹ 10 + \frac{0.15}{0.15} (₹ 10 - 10)}{0.15}$ $= ₹ 66.67$	$PP = \frac{₹ 10 + \frac{0.10}{0.15} (₹ 10 - 10)}{0.15}$ $= ₹ 66.67$

14. The following information is available in respect of a firm :

Earnings per Share (EPS) ` 20

Rate of Capitalisation ` 10%

Calculate the market price of the company's quoted shares under Walter's Model if the Dividend Pay-out Ratio is 0, 25%, 50%, 75% and 100%, if it can earn a return of

a) 15%

b) 10% and

c) 5%

Sol:

$\text{Walter Model} = \frac{D + \frac{r}{k_e} (\text{Eps} - \text{Dividend})}{k_e}$

Market Price ` Share

$r > K_0$ (15%)	$r = K_0$ (10%)	$r < K_0$ (5%)
a) DP Ratio 0 $PP = \frac{0 + \frac{0.15}{0.10} (20 - 0)}{0.10}$ $= \text{` } 300$	$PP = \frac{0 + \frac{0.10}{0.10} (20 - 0)}{0.10}$ $= \text{` } 200$	$PP = \frac{0 + \frac{0.05}{0.10} (20 - 0)}{0.10}$ $= \text{` } 100$
b) DP Ratio 25% $PP = \frac{5 + \frac{0.15}{0.10} (20 - 5)}{0.10}$ $= \text{` } 275$	$PP = \frac{5 + \frac{0.10}{0.10} (20 - 5)}{0.10}$ $= \text{` } 200$	$PP = \frac{5 + \frac{0.05}{0.10} (20 - 5)}{0.10}$ $= \text{` } 125$
c) DP Ratio 50% $PP = \frac{10 + \frac{0.15}{0.10} (20 - 10)}{0.10}$ $= \text{` } 250$	$PP = \frac{10 + \frac{0.10}{0.10} (20 - 10)}{0.10}$ $= \text{` } 200$	$PP = \frac{10 + \frac{0.05}{0.10} (20 - 10)}{0.10}$ $= \text{` } 150$
d) DP Ratio 75% $PP = \frac{15 + \frac{0.15}{0.10} (20 - 15)}{0.10}$ $= \text{` } 225$	$PP = \frac{15 + \frac{0.10}{0.10} (20 - 15)}{0.10}$ $= \text{` } 200$	$PP = \frac{15 + \frac{0.05}{0.10} (20 - 15)}{0.10}$ $= \text{` } 175$

15. Agile Ltd., belongs to risk class of which appropriate capitalisation rate is 10%. It currently has 100000 shares selling at Rs. 100 each. The firm is contemplating declaration of a dividend of Rs. 6 per share at the end of the current fiscal year which has just began. Answer the following questions based on Modigliani and Miller model and assumption of no taxes,

- (i) What will be the price of the shares at the end of the year if a dividend is not declared?
- (ii) What will be the price if dividend is declared?
- (iii) Assuming that the firm pays dividend, has net income of Rs. 10 lakhs and makes new investments of Rs. 20 lakhs during the period, how many new shares must be issued ?

Sol :

MM valuation model is as follows,

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

Where,

P_0 = Current market price per share

P = Capitalisation rate

D_1 = Dividend to be declared at the end of the year.

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

- (i) Price per share at the end of the year if dividend is not declared,

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

$$P_0 = 100$$

$$P = 10\%$$

$$D_1 = 0$$

$$\therefore 100 = \frac{(0 + P_1)}{(1 + 0.10)}$$

$$\Rightarrow P_1 = \text{Rs. } 100$$

- (ii) Price per share at the end of the year if dividend of Rs. 6 is declared.

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

Where,

$$P_0 = 100, P = 10\%, D_1 = 6$$

$$\therefore 100 = \frac{(6 + P_1)}{(1 + 0.10)}$$

$$\Rightarrow P_1 = \text{Rs. } 104.$$

- (iii) Retained earnings = Net income – Dividend paid
 = Rs. 10 lakhs – Rs. 6 lakhs = Rs. 4 lakhs

New investment is Rs. 20 lakhs

Funds required will be (Rs. 20 – Rs. 4) = Rs. 16 lakhs

Price per share as above Rs. 104.

$$\text{Number of new shares to be issued} = \frac{\text{Rs. 16,00,000}}{\text{Rs. 104}} = 15385 \text{ shares}$$

- 16. X Ltd., had 50,000 equity shares of Rs. 10 each outstanding on January 1. The share are currently being quoted at par in the market. The company now intends to pay a dividend of Rs. 2 per whose appropriate capitalisation rate is 15% Using M.M. model and assuming capitalisation rate is 15%. Using M.M. Model and assuming no taxes, ascertain the price of the company's share as it is likely to prevail at the end of the year,**

i) When dividend is declared and

ii) When no dividend is declared.

Also find out the number of new equity shares that the company must issue to meet its investment needs of Rs. 2 lakhs, assuming a net income of Rs. 1,10,000 and also assuming that the dividend is paid.

Sol :

- i) Price of the share when dividends are paid,**

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

$$\Rightarrow \text{Rs. 10} = \text{Rs. } \frac{2 + P_1}{1.15}$$

$$\Rightarrow \text{Rs. 11.5} = \text{Rs. 2} + P_1$$

$$\therefore P_1 = \text{Rs. 9.5}$$

- ii) Price of the share when dividends are not paid,**

$$\Rightarrow \text{Rs. 10} = \frac{P_1}{1.15}$$

$$\therefore P_1 = \text{Rs. 11.5}$$

Number of new equity shares to be issued,

$$\Delta n = \frac{I - (E - nD_1)}{P_1}$$

$$= \frac{2,00,000 - (1,10,000 - 1,00,000)}{9.5} = 20,000 \text{ shares.}$$

17. Ajay financial service Ltd., has a capital of Rs. 10. Lakhs in equity share of Rs. 100 each. The share are currently quoted at per. The company proposed to declare a dividend of Rs. 10 per share at the end of current financial year. The capitalisation rate for the risk clause to which the company belongs is 12% what will be the market price of the share at the end of the year, if
- A dividend is not declared?
 - A dividend is declared?
 - Assuming that the company pay the dividend and has net profit of Rs. 6 lakhs and maker new investment of Rs. 10 lakhs deeming the period, how many new share must be issued? Use the MM model.

Sol :

According to MM model

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

- i) If Dividend is not declared

$$100 = \frac{10 + P_1}{1 + 0.12} = \frac{P_1}{1.12}$$

$$\Rightarrow P_1 = \text{Rs. } 112$$

- ii) If Dividend is declared

$$100 = \frac{10 + P_1}{1 + 0.12} = \frac{10 + P_1}{1.12}$$

$$\Rightarrow 112 = 10 + P_1$$

$$\begin{aligned} \Rightarrow P_1 &= 112 - 10 \\ &= 102 \end{aligned}$$

- iii) In the Case when Dividend is Rs. 10

Total Earnings	5,00,000
Less : Dividend	1,00,000
Retained Earning	4,00,000
Total Fund Required	10,00,000
Fresh Funds to be Raised	6,00,000

Market price of the share when dividend declared is Rs. 102

$$\text{Number of shares} = \frac{6,00,000}{102} = 5882.35$$

The firm should issue 5882.35 shares @ Rs. 102.

18. The following information related to XYZ Ltd.

Particulars	Amount (Rs.)
Paid-up Equity Capital	20,00,000
Earnings of the company	2,00,000
Dividend paid	1,60,000
Price Earnings Ratio	12.5
Number of share outstanding	20,000

You are required to find out whether the company's dividend payout ratio is optimal, using Walter's model.

Sol :

(Dec.-16)

According to Walter Model

$$P = \frac{D + \frac{r}{K_e} (E - D)}{K_e}$$

$$\text{Dividend} = \frac{1,60,000}{20,000} = ₹ 8$$

$$\text{EPS} = \frac{\text{Earnings of the company}}{\text{Number of shares outstanding}} = \frac{2,00,000}{20,000}$$

$$\text{EPS} = ₹ 10$$

$$\begin{aligned} \text{Market price per share} &= \frac{P}{E} \text{ ratio} \times \text{EPS} \\ &= 12.5 \times ₹ 10 = ₹ 125 \end{aligned}$$

$$K_e = \frac{8}{125} \times 100 = 0.064$$

$$K_e = 0.064$$

$$P = \frac{8 + \frac{r}{0.064} (10 - 8)}{0.064} = \frac{0.512 + 2r}{0.064}$$

$$125 = \frac{0.512 + 2r}{0.064} = 8 = \frac{0.512 + 2r}{0.064}$$

$$8 \times 0.064 = 0.512 + 2r$$

$$0.512 - 0.512 = 2r$$

$$r = 0\%$$

When the return on investment is zero. It indicates that the firm should distribute the entire earnings as dividends and the optimum payout would be 100%.

19. From the following information determine the value of its shares of a company as per Gorden's model in each alternative, assuming the following :

$K_e = 11\%$, $E = \text{Rs. } 20$: $r = \text{(i) } 12\% \text{ and (ii) } 10\%$

Options	A	B	C	D	E	F	G
D/P ratio	10%	20%	30%	40%	50%	60%	70%

Sol :

(June-16)

$$K_e = 11\% \quad E = 20 \quad r = 12\%, 10\%$$

$$1 - b = 10\%, 20\%, 30\%, 40\%, 50\%, 60\%, 70\%$$

$$\text{Value of share under Gorden model} = P = \frac{E(1-b)}{k-g} = \frac{E(1-b)}{k-br}$$

$$\text{When } r = 12\%, 1 - b = 10\%$$

$$P = \frac{20(0.1)}{0.11 - (0.9)(0.12)} = \text{` } 1000$$

$$r = 12\%, 1 - b = 20\%$$

$$P = \frac{20(0.2)}{0.11 - (0.8)(0.12)} = \text{` } 286$$

$$r = 12\%, 1 - b = 30\%$$

$$P = \frac{20(0.3)}{0.11 - (0.7)(0.12)} = \text{` } 231$$

$$r = 12\%, 1 - b = 40\%$$

$$P = \frac{20(0.4)}{0.11 - (0.6)(0.12)} = \frac{8}{0.038} = 211$$

$$r = 12\%, 1 - b = 50\%$$

$$P = \frac{20(0.5)}{0.11 - (0.5)(0.12)} = \frac{10}{0.05} = 200$$

$$r = 12\%, 1 - b = 60\%$$

$$P = \frac{20(0.6)}{0.11 - (0.4)(0.12)} = \frac{12}{0.062} = \text{` } 194$$

$$r = 12\%, 1 - b = 70\%$$

$$P = \frac{20(0.7)}{0.11 - (0.3)(0.12)} = \frac{14}{0.074} = 189$$

$$r = 10\%, 1 - b = 10\%$$

$$P = \frac{20(0.1)}{0.11 - (0.9)(0.1)} = \frac{2}{0.02} = 100$$

$$r = 10\%, 1 - b = 20\%$$

$$P = \frac{20(0.2)}{0.11 - (0.8)(0.1)} = \frac{4}{0.03} = 133$$

$$r = 10\%, 1 - b = 30\%$$

$$P = \frac{20(0.3)}{0.11 - (0.7)(0.1)} = \frac{6}{0.04} = 150$$

$$r = 10\%, 1 - b = 40\%$$

$$P = \frac{20(0.4)}{0.11 - (0.6)(0.1)} = \frac{8}{0.05} = 160$$

$$r = 10\%, 1 - b = 50\%$$

$$P = \frac{20(0.5)}{0.11 - (0.5)(0.1)} = \frac{10}{0.06} = 167$$

$$r = 10\%, 1 - b = 60\%$$

$$P = \frac{20(0.6)}{0.11 - (0.4)(0.1)} = \frac{12}{0.07} = 171$$

$$r = 10\%, 1 - b = 70\%$$

$$P = \frac{20(0.7)}{0.11 - (0.3)(0.1)} = \frac{14}{0.08} = 175$$

- 20. X Co. Ltd. has the current market price as Rs. 10. The current value of the firm is Rs. 20,00,000 @ Rs. 20 per Share Assume value for I (New Investment). Y(earnings) and D (Dividends) at the end of the year I = Rs. 6,80,000, Y = Rs. 1,15,000 and D = Rs 1 per Share. Calculate new number of Shares to be issued under the MM assumptions.**

Sol :

(Jan.-20)

$$\begin{aligned} \text{Retained earnings} &= \text{Net income} - \text{Dividend paid} \\ &= \text{Rs. 1,15,000} - \text{Rs. 15,000} \end{aligned}$$

New investment is Rs. 6,80,000

Funds required will be (6,80,000 – 15,000)

Price per share as above Rs. 20.

$$\text{Number of new shares to be issued} = \frac{6,65,000}{20} = 33,250 \text{ shares.}$$

Exercise Problems

1. A company earns ₹ 6 per share having capitalisation rate of 10 per cent and has a return on investment at the rate of 20 per cent. According to Walter's model, what should be the price per share at 30 per cent dividend pay-out ratio? Is this the optimum pay-out ratio as per Walter model?

[Ans: P = ₹ 102]

2. The earning per share of company are ₹ 12 and the rate of capitalization applicable to the company is 10%. The productivity of earning (r) is 10%. Compute the market value of Company, if the payout ratio is (a) 25% (b) 50% (c) 75%.

[Ans: If dividend Payout is 25% - ₹ 120; If dividend Payout is 50% - ₹ 120; If dividend Payout is 75% - ₹ 120]

3. G limited has invested ₹ 500 lakhs in assets. There are 50 lakhs shares outstanding. The par value per share is ₹ 10. It earns a rate of 15% on its investment and has a policy of retaining 50% of earnings. If the appropriate discount rate of the company is 10%. what is the price of its shares using the Gordon's model? What will happen to the price of the share if the company has a pay-out of 80% or 20%?

[Ans: If dividend Payout is 50 % - ₹ 30; If dividend Payout is 80 % - ₹ 17.14; If dividend Payout is 20 % - ₹ (-)15]

4. The MNC Ltd.'s available information is:

K = 15% E = ₹ 30

(1) r = 14%, (2) r = 15%, and (3) r = 16%

You are required to calculate market price of a share of the MNC Ltd. As per Gordon model if:

(1) b = 40%, (2) b = 60%. and (3) b = 80%

[Ans: Market price of stock:

When b = 40%	r = 14% ₹ 191.49,	r = 15% ₹ 200,	r = 16% ₹ 209.30
When b = 60%	r = 14% ₹ 181.82,	r = 15% ₹ 200,	r = 16% ₹ 222.22
When b = 80%	r = 14% ₹ 157.89,	r = 15% ₹ 200,	r = 16% ₹ 272.73]

5. The overall cost of capital of a company is 10%. It has currently 2,500 outstanding shares selling at ₹ 100 each. The firm is contemplating the declaration of dividends of ₹ 5 per share at the end of the current financial year. It expects to have a net income of ₹ 2,50,000 and has a proposal for making new investments of ₹ 5,00,000. Show that under MM assumptions, the payment of dividend does not affect the value of the firm.

[Ans: Value of the firm when dividends are paid - ₹ 2,500,000: Value of the firm when dividends are not paid - ₹ 2,500,000]

Short Question and Answers

1. Define Dividend Policy.

Ans :

The term dividend policy refers to the policy concerning quantum of profit to be distributed as dividend. The "concept of dividend policies implies that companies through their Board of Directors evolve a pattern of dividend payment which has a bearing on future action.

Definition

According to Weston and Brigham, "Dividend policy determines the division of earnings between payments to shareholders and retained earnings".

The management should develop a dividend policy which divides net earnings into dividends and retained earnings in an optimum way so as to achieve the objective of wealth maximization for shareholders.

The management of an enterprise has an important financial decision to decide about the disposition of income left after meeting all business expenses. Generally, of the total business profits, a portion is retained for reinvestment in the business and rest is distributed to shareholders as dividend. The important issue is to decide the portion of profit to declare for dividend pay out and for retaining in business. The percentage is decided after considering the factors such as market price of the shares the trend in earnings, the tax position and the profitability use of funds.

2. Explain different forms of dividends.

Ans :

(a) Cash Dividend

A cash dividend is a usual method of paying dividends. Payment of dividend in cash results in outflow of funds and reduces the company's net worth, though the shareholders get an opportunity to invest the cash in any manner they desire. This is why the ordinary shareholders prefer to receive dividends in cash. But the firm must have adequate liquid

resources at its disposal or provide for such resources so that its liquidity position is not adversely affected on account of cash dividends.

(b) Scrip or Bond Dividend

A scrip dividend promises to pay the shareholders at a future specific date. In case a company does not have sufficient funds to pay dividends in cash, it may issue notes or bonds for amounts due to the shareholders. The objective of scrip dividend is to postpone the immediate Payment of cash. A scrip dividend bears interest and is accepted as a collateral security.

(c) Property Dividend

Property dividends are paid in the form of some assets other than cash. They are distributed under exceptional circumstances and are not popular in India.

(d) Stock Dividend

Stock dividend means the issue of bonus shares to the existing shareholders. If a company does not have liquid resources it is better to declare stock dividend. Stock dividend amounts to capitalisation of earnings and distribution of profits among the existing shareholders without affecting the cash position of the firm. This has been discussed in detail under "Bonus Issue".

3. Define Bonus Issue?

Ans :

A company can pay bonus to its shareholders either in cash or in the form of shares. Many a times, a company is not in a position to pay bonus in cash inspite of sufficient profits because of unsatisfactory cash position or because of its adverse effects on the working capital of the company. In such cases, if the company so desires and the articles of association of the company provide, it can pay bonus to its shareholder in the form of shares by making partly paid shares as fully paid or by the issue of fully paid bonus shares.

The dictionary meaning of bonus shares is : 'a premium or gift, usually of stock, by a corporation to shareholders' or "an extra dividend paid to shareholders in a joint stock company from surplus profit." However, in legal context the meaning is not the same. A bonus share is neither dividend nor a gift.

Issue of bonus shares in lieu of dividend is not allowed as according to Section 205 of the Companies Act, 1956, no dividend can be paid except in cash. It cannot be termed as a gift also because it only represents the past sacrifice of the shareholders.

4. Objectives of bonus issue.

Ans :

- i) To bring the amount of issued and paid up capital in line with the capital employed so as to depict more realistic earning capacity of the company.
- ii) To bring down the abnormally high rate of dividend on its capital so as to avoid labour problems such as demand for higher wages and to restrict the entry of new entrepreneurs due to the attraction of abnormal profits.
- iii) To Pay bonus to the shareholders of the company without affecting its liquidity and the earning capacity of the company.
- iv) To make the nominal value and the market value of the shares of the company comparable.
- v) To correct the balance sheet so as to give a realistic view of the capital structure of the company.

5. Walter's Model.

Ans :

Walter's model believes that dividends are relevant because dividends influence the value of the firm. According to Walter, firm cannot be isolated from its dividend policy because they are associated with each other.

The Walter's model is supported by important statements like there exists a relationship between internal rate of return (r) and cost of capital (k) which influence an optimum dividend policy of a firm.

When internal rate of return is more than the cost of capital ($r > k$) then firm must preserve its earnings and when internal rate of return is less than cost of capital ($r < k$) then firm must distribute its earnings to shareholders as dividends. In the situation when $r > k$, the optimum pay out will be zero which results in increase in the value of the shares. And when $r < k$, the firm distributes all its earnings and optimum pay out will be 100%.

6. Gordon Model.

Ans :

Gordon's model was developed by Myron Gordon. This model believes that dividends are relevant and dividend decision has an impact on firm value. Gordon supports Walter's model in analysis of relationship between dividend policy and valuation of firm. Gordon's model is based on following assumptions,

- i) It is assumed that firm is an all-equity firm and all investments are financed through retained earnings.
- ii) It is assumed that firm has a perpetual life and there are no corporate taxes.
- iii) The cost of capital is constant and more than the growth rate.
- iv) The internal rate of return remains constant.
- v) Firm decides a retention ratio and it remains constant.

7. Limitations of Gordon Model.

Ans :

- i) This model is purely quantitative as it does not consider qualitative factors such as industry trends or trends in management strategy.
- ii) The Gordon growth model is highly sensitive to the inputs having an impact on growth rate.
- iii) If Gordon model is not used properly then it may generate misleading and irrational results. Due to the fact that value of dividends may becomes infinite when the growth rate converges on the discount rates.

- iv) This model is suitable only when growth rate is constant and if growth rate exceeds the required rate of return then Gordon model may not be suitable for the determination of value of dividends.
- v) In Gordon model, calculations are based on the assumption that future dividends will grow at a constant rate forever.
- vi) This model is not suitable for rapidly growing industries which have less predictable dividend patterns.

8. Assumptions of Modigliani - Miller Approach

Ans :

M.M. hypothesis is based on the following assumptions :

- i) Capital markets are perfect. The conditions are (a) investors behave rationally, (b) information is freely available to them and (c) there are no floatation and transaction costs.
- ii) There are either no taxes or there are no differences in the tax rates applicable to capital gains and dividends.
- iii) The firm has a fixed investment policy.
- iv) Risk or uncertainty does exist. Investors are able to forecast future prices and dividends with certainty.

9. Criticism of M.M. Hypothesis.

Ans :

- i) M.M.hypotheses assumes that taxes do not exist, it is far from reality,. In practical life not only the shareholders has to pay tax but there are different rates of tax for capital gains and dividends. Capital gains are subject to a lower rate of tax as compared to dividends. The cost of internal financing will, therefore be cheaper as compared to cost of external financing. So, shareholders will favour a dividend policy with retention of earnings as against the payment of dividends on account of tax differential.
- ii) *Floatation costs* : A firm has always to pay floatation costs in term of under writing fee and brokers commission whenever it wants to raise funds from outside. As a result of external financing is costlier than internal financing.
- iii) Shareholders prefer current income than future income. M.M states that both are equal.
- iv) Dividends have informational content, it is not considered by M.M.

10. State the types of dividend policies.

Ans :

(a) Regular Dividend Policy

In this type of dividend policy the investors get dividend at usual rate. Here the investors are generally retired persons or weaker section of the society who want to get regular income. This type of dividend payment can be maintained only if the company has regular earning.

(b) Stable Dividend Policy

In this type the payment of certain sum of money is regularly paid to the shareholders. It is of three types:

- i) **Constant Dividend per Share:** In this reserve fund is created to pay fixed amount of dividend in the year when the earning of the company is not enough. It is suitable for the firms having stable earning.
- ii) **Constant Pay out Ratio:** It means the payment of fixed percentage of earning as dividend every year.
- iii) **Stable Rupee Dividend Plus Extra Dividend:** It means the payment of low dividend per share constantly plus extra dividend in the year when the company earns high profit.

(c) Irregular Dividend Policy

As the name suggests here the company does not pay regular dividend to the shareholders. The company uses this practice due to following reasons:

- i) Due to uncertain earning of the company.
- ii) Due to lack of liquid resources.
- iii) The company sometime afraid of giving regular dividend.
- iv) Due to not so much successful business.

(d) No Dividend Policy

The company may use this type of dividend policy due to requirement of funds for the growth of the company or for the working capital requirement.

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Choose the Correct Answer

1. A _____ is a payment of additional shares to share holder in live of cash. [a]
(a) Stock dividend (b) Stock split
(c) Extra dividend (d) Regular dividend
2. _____ occurs when here is an increase in the number of shares outstanding by reducing the parvalue of stock. [a]
(a) Stock split (b) Stock dividend
(c) Extra Stock (d) None
3. _____ is the expected cash dividend paid to shareholders normally. [d]
(a) Stock split (b) Stock dividend
(c) Extra dividend (d) Regular dividend
4. _____ is a non recurring dividend paid to share holders in addition to the regular dividend. [c]
(a) Split stock (b) Stock dividend
(c) Extra dividend (d) Regular dividend
5. The repurchase of stock is considered _____ decision rather than _____ decision. [a]
(a) An investment, a sinancing (b) A sinancing, an investing
(c) An investment, a dividend (d) A dividend, a sinancing
6. _____ is the proportion of earning that are paid to common Share-holders in the form of cash dividend. [d]
(a) Retention rate (b) 1 plus retention rate
(c) Growth rate (d) Dividend pay out ratio
7. _____ is a payment of additional shares to share holders in cash. [d]
(a) Stock split (b) Stock dividend
(c) Extra dividend (d) Regular dividend
8. _____ and _____ carry a fixed rate of interest are to be paid off irrespective of firms revenue. [b]
(a) Debentures, Dividends (b) Debentures, bonds
(c) Dividends, Bonds (d) Equity, Treasury Notes
9. Credit policy of every company is largely influenced by _____ and _____. [b]
(a) Liquidity, accountallity (b) Liquidity, profitability
(c) Liablity, profitallity (d) Liablity, Liquidity
10. In MM model MM stands for. [d]
(a) M khan and Madigillan (b) Miller and Mkhan
(c) Modigilans and Mkhan (d) Miller and Modigllani

Fill in the blanks

1. _____ is considered disadvantage of stock owner ship.
2. _____ is cost incurred in issuance of shares, debentures, normally include fixed components.
3. _____ is the Mix of long term debt and equity.
4. The net effect of a stock purchase is _____.
5. The repurchase of stock _____ the earning per share and _____ the market price of stock.
6. The purpose of reverse stock split is to _____.
7. The stock split has _____ effect on the firm's capital structure.
8. The purpose of stock split is _____ of the stock by Lowering the Market price.
9. Modigliani and Miller suggested by the firm's dividend policy due to _____.
10. _____ is the set of guidelines a company uses to decide how much of its earnings it will pay out to shareholders.

ANSWERS

1. Capital loss
2. Flotation cost
3. Capital structure
4. Similar to a cash dividend
5. Increases, Increase
6. Increase the price of stock
7. No
8. Enhance trading activity
9. The clientele effect
10. Dividend policy

Table : Present Value Interest Factor (PVIF)

Year	1 %	2 %	3 %	4 %	5 %	6 %	7 %	8 %	9 %	10 %
1	0.990	0.980	0.971	0.926	0.952	0.943	0.935	0.926	0.917	0.909
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751
4	0.961	0.961	0.924	0.888	0.855	0.823	0.792	0.735	0.708	0.683
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424
10	0.905	0.82	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350
12	0.887	0.789	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239
16	0.853	0.728	0.623	0.534	0.458	0.394	0.339	0.292	0.252	0.218
17	0.844	0.714	0.605	0.513	0.436	0.371	0.317	0.270	0.231	0.198
18	0.836	0.700	0.587	0.494	0.416	0.350	0.296	0.250	0.212	0.180
19	0.823	0.686	0.570	0.475	0.396	0.331	0.227	0.232	0.194	0.164
20	0.820	0.673	0.554	0.456	0.377	0.312	0.258	0.215	0.178	0.149
21	0.811	0.660	0.538	0.439	0.359	0.294	0.242	0.199	0.164	0.135
22	0.803	0.647	0.522	0.422	0.342	0.278	0.226	0.184	0.150	0.123
23	0.795	0.634	0.507	0.406	0.326	0.262	0.211	0.170	0.138	0.112
24	0.788	0.622	0.492	0.390	0.310	0.247	0.197	0.158	0.126	0.102
25	0.780	0.610	0.478	0.375	0.295	0.233	0.184	0.146	0.116	0.092
30	0.742	0.552	0.412	0.308	0.231	0.174	0.131	0.099	0.075	0.057

Table : Present Value Interest Factor (PVIF)

Year	11 %	12 %	13 %	14 %	15 %	16 %	17 %	18 %	19 %	20 %
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694
3	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579
4	0.656	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482
5	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402
6	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335
7	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279
8	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233
9	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194
10	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162
11	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135
12	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112
13	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093
14	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078
15	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065
16	0.188	0.163	0.141	0.123	0.107	0.093	0.081	0.071	0.062	0.054
17	0.170	0.146	0.125	0.108	0.093	0.080	0.069	0.060	0.052	0.045
18	0.153	0.130	0.111	0.095	0.081	0.069	0.059	0.051	0.044	0.038
19	0.138	0.116	0.098	0.083	0.070	0.060	0.051	0.043	0.037	0.031
20	0.124	0.104	0.087	0.073	0.061	0.051	0.043	0.037	0.031	0.026
21	0.112	0.093	0.077	0.064	0.053	0.044	0.037	0.031	0.026	0.22
22	0.101	0.083	0.068	0.056	0.046	0.038	0.032	0.026	0.022	0.018
23	0.091	0.074	0.060	0.049	0.040	0.033	0.027	0.022	0.018	0.015
24	0.074	0.059	0.047	0.038	0.030	0.024	0.020	0.016	0.013	0.010
25	0.074	0.059	0.047	0.038	0.030	0.024	0.020	0.016	0.013	0.010
30	0.044	0.033	0.026	0.020	0.015	0.012	0.009	0.007	0.005	0.004

FACULTY OF COMMERCE
M.Com. I - Semester (CBCS) Examination
January / February - 2020
FINANCIAL MANAGEMENT

Time : 3 Hours]

[Max. Marks : 80

Note: Answer all the questions from Part - A and Part - B.
Each question carries 4 marks in Part - A and 12 marks in Part - B.

PART - A (5 × 4 = 20 Marks)
[Short Answer Type]

ANSWERS

1. State the objectives of financial Management. (Unit-I, SQA.11)
2. Distinguish between NPV and IRR methods. (Unit-II, SQA.12)
3. What are the sources of working capital finance? (Unit-III, SQA.14)
4. What do you mean by Leverage? (Unit-IV, SQA.6)
5. State the types of Dividend Policies. (Unit-V, SQA.10)

PART - B (5 × 12 = 60 Marks)
[Essay Answer Type]

6. (a) Discuss the changing role of Finance Manager in a complex business environment (Unit-I, Q.No.14)

OR

- (b) Mr. X deposits Rs. 5,000 at the end of every year for 5 years and the deposit earns a compound interest @ 8% p.a. Determine how much money he will have at the end of 5 years? (Unit-I, Prob.6)
7. (a) What is Capital Budgeting? Explain the relative merits and demerits of various capital budgeting techniques. (Unit-II, Q.No.1, 10, 11, 13, 14, 15)

OR

- (b) From the following details, calculate Internal Rate of Return. (Unit-II, Prob.21)
Initial Investment Rs. 60,000
Life of the Asset 4 years
Estimated Net Annual Cash Flows:

Year	1	2	3	4
Cash Flows (Rs.)	15,000	20,000	30,000	20,000

8. (a) What is Working Capital? Discuss the factors influencing for determination of working capital of manufacturing concern. (Unit-III, Q.No.1, 5)

OR

- (b) You are given the following estimates for estimating the working capital requirements of a business and you are instructed to add 10% to your computed figure to allow for contingencies.

(Unit-III, Prob.5)

Particulars	Rs.
i) Amount blocked up for stocks	5,000
Stock of finished goods	8,000
ii) Average Credit given:	
Inland Sales (6 weeks Credit)	3,12,000
Export Sales (1½ weeks Credit)	78,000
iii) Lag in payment of outgoings:	
Wages (1½ weeks)	2,60,000
Stocks of materials (1½ month)	48,000
Rent (6 months)	10,000
Clerical Staff (½ month)	62,400
Manager (½ month)	4,800
Other (1½ month)	48,000
iv) Payment in Advance	
Sundry expenses paid quarterly in advance	8,000

9. (a) What is Capital Structure? Describe the Net Income Approach and net operating income approach relating to theories of capital structure.

(Unit-IV, Q.No.21, 25, 26)

OR

- (b) From the following details, compute the weighted average cost of capital before and after tax by assuming tax rate as 50%

(Unit-IV, Prob.8)

Sources of Funds	Amount (Rs.)	Specific cost before tax
Debt	15,00,000	5%
Preference Shares	12,00,000	10%
Equity Shares	18,00,000	12%
Retained Earnings	15,00,000	11%

10. (a) Discuss the Walter's model and Gordon's model relating to dividend theories.

(Unit-V, Q.No.7, 8)

OR

- (b) X Co Ltd. has the current market price as Rs. 10. The current value of the firm is Rs. 20,00,000 @ Rs. 20 per Share Assume value for I (New Investment), Y (earnings) and D (Dividends) at the end of the year I = Rs. 6,80,000, Y = Rs. 1,15,000 and D = Re 1 per Share. Calculate new number of Shares to be issued under the MM assumptions.

(Unit-V, Prob.20)

FACULTY OF COMMERCE
M.Com. I - Semester Examination
December - 2016
FINANCIAL MANAGEMENT

Time : 3 Hours]

[Max. Marks : 80

SECTION - A (5 × 4 = 20)**[Short Answer Type]****ANSWERS**

1. What are the objectives of Finance Function ? (Unit-I, SQA.12)
2. Name various methods of Capital Budgeting. (Unit-II, SQA.14)
3. What are the sources of short term working capital ? (Unit-III, SQA.14)
4. What is cost of capital ? (Unit-IV, SQA.1)
5. Write a note on dividend policy in practice. (Unit-V, SQA.1)

SECTION - B (5 × 12 = 60)**[Essay Answer Type]**

6. (a) "Finance Function is concerned with allocating funds to specific assets and obtaining the best mix of financing in relation to the overall valuation of the firm". Discuss. (Unit-I, Q.No.6)
- (b) Calculate the present value of the following cash flows assuming a discount rate of 8%. (Unit-I, Prob.13)

Year	1	2	3	4
Cash Flows (Rs.)	10,000	20,000	10,000	5,000

7. (a) What do you understand by capital budgeting process ? (Unit-II, Q.No.4)
Enumerate briefly the major steps involved in capital budgeting.

OR

- (b) A Chemical Company is considering investment in a project that costs Rs. 5,00,000. The life of the project as 5 years and estimated salvage value is zero. Tax rate is 30%. The company uses straight line depreciation and proposed project has estimated earnings before depreciation and before tax as follows : (Unit-II, Prob.25)

Year	1	2	3	4	5
Earnings before depreciaion and tax (Rs.)	1,00,000	1,00,000	1,50,000	1,50,000	2,50,000

Determine the following :

- (i) Pay-Back Period
- (ii) Net Present Value at 15%

The following are the present value factors at 15% p.a.

Year	1	2	3	4	5
P.V. Factor	0.870	0.756	0.658	0.572	0.497

8. (a) Define the term working capital. What factors would you take into consideration in estimating the working capital requirements of a concern ? (Unit-III, Q.No.1, 5)

OR

- (b) PQR Limited sells its products on a gross profit of 20% on sales. (Unit-III, Prob.7)

The following information is extracted from its annual accounts for the year ended 31st March, 2016

Particulars	Amount (Rs.)
Sales (3 months credit)	40,00,000
Raw Materials	12,00,000
Wages (15 days in arrears)	9,60,000
Manufacturing expenses (one month in arrears)	12,00,000
Administration expenses (one month in arrears)	4,80,000
Sales promotion expenses (payable half yearly in advance)	2,00,000

The company enjoys one month's credit from suppliers of a raw materials and maintains 2 months stock of raw materials and one and half months finished goods. Cash balance is maintained at Rs. 1,00,000 as a precautionary balance.

Assuming a 10% margin, find out the working capital requirements of PQR Limited Cost of sales for computation of debtors and stock of finished goods may be taken at sales minus gross profit as per rate of gross profit given.

9. (a) What is meant by capital structure ? Explain the major determinants of capital structure. (Unit-IV, Q.No.21, 23)

OR

- (b) The following is the capital structure of Ajantha Co. Limited.

(Unit-IV, Prob.9)

Sources of Capital	Book Value (Rs.)	Market Value (Rs.)
Equity Share @ Rs. 100 each	8,00,000	16,00,000
9% Cumulative Preference Shares @ Rs. 100 each	2,00,000	2,40,000
11% Debentures	6,00,000	6,60,000
Retained Earnings	4,00,000	Nil
Total	20,00,000	25,00,000

The current market price of the company's equity share is Rs. 200. For the last year the company had paid equity dividend at 25% and its dividend is likely to grow 5% every year. The corporate tax rate is 30% and shareholders personal income tax rate is 20%.

You are required to calculate :

- (i) Cost of capital for each source of capital
- (ii) Weighted average cost of capital on the basis of book value weights.
- (iii) Weighted average cost of capital on the basis of market value weights.

10. (a) Enumerate the legal and procedural aspects of the payment of dividend.

(Unit-V, Q.No.10)

OR

- (b) The following information related to XYZ Ltd.

(Unit-V, Prob.19)

Particulars	Amount (Rs.)
Paid-up Equity Capital	20,00,000
Earnings of the company	2,00,000
Dividend paid	1,60,000
Price Earnings Ratio	12.5
Number of share outstanding	20,000

You are required to find out whether the company's dividend payout ratio is optimal, using Walter's model.

FACULTY OF COMMERCE
M.Com. I - Semester Examination
June - 2016
FINANCIAL MANAGEMENT

Time : 3 Hours]

[Max. Marks : 80

Note : Answer all the questions in not more than one page each.

SECTION - A (5 × 4 = 20)

[Short Answer Type]

ANSWERS

1. State the objectives of Financial Management. (Unit-I, SQA.11)
2. What is capital Budgeting? (Unit-II, SQA.1)
3. State Motives of holding cash? (Unit-III, SQA.6)
4. What are the leverages and state its computation? (Unit-IV, SQA .6)
5. State types of dividend policies. (Unit-V, SQA.10)

SECTION - B (5 × 12 = 60)

[Essay Answer Type]

Note: Answer all the questions by using internal choice in not exceeding 4 pages each.

6. (a) Discuss the role of Finance Manager under changing complex business environment. (Unit-I, Q.No.14)

OR

- (b) From the following information calculate total present value of future cash flows: (Unit-I, Prob.15)

Years	Cash Inflows (Rs.)
1	40,000
2	60,000
3	50,000
4	30,000
5	80,000

Use the discount rate of 10%

7. (a) Examine the relative merits and demerits of various capital budgeting techniques. (Unit-II, Q.No. 10, 11, 13, 14, 15)

OR

- (b) Form the following information, you are required to evaluate each of the following projects according to (Unit-II, Prob.24)

- (i) Pay-back method
- (ii) Return on average investment and
- (iii) Net present value with a cost of capital of 10% and capital outlay of Rs. 50,000

Years	Cash Inflows (Rs.)	
	Project - I (Rs.)	Project - II (Rs.)
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

Using the NPV method to suggest which project is preferable.

8. (a) Discuss the determinants of working capital requirements of a manufacturing company.

(Unit-III, Q.No. 5)

OR

- (b) From the following details, you are required to estimate an amount of working capital for the production of 300000 units per annum.

(Unit-III, Prob.6)

Cost Element	Per Unit (Rs.)
Raw materials	20
Direct Labour	5
Overheads	15
Total	40
Profit	10
Selling price	50

- (i) Raw materials are held in stock for two months
- (ii) Work-in-process will be half months production
- (iii) Finished goods remain in warehouse for a month
- (iv) Suppliers of materials extend one month credit
- (v) Two months credit is allowed to customers
- (vi) A minimum cash balance of Rs. 25,000 is to be maintained.

9. (a) What is capital structure and explain the factors influencing for the determination of capital structure?

(Unit-IV, Q.No.21, 23)

OR

- (b) Compute the market value of the firm, value of shares and the average cost of capital from the following information: (Unit-IV, Prob.10)

Net operating income Rs. 2,00,000

Total Investment Rs. 10,00,000

Equity Capitalization Rate :

- (i) If the firm use no debt – 10%
- (ii) If the firm uses Rs. 4,00,000 Debentures – 11%
- (iii) If the firm uses Rs. 6,00,000 Debentures – 13%

Assume that Rs. 4,00,000 Debentures can be raised at 5% rate of interest where as Rs. 6,00,000 debentures can be raised at 6% rate of interest.

10. (a) Discuss the factors influencing for the determination of Dividends policy of a company. (Unit-V, Q.No.3)

OR

- (b) From the following information determine the value of its shares of a company as per Gordon's model in each alternative, assuming the following : (Unit-V, Prob.19)

$K_e = 11\%$, $E = \text{Rs. } 20$: $r =$ (i) 12% and (ii) 10%

Options	A	B	C	D	E	F	G
D/P ratio	10%	20%	30%	40%	50%	60%	70%

FACULTY OF COMMERCE
M.Com. I Year I Semester (CBCS) Examination
Model Paper - I
FINANCIAL MANAGEMENT

Time : 3 Hours]

[Max. Marks : 80

Note: Answer all the questions from Part - A and Part - B. Each question carries 4 marks in Part - A and 12 marks in Part - B.

PART - A (5 × 4 = 20)
(Short Answer Type)

ANSWERS

1. Investment Decisions.	(Unit - I, SQA.4)
2. Features of Capital Budgeting Technique.	(Unit - II, SQA.2)
3. Working capital.	(Unit - III, SQA.1)
4. What is Cost of Capital ?	(Unit - IV, SQA.1)
5. Criticism of M.M. Hypothesis.	(Unit - V, SQA.1)

PART - B (5 × 12 = 60)
(Essay Answer Type)

Note: Answer all the questions by using internal choice in not exceeding 4 pages each.

6. (a) Explain the Role of Finance Manager. (Unit - I, Q.No.14)
- OR
- (b) A finance company makes an offer to deposit a sum of Rs. 1,100 and then receive a return of Rs. 80 p.a. perpetually. Should this offer be accepted if the rate of interest is 8%? Will the decision change if the rate of interest is 5% ? (Unit - I, Prob.11)
7. (a) Define Net Present Value. Explain advantages and disadvantages of NPV. (Unit - II, Q.No.13)
- OR
- (b) Two mutually exclusive investment proposals are being considered the following information is available. The initial investment of both the projects is 5,000/-

Project X			Project Y		
Year	Cash flows	CF	Year	Cash flows	CF
1	4000	0.2	1	8000	0.3
2	8000	0.4	2	9000	0.1
3	12000	0.1	3	9000	0.2
4	5000	0.2	4	7000	0.2
5	4000	0.1	5	6000	0.2

If cost of capital is 12% suggest which project should be acceptable.

(Unit - II, Prob.29)

8. (a) Discuss in detail about operating cycle. (Unit - III, Q.No.8)

OR

- (b) Prepare a cash budget of R.M.C. Ltd. for April, May and June 2012.

Months	Sales (Rs.)	Purchases (Rs.)	Wages (Rs.)	Expenses (Rs.)
Jan. (Actual)	80,000	45,000	20,000	5,000
Feb. (Actual)	80,000	40,000	18,000	6,000
March (Actual)	75,000	42,000	22,000	6,000
April (Budget)	90,000	50,000	24,000	7,000
May (Budget)	85,000	45,000	20,000	6,000
June (Budget)	80,000	35,000	18,000	5,000

Additional Information:

- (i) 10% of the purchases and 20% of sales are for cash.
 - (ii) The average collection period of the company is A month and the credit purchases are paid regularly after one month.
 - (iii) Wages are paid half monthly and the rent of Rs. 500 included in expenses is paid monthly and other expenses are paid after one month lag.
 - (iv) Cash balance on April 1, 2012 may be assumed to be Rs.15,000 (Unit - III, Prob.16)
9. (a) From the following capital structure of a company, calculate the overall cost of capital using

i) Book value weights, and

ii) Market value weights

Source	Book value (`)	Market value (`)
Equity share capital (` 10 shares)	45,000	90,000
Retained earnings	15,000	Nil
Preference share capital	10,000	10,000
Debentures	30,000	30,000

The after tax cost of different source of finance is as follows: Equity share capital

14%, Retained earnings 13%, preference capital 10%, Debentures 5%

(Unit - III, Prob.7)

OR

- (b) Explain briefly about EBIT- EPS Analysis. (Unit - IV, Q.No.19)
10. (a) Explain the classification of Dividend Policies. (Unit - V, Q.No.2)

OR

- (b) From the following information, compute market price of the company share as per Walter's Model, if it can earn a return of (i) 20; (ii) 15 and (iii) 10 per cent on its investments

Earnings per Share (EPS) ` 10

Dividends payout Ratios rare (a); (b) 50 (c) 75; (d) 100 per cent

The Company's capitalisation is 15 per cent

(Unit - V, Prob.13)

FACULTY OF COMMERCE
M.Com. I Year I Semester (CBCS) Examination
Model Paper - II
FINANCIAL MANAGEMENT

Time : 3 Hours]

[Max. Marks : 80

Note: Answer all the questions from Part - A and Part - B. Each question carries 4 marks in Part - A and 12 marks in Part - B.

PART - A (5 × 4 = 20)

(Short Answer Type)

ANSWERS

1. Define Financial Management.	(Unit - I, SQA.1)
2. Advantages of NPV.	(Unit - II, SQA.5)
3. Importance of Receivable Management ?	(Unit - III, SQA.9)
4. Weighted Average Cost of Capital.	(Unit - IV, SQA.3)
5. Define Bonus Issue ?	(Unit - V, SQA.3)

PART - B (5 × 12 = 60)

(Essay Answer Type)

Note: Answer all the questions by using internal choice in not exceeding 4 pages each.

6. (a) What do you understand by Organization of Finance Function ? (Unit - I, Q.No.6)

OR

- (b) Calculate the present value of the following cash flows assuming a discount rate of 8%.

Year	1	2	3	4
Cash Flows (Rs.)	10,000	20,000	10,000	5,000

(Unit - I, Prob.13)

7. (a) Explain the similarities and distinguish between NPV and IRR. (Unit - II, Q.No.16)

OR

- (b) Calculate NPV and profitability index when cost of capital is 10%. Initial investment is 12,00,000/-. The estimated cash flows before Dep and taxes over 6 year period as Rs. 4,00,000/-, 5,00,000, 3,00,000, 2,00,000, 3,00,000 and 2,00,000 respectively. Additional working capital is Rs. 75,000/- tax rate is 40%?

(Unit - II, Prob.15)

8. (a) Explain the various sources and levels of working capital. (Unit - III, Q.No.7)

OR

- (b) Prepare a cash budget for the month of May, June and July 2019 on the basis of the following information.

Month	Credit Sales	Credit Purchase	Wages	Manufacturing Expenses	Office Expenses	Selling Expenses
March	60,000	36,000	90,000	4,000	2,000	4,000
April	62,000	38,000	8,000	3,000	1,500	5,000
May	64,000	33,000	10,000	4,500	2,500	4,500
June	58,000	35,000	8,500	3,500	2,000	3,500
July	56,000	39,000	9,500	4,000	1,000	4,500
August	60,000	34,000	8,000	3,000	1,500	4,500

Additional Information :

- Cash balance on 1st May, 2019 \$8,000.
- Plant costing ₹16,000 is due for delivery in July, payable 10% on delivery and balance after 3 months.
- Advance tax of ₹8,000 each is payable in March and June.
- Period of credit allowed (i) by suppliers – two months and (ii) to customers – one month.
- Lag in payment of manufacturing expenses 1/2 month.
- Lag in payment of office and selling expenses – one month.

(Unit - III, Pro.10)

9. (a) Explain the factors determining capital structure.

(Unit - IV, Q.No.23)

OR

- (b) From the following capital structure of a company, calculate the overall cost of capital using

i) Book value weights, and

ii) Market value weights

Source	Book value (₹)	Market value (₹)
Equity share capital (₹10 shares)	45,000	90,000
Retained earnings	15,000	Nil
Preference share capital	10,000	10,000
Debentures	30,000	30,000

The after tax cost of different source of finance is as follows: Equity share capital 14%, Retained earnings 13%, preference capital 10%, Debentures 5%

(Unit - IV, Q.No.7)

10. (a) What are the Factors Influencing Dividend Policy ?

(Unit - V, Q.No.3)

OR

- (b) X Ltd., had 50,000 equity shares of Rs. 10 each outstanding on January 1. The share are currently being quoted at par in the market. The company now intends to pay a dividend of Rs. 2 per share whose appropriate capitalisation rate is 15% Using M.M. model and assuming capitalisation rate is 15%. Using M.M. Model and assuming no taxes, ascertain the price of the company's share as it is likely to prevail at the end of the year,

- i) When dividend is declared and
- ii) When no dividend is declared.

Also find out the number of new equity shares that the company must issue to meet its investment needs of Rs. 2 lakhs, assuming a net income of Rs. 1,10,000 and also assuming that the dividend is paid.

(Unit - V, Prob.16)

FACULTY OF COMMERCE
M.Com. I Year I Semester (CBCS) Examination
Model Paper - III
FINANCIAL MANAGEMENT

Time : 3 Hours]

[Max. Marks : 80

Note: Answer all the questions from Part - A and Part - B. Each question carries 4 marks in Part - A and 12 marks in Part - B.

PART - A (5 × 4 = 20)

(Short Answer Type)

ANSWERS

1. Agency Cost.	(Unit - I, SQA.8)
2. Characterises of Risk.	(Unit - II, SQA.10)
3. Operating cycle.	(Unit - III, SQA.2)
4. What are the problems in determination of cost of capital ?	(Unit - IV, SQA.7)
5. State the types of dividend policies.	(Unit - V, SQA.1)

PART - B (5 × 12 = 60)

(Essay Answer Type)

Note: Answer all the questions by using internal choice in not exceeding 4 pages each.

6. (a) What are the Goals of Financial Management ? (Unit - I, Q.No.9)

OR

- (b) From the following information calculate total present value of future cash flows:

Years	Cash Inflows (Rs.)
1	40,000
2	60,000
3	50,000
4	30,000
5	80,000

Use the discount rate of 10%

(Unit - I, Prob.15)

7. (a) Outline the process of capital budgeting. (Unit - II, Q.No.4)

OR

- (b) A project requires an investment of ₹ 1,44,000 and is expected to generate cash in flows of ₹ 54,000, ₹ 63,000, ₹ 72,000, ₹ 63,000 and ₹ 54,000 per annum for the next five years. The risk free rate is 10%.

Evaluate the project using IRR method.

Year	1	2	3	4	5
C.E	0.96	0.92	0.88	0.82	0.79

(Unit - II, Prob.23)

8. (a) Explain the factors determining the Working Capital requirements ?

(Unit - III, Q.No.5)

OR

- (b) From the following details, you are required to estimate an amount of working capital for the production of 300000 units per annum.

Cost Elements	Per Unit (Rs.)
Raw materials	20
Direct Labour	5
Overheads	15
Total	40
Profit	10
Selling price	50

- (i) Raw materials are held in stock for two months
- (ii) Work-in-process will be half months production
- (iii) Finished goods remain in warehouse for a month
- (iv) Suppliers of materials extend one month credit
- (v) Two months credit is allowed to customers
- (vi) A minimum cash balance of Rs. 25,000 is to be maintained.

(Unit - III, Prob.6)

9. (a) Discuss about Weighted Average Cost of Capital.

(Unit - IV, Q.No.12)

OR

- (b) Explain briefly about Modigliani-Miller Approach (MM Hypothesis).

(Unit - IV, Q.No.27)

10. (a) Explain about Walter's Model with an example.

(Unit - V, Q.No.7)

OR

- (b) The following information is available in respect of a firm :

Earnings per Share (EPS) ` 20

Rate of Capitalisation ` 10%

Calculate the market price of the company's quoted shares under

Walter's Model if the Dividend Pay-out Ratio is 0, 25%, 50%, 75% and 100%, if it can earn a return of

- a) 15% b) 10% and c) 5%

(Unit - V, Prob.14)