1

SOURCES OF FINANCING

Unit Structure

1.0 OBJECTIVES

After studying this unit you willunderstand:

- Meaning offinance
- Need and Importance ofFinance
- Sources of long term finance
- Sources of short termfinance

1.1 MEANING OF FINANCE

Finance is a broad term that describes activities associated with banking, leverage or debt, credit, capital markets, money, and investments. Basically, finance represents money management and the process of acquiring needed funds. Finance also encompasses the oversight, creation, and study of money, banking, credit, investments, assets, and liabilities that make up financial systems. It is necessary to raise finance from various sources for implementation of the project. The schemes of finance will be determined after consideration of various aspects attached to different sources of finance as following:

a) Share capital –preference shares and equityshares

b) Debentures

c) Term loan from financial institutions

d) Unsecured loan-banks, promoters,others.

1.1.1 Promoters Contribution :

The persons who are involved in implementation of a project are known as promoters .An entrepreneur who promotes the project is also required to participate in the scheme of finance of the project. The extent of promoter's contribution in the project is a sign of interest of the promoters in the project. Promoter's contribution indicates the extent of their involvement the inthe project. The promoters contribution can be provided in the form of subscribing to equity and preference shares issued by the company unsecured loans ,seed capital assistance and internal accrual of funds .The bank and financial institution normally participate in the scheme of project finance and they ask the promoters to bring in a certain portion of funds required which is normally between 25% to 50% of the cost of the project into the equity share capital of the company .The promoters contribution can be arranged from outside sources like friends and relatives. For eligibility of the project financing the financial institution may stipulate minimum promoter's contribution which is to be arranged by the promoters.

1.1.2 Margin money

The banks and financial institutions maintain a margin while financing the project cost. They asked the borrowers to bring a certain amount of the cost of the project cost as margin money to safeguard from the changes in the value of assets that are being financed and provided as a security. The quantum of margin money to depend upon the creditworthiness of the borrower and nature of security provided to the institution. Margin money is one of the important factors which are evaluated by the financial institutions while considering the project for financial assistance. The margin money required for working capital will be provided in the project cost .The RBI guidelines provide the amount of capital brought by the promoters in project financing.

1.1.3 Capital Structure

Capital structure refers to the mix of a firm's capitalization and includes long-term source of fund such as debentures, preference shares, equity share, and retained earnings. The decision regarding the forms of financing their requirements and their relative proportions in total capitalization are known as capital structure decision. A firm has the choice to raise capital for financing its project from different sources in different proportions as follows:

(a) exclusive use of equity capital

(b) Use of equity and preferencecapital

(c) Use of equity and debt capital

(d) Use of equity, preference and debtcapital

(e) Use of a combination of debt, equity and preference capital in differentproportions.

The choice of combination of these sources is called capital structure mix.

1.1.4 Optimum Capital Structure :

The theory of optimal capital structure deals with the issue of right mix of debt and equity in the long term capital structure of a firm. This theory states that if a company takes on debt the valueof

the firm increases up to a point, beyond that point if debt continues to increases then the value of the firm will start to decrease. if the company is unable to repay the debt within the specified period, then it will affect the goodwill of the company in the market . Therefore, the company should select its appropriate capital structure with due consideration to the factors of debt and equity.

1.1.5 Trading on Equity

The term 'trading on equity' is derived from the fact that debts are contracted and loans are raised mainly on the basis of equity capital. The concept of trading on equity provides that the capital structure of a company should include equity as well as debt. Again the proportion of debt in the capital structure should also be optimal. Those who provide debt have a limited share in the firm's earnings and hence want to be protected in term of earning and values represented by equity capital. Since fixed charges do not vary with the firm's earnings before interest and tax, a magnified effect is produced on earning per share. The determination of optimal level of debt is a formidable task and is a major policy decision .EBIT-EPS analysis is a widely used tool to determine the level of debt in afirm.

1.2 NEEDS AND IMPORTANCE OF FINANCE

What is the main purpose of business finance? or Why is finance so important?

1. Establishment of Business Enterprises:

The promotion of any establishment or any type of enterprise basically requires finance.

Finance is required at every stage of the business establishment like

a. During registration of the company,

b. At the incorporation stage,

c. For obtaining the certificate for starting the business and

d. also for obtaining various permissions

Besides, expenditure on these requirements, finance is required for arranging the Assets such as working place, plant and machinery, and furniture and equipment, for short term items like working material, furnishing and salaries of the employees.

Thus, finance is required to complete the initial activities of the business enterprise.

2. Proficient Operation of Business :

Operations of business cannot be efficiently operated without finance. The activities such as purchase of raw materials, sending of products to the consumers, conversion of raw materials into finished product and sale cannot be done without efficient finance.

3. Development and Expansion of Business :

Finances are required for the overall development and extension of all business activities in compatibility with advance technology. With finances, various commodities can be upgraded with the purchases or sold or produced. Besides, finance (capital) is also required for the purchasing of techniques, machinery, and equipment, the establishment of Laboratories, etc.

1. Sound Business Position :

Finance is an important measure by which the position of a business is measured i.e. whether it is strong or weak, Few examples of business transactions like payments to the suppliers, remuneration and facilities to the Employees and payment of principal amount and interest can be paid to the lender within due date only when sufficient funds are available.

5. Surviving in the Competition Era :

One of the biggest threats to any business units are their competitors. Performing with an aim to meet the expectations of the customers and having edge over the competitors requires finance. To gain such edge one organisation has to look in many aspects. So there should be proper policies and allocation of required funds towards relating advertisement and publicity, production and distribution of commodities and services, incentives to the consumers, sale promotion, providing services and commodities at a fair price are required, to face present-day competitors.

6. Infrastructural Facilities :

Finance is also required for arranging infrastructural facilities which are essential for any business entrepreneurship. The volume of

finance required depends upon the nature of the business organisation i.e. Proprietary business, may be high or low, according to the coverage of various Enterprises. Substantial capital is required for all infrastructural facilities, place, land, office site, plant installation for the establishment of industries, place for conversion of raw materials into finished products, water, electricity, telephone, etc.

7. Modernization of Business :

In this era there dynamism and ever changing technologies, there is always need for upgradation. Finances are required for technical know-how, research and development, new techniques, new machinery, various new products, and computerization, which are essential for the upgradation, modernization and operation of the business.

8. Labour Welfare and Social Security :

For the success of any business or enterprise, human relations between employers and workers should be cordial. In order to ensure the same, entrepreneurs should essentially safeguard the interests of the employees and workers. Employer should proper facilities like – that of housing, primary treatment, health, education, libraries, and reading rooms, travel, etc. In addition, they are also to be provided provident fund, gratuity, pension, old age, personal or group insurance and accidental insurance, etc. All these need a substantial volume of finance.

1.3 SOURCES OF FINANCE

The sources from which a business meets its financial requirements can be classified on the basis of time, ownership and source of generation as explained in Figure 1.1.

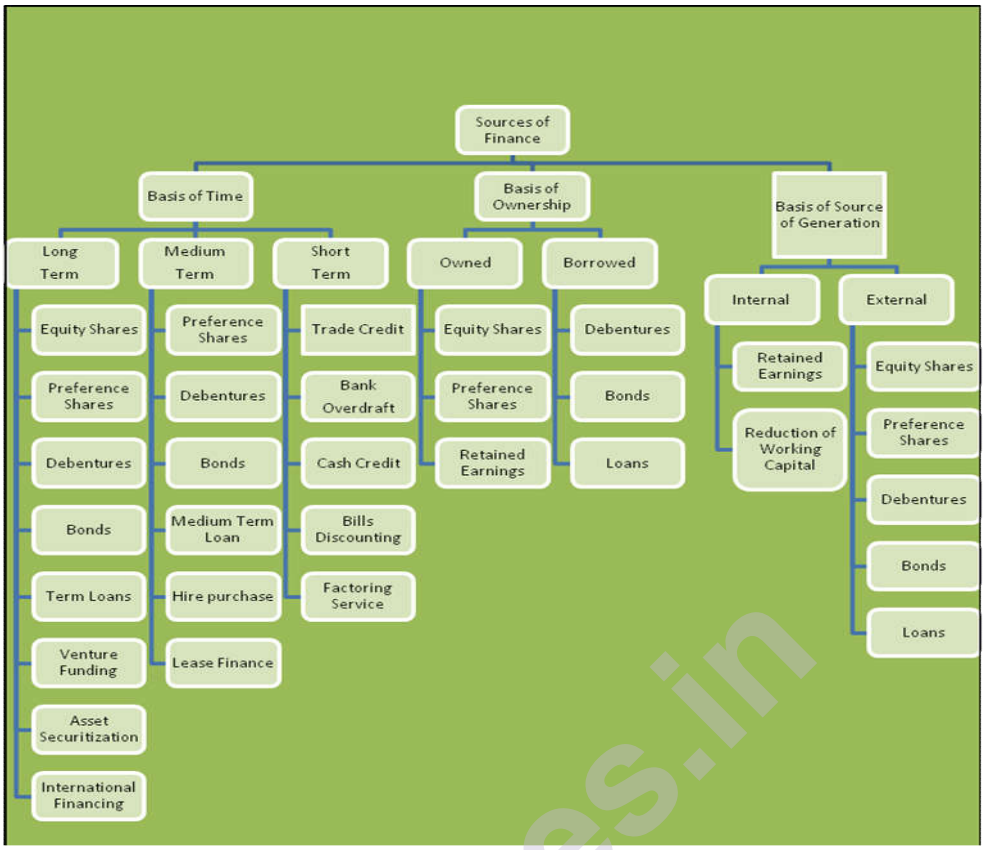


Figure1

1.3.1 Long Term Sources of Finance :

Long-term financing means capital requirements for a period of more than 5 years to 10, 15 or 20 years or maybe more depending on other factors. Capital expenditures in fixed assets like plant and machinery, land and building etc. of a business are funded using long-term sources of finance. Part of working capital which permanently stays with the business is also financed with long-term sources of finance. Long term financing sources can be in form of any of them:

(a) Equity Shares.

(b) Preference Shares.

(c) Debentures

(d) Bonds.

(e) Term Loans.

(f) Venture Funding

(g) Assets Securitization

(h) International Financing

(a) Equity Shares

Equity share is a main source of finance for any company giving investors rights to vote, share profits and claim on assets. We call it stock, ordinary share, or shares, all are one and the same.Normally, a company is started with equity finance as its first source of capital from the owners or promoters of that company. The company then finds an investor in the form of friends, relatives, venture capitalists, mutual funds, or any such small group of investors and issue fresh equity shares to these investors.A point comes where the company reaches a very big level and requires huge capital investment for business growth. It then offers its equity share to the general public. This is called Initial Public Offer (IPO). More such issues in future are called Follow-on Public Offer (FPO).

They are categorized under long-term sources of finance because legally they are irredeemable in nature. For an investor, these shares are certificate of ownership in the company by virtue of which investors are entitled to share the net profits and have a residual claim over the assets of the company in the event of liquidation. Investors have voting rights in the company and their liability to the company is limited to the amount of investment.

Types of Equity Shares

There are various types of equity shares classified based on various things:

i Authorized Share Capital: It is the maximum amount of capital which can be issued by a company. It can be increased from time to time. Some fee is required to be paid to legal bodies accompanied with some formalities.

ii Issued Share Capital: It is that part of authorized capital which is offered to investors.

iii Subscribed Share Capital: It is that part of Issued capital which is accepted and agreed by the investor.

iv Paid Up Capital: It is the part of subscribed capital, the amount of which is paid by the investor.

Normally, all companies accept complete money in one shot and therefore issued, subscribed and paid capital becomes one and the same. Conceptually, paid up capital is the amount of money which is actually invested in the business.

There are other types of equity shares discussed below:

i Rights Share: These are the shares issued to the existing shareholders of a company. Such kind of shares is issued to protect the ownership rights of the investors.

ii Bonus Share: These are the type of shares given by the company to its shareholders as a dividend. There are various advantages and disadvantages of bonus shares like dividend, capital gain, limited liability, high risk, fluctuation in the market, etc.

iii Sweat Equity Share: These shares are issued to an exceptional employees or directors of the company for their exceptional job in terms of providing know-how or intellectual property rights to the company.

Various Prices of Equity Shares

i Par or Face Value: It is the value of a share of which it is accounted in books of accounts.

ii Issue Price: It is the price at which the equity share is actually offered to the investor. Normally, the issue price and face value of a share are same in the case of new companies.

iii Share Premium and Share at Discount: When a share is issued at a price higher than face value, the excess amount is called premium. Contrary to it, if the share is issued at a price lower than face value, it is said to be issued at a discount.

iv Book Value: It is the ratio of the total of paid-up capital and reserves and surplus divided by total no. of shares. This is the balance sheet value of shares.

v Market Value: In the case of companies listed on stock exchanges, the market value of the share is the price at which they are sold currently sold in the market.

Investing and Financing Angle of Equity Shares

When talking about equity shares, there are two angles. One is an investor's angle wherein the investor invests in equity shares and second financing angle where a company accepts the finance in the form of equity. There are pros and cons of both of these as described below.

ADVANTAGES

i Dividend: An investor is entitled to receive a dividend from the company. It is one of the two main sources of return on his investment.

ii Capital Gain: The other source of return on investment apart from dividend is the capital gains. Gains which arise due to rise in market price of the share.

iii Limited liability: Liability of shareholder or investor is limited to the extent of the investment made. If the company goes into

losses, the share of loss over and above the capital investment would not be borne by the investor.

iv Exercise control: By investing in the company, the shareholder gets ownership in the company and thereby he can exercise control.

v Claim over Assets and Income: An investor of equity share is the owner of the company and so is the owner of the assets of that company. He also enjoys a share of the incomes of the company.

vi Rights Shares: Whenever companies require further capital for expansion, growth, entering into new areas etc., they tend to issue 'rights shares'. By issuing such shares, ownership and control of existing shareholders are preserved and the investor receives investment priority over other general investors.

vii Bonus Shares: At times, companies decide to issue bonus shares to its shareholders. It is also a type of dividend. Bonus shares are free shares given to existing shareholders and many times they are given in lieu of dividends.

viii Liquidity: The shares of the company which is listed on stock exchanges have the benefit of any time liquidity. The shares can very easily transfer ownership.

ix Stock Split: Stock split means splitting a share into parts. How should an investor be benefited by this? By splitting of share, the per-share price reduces in the market which eventually increases the readability of share. At the end, stock split results in higher volumes with a number of investors leading to high liquidity of the share.

DISADVANTAGES

i Dividend: The dividend which a shareholder receives is neither fixed nor controllable by him. The management of the company decides how much dividend should be given.

ii High Risk: Equity share investment is a risky share compared to any other investment like debts etc. The money is invested based on the faith an investor has in the company. There is no collateral security attached with it.

iii Fluctuation in Market Price: The market price of any equity share has a wide variation. It is always very difficult to book profits from the market. On the contrary, there are equal chances of losses.

iv Limited Control: An equity investor is a small investor in the company, therefore, it is hardly possible to impact the decision of the company using the voting rights.

v Residual Claim: An equity shareholder has a residual claim over both the assets and the income. Income which is available to equity shareholders is after the payment of all other stakeholders' viz. debenture holders etc.

(b) Preference shares:

Preference Shares: Preference shares are one of the special types of share capital having fixed rate of dividend and they carry preferential rights over ordinary equity shares in sharing of profits and also claims over assets of the firm. Preference shares are long-term source of finance for a company. They are neither completely similar to equity nor equivalent to debt. The law treats them as shares but they have elements of both equity shares and debt. For this reason, they are also called 'hybrid financing instruments'.

Features of Preference Shares Similar to Debt

i Fixed Dividends: Like debt carries a fixed interest rate, preference shares have fixed dividends attached to them.But the obligation of paying a dividend is not as rigid as debt. Non-payment of a dividend would not amount to bankruptcy in case of preference share.

ii Preference over Equity: As the word preference suggests, these type of shares get preference over equity shares in sharing the income as well as claims on assets. Alternatively, preference share dividend has to be paid before any dividend payment to ordinary equity shares. Similarly, at the time of liquidation also, these shares would be paid before equity shares.

iii No Voting Rights: Preference shares holders normally does not have any voting rights. They are similar to debenture holders and do not have any say in the management of the company.

iv No Share in Earnings: Preference shareholders can only claim two things. One agreed on percentage of dividend and second the amount of capital invested. Equity shares are entitled to share the residual earnings and residual assets in case of liquidation which preference shares are not entitled.

v Fixed Maturity: Just like debt, preference shares also have fixed maturity date. On the date of maturity, the preference capital will have to be repaid to the preference shareholders. A special type of shares i.e. irredeemable preference shares is an exception to this. They do not have any fixed maturity.

Features of Preference Shares similar to Equity Shares:

i Dividend from PAT: Equity share dividend is paid out of the profits left after all expenses and even taxes and same is the

case with preference shares. The preference dividend is paid out of the divisible profits of the company. Out of the divisible profits, the preference dividend would be paid first and the remaining profits can be utilized for paying any dividend to equity shareholders.

ii Management Discretion over Dividend Payment: The payment of preference dividend is not compulsory and is a decision of the management. Equity shareholders also do not have any right to ask for dividends, the dividends are paid at the discretion of the management of the company. Unlike debt, the nonpayment of a dividend of preference shares does not amount to bankruptcy.

iii No Fixed Maturity: The maturity of a special variant of preference share is not fixed just like equity shares. This variant is popularly known as irredeemable preference shares.

Types of Preference Shares

There are various Types of Preference Shares with differences in their structure. Some of these are cumulative, non-cumulative, participating, non-participating, redeemable, irredeemable, convertible, non-convertible, callable, adjustable rate preference shares.

i Convertible and Non-Convertible Preference Shares

Convertible preference shareholders possess an option or right whereby they can be converted into an ordinary equity share at some agreed terms and conditions. Non-convertible simply does not have this option but has all other normal characteristics of a preference share.

ii Redeemable and Irredeemable Preference Shares

Redeemable preference share is very commonly seen preference share which has a maturity date on which date the company will repay the capital amount to the preference shareholders and discontinue the dividend payment thereon. Irredeemable preference shares are little different from other types of preference shares. It does not have any maturity date. However after introduction of Companies Act, 2013, no irredeemable preference shares can be issued and even the existing irredeemable preference shares have to be redeemed.

iii Cumulative and Non-Cumulative Preference Shares

If the shares are cumulative preference shares, the dividends are cumulated and therefore paid when the company makes the profit. In short, a dividend of cumulative preference shares will have to be paid as long as the company earns the profit in any year. Whereas,

for non-cumulative preference shares, a company can skip the dividend in the year, the company has incurred losses.

iv Preference Shares with Callable Options

These are another innovative preference shares in which the company has an option to buy the share at a predetermined price and on or before a certain date.

v Adjustable Rate Preference Shares

These are some of the innovative types of instruments where the rate of dividend is not fixed and is formulated based on some calculations relating to the current interest rates etc.

BENEFITS OF PREFERENCE SHARE

There are several benefits of a preference share from the point of view of a company which is discussed below:

i No Legal Obligation for Dividend Payment: There is no legal compulsionfor payment of preference dividend. This dividend is not a fixed liability like the interest on the debt which has to be paid in all circumstances.

ii Improves Borrowing Capacity: Preference shares become a part of net worth and therefore reduces debt to equity ratio. This is how the overall borrowing capacity of the company increases.

iii No dilution in control: Issue of preference share does not lead to dilution in control of existing equity shareholders because the voting rights are not attached to the issue of preference share capital. The preference shareholders invest their capital with fixed dividend percentage but they do not get control rights with them.

iv No Charge on Assets: While taking a term loan security needs to be given to the financial institution in the form of primary security and collateral security. There are no such requirements and therefore, the company gets the required money and the assets also remain free of any kind of charge on them.

DISADVANTAGES OF PREFERENCE SHARES

i Costly Source of Finance: Preference shares are considered a very costly source of finance which is apparently seen when they are compared with debt as a source of finance. The interest on the debt is a tax-deductible expense whereas the dividend of preference shares is paid out of the divisible profits of the company i.e. profit after taxes and all other expenses.

ii Skipping Dividend Disregard Market Image: Skipping of dividend payment may not harm the company legally but it would always create a dent on the image of the company.

iii Preference in Claims: Preference shareholders enjoy a similar situation like that of an equity shareholder but still gets a preference in both payment of their fixed dividend and claim on assets at the time of liquidation.

(c) Debentures:

A debenture is a debt instrument used by the companies to raise money for medium to long term at a specified rate of interest. It consists of a written contract specifying the repayment of the principal and the interest payment at the fixed rate. Generally, a debenture is not secured by any collateral and is only backed by the reputation of the issuer.

FEATURES / ATTRIBUTES OF DEBENTURES:

Trust Indenture :

It is an agreement which has to be entered into by the 'Issuing Company' and the 'Trust' which is involved in taking care of the interest of the general investors. Normally the trustee is a bank or a financial institution who is appointed by a debenture trust deed.

Coupon Rate :

It is the rate of interest which is promised by the company to pay to the debenture holder on a regular interval which may vary from case to case. The rate of interest may be fixed or floating.

Tax Benefit :

Most important element from the company point of view is that the interest paid is a tax deductible expense. Effectively, the company will get the tax benefit because the taxable income will be reduced by the extent of interest paid. Due to this, the effective cost of borrowing gets reduced.

Date of Maturity :

For all the debentures, the issuing company has to issue repayment to the debenture holders on the date of maturity. This date is also mentioned on the certificates

Security :

Here, we should classify debentures into two – secured debentures and unsecured debentures. Secured debentures are secured by some or other immovable assets of the company whereas the unsecured assets are issued based on the general credit of the company. The general legal preference of debt is available to all types of debentures i.e. in the event of liquidation debenture will stand prior to preference shares and ordinary equity shares.

Convertibility :

Certain types of debentures are issued with the option of conversion into equity. The ratio of conversion and the time period after which conversion will take place is mentioned in the agreement of debenture. Debentures may be fully or partly convertible in nature.

Credit Rating :

Normally, an investor would not go and check the credibility and the risk involved with the debentures. Credit rating agencies are given this task and they rate the debentures and the overall company. Involving a rating agency is compulsory for the issuing company normally in every country.

A debenture is the primary source of long-term capital for companies to fulfill their financial requirements. Other instruments to raise long term capital are bank loans, bonds, and equity shares. Though all these instruments are used widely in different combinations, they differ from each other in many ways. The article clarifies how debenture is different from the bank loan, equity shares, and bonds respectively.

Types of Debentures:

There are various types of debentures like redeemable, irredeemable, perpetual, convertible, non-convertible, fully, partly, secured, mortgage, unsecured, naked, first mortgaged, second mortgaged, the bearer, fixed, floating rate, coupon rate, zero coupon, secured premium notes, callable, puttable, etc.

Redeemable and Irredeemable (Perpetual) Debentures :

Redeemable debentures carry a specific date of redemption on the certificate. The company is legally bound to repay the principal amount to the debenture holders on that date. On the other hand, irredeemable debentures, also known as perpetual debentures, do not carry any date of redemption. However after introduction of Companies Act, 2013, no irredeemable debentures can be issued and even the existing irredeemable debentures have to be redeemed.

Convertible and Non-Convertible Debentures :

Convertible debenture holders have an option of converting their holdings into equity shares. The rate of conversion and the period after which the conversion will take effect are declared in the terms and conditions of the agreement of debentures at the time of issue. On the contrary, non-convertible debentures are simple debentures with no such option of getting converted into equity. Their state will

always remain of a debt and will not become equity at any point of time.

Fully and Partly Convertible Debentures :

Convertible Debentures are further classified into two – Fully and Partly Convertible. Fully convertible debentures are completely converted into equity whereas the partly convertible debentures have two parts. Convertible part is converted into equity as per agreed rate of exchange based on an agreement. Non-convertible part becomes as good as redeemable debenture which is repaid after the expiry of the agreed period.

Secured (Mortgage) and Unsecured (Naked) Debentures

Debentures are secured in two ways. One when the debenture is secured by the charge on some asset or set of assets which is known as secured or mortgage debenture and another when it is issued solely on the credibility of the issuer is known as the naked or unsecured debenture. A trustee is appointed for holding the secured asset which is quite obvious as the title cannot be assigned to each and every debenture holder.

Registered Unregistered Debentures (Bearer) Debenture

In the case of registered debentures, the name, address, and other holding details are registered with the issuing company and whenever such debenture is transferred by the holder; it has to be informed to the issuing company for updating in its records. Otherwise, the interest and principal will go the previous holder because the company will pay to the one who is registered. Whereas, the unregistered commonly known as bearer debenture. can be transferred by mere delivery to the new holder. They are considered as good as currency notes due to their easy transferability. The interest and principal are paid to the person who produces the coupons, which are attached to the debenture certificate. and the certificate respectively.

Fixed and Floating Rate Debentures :

Fixed rate debentures have fixed interest rate over the life of the debentures. Contrarily, the floating rate debentures have the floating rate of interest which is dependent on some benchmark rate say LIBOR etc.

Secured Premium Notes / Debentures :

These are secured debentures which are redeemed at a premium over the face value of the debentures. They are similar to zero coupon bonds. The only difference is that the discount and premium. Zero coupon bonds are issued at the discount and

redeemed at par whereas the secured premium notes are issued at par and redeemed at the premium.

Callable and Puttable Debentures / Bond :

Callable debentures have an option for the company to buyback and repay to the investors whereas, in the case of puttable debentures, the option lies with the investors. Puttable debenture holders can ask the company to redeem their debenture and ask for principal repayment.

(d) Bonds :

Bond is a financial instrument whereby the issuer of the bond raises (borrows) capital or funds at a certain cost for certain time period and pays back the principal amount on maturity of the bond. Interest paid on bonds is usually referred to as coupon. In simple words, a bond is a loan taken at a certain rate of interest for a definite time period and repaid on maturity.

From a company's point of view, the bond or debenture falls under the liabilities section of the balance sheet under the heading of Debt. A bond is similar to the loan in many aspects however it differs mainly with respect to its tradability. A bond is usually tradable and can change many hands before it matures; while a loan usually is not traded or transferred freely.

Common features of bonds and the financial terms related to bonds.

1. Issuer: The entities that borrow money by issuing bonds are called as issuers.

2. Face Value: Every bond that is issued has a face value; which is usually the principal amount that is borrowed and returned on maturity. In layman's term, it is the value of the bond on its maturity.

3. Coupon: The rate of interest paid on the bond is called as a coupon.

4. Rating: Every bond is usually rated by credit rating agencies; higher the credit rating lower will be the coupon required to pay by the issuer and vice versa.

5. Coupon Payment Frequency: The coupon payments on the bond usually have a payment frequency. The coupons are usually paid annually or semi-annually; however, they may be paid quarterly or monthly as well.

6. Yield: The effective return that the investor makes on the bond is called as a return. Assuming a bond was issued for a face value of ₹ 1000 and a coupon rate of 10% on initiation. The Price at a

later date may rise or fall and hence the investor who invests at a rate other than ₹ 1000 will still receive a coupon payment of ₹100 (1000 * 10%) but the effective earning shall be different since investment amount is not ₹ 1000. That effective return in layman's term is called as the yield. If the holding period is considered for a year this is referred to as current yield and if it is held to maturity it is referred to as yield to maturity (YTM).

DIFFERENT TYPES OF BONDS

Plain Vanilla Bonds

A plain vanilla bond is a bond without any unusual features; it is one of the simplest forms of bond with a fixed coupon and a defined maturity and is usually issued and redeemed at the face value. It is also known as a straight bond or a bullet bond.

Zero Coupon Bonds

A zero coupon bond is a type of bond where there are no coupon payments made. It is not that there is no yield; the zero coupon bonds are issued at a price lower than the face value (say Dees 950) and then pay the face value on maturity (1000). The difference will be the yield for the investor. These are also called as discount bonds or deep discount bonds if they are for longer tenor.

Deferred Coupon Bonds

This type of bond is a blend of a coupon-bearing bond and a zero coupon bond. These bonds do not pay any coupon in the initial years and thereafter pay a higher coupon to compensate for no coupon in the initial years. Such bonds are issued by corporates whose business model has a gestation period before the actual revenues start. Examples of a company which may issue such type of bonds include construction companies.

Convertible Bonds

Convertible bonds are a special variety of bonds which have an inbuilt feature of being converted to equity shares at a specified time at a pre-set conversion price.

Foreign currency convertible Bonds

Foreign currency convertible bond is a special type of bond issued in the currency other than the home currency. In other words, companies issue foreign currency convertible bonds to raise money in foreign currency.

Difference between Debentures & Bonds

Debenture and bond are used often as interchangeable terms. However, there are subtle and noteworthy differences between the two instruments:

- Security: A bond is a more secure instrument than a debenture. A debenture does not have any collateral backing; whereas a bond will always have collateral attached.
- Rate of Interest: Debenture holders are entitled to a higher rate of interest in comparison to bond holders. The reason is that debenture is an unsecured loan and therefore, is riskier than a bond.
- Liability: In a case of a bankruptcy, the company is liable to pay bondholders on priority, whereas debenture holders are paid later.
- Periodical Payments: Debenture holders are paid periodical interest on their loan and the principal is paid back at the completion of the entire term. Bondholders, on the other hand, are not paid any periodical payments. They receive the accrued interest and the principal upon the term completion at one go.

(e) Term Loan:

A term loan provides borrowers with a lump sum of cash upfront in exchange for specific borrowing terms. Term loans are normally meant for established small businesses with sound financial statements. In exchange for a specified amount of cash, the borrower agrees to a certain repayment schedule with a fixed or floating interest rate. Term loans may require substantial down payments to reduce the payment amounts and the total cost of the loan.

Types of Term Loans

Term loans come in several varieties, usually reflecting the lifespan of the loan. These include:

Short-term loans: These loans are generally for a period of less than a 12 months.

Intermediate-term loans: These loans are generally for a period of one to three years.

Long-term loans: These loans last anywhere above three to twemty five years.

(f) Venture Funding:

Venture funding is a funding process in which the venture funding companies manage the funds of the investors who want to invest in new businesses which have the potential for high growth in future. The venture capital funding firms provide the funds to start ups in exchange for the equity stake. Such a startup is generally one that possesses the ability to generate high returns. However, the risk for venture capitalists is high.

There are five stages of venture funding. They are as follows:

Stage 1: Seed Capital

Stage 2: Startup Capital

Stage 3: Early Stage / Second Stage Capital

Stage 4: Expansion Stage

Stage 5: Bridge / Pre IPO Stage

Stage 1: Seed Capital

In this first stage of venture funding, the venture or the startup company in need of the funds contacts the venture capital firm or the investor. The venture firm shall share its idea of business with the investors and convince them to invest in the project. The investor or venture capital firm shall then conduct research on the business idea and analyze its future potential. If the expected returns in future are good, the investor (Venture capitalist) shall invest in the business.

Stage 2: Startup Capital

Startup capital is the second stage of venture funding. If the venture is able to attract the investor, the idea of the business of the venture is brought into reality. A prototype product is developed and fully tested to know the actual potential of the product. Generally, a person from the venture capital firm takes a seat in the management of the business to monitor the operations regularly and keep a check that every activity is done as per the framed plan. If the idea of business meets the requirement of the investor and has sufficient market in the trail run, the investor agrees to participate in the future course of the business.

Stage 3: Early Stage / Second Stage Capital

After the startup capital stage comes the early/first/second stage capital. In this stage, the investor significantly increases the capital invested in the venture business. The capital increase is mainly towards increasing the production of goods, marketing or other

expansion say building a network etc. The company with higher capital inflow moves towards profitability as it is able to reach a wide range of customers.

Stage 4: Expansion Stage

This is the fourth stage of venture funding. In this stage, the company expands its business by way of diversification and differentiation of its products. This is possible only if the company is earning good profits and revenue. To reach up to this stage the company needs to be operational for at least 2 to 3 years. The expansion gives the venture new wings to enter into untapped markets.

Stage 5: Bridge / Pre IPO Stage

This is the last stage of venture funding. When the company has developed substantial share in the market with its products, the company may opt for going public. One main reason for going public is that the investors can exit out of the company after earning profits for the risks they have taken all the years. The company mainly uses the amount received by way of IPO for various purposes like merger, elimination of competitors, research and development, etc.

(g) American Depository Receipt

American Depository Receipt represents the shares of a foreign company issued by U.S bank which can be traded in U.S. equity markets.

Meaning of American Depository Receipt

American Depository Receipt (ADR) is a certified negotiable instrument issued by an American bank suggesting the number of shares of a foreign company that can be traded in U.S. financial markets. American Depository Receipts provide US investors with an opportunity to trade in shares of a foreign company.

American Depository Receipt Process

The domestic company, already listed in its local stock exchange, sells its shares in bulk to a U.S. bank to get itself listed on U.S. exchange.

The U.S. bank accepts the shares of the issuing company. The bank keeps the shares in its security and issues certificates (ADRs) to the interested investors through the exchange.

Investors set the price of the ADRs through bidding process in U.S. dollars. The buying and selling in ADR shares by the investors is possible only after the major U.S. stock exchange lists the bank certificates for trading.

The U.S. stock exchange is regulated by Securities Exchange Commission, which keeps a check on necessary compliances that need to be complied by the foreign company.

Advantages of American Depository Receipt

The American investor can invest in foreign companies which can fetch him higher returns.

The companies located in foreign countries can get registered on American Stock Exchange and have its shares trades in two different countries.

The benefit of currency fluctuation can be availed.

It is an easier way to invest in foreign companies as there are no restrictions to invest in ADR.

ADR simplifies tax calculations. Trading in shares of foreign company in ADR would lead to tax under US jurisdiction and not in the home country of company.

The pricing of shares of foreign companies in ADR is generally cheaper. Hence it provides additional benefit to investors.

Disadvantages of American Depository Receipt

Even though the transactions in ADR take place in US dollars, still they are exposed to the risk associated with foreign exchange fluctuation.

The number of options to invest in foreign companies is limited. Only few companies feel the necessity to register themselves through ADR. This limits the choice available to US investor to invest.

The investment in companies opting for ADR often becomes illiquid as investor needs to hold the shares for long term to generate good returns.

The charges for entire process of ADR are mostly transferred on investors by the foreign companies.

Any violation of compliance can lead to strict action by Securities Exchange Commission.

Conclusion:

ADRs provide the US investors with ability to trade in foreign companies shares. ADR makes it easier and convenient for the domestic investors in US to trade in foreign companies shares. ADR provides the investors an opportunity to diversify their portfolio by investing in companies which are not located in America. This

eventually leads to investors investing in companies located in emerging markets, thereby leading to profit maximization for investors.

(h) Global Depository Receipt

Global Depository Receipt (GDR) is an instrument in which a company located in domestic country issues one or more of its shares or convertibles bonds outside the domestic country. In GDR, an overseas depository bank i.e. bank outside the domestic territory of a company, issues shares of the company to residents outside the domestic territory. Such shares are in the form of depository receipt or certificate created by overseas the depository bank.

Issue of Global Depository Receipt is one of the most popular ways to tap the global equity markets. A company can raise foreign currency funds by issuing equity shares in a foreign country.

Global Depository Receipt Example

A company based in USA, willing to get its stock listed on German stock exchange can do so with the help of GDR. The US based company shall enter into an agreement with the German depository bank, who shall issue shares to residents based in Germany after getting instructions from the domestic custodian of the company. The shares are issued after compliance of law in both the countries.

Global Depository Receipt Mechanism

The domestic company enters into an agreement with the overseas depository bank for the purpose of issue of GDR.

The overseas depository bank then enters into a custodian agreement with the domestic custodian of such company.

The domestic custodian holds the equity shares of the company.

On the instruction of domestic custodian, the overseas depository bank issues shares to foreign investors.

The whole process is carried out under strict guidelines.

GDRs are usually denominated in U.S. dollars

Advantages of GDR

The following are the advantages of Global Depository Receipts:

GDR provides access to foreign capital markets.

A company can get itself registered on an overseas stock exchange or over the counter and its shares can be traded in more than one currency.

GDR expands the global presence of the company which helps in getting international attention and coverage.

GDR are liquid in nature as they are based on demand and supply which can be regulated.

The valuation of shares in the domestic market increase, on listing in the international market.

With GDR, the non-residents can invest in shares of the foreign company.

GDR can be freely transferred.

Foreign Institutional investors can buy the shares of company issuing GDR in their country even if they are restricted to buy shares of foreign company.

GDR increases the shareholders base of the company.

GDR saves the taxes of an investor. An investor would need to pay tax if he purchases shares in the foreign company, whereas in GDR same is not the case.

Disadvantages

The following are the disadvantages of Global Depository Receipts:

Violating any regulation can lead to serious consequences against the company.

Dividends are paid in domestic country's currency which is subject to volatility in the forex market.

It is mostly beneficial to High Net-Worth Individual (HNI) investors due to their capacity to invest high amount in GDR.

GDR is one of the expensive sources of finance.

(i) Public Fixed Deposits :

Public deposits refer to the unsecured deposits invited by companies from the public mainly to finance working capital needs. A company wishing to invite public deposits makes an advertisement in the newspapers.

Any member of the public can fill up the prescribed form and deposit the money with the company. The company in return issues a deposit receipt. This receipt is an acknowledgement of debt by the company. The terms and conditions of the deposit are printed on the back of the receipt. The rate of interest on public deposits depends on the period of deposit and reputation of the company.

A company can invite public deposits for a period of six months to three years. Therefore, public deposits are primarily a source of short-term finance. However, the deposits can be renewed from time-to-time. Renewal facility enables companies to use public deposits as medium-term finance.

Public deposits of a company cannot exceed 25 per cent of its share capital and free reserves. As these deposits are unsecured, the company having public deposits is required to set aside 10 per cent of deposits maturing by the end of the year. The amount so set aside can be used only for paying such deposits.

Thus, public deposits refer to the deposits received by a company from the public as unsecured debt. Companies prefer public deposits because these deposits are cheaper than bank loans. The public prefers to deposit money with well-established companies because the rate of interest on public deposits is higher than on bank deposits. Now public sector companies also invite public deposits. Public deposits have become a popular source of industrial finance in India.

Merits of Public Deposits:

1. Simplicity:

Public deposits are a very convenient source of business finance. No cumbersome legal formalities are involved. The company raising deposits has to simply give an advertisement and issue a receipt to each depositor.

2. Economy:

Interest paid on public deposits is lower than that paid on debentures and bank loans. Moreover, no underwriting commission, brokerage, etc. has to be paid. Interest paid on public deposits is tax deductible which reduces tax liability. Therefore, public deposits are a cheaper source of finance.

3. No Charge on Assets:

Public deposits are unsecured and, therefore, do not create any charge or mortgage on the company's assets. The company can raise loans in future against the security of its assets.

1. Flexibility:

Public deposits can be raised during the season to buy raw materials in bulk and for other short-term needs. They can be returned when the need is over. Therefore, public deposits introduce flexibility in the company's financial structure.

5. Trading on Equity:

Interest on public deposits is paid at a fixed rate. This enables a company to declare higher rates of dividend to equity shareholders during periods of good earnings.

Public deposits enable a company to build up contacts with a wider public. These contacts prove helpful in the sale of shares and debentures in future.

Demerits of Public Deposits:

1. Uncertainty :

Public deposits are an uncertain and unreliable source of finance. The depositors may not respond when economic conditions are uncertain. Moreover, they may withdraw their deposits whenever they feel shaky about the financial health of the company.

Depositors are entitled to withdraw their deposits at any time after giving prior notice to the company. During times of financial tightness or distress the depositors may get panicked and wish to withdraw their deposits.

Moreover, if a large number of depositors simultaneously withdraw their deposits during slump, the company may find it difficult to repay a huge sum at once. Therefore, public deposits are described as 'fair weather friends'.

2. Limited Funds :

A limited amount of funds can be raised through public deposits due to legal restrictions.

3. Temporary Finance :

The maturity period of public deposits is short. The company cannot depend upon public deposits for meeting long-term financial needs.

1. Limited Appeal :

Public deposits do not appeal as a mode of investment to bold investors who want capital gains. Conservative investors may also not like these deposits in the absence of proper security.

5. Unsuitable for New Concerns :

New companies lacking in sound credit standing cannot depend upon public deposits. Investors do not like to deposit money with such companies.

(j) Concept of Securitization :

Securitization is a structured process by which a pool of loans and other receivables are packaged and sold in the form of asset-backed securities to the investors to raise the required funds from them. By this process relatively illiquid assets are converted into securities. Securitization falls under the broad category termed as structured finance transactions. Structured finance refers to securities where the promise to repay the investors is backed by the value of the underlying financial asset or the credit support of a third party to the transaction or some combination of the two. Thus, securitization is nothing but liquefying assets comprising loans and receivables of an institution through systematic issuance of financial instruments.

(i) The process of securitization starts with identification by the company (the originator) the loans or bills receivable in its portfolio, to prepare a basket or pool of assets to be securitized.

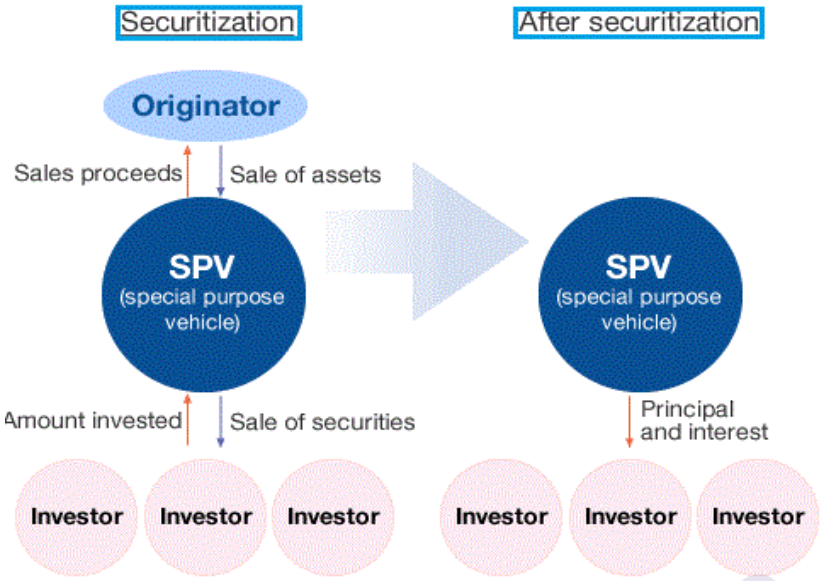
(ii) The pool of assets so identified is then sold to a specific purpose vehicle (SPV) or trust. Usually an investment banker performs the task of an SPV, which is also called an issuer, as it ultimately issues the securities to investors.

(iii) Once the assets are acquired by SPV, the same are split into individual shares/securities which are reimbursed by selling them to investors. These securities are called 'Pay or Pass Through Certificates' (PTC) which are so structured as to synchronize for redemption with the maturity of the securitized loans or bills.

(iv) Repayments under the securitized loans or bills keep on being received by the originator and passed on to the SPV. To this end, the contractual relationship between the originator an d the borrowers/obligates is allowed to subsist in terms of the pass through transaction; alternatively a separate agency arrangement is made between the SPV (Principal) and the originator (agent).

(v) Although a PTC could be with recourse to its originator, the usual practice has been to make it without recourse. Accordingly, a PTC holder takes recourse to the SPV and not the originator for payment to the principal and interest on the PTCs held by him. However, a part of the credit risk, as perceived (and not interest risk), can be absorbed by the originator, by transferring the assets at a discount, enabling the SPV to issue the PTCs at a discount to face value.

(vi) The debt to be securitized and the PTC issues are got rated by rating agencies on the eve of the securitization. The issues by the SPV could also be guaranteed by external guarantor-institutions to enhance creditability of the issues. The PTCs, before maturity, are tradable in a secondary market to ensure liquidity for the investors.



(h) Long term financialinstitution:

Long term loans are provided by specify financial institutions in India. The following are the specialised financial institution:

(i) The industrial financial corporation inIndia.

(ii) Industrial development bank ofIndia.

(iii) Industrial Reconstruction Corporation in India.

(iv) Small industries development bank ofIndia.

(v) Life insurance Corporation ofIndia.

(vi) State financial corporation.

(vii) Exime book.

Term loans are provided by these institutions at deferent rate of interest under scheme of financial institution. it is also to be repaid according to a stipulated repayment schedule these institution stipulate a number of condition management and certain and other financial policy of a company.

Term loan represent secured borrowing. It is the most important source of finance for new project. They generally carry a rate of interest inclusive interest tax depending on the credit rating of the borrower, the perceived risk of lending. The loan are generally repayable over a period of 60 to 10 years in annul, half yearly or quarterly installment. For last scale project all India financial institution provides the bulk of term finance either singly or in consortium with other financial institution.

(b) Loan from commercial banks:

The banks' in India also provide term loans to the companies .banks normally provides term loans to projects in the small and medium scale sectors . The primary role of commercial banks is to cater to the short term requirement of the industry. However banks have started taking an interest on term financing of industries in several ways. The proceeds of the term loan from banks are generally used for fixed assets or for expansion of plant capacity. Their repayment is scheduled over a period of time. Term loans proposals involve an element of risk because of changes in the conditions affecting the borrowers. The bank making such a proposal has to access the situation to make a proper appraisal. The decision in such a situation would depend upon various factors affecting the conditions of the industry concerned and the earning potential of the borrower.

(c) Retained earnings:

Retained earnings are the profits retained in the business. Every company retains certain portion every year in the form of reserve. Even the balance of profit after declaration of dividend is also carried forward in the balance of sheet. It is known as ploughing backs of profits. Such funds belong to the ordinary shareholder's and increase the net worth of company. a public limited company has to plough back a reasonable amount of profit every year keeping in view the legal requirements and its own expansions plans. However, retained earnings can be used by existing and financially sound companies. A new company or a loss making company cannot follow this method. Retained earnings are used as a long-term capital without any cost.

1.3.2 Short Term Source of Finance :

Short-term financing deals with raising of money required forperiods varying from a few days to one year. It may sometimes exceed for a period above one year but still be called as short-term finance.

1. Trade Credit

Trade credit is credit received by an business organisation from the manufacturers or wholesalers or suppliers. It is also known as mercantile credit. The usual duration of this credit ranges from 30 to 90 days. It is granted to the company or firm on "Open account" without any security except that of the goodwill and financial standing of the buyer. Trade credit does not provide the cash but it facilitates the purchase of materials without immediate payment. Usually no interest is charged on trade credits. Trade credit depends upon the buyer's need for it and also the willingness of the supplier and factors such as:

The financial resources of the supplier.

His eagerness to dispose of his stock.

Degree of competition in the market.

Credit worthiness of the firm.

2. Consumer Credit or Customer Advance

Many times the manufacturers or the suppliers insist on, advance by the customers particularly in case of special orders or big orders. The customer advance forms part of the price of the products ordered by him. Sometimes, the customer also tenders the full price. This is an interest free source of finance. The period of such credit depends upon the time taken to deliver the goods. The availability of this credit also depends on the following factors:

Competitive conditions in the market

Customs of the trade and usage.

Reputation of the supplier.

3. Installment Credit

This is also called consumer credit. Retailers for selling consumer durable generally use it. Here, however, we use the term "Installment credit" to denote the facility provided by the equipment suppliers on easy installments as this serves to provide capital to a firm in kind. Installment includes interest on unpaid sums and is suitably spread so as to enable the purchasing company to meet them out of current cash flows. Commercial banks and financial institutions, now-a-days provide this form of credit on liberal terms. Hire purchase system is also a modified form of the installment credit. In the hire purchase system, the title over the machinery or equipment remains with the supplier until the full price amount is settled.

1. Factoring

Under this method, a financing company purchases the account receivables from the customers or money is advanced on the security of the accounts receivable. In financial accounting, it is denoted as Trade Debtors, and this item appears on the asset side of the Balance Sheet. Since credit sales are unavoidable in trading transactions, every trader has always a larger amount locked up in the form of Account Receivables. This account receivable is a right to property and a right to collect the amount from the client.

5. Short-term Loans

Commercial banks also provide loans to the business concern to meet the short-term financial requirements. When a bank makes an advance in lump sum against some security it is termed as loan. Loan may be in the following form:

(a) Cash credit: A cash credit is an arrangement by which a bank allows his customer to borrow money up to certain limit against the security of the commodity.

(b) Overdraft: Overdraft is an arrangement with a bank by which a current account holder is allowed to withdraw more than the balance to his credit up to a certain limit without any securities.

MONEY MARKET INSTRUMENTS IN INDIA

1. Treasury Bills

T-bills are one of the most popular money market instruments. They have varying short-term maturities. The Government of India issues it at a discount for 14 days to 364 days. These instruments are issued at a discount and repaid at par at the time of maturity. Also, a company, firm, or person can purchase TB's. And are issued in lots of Rs. 25,000 for 14 days & 91 days and Rs. 1,00,000 for 364 days.

2. Commercial Bills

Commercial bills, also a money market instrument, works more like the bill of exchange. Businesses issue them to meet their short-term money requirements. These instruments provide much better liquidity. As the same can be transferred from one person to another in case of immediate cash requirements.

3. Certificate of Deposit

Certificate of deposit or CD's is a negotiable term deposit accepted by commercial banks. It is usually issued through a promissory note. CD's can be issued to individuals, corporations, trusts, etc. Also, the CD's can be issued by scheduled commercial banks at a discount. And the duration of these varies between 3 months to 1 year. The same, when issued by a financial institution, is issued for a minimum of 1 year and a maximum of 3 years.

1. Commercial Paper

Corporates issue CP's to meet their short-term working capital requirements. Hence serves as an alternative to borrowing from a bank. Also, the period of commercial paper ranges from 15 days to 1 year. The Reserve Bank of India lays down the policies related to the issue of CP's. As a result, a company requires RBI's prior

approval to issue a CP in the market. Also, CP has to be issued at a discount to face value. And the market decides the discount rate.

Denomination and the size of CP:

Minimum size – Rs. 25 lakhs

Maximum size – 100% of the issuer's working capital

5. Call Money

It is a segment of the market where scheduled commercial banks lend or borrow on short notice (say a period of 14 days). In order to manage day-to-day cash flows. The interest rates in the market are market-driven and hence highly sensitive to demand and supply. Also, the interest rates have been known to fluctuate by a large % at certain times.

1.4 EXERCISES

1 Which of the following is a liability of a bank?
(a) Treasury Bills
(b) Commercial Papers
(c) Certificate of Deposits
(d) Junk Bonds

2. Commercial paper is a type of
(a) Fixed coupon bond
(b) Unsecured short-term debt
(c) Equity share capital
(d) Government bond

3. In India, Commercial Papers are issued as per the guidelines issued by
(a) Securities and Exchange Board of India
(b) Reserve Bank of India
(c) Forward Market Commission
(d) None of the above

1. Commercial paper are generally issued at a prices
(a) Equal to face value
(b) More than face value
(c) Less than face value
(d) Equal to redemption value

5. Which of the following is not applicable to commercial paper?
(a) Face Value
(b) Issue Price
(c) Coupon rate
(d) None of the above

6. Which of the following is true with respect to commercial paper (CP)?
   (a) These are issued in multiples of 1 lakh
   (b) The minimum amount to be invested by a single investor is 5 lakhs
   (c) The minimum maturity period is 30 days
   (d) The issuer cannot buy back these instruments
   (e) These can be raised up to the extent of 80% of working capital limit

7. Which of the following statements is/are true with respect to Short-term bank finance
   i. Under the cash credit arrangement the customer is permitted to borrow up to a limit called the cash credit limit
   ii. Cash credit account operates against security in the form of pledge of shares and securities.
   iii. Under letter of credit agreement the bank assumes the risk and also provides the credit

   Security in the form of hypothecation is limited to movable properties
   (a) Only (ii) above
   (b) Only (iv) above
   (c) Both (i) and (iv) above
   (d) Both (ii) and (iii) above

8. Which of the following statements is not true with respect to Commercial Papers (CPs)
   a. These are short-term usance promissory notes with a fixed maturity period
   b. It is also referred to as Corporate Paper
   c. is mostly used to finance the current transactions of a company
   d. it helps to meet the seasonal need for funds
   e. it cannot be issued by body corporate

9. which of the following statements is true with regard to public deposit to a company?
   (a) The procedure involved in raising public deposit is fairly complex
   (b) A public deposit with maturity period of less than 1 year is also treated as long term liability
   (c) After-tax cost of public deposits will be much less than the after-tax cost of bank borrowing
   (d) Security is offered in the case of public deposit
   (e) Public deposit will have restrictive covenants in respect of dividends payments appointment of senior executives

10. The type of collateral (security) used for short-term loan is
    (a) Real estate
    (b) Plant and Machinery
    (c) Stock of good
    (d) Equity share capital

Solution

1. C	6. B
2. B	7. C
3. B	8. C
1. C	9. D
5. D	10. E

1. What are the sources of long-term finance?
2. Explain the concept of financial feasibility of aProject?
3. Explain the advantages of equityfinancing?
4. What is debenture (debt) financing? Why debentures are considered cheaper than equity as a source of long-term finance?
5. Write short notes on the following:
   (a) Trading onequity
   (b) Promoter's contribution.
   (c) Preference Shares
   (d) Money Market Instruments
   (e) Loan syndication.

2

INVESTMENT DECISIONS - I

Unit Structure :

2.0 OBJECTIVES

After studying the unit the students will be able to:

- Discuss the concept Time value of money.
- Understand the methods of Time value of money.
- Calculate the future value of single flow.
- Discuss the merits and demerits of various Investment Appraisal Techniques
- Solve the problems on Investment Appraisal Techniques.

2.1 INTRODUCTION:

Capital Budgeting is the art of finding assets that are worth more than they cost to achieve a predetermined goal i.e., ‘optimizing the wealth of a business enterprise’.

Capital investment involves a cash outflow in the immediate future in anticipation of returns at a future date.

A capital investment decision involves a largely irreversible commitment of resources that is generally subject to significant degree of risk. Such decisions have for reading efforts on an enterprise's profitability and flexibility over the long-term. Acceptance of non-viable proposals acts as a drag on the resources of an enterprise and may eventually lead to bankruptcy.

For making a rational decision regarding the capital investment proposals, the decision maker needs some techniques to convert the cash outflows and cash inflows of a project into meaningful yardsticks that can measure the economic worthiness of projects.

CAPITAL BUDGETING PROCESS:

A Capital Budgeting decision involves the following process:

(1) Investment screening and selection
(2) The Capital Budget proposal
(3) Budgeting Approval and Authorization
(4) Project Tracking
(5) Post-completion Auditor

2.2 TIME VALUE OF MONEY :

2.2.1 Concept

We know that Rs. 100 in hand today is more valuable than Rs. 100 receivable after a year. We will not part with Rs. 100 now if the same sum is repaid after a year. But we might part with Rs. 100 now if we are assured that Rs. 110 will be paid at the end of the first year. This "additional Compensation" required for parting Rs. 100 today, is called "interest" or "the time value of money". It is expressed in terms of percentage per annum.

2.2.2 Why should money have time value?

Money should have time value for the following reasons:

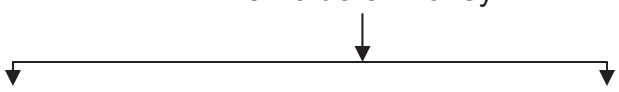
(a) Money can be employed productively to generate real returns;
(b) In an inflationary period, a rupee today has higher purchasing power than a rupee in the future;
(c) Due to uncertainties in the future, current consumption is preferred to future consumption.
(d) The three determinants combined together can be expressed to determine the rate of interest as follows:

Nominal or market interest rate
= Real rate of interest or return (+) Expected rate of inflation (+) Risk premiums to compensate for uncertainty.

2.3 METHODS OF TIME VALUE OF MONEY

(1) Compounding: We find the Future Values (FV) of all the cash flows at the end of the time period at a given rate of interest.

(2) Discounting : We determine the Time Value of Money at Time "O" by comparing the initial outflow with the sum of the Present Values (PV) of the future inflows at a given rate of interest.



Compounding (Future Value)	Discounting (Present Value)
(a) Single Flow	(a) Single Flow
(b) Multiple Flows	(b) Uneven Multiple Flows
(c) Annuity	(c) Annuity
	(d) Perpetuity

2.4 FUTURE VALUE OF A SINGLE FLOW

It is the process to determine the future value of a lump sum amount invested at one point of time.

$$FV_n = PV\ (1+i)^n$$

Where,

FV_n	= Future value of initial cash outflow after n years
PV	= Initial cash outflow
i	= Rate of Interest p.a.
n	= Life of the Investment
and $(1+i)^n$	= Future Value of Interest Factor (FVIF)

Illustration: 1

The fixed deposit scheme of Punjab National Bank offers the following interest rates:

Period of Deposit	Rate Per Annum
46 days to 179 days	5.0
180 days < 1 year	5.5
1 year and above	6.0

An amount of Rs. 15,000 invested today for 3 years will be compounded to:

$$FV_n = PV\ (1+i)^n$$

$$= PV \times FVIF\ (6,3)$$

$$= PV \times (1.06)^3$$

$$= 15,000\ (1.191)$$

$$= \text{Rs. } 17,865$$

Doubling Period "How long will it take for the amount invested to be doubled for a given rate of interest"?

(i) By Applying "Rule of 72"

$$\text{Doubling Period} = \frac{72}{\text{Rate of Interest}}$$

For instance, if the rate is 5%, then the doubling period is $\frac{72}{5} = 14.4$ years.

(ii) Rule of 69: For a better and accurate way of calculating the doubling period :

$$= 0.35 + \frac{69}{\text{Interest Rate}}$$

$$= 0.35 + \frac{69}{5} = 0.35 + 13.8 = 14.15 \text{ Years.}$$

If compounding is done for shorter periods (i.e. other than annual compounding)

$$FV = PV_n \left(1 + \frac{i}{m}\right)^{m \times n}$$

PV = Initial Cash Outflow
i = Rate of interest p.a.
m = no. of times compounding is done per year
n = no. of years for which compounding is done.

Illustration 2:
Calculate the Future value of Rs. 1000 invested in State Bank Cash Certificate Scheme for 2 years @ 5.5% p.a., compounded semi-annually.

Solution:

$$FV_n = PV\left(1+\frac{i}{m}\right)^{m\times n} = 1{,}000\ (1.0275)^4$$

$$= 1{,}000\left(1+\frac{0.55}{2}\right)^{2\times 2}$$

$$= 1{,}000 \text{ X } 1.11462 = 1{,}114.62$$

Future Value of Multiple Flows

Rate of Interest = 6% p.a. Total Accumulation after 3 years

Being of Year	Investment (Rs.)	EVIF	Compounded Value (Rs.)
0	4,000	1.2625	5,050
1	6,000	1.191	7,146
2	5,000	1,1236	5,618
3	5,000	1.06	5,300
Total	**20,000**		**23,114**

The total compounded value is Rs. 23,114

Future Value of Annuity

Annuity is a term used to describe a series of periodic flows of equal amounts. These flows can be inflows or outflows.

The future value of annuity is expressed as :

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

Where, A = Amount of Annuity
i = rate of interest
n = time period
FVA_n = compounded at the end of n years.

And $\left(\frac{(1+i)^n - 1}{i}\right)$ is the Future Value of Interest Factor for Annuity (FVIFA)

Illustration 3 :

Calculation the maturity value of a recurring deposit of Rs. 500 p.a. for 12 months @ 9% p.a. compounded quarterly.

Solution :

Effective rate of interest per annum $= \left(\frac{1+0.09}{4}\right)^4 - 1$

= 1.0931 – 1 = 0.0931

Rate of interest per month
= $(1 + i)^{1/m} - 1$
= $(1+ 0.0931)^{1/12} - 1$
= 1.0074 – 1
= 0.0074
= 0.74%

Maturity Value can be calculated as follows:

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

$$= 500\left\{\frac{(1+0.0074)^{12} - 1}{0.0074}\right\}$$

= 500 ×12.50 = Rs. 6,250/-

Present Value of a Single Flow:

$$PV = \frac{FV_n}{FVIF(i,n)} = \frac{FV_n}{(1+i)^n}$$

Where, PV = Present Value
FV_n = Future Value receivable after n years
i = rate of interest
n = time period

And $\frac{1}{FVIF(i,n)} = PVIF(i,n)$ [Present Value of Interest Factor]

Illustration 4:

Calculate the Present Value of Rs. 1,000 receivable after 3 years. Cost of Capital @ 10% p.a.

Solution :

P.V. of Re. 1 @ 10% p.a. receivable after 3 years. = 0.7513
P.V. of Rs. 1000 = Rs. 1000 × 0.7513 = Rs. 751.30

Present Value of Uneven Multiple Flows

Year	Cash Inflows	P.V.F. @ 10%	Discounted Cash Flows
1	50,000	0.9091	45,455
2	90,000	0.8264	74,376
3	1,20,000	0.7513	90,145
	2,60,000		**2,09,987**

The present value of Rs. 2, 60,000 discounted @ 10% will be Rs. 2, 09,987.

Present Value of Even Cash Inflows

Calculate P.V. of Rs. 50,000 receivable for 3 years @ 10%
P.V. = Cash Flows × Annuity @ 10% for 3 years.
= 50,000 × 2.4868 = Rs. 1, 24,340/-

Present Value of an Annuity:

The present value of an annuity 'A' receivable at the end of every year for a period of n years at the rate of interest 'i' is equal to

$$PVA_n = \frac{A}{(1+i)} + \frac{A}{(1+i)^2} + \frac{A}{(1+i)^3} + \frac{A}{(1+i)^n}$$

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

Where, $\left(\frac{(1+i)^n - 1}{i(1+i)^n}\right)$ is called the PVIFA (Present Value of Interest Factor Annuity) and it represents the present value of Rs. 1 for the given values of i and n.

Illustration 5:

Calculate the present value of Rs. 100 deposited per month for 12 months @ 12% p.a., compounded quarterly.

Solution:

Step (1) Calculate effective rate of interest per annum

$$r = \left(1 + \frac{i}{m}\right)^m - 1$$

$$= \left(1 + \frac{0.12}{4}\right)^4 - 1$$

= 1.1255 –1 = 0.1255

= 12.55%

Where, i = normal rate of interest p.a.
r = effective rate of interest p.a.
m = no. of terms compounded in a year

Step (2) Calculate effective rate of interest per month.

$= (1 + r)^{1/12} - 1$

$= (1+0.1255)^{1/12} - 1$

= 0.00990

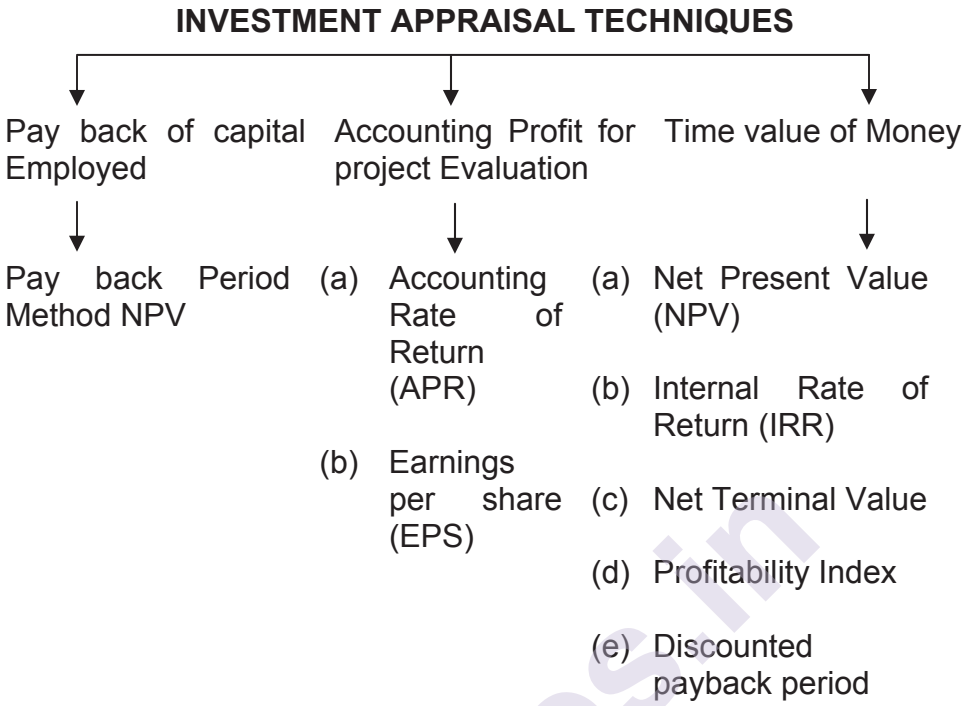
Step (3) The present value of deposits :

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

$$= 100\left(\frac{(1+0.00990)^{12} - 1}{0.00990\,(1+0.00990)^{12}}\right)$$

$$= 100\left(\frac{0.1255}{0.01114}\right) = 100 \times 11.26 \text{ = Rs. 1126}$$

2.5 INVESTMENT APPRAISAL TECHNIQUES



2.6 PAYBACK PERIOD METHOD

2.6.1 MEANING

The basic element of this method is to calculate the recovery time, by year wise accumulation of cash inflows (inclusive of depreciation) until the cash inflows equal the amount of the original investment. The time taken to recover such original investment is the "payback period" for the project.

"The shorter the payback period, the more desirable a project".

2.6.2 MERITS:

(1) No assumptions about future interest rates.

(2) In case of uncertainty in future, this method is most appropriate.

(3) A company is compelled to invest in projects with shortest payback period, if capital is a constraint.

(4) It is an indication for the prospective investors specifying the payback period of their investments.

(5) Ranking projects as per their payback period may be useful to firms undergoing liquidity constraints.

2.6.3 DEMERITS:

(1) Cash generation beyond payback period is ignored.

(2) The timing of returns and the cost of capital is not considered.

(3) The traditional payback method does not consider the salvage value of an investment.

(4) Percentage Return on the capital invested is not measured.

(5) Projects with long payback periods are characteristically those involved in long-term planning, which are ignored in this approach.

2.6.4 SOLVED PROBLEMS

Illustration 6:

Initial Investment = Rs. 1, 00,000
Expected future cash inflows Rs. 20,000, Rs. 40,000, Rs. 60,000, Rs. 70,000

Solution:

Calculation of Pay Back period.

Year	Cash Inflows (Rs.)	Cumulative Cash Inflows (Rs.)
1	20,000	20,000
2	40,000	60,000
3	60,000	1,20,000
4	70,000	1,90,000

The initial investment is recovered between the 2nd and the 3rd year.

$$\text{Payback Period} = 2 \text{ years} + \left(\frac{\text{Balance of Unrecovered Initial Investment}}{\text{Cash Inflows during the year}} \times 12 \right)$$

$$= 2 \text{ years} + \frac{\text{Initial Investment} - \text{Cumulative Cash Inflows at the end of } 2^{nd} \text{ year}}{\text{Cash Inflows in the } 3^{rd} \text{ year}} \times 12$$

$$= \frac{2 \text{ years} + \left(\frac{1,00,000 - 60,000}{60,000} \times 12 \right)}{2 \text{ years} + \left(\frac{40,000}{60,000} \times 12 \right)}$$

= 2 years 8 months.

Illustration 7:

Victory Ltd. decided to purchase a machine to increase the installed capacity. The company has four machines under consideration. The relevant details including estimated yearly expenditure and sales are given below. All sales are for cash. Corporate Tax Rate @ 33.99% (inclusive of Surcharge @ 10%, Deduction cess @ 2% and Secondary & Higher Education cess @ 1%)

Particulars	M_1	M_2	M_3	M_4
Initial Investment (Rs. lacs)	30.00	30.00	40.00	35.00
Estimated Annual Sales (Rs. lacs)	50.00	40.00	45.00	48.00
Cost of Production (Estd) (Rs. lacs)	18.00	14.00	16.70	21.00
Economic Life (yrs)	2	3	3	4
Scrap Values (Rs. lacs)	4.00	2.50	3.00	5.00

Calculate Payback Period

Solution:

Statement Showing Payback for four machines

Particulars	M_1	M_2	M_3	M_4
(1) Initial Investment (Rs. lacs)	30.00	30.00	40.00	35.00
(2) Estd. Annual Sales (Rs. Lacs)	50.00	40.00	45.00	48.00
(3) Estd. Cost of Production (Rs. lacs)	18.00	14.00	16.70	21.00
(4) Depreciation (Rs. lacs)	13.00	9.17	12.33	7.50
(5) Profit Before Tax (PBT) [2–3–4]	19.00	16.83	15.97	19.50
(6) Tax @ 33.99% (Rs. lacs)	6.4581	5.721	5.428	6.628
(7) Profit After Tax (PAT) [5–6] (Rs. lacs)	12.5419	11.109	10.542	12.872
(8) Net Cash Flow [7+4]	25.5419	20.279	22.872	20.372

$$\text{Pay back Period (Years)} = \frac{M_1}{25.5419} = \frac{30.00}{20.279} = \frac{M_3}{22.872} = \frac{40.00}{20.372} = \frac{35.00}{}$$

$$\left(\frac{\text{Initial Investment}}{\text{Net Annual Cash Flow}}\right) = 1.17 = 1.48 = 1.75 = 1.72$$

Analysis: Machine 1 is more profitable, as it has the lowest payback period.

Bailout Factor

This deals with the possibility of scrapping the machine during its estimated life.

Illustration 8:

Project × costs Rs. 20 lacs and project y costs Rs. 30 lacs both have a life of 5 years. Expected cash flows Rs. 8 lacs p.a. for project × and Rs. 15 lacs p.a. for project y. Estimated scrap values of project × Rs. 5 lacs, declining at an annual rate of Rs. 1 lacs p.a. and of project y Rs. 8 lacs declining at an annual rate of Rs. 1 lac p.a.

Under Traditional payback:

Project X = $\frac{20,00,000}{8,00,000}$ = 2.5Years

Project Y = $\frac{30,00,000}{15,00,000}$ = 2 years

Under Bailout Payback:

The bailout payback time is reached if the accumulated cash inflows plus the expected salvage value at the end of a particular year equals the original/initial investment.

Project X	Cumulative Cash Receipts (Rs.)	Salvage Value (Rs.)	
End of year 1:	8,00,000	5,00,000	= 13,00,000
End of year 2:	16,00,000	4,00,000	= 20,00,000

Bailout payback period for Project X = 2 years.

Project Y	Cumulative Cash Receipts (Rs.)	Salvage Value (Rs.)	
End of year 1 :	15,00,000	8,00,000	= 23,00,000
End of year 2 :	30,00,000	7,00,000	= 37,00,000

Bailout is between years 1 & years 2.

Project Y is choosen having a lower bailout payback period, assuming that the major objective is to avoid loss.

2.6.5 PAYBACK PERIOD RECIPROCAL

Payback period may be expressed alternatively as the "payback reciprocal":

$$\text{Payback period reciprocal} = \frac{1}{\text{Payback period}} \times 100$$

Illustration 9:
If the payback period for a project is 5 years, then the payback period reciprocal would be:

$$\left(\frac{1}{5} \times 100 \right) = 20\%$$

The projects having lower payback period shall yield higher payback reciprocal, which reflects the worth of such project.

2.7 AVERAGE RATE OF RETURN

2.7.1 MEANING

This method measures the increase in profit expected to result from investment.

$$\textbf{ARR} = \frac{\textbf{Average Annual Profit After Tax}}{\textbf{Average or Initial Investment}} \times 100$$

$$= \frac{\textbf{Average EBIT (1 - t)}}{\textbf{Average Investment}} \times 100$$

Where, $\textbf{Average Investment} = \frac{\textbf{Initial Investment + Salvage Value}}{2}$

2.7.2 MERITS

(1) This method considers all the years in the life of the project.
(2) It is based upon profits and not concerned with cash flows.
(3) Quick decision can be taken when a number of capital investment proposals are being considered.

2.7.3 DEMERITS

(1) Time Value of Money is not considered.

(2) It is biased against short-term projects.

(3) The ARR is not an indicator of acceptance or rejection, unless the rates are compared with the arbitrary management target.

(4) It fails to measure the rate of return on a project even if there are uniform cash flows.

2.7.4 SOLVED PROBLEMS

Illustration 10:

A project costing Rs. 10 lacs. EBITD (Earnings before Depreciation, Interest and Taxes) during the first five years is expected to be Rs. 2,50,000; Rs. 3,00,000; Rs. 3,50,000; Rs. 4,00,000 and Rs. 5,00,000. Assume 33.99% tax and 30% depreciation on WDV Method.

Solution :

Computation of Project ARR:

Particulars	Yr 1	Yr 2 Rs.	Yr 3 Rs.	Yr 4 Rs.	Yr 5 Rs.	Average
EBITD	2,50,000	3,00,000	3,50,000	4,00,000	5,00,000	3,60,000
Less: Dep.	3,00,000	2,10,000	1,47,000	1,02,900	72,030	1,66,386
EBIT	(50,000)	90,000	2,03,000	2,97,100	4,27,970	1,93,614
Less: Tax@33.99%	--	13,596	69,000	1,00,984	1,45,467	65,809
	(50,000)	76,404	1,34,000	1,96,116	2,82,503	1,27,805

Book Value of Investment:

Begining	10,00,000	7,00,000	4,90,000	3,43,000	2,40,100
End	7,00,000	4,90,000	3,43,000	2,40,100	1,68,070
Average	8,50,000	5,95,000	4,16,500	2,91,550	2,04,085
4,71,427					

ARR = $\frac{\text{Average EBIT (1-t) X 100}}{\text{Average Investment}} = \frac{\text{1, 27,805 X100}}{\text{4, 71,427}}$

= 27.11%

Note: Unabsorbed depreciation of Yr. 1 is carried forward and set-off against profits of Yr. 2. Tax is calculated on the balance of profits
= 33.99% (90,000 – 50,000)
= 13,596/-

2.8 EARNINGS PER SHARE (EPS)

EPS is one of the major criterion for capital investment appraisal. The value of a firm is maximized if the market price of equity shares is maximized.

$$EPS = \frac{\left[(EBIT - I)(1 - t) - D\right]}{n}$$

Where
EBIT = Earnings before Interest and Tax
I = Interest
t = Corporate tax rate
D = Preference Dividend
n = no. of equity shares

Note: The major drawback of this method is that it ignores cash flows, timing and risk.

2.9 NET PRESENT VALUE (NPV) METHOD

2.9.1 MEANING

Net Present Value = Present Value of Cash Inflows – Present Value of Cash Outflows

The discounting is done by the entity's weighted average cost of capital.

The discounting factors is given by : $\frac{1}{(1+i)^n}$

Where
i = rate of interest per annum
n = no. of years over which discounting is made.

2.9.2 MERITS

(1) It recognizes the Time Value of Money.

(2) It considers total benefits during the entire life of the Project.

(3) This is applicable in case of mutually exclusive Projects.

(4) Since it is based on the assumptions of cash flows, it helps in determining Shareholders Wealth.

2.9.3 DEMERITS

(1) This is not an absolute measure.

(2) Desired rate of return may vary from time to time due to changes in cost of capital.

(3) This Method is not effective when there is disparity in economic life of the projects.

(4) More emphasis on net present values. Initial investment is not given due importance.

2.9 .4 SOLVED PROBLEMS

Illustration 11:

Z Ltd. has two projects under consideration A & B, each costing Rs. 60 lacs.

The projects are mutually exclusive. Life for project A is 4 years & project B is 3 years. Salvage value NIL for both the projects. Tax Rate 33.99%. Cost of Capital is 15%.

Net Cash Inflow (Rs. Lakhs)

At the end of the year	Project A	Project B	P.V. @ 15%
1	60	100	0.870
2	110	130	0.756
3	120	50	0.685
4	50	—	0.572

Solution :

Computation of Net Present Value of the Projects.

Project A **(Rs. lakhs)**

	Yr. 1	Yr. 2	Yr. 3	Yr. 4
1. Net Cash Inflow	60.00	110.00	120.00	50.00
2. Depreciation 1	15.00	15.00	15.00	15.00
3. PBT (1–2)	45.00	95.00	105.00	35.00
4. Tax @ 33.99%	15.30	32.29	35.70	11.90
5. PAT (3–4)	29.70	62.71	69.30	23.10
6. Net Cash Flow (PAT+Depn)	44.70	77.71	84.30	38.10
7. Discounting Factor	0.870	0.756	0.685	0.572

8. P.V. of Net Cash Flows	38.89	58.75	57.75	21.79
9. Total P.V. of Net Cash Flow	= 177.18			
10. P.V. of Cash outflow (Initial Investment)	= 60.00			
Net Present Value	**= 117.18**			

Project B

	Yr. 1	**Yr. 2**	**Yr. 3**
1. Net Cash Inflow	100.00	130.00	50.00
2. Depreciation	20.00	20.00	20.00
3. PBT (1–2)	80.0	110.00	30.00
4. Tax @ 33.99%	27.19	37.39	10.20
5. PAT (3–4)	52.81	72.61	19.80
6. Next Cash Flow (PAT + Dep.)	72.81	92.61	39.80
7. Discounting Factor	0.870	0.756	0.685
8. P.V. of Next Cash Flows	63.345	70.01	27.263
9. Total P.V. of Cash Inflows	= 160.621		
10. P.V. of Cash Outflows (Initial Investment)	= 60.00		
Net Present Value	**= 100.621**		

As Project "A" has a higher Net Present Value, it has to be taken up.

2.10 INTERNAL RATE OF RETURN (IRR)

2.10.1 MEANING

Internal Rate of Return is a percentage discount rate applied in capital investment designs which brings the cost of a project and its expected future cash flows into equality, i.e., NPV is zero.

2.10.2 MERITS:

(i) The Time Value of Money is considered.
(ii) All cash flows in the project are considered.

2.10.3 DEMERITS

(i) Possibility of multiple IRR, interpretation may be difficult.

(ii) If two projects with different inflow/outflow patterns are compared, IRR will lead to peculiar situations.

(iii) If mutually exclusive projects with different investments, a project with higher investment but lower IRR contributes more in terms of absolute NPV and increases the shareholders' wealth.

2.10.4 SOLVED PROBLEMS

Ilustration 1:

Project Cost	Rs. 1,10,000

Cash Inflows:

Year 1	Rs. 60,000
Year 2	Rs. 20,000
Year 3	Rs. 10,000
Year 4	Rs. 50,000

Calculate the Internal Rate of Return.

Solution:

Internal Rate of Return will be calculated by the trial and error method. The cash flow is not uniform. To have an approximate idea about such rate, we can calculate the "Factor". It represent the same relationship of investment and cash inflows in case of payback calculation:

F = I/C

Where F = Factor

I = Original investment

C = Average Cash inflow per annum

Factor for the project = $\frac{1,10,000}{35,000}$ = 3.14

The factor will be located from the table "P.V. of an Annuity of Rs. 1" representing number of years corresponding to estimated useful life of the asset.

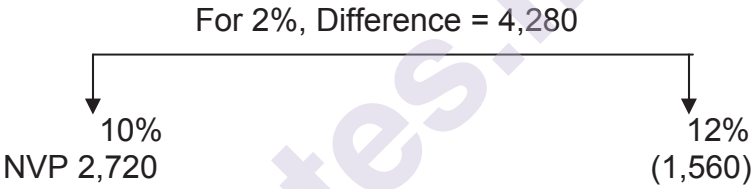
The approximate value of 3.14 is located against 10% in 4 years.

We will now apply 10% and 12% to get (+) NPV and (–) NPV [Which means IRR lies in between]

Year	Cash Inflows (Rs.)	P.V. @ 10% DCFAT		P.V. @ 12% DCFAT	
			(Rs.)		(Rs.)
1	60,000	0.909	54,540	0.893	53,580
2	20,000	0.826	16,520	0.797	15,940
3	10,000	0.751	7,510	0.712	7,120
4	50,000	0.683	34,150	0.636	31,800

P.V. of Inflows	1,12,720	1,08,440
Less : Initial Investment	1,10,000	1,10,000
NPV	**2,720**	**(1,560)**

Graphically,



IRR may be calculated in two ways :

Forward Method : Taking 10%, (+) NPV

$$IRR = 10\% + \frac{\text{NPV at 10\%}}{\text{Total Difference}} \times \text{Difference in Rate}$$

$$= 10\% + \frac{2720}{4280} \times 2\%$$

$$= 10\% + 1.27\% = 11.27\%$$

Backward Method: Taking 12%, (–) NPV

$$IRR = 12\% + \frac{(1560)}{4280} \times 2\%$$

$$= 12\% - 0.73\% = 11.27\%$$

The decision rule for the internal rate of return is to invest in a project if its rate of return is greater than its cost of capital.

For independent projects and situations involving no capital rationing, then:

Situation	Signifies	Decision
IRR = Cost of Capital	The investment is expected not to change shareholder wealth	Indifferent between Accepting & Rejecting
IRR > Cost of Capital	The investment is expected to increase shareholders wealth	Accept
IRR < Cost of Capital	The investment is expected to decrease shareholders wealth	Reject

2.11 NPV-IRR CONFLICT

Let us consider two mutually exclusive projects A & B.

	Project A	Project B	Decision
Cost of Capital	10%	10%	
IRR	13%	11%	Project A
NPV	1,00,000	1,10,000	Project B

When evaluating mutually exclusive projects, the one with the highest IRR may not be the one with the best NPV.

The conflict between NPV and IRR for the evaluation of mutually exclusive projects is due to the reinvestment assumption:

- NPV assumes cash flows reinvested at the cost of capital.
- IRR assumes cash flows reinvested at the internal rate of return.

The reinvestment assumption may cause different decisions due to:

- Timing difference of cash flows.
- Difference in scale of operations.
- Project life disparity.

Terminal Value Method

Assumption:

(1) Each cash flow is reinvested in another project at a predetermined rate of interest.

(2) Each cash inflow is reinvested elsewhere immediately after the completion of the project.

Decision-making

If the P.V. of Sum Total of the Compound reinvested cash flows is greater than the P.V. of the outflows of the project under consideration, the project will be accepted otherwise not.

Illustration 1:

Original Investment Rs. 40,000
Life of the project 4 years
Cash Inflows Rs. 25,000 for 4 years
Cost of Capital 10% p.a.
Expected interest rates at which the cash inflows will be reinvested:

Year-end	1	2	3	4
%	8	8	8	8

Solution:

First of all, it is necessary to find out the total compounded sum which will be discounted back to the present value.

Year	Cash Inflows (Rs.)	Rate of Int. (%)	Yrs. of Investment	Compounding Factor	Total Compounding (Rs.)
1	25,000	8	3	1.260	31,500
2	25,000	8	2	1.166	29,150
3	25,000	8	1	1.080	27,000
4	25,000	8	0	1.000	25,000
	1,12,650				

Present Value of the sum of compounded values by applying the discount rate @ 10%

$$\text{Present Value} = \frac{\text{Compounded Value of Cash Inflow}}{(1+i)^n}$$

$$= \frac{1,12,650}{(1.10)^4}$$

$$= 1,12,650 \times 0.683 = 76,940/-$$

[0.683 being the P.V. of Re. 1 receivable after 4 years]

Decision: The present value of reinvested cash flows, i.e., Rs. 76,940 is greater than the original cash outlay of Rs. 40,000.

The project should be accepted as per the terminal value criterion.

Profitability Index:

$$\text{Profitability Index} = \frac{\text{P.V. of cash Inflow}}{\text{P.V. of cash Outflow}}$$

If P.I > 1, project is accepted
P.I < 1, project is rejected

The PI signifies present value of inflow per rupee of outflow. It helps to compare projects involving different amounts of initial investments.

Illustration 2:
Initial investment Rs. 20 lacs. Expected annual cash flows Rs. 6 lacs for 10 years. Cost of
Capital @ 15%.
Calculate Profitability Index.

Solution:
Cumulative discounting factor @ 15% for 10 years = 5.019
P.V. of inflows = 6.00 × 5.019 = Rs. 30.114 lacs.

$$\text{Profitability Index} = \frac{\text{P.V. of Inflows}}{\text{P.V. of Outflows}} = \frac{30.114}{20} = 1.51$$

Decision: The project should be accepted.
Discounted Payback Period

In Traditional Payback period, the time value of money is not considered. Under discounted payback period, the expected future cash flows are discounted by applying the appropriate rate, i.e., the cost of capital.

Illustration 3:

Initial Investment Rs. 1,00,000
Cost of Capital @ 12% p.a.

Expected Cash Inflows

Yr. 1	Rs. 25,000
Yr. 2	Rs. 50,000
Yr. 3	Rs. 75,000
Yr. 4	Rs. 1,00,000
Yr. 5	Rs. 1,50,000

Calculate Discounted Payback Period.

Solution:

Year	Cash Inflows (Rs.)	Discounting Factor @ 12%	Discounted Cash Flows (Rs.)	Cumulative DCF (Rs.)
1	25,000	0.8929	22,323	22,323
2	50,000	0.7972	39,860	62,183
3	75,000	0.7117	53,378	1,15,561
4	1,00,000	0.6355	63,550	1,79,111
5	1,50,000	0.5674	85,110	2,64,221

The recovery was made between 2nd and 3rd year.

$$\text{Discounted Payback Period} = 2\text{ Years} + \frac{1{,}00{,}000 - 62{,}183}{1{,}15{,}561 - 62{,}183} \times 12$$

$$= 2\text{ Years} + \frac{37{,}817}{53{,}378} \times 12$$

= 2 years 8 ½ Months.

2.12 QUESTIONS

A - Find out the correct option:

1. Long-term decisions are called as
   a) Capita budgeting decisions
   b) Working capital decisions
   c) Future decisions

2. Capital budgeting decisions involve huge amount of risk due to
   a) Time factor
   b) Money factor
   c) Human factor

3. Payback period is
   a) The time required to recover the original investment
   b) The time required to depreciate asset
   c) The time required to pay to creditor

4. N.P.V method is
   a) Most traditional
   b) Most modern
   c) Most complicated

5. P.I is the proportion between
   a) PV of cash inflow and PV of cash outflow
   b) PV of cash inflow and total cash outflow
   c) Cash inflow and total cash outflow

6. The method which does not consider investments profitability is
   a) Payback
   b) ARR
   c) NPV
   d) IRR

7. The most reliable method for financing capital budget decision
   a) NPV
   b) ARR
   c) Payback
   d) Post audit method

8. P. Ltd is adding a new product line which requires an investment of Rs. 14,54,000. The life of the project will be 10 years and will generate cash inflow of Rs. 3,10,000 for the first year, Rs. 2,80,000 for the second year and Rs. 2,40,000 for each year thereafter for eight years. The payback period is
   a) 6 years
   b) 5 years & 7.2 months
   c) 7 years
   d) 4.5 years

9. Cost of project A is as 2, 72,000 and offers eight annual net cash inflow of Rs. 60,000. The expected rate of return is 14%. The NPV will be
   a) 6,340
   b) 7,400
   c) 8,590
   d) 4,300

10. P.I is the proportion between
    a) PV of cash inflow / scrap value
    b) PV of cash inflow / investment
    c) PV of cash inflow / life of the project
    d) None of the above

11. In replacement decision market value of existing assets is considered as
    a) Cash inflow
    b) Cash outflow
    c) Scrap value
    d) Cost of capital

12. Working capital required is treated as
    a) Cash outflow
    b) Cash inflow
    c) Cost of capital
    d) None of the above

13. Retrenchment compensation to employees is treated as
    a) Cash inflow
    b) Cash outflow
    c) Cost of capital
    d) None of the above

14. Under capital rationing situation, the method used to rank the indivisible projects is
    a) NPV
    b) PI
    c) Payback
    d) None of the above

B - State with reasons whether the following statements are true or false:

1. Investors are required to select right securities for investment of their surplus money.
2. Liquidity is convertibility of investments into cash.
3. Investors do not expect regular income.
4. Jewellery does not give recurring income.
5. Investments in shares results in dividend.
6. An investor does not expect liquidity of investment.
7. Appreciation growth in the value of investment.
8. Capital budgeting decisions are long term investment decisions.
9. Cost of investment is a part of cash outlay.
10. Depreciation should be added back to N.P. after tax to get cash inflow.
11. Capital budgeting decisions are very easy to take.
12. The project with longer payback period should be selected.
13. N P V method considers time value.

14. IRR is the best method of evaluating capital budgeting projects.
15. The cost of capital of a new projects is 18%. Two competing projects X and Y having IRR of 17% and 16% respectively project X has higher IRR. Hence it should be accepted.
16. Both IRR and NPV can be zero.
17. Cost of disposal of the existing machine is considered as cash outflow.

C - Fill in blanks.

1. Capital budgeting decision are _____.
2. Cash inflow should be after _____ buy before_____.
3. Scrap value _____cash inflow in the last year.
4. In capital _____ limited funds are allocated a among the financially viable projects.
5. Capital Rationing is done when funds are_____.
6. Tax saving on loss on sale of existing value is considered as _____.
7. Training cost of employees is considered as _____ in capital budgeting.

D - Match the Column:

	Group A		Group B
1	Capital budgeting decisions	A	Average / Average Investment
2	Capital budgeting decisions	B	Discounted cash flow
3	ARR	**D**	Considers time value of money
4	NPV	E	More risky
5	Discounted cash flow	**F**	Long term investment decisions

E – Answer the following Questions.

1. Write short notes on:
   1. DFC Technique
   2. Pay Back Period
   3. I.R.R.
2. What are the various factors that you would consider in appraising a project proposal?

❖❖❖❖

3

INVESTMENT DECISIONS- II

Unit Structure :

3.1 OBJECCTIVES

After studying the unit the students will be able to solve the problems related to the Investment Appraisal Techniques.

3.2 PROBLEMS & SOLUTIONS

Illustration 1 : Zenith Industrial Ltd. are thinking of investing in a project costing Rs. 20 lakhs. The life of the project is five years and the estimated salvage value of the project is zero. Straight line method of charging depreciation is followed. The tax rate is 50%. The expected cash flows before tax are as follows:

Year	1	2	3	4	5
Estimated Cash flow before depreciation and tax (Rs. lakhs)	4	6	8	8	10

You are required to determine the : (i) Payback Period for the investment, (ii) Average Rate of Return on the investment, (iii) Net Present Value at 10% Cost of Capital, (iv) Benefit-Cost Ratio.

Solution:

Calculation of Annual Cash Inflow After Tax (Rs. lakhs)

Particulars	1 year	2 year	3 year	4 year	5 year
Cash inflow before depreciation and tax	4	6	8	8	10
Less : Depreciation	4	4	4	4	4
EBT	-	2	4	4	6

Less : Tax @ 50%	-	1	2	2	3
EAT	-	1	2	2	3
Add : Depreciation	4	4	4	4	4
Cash inflow after tax	4	5	6	6	7

(i) Pay Back Period :

Year	Cash inflow after tax	Cumulative cash inflow after tax
1	4	4
2	5	9
3	6	15
4	6	21
5	7	28

Pay Back Period = 3 years + $\frac{\text{Rs.5 Lakhs}}{\text{Rs.6 Lakhs}}$ X 12 Months

= 3 Years 10 Months

(ii) Average Rate of Return

Average return = Rs.8 lakhs/5 years = Rs. 1.6 lakhs

Average investment = Rs. 20 lakhs/2 = Rs. 10 lakhs

Average rate of return = $\frac{1.6}{10}$ X100 = 16%

(iii) Net Present Value at 10% Cost of Capital (Rs. lakhs)

Year	Cash inflow after tax	Discount factor @ 20%	Present Value
1	4	0.909	3.636
2	5	0.826	4.130
3	6	0.751	4.506
4	6	0.683	4.098
5	7	0.621	4.347

P.V. of Cash Inflows 20.717

Less: Initial Investment 20.00

NPV 0.717

(iv) Benefit-Cost Ratio = $\frac{\text{P.V. of Cash Inflow}}{\text{P.V. of cash outflow}} = \frac{20.717}{20}$

= 1.036

Illustration 2:

The relevant information for two alternative systems of internal transportation are given below:(Rs. Million)

Particulars	System 1	System 2
Initial investment	6	4
Annual operating costs	1	0.9
Life	6 years	4 years
Salvage value at the end	2	1.5

Which system would you prefer if the cost of capital is 6%? Justify your recommendation with appropriate analysis.

[Present value of annuity at 6% for 6 years = 4.917 and for 4 years = 3.465. Present value of Rs. 1.00 at 6% at the end of 6the year 0.705 and that at the end of 4th year 0.792].

Solution :

P.V. of Costs of Internal Transportation - System 1 (Rs. Million)

Initial investment	(6×1.000)	6.000
Add : Annual operating cost	(1×4.917)	4.917
		10.917
Less : Salvage value at the end of 6 years	(2×0.705)	1.410
P.V. cash outflow		**9.507**

P.V. of Costs of Internal Transportation - System 2 (Rs. Million)

Initial investment	(4×1.000)	4.000
Add : Annual operating cost	(0.9×3.465)	3.1185
		7.1185
Less : Salvage value at the end of 6 years	(1.5×0.792)	1.188
P.V. cash outflow		**5.9305**

Equivalent Annual Cost

$$\text{System 1} = \frac{9.507}{4.917} = \text{Rs. 1.93 Million}$$

$$\text{System 2} = \frac{5.9305}{3.465} = \text{Rs. 1.71 Million}$$

Analysis: The equivalent annual cost of System 2 is less than Sysem 1. Hence, System 2 is suggested to takeup.

Illustration 3:

A company is considering which of two mutually exclusive projects is should undertake. The Finance Director thinks that the

project with the higher NPV should be chosen whereas the Managing Director think that the one with the higher IRR should be undertaken especially as both projects have the same initial outlay and length of life. The company anticipates a cost of capital of 10% and the net after-tax cash flows of the projects are as follows:

Year	0	1	2	3	4	5
Cash Flows :						
Project X	(200)	35	80	90	75	20
Project Y	(200)	218	10	10	4	3

Required :

(a) Calculate the NPV and IRR of each project.
(b) State, with reasons, which project you would recommend.
(c) Explain the inconsistency in the ranking of the two projects.

The discount factors are as follows :

Year	**0**	**1**	**2**	**3**	**4**	**5**
Discount Factors: (10%)	1	0.91	0.83	0.75	0.68	0.62
(20%)	1	0.83	0.69	0.58	0.48	0.41

Solution :

(a) Calculation of the NPV and IRR of each project
NPV of Project X

Year	**Cash Flows**	**Discount Factors @ 10%**	**Discounted Values**	**Discount Factors @ 20%**	**Discounted Values**
0	(200)	1.00	(200)	1.00	(200)
1	35	0.91	31.85	0.83	29.05
2	80	0.83	66.40	0.69	55.20
3	90	0.75	67.50	0.58	52.20
4	75	0.68	51.00	0.48	36.00
5	20	0.62	12.40	0.41	8.20
NPV			+29.15		-19.35

IRR of Project X

At 20% NPV is -19.35
At 10% NPV is +29.15

$$IRR = 10 + \frac{29.15}{29.15 + 19.35} \times 10 = 10 + \frac{29.15}{48.50} \times 10 = 16.01\ \%$$

Financial Management Decisions

NPV of Project Y

Year	Cash Flows	Discount Factors @10%	Discounted Values	Discounted Factors @20%	Discounted Value
0	(200)	1.00	(200)	1.00	(200)
1	218	0.91	198.38	0.83	180.94
2	10	0.83	8.30	0.69	6.90
3	10	0.75	7.50	0.58	5.80
4	4	0.68	2.72	o.48	1.92
5	3	0.62	1.86	0.41	1.23
NPV			+18.76		-3.21
IRR of Project Y					

At 20% NPV is -3.21
At 10% NPV is +18.76
IRR = 10 + 18.76/18.76 + 3.21 x 10 = 10 + 18.76/21.97x10
= 18.54%

(b) Both the projects are acceptable because they generate the positive NPV at the company's cost of capital at 10%. However, the company will have to select Project X' because it has a higher NPV. If the company follows IRR method, then Project Y should be selected because of higher internal rate of return (IRR). But when NPV and IRR give contradictory results, a project with higher NPV is generally preferred because of higher return in absolute terms. Hence project X should be selected.

(c) The inconsistency in the ranking of the projects arises because of the difference in the pattern of cash flows. Project X's major cash flows occur mainly in the middle three years, whereas Y generates the major cash flows in the first itself.

Illustration 4:
Projects X and Y are analyzed and you have determined the following parameters. Advice the investor on the choice of a project:

Particulars	Project X	Project Y
Invest	Rs. 7 cr.	Rs. 5 cr.
Project life	8 years	10 years
Construction period	3 years	3 years
Cost of capital	15%	18%
N.P.V. @ 12%	Rs. 3,700	Rs. 4,565
N.P.V. @ 18%	Rs. 325	Rs. 325
I.R.R.	45%	32%
Rate of return	18%	25%
Payback	4 years	6 years
B.E.P.	45%	30%
Profitability index	1.76	1.35

Solution:
Relative Ranking of Project X and Project Y

Particular's	Rank	
	Project X	Project Y
IRR	I	II
Rate of Return	II	I
Pay back	I	II
Profitability index	I	II
NVP @ 12%	II	I
NVP @ 18%	Equal	Equal
B.E.P.	II	I
Cost of Capital	I	II

Analysis: The major criterion i.e., IRR, Pay back and Profitability Index in which Project X is ranking first and hence it could be selected.

Illustration 5:

A company is contemplating to purchase a machine. Two machine A and B are available, each costing Rs. 5 lakhs. In comparing the profitability of the machines, a discounting rate of 10% is to be used and machine is to be written off in five years by straight-line method of depreciation with nil residual value. Cash inflows after tax are expected as follows:

(Rs. in lakhs)

Year	Machine A	Machine B
1	1.5	0.5
2	2.0	1.5
3	2.5	2.0
4	1.5	3.0
5	1.0	2.0

Indicate which machine would be profitable using the following methods of ranking investment proposals:

(i) Pay back method : (ii) Net present value method; (iii) Profitability index method; and (iv) Average rate of return method.

The discounting factors at 10% are—

Year	1	2	3	4	5
Discount factors	.909	.826	.751	.683	.621

Solution:

(i) Payback Period (PB) = $\frac{\text{Initial Investment}}{\text{Annual cash inflows}}$

Calculation of payback period:
Machine A

Year	Cash Inflows		Payback years required
	Total	Needed	
1	1.50	1.50	1 year
2	2.00	2.00	1 year
3	2.50	1.50	$\frac{1.50}{2.50} \times 12$ Months = 7.2

Year	Cash Inflows		Payback years required
	Total	Needed	
1	0.50	.50	1 year
2	1.50	1.50	1 year
3	2.00	2.00	1 year
4	3.00	1.00	(1/3 X 12) = 4 Months
		5.00	

Payback period for Machine B = 3 years 4 months.
Rank : Machine A – I, Machine B – II, Machine A is more profitable.

(ii) Calculation of Net present value of cash inflows for Machine A & Machine B.

Years	Cash Inflows		Discount Factor @10%	P.V. Of Cash Inflows	
	Machine A	Machine B		Machine A	Machine B
1	1.5	0.5	.909	1.36	0.45
2	2.0	1.5	.826	1.65	1.24
3	2.5	2.0	.751	1.88	1.50
4	1.5	3.0	.683	1.02	2.05
5	1.0	2.0	.621	0.62	1.24
				6.53	6.48
Total P.V.				6.53	6.48
Initial Investment				5.00	5.00
Net Present Value (NPV)				1.53	1.48

Rank: Machine – A – I, Machine B – II

Since Machine A has grater NPV compared to Machine B, Machine A is more profitable.

(iii) Calculation of profitability Index

	Machine A	Machine B
Profitability Index = Present value of Cash Inflows / Present value of Cash outflows	$\frac{6.53}{5.00} = 1.306$	$\frac{6.48}{5.00} = 1.296$
Rank	I	II

Machine A is more profitable.

iv) $\text{Calculation of Average Rate of Return} = \frac{\text{Average annual earnings}}{\text{Initial Cost}} \times 100$

Rs. in Lakhs

	Machine A	Machine B
Total Cash Inflow	8.50	9.00
Less: Deprecation for 5 years	5.00	5.00
Net earning after tax and depreciation	3.50	4.00

Life of machine (yrs)	5	5
Average earnings per year	.70	0.80
Initial Cost	5	5
ARR	$\frac{0.70}{5.00} \times 100 = 14\%$	$\frac{0.80}{5.00} \times 100 = 16\%$
Rank	II	I

Machine B is more profitable.

Illustration 6:
Determine which of the following two mutually exclusive projects should be selected if they are:

(i) One-off investments or (ii) If they can be repeated indefinitely :

(Rs.)

Particulars	Project A	Project B
Investment	40,000	60,000
Life	4 years	7 years
Annual net cash inflows	15,000	16,000
Scrap value	5,000	3,000

Cost of capital is 15%. Ignore taxation. The Present Value of annuity for 4 years and 7 years at 15% are respectively 2.8550 and 4.1604 and the discounting factors at 4 years/7 years respectively 0.5718 and 0.3759.

Solution:

(i) Project A (Rs.)			
Year	Cash flow	Discount factor	Present value
0	(40,000)	1.0000	(40,000)
1-4	15,000	2.8550	42,825
4	5,000	0.5718	2,859
NPV = 5,684			

(i) Project B (Rs.)			
Year	Cash flow	Discount factor	Present value
0	(60,000)	1.0000	(60,000)
1-7	16,000	4.1604	66,566
7	3,000	0.3759	1,128
NPV = 7,694			

Suggestion: If Projects A and B are one-off investments, then Project B is preferable.

(ii) Uniform Annual Equivalent

$$A = \frac{5,684}{2.8550} = 1,991 \qquad B = \frac{7,694}{4,1604} = 1,849$$

Suggestion: Choose Project A for continual repeats.

Illustration 7: Company X is forced to choose between two machines A and B. The two machines are designed differently, but have identical capacity and do exactly the same job. Machine A costs Rs. 1,50,000 and will last for 3 years. It costs Rs. 40,000 per year to run. Machine B is an 'economy' model costing only Rs. 1,00,000, but will last only for 2 years, and costs Rs 60,000 per year to run. These are real cash flows. The costs are forecasted in rupees of constant purchasing power. Ignore tax. Opportunity cost of capital is 10 per cent. Which machine company X should buy?

Solution :

Working Notes :

Compound present value of 3 years @ 10% = 2.486
P.V. of Running cost of Machine A for 3 years = Rs. 40,000×2.486
= Rs. 99,440
Compound present value of 2 years @ 10% = 1.735
P.V. of Running cost of Machine B for 2 years = Rs. 60,000×1.735
= Rs. 1,04,100

Statement showing evaluation of Machine A and B (Rs.)

Particulars	Machine A	Machine B
Cost of purchase	1,50,000	1,00,000
Add : P.V. of running cost for 3 years	99,440	1,04,100
	2,49,440	2,04,100
P.V. Cash outflow	2,49,440	2,04,100
	2,486	1,735

Equivalent Present value of annual Cash outflow = 1, 00,338 = 1,17,637

Analysis: Since the annual Cash outflow of Machine B is highest, Machine A can be purchased.

Illustration 8:

A particular project has a four-year life with yearly projected net profit of Rs. 10,000 after charging yearly Depreciation of Rs. 8,000 in order to write-off the capital cost of Rs. 32,000. Out of the Capital cost Rs. 20,000 is payable immediately (Year 0) and balance in the next year (which will be the Year 1 for evaluation). Stock amounting to Rs. 6,000 (to be invested in Year 0) will be required throughout the project and for Debtors a further sum of Rs. 8,000 will have to be invested in Year 1. The working capital will be recouped in Year 5. It is expected that the machinery will fetch a residual value of Rs. 2,000 at the end of 4th year. Income Tax is payable @ 40% and the Depreciation equals the taxation writting down allowances of 25% per annum. Income Tax is paid after 9 months after the end of the year when profit is made. The residual value of Rs. 2,000 will also bear Tax @ 40%. Although the project is for 4 years, for computation of Tax and realisation of working capital, the computation will be required up to 5 years.

Taking Discount factor of 10%, calculate NPV of the project and give your comments regarding its acceptability.

(NPV Factors @ 10% - Year 1-0.9091; Yr. 2-0.8264; Yr. 3-0.7513; Yr. 4-0.6830; Yr. 5-0.6209).

Solution:

Calculation of NPV of Project (Rs.)

Particulars	0	1	2	3	4	5
Capital Expenditure	(20,000)	(12,000)	--	--	--	--
Working Capital	(6,000)	(8,000)	--	--	--	--
Net Profit	--	10,000	10,000	10,000	10,000	10,000
Deprecation Add back	--	--	8,000	8,000	8,000	8,000
Tax	--	--	(4,000)	(4,000)	(4,000)	(4,800)
Salvage Value	--	--	--	--	2,000	--
Recovery of Working Capital	--	--	--	--	--	14,000
Net Cash Inflow	(26,000)	(10,000)	14,000	14,000	16,000	27,200
Discount Factor @ 10%	1.000	0.9091	0.8264	0.7513	0.6830	0.6209
Present Value	(26,000)	(9,091)	11,570	10,518	10,928	16,688

Suggestion: Since NPV is Rs. 14,813 ; it is suggested to accept the proposal.

Illustration 9: Following are the data on a capital project being evaluated by the Management of X Ltd.:

Project M

Annual cost saving	Rs. 40,000
Useful life	4 years
I.R.R.	15%
Profitability Index (PI)	1.064
NPV	?
Cost of capital	?
Cost of project	?
Payback	?
Salvage value	0

Find the missing values considering the following table of discount factor only :

Discount	15%	14%	13%	12%
1 year	0.869	0.877	0.885	0.893
2 year	0.756	0.769	0.783	0.797
3 year	0.658	0.675	0.693	0.712
4 year	0.572	0.592	0.613	0.636

Solution:

Calculation of Cost of Project i.e., Initial Cash Outlay of Project M

Annual cost saving = Rs. 40,000
Useful life = 4 years
I.R.R. = 15%

At 15% I.R.R., the total present value of cash inflows is equal to initial cash outlay.

Total present value of cash inflows @ 15% for 4 years is 2.855 = Rs. 40,000 × 2.855 = Rs. 1, 14,200
Project Cost is Rs. 1, 14,200

Calculation of Payback Period of Project M

$$\text{Payback Period} = \frac{\text{Cost of Project}}{\text{Annual Cost Saving}} = \frac{1,14,000}{40,000} = 2.855$$ or 2 years 11 months (approx)

Calculation of Cost of Capital

$$\text{Profitability Index} = \frac{\text{Discounted Cash Inflows}}{\text{Cost of Project}}$$

Profitability Index = 1.064 given

Cost of Project = Rs. 1, 14,200

$$1.064 = \frac{\text{Present value of cash inflows}}{1.14,200}$$

Present value of cash inflows = 1.064 × 1, 14,200 = Rs. 1, 21,509

Cumulative Discount Factor for 4 years

$$= \frac{\text{Present Value of Cash inflows}}{\text{Annual cost saving}}$$

$$= \frac{1,21,509}{40,000}$$

$$= 3.038$$

Looking at present value table at compound discount factor for 4 years is 3.038

Cost of capital = 12%

Calculation Net Present Value of Project

N.P.V = Present Value of Total Cash Inflows - Cost of Project
= 1, 21,509 – 1, 14,200 = Rs. 7,309

Illustration 10 :

XYZ Ltd. is manufacturer of high quality running shoes. Devang. President is considering computerizing the company's ordering, inventory and billing procedures. He estimates that the annual savings from computerization include a reduction of 10 clerical employees with annual salaries of Rs. 15,000 each, Rs. 8,000 from reduced production delays caused by raw materials inventory problems, Rs. 12,000 from lost sales due to inventory stock outs and Rs. 3,000 associated with timely billing procedures.

The purchase price of the system is Rs. 2,00,000 and installation costs are Rs. 50,000. These outlays will be capitalized (depreciated) on a straight line basis to a zero book salvage value which is also its market value at the end of five years. Operation of the new system requires two computer specialists with annual

salaries of Rs. 40,000 per person. Also tax rate is 40% and rate of return (cost of capital) for this project is 12%. Maintenance & Operating expenses is Rs. 12,000 p.a.

You are required to:

(i) Find the project's initial net cash outlay.

(ii) Find the project's operating and terminal value cash flows over its 5 year life.

(iii) Evaluate the project using NPV method.

(iv) Evaluate the project using PI method.

(v) Calculate the project's payback period.

(vi) Find the project's cash flows and NPV [part (i) through (iii)] assuming that the system can be sold for Rs. 25,000 at the end of five years even though the book salvage value will be zero, and

(vii) Find the project's cash flows and NPV [part (i) though (iii)] assuming that the book salvage value for depreciation purposes is Rs. 20,000 even though the machine is worthless in terms of its resale value.

Note :

(a) Present Value of annuity of Re. 1 at 12% rate of discount for 5 years is 3.605.

(b) Present Value of Re. 1 at 12% rate of discount, received at the end of 5 years is 0.567.

Solution :

(i) Calculation of Project's initial net cash outlay	(Rs.)
Purchase price of system	2,00,000
Installation cost	50,000
Net cash outlay of project	2,50,000

(ii) Calculation of Project's Operating and Terminal Value cash flows over its 5 year life (Rs.)

Savings

Reduction in salaries (10 clerks × Rs. 15,000 p.a.)		1,50,000
Reduction in production delays		8,000
Reduction in lost sales		12,000
Savings from timely billing procedures		3,000
	(a)	**1, 73,000**

Expenses		
Depreciation		50,000
Salaries of computer specialists		80,000
Maintenance & Operating expenses		12,000
	(b)	**1, 42,000**
Profit before tax	(a) – (b)	31,000
Less : Tax @ 40%		12,400
Profit after tax		18,600
Add : Depreciation		50,000
Net cash inflows p.a. for 1 to 5 years		68,600

(iii) Evaluation of Project using NPV method (Rs.)

Year	Cash inflow	P.V. @ 12%	Total P.V.
0	(2,50,000)	1.000	(2,50,000)
1 to 5	68,600	3.605	2,47,303

NPV –2,697

Analysis: Since NPV is negative, the project cannot be accepted under NPV method.

(iv) Evaluation of Project using PI method

$$\text{Profitability Index (PI)} = \frac{\text{Present value of cash inflows}}{\text{Present value of outflows}}$$

$$= \frac{2,47,303}{2,50,000}$$

$$= 0.99$$

Analysis: Since Profitability Index is less than 1, the Project cannot be accepted under this method.

(v) Calculation of the Project's Payback Period : (Rs.)

Year	Net cash inflows	Cumulative cash inflow
1	68,600	68,600
2	68,600	1,37,200
3	68,600	2,05,800
4	68,600	2,74,400
5	68,600	3,43,000

The payback period is 3 years and fraction of the 4th year. The fraction year is calculated as under :

$$= \frac{44,200}{68,600}$$

$$= 0.64$$

Hence, the payback period is 3.64 years.

(vi) Calculation of Project Cash flows and NPV assuming that the system can be sold for Rs. 25,000 at the end of 5 years.

Year	Cash flows	P.V. @ 12%	Total P.V.
0	(2,50,000)	1.000	(2,50,000)
1 to 5	68,600	3.605	2,47,303
5	15,000*	0.567	8,505
NPV	**5,808**		

* Post tax salvage value = 25,000 (1-0.40) = Rs. 15,000

Analysis: Since NPV is positive, the project can be selected.

(vii) Calculation of project's cash flows and NPV assuming that the book salvage value for depreciation purposes is Rs. 20,000 even though the machine is worthless in terms of its resale value :

$$\text{Depreciation p.a.} = \frac{2,50,000 - 20,000}{5 \text{ YEARS}}$$

= Rs. 46,000 p.a.

Cash Inflow p.a.	**(Rs.)**
Savings	1,73,000
Less : Depreciation	46,000
Salaries of computer specialists	80,000
Maintenance cost	12,000
	1,38,000
Profit before tax	35,000
Less : Tax @ 40%	14,000
Profit after tax	21,000
Add : Depreciation	46,000
Cash Inflow p.a.	67,000

Year	**Cash flows Rs.**	**P.V. factor @ 12%**	**Total P.V. Rs.**
0	(2,50,000)	1.000	(2,50,000)
1 to 5	67,000	3.605	2,41,535
5 (tax credit)	8,000	0.567	4,536
NPV	**(3,929)**		

Analysis : Since NPV is negative, Project can be rejected.

Illustration 11:
Xpert Engineering Ltd. is considering buying one of the following two mutually exclusive investment projects:

Project A: Buy a machine that requires an initial investment outlay of Rs. 1,00,000 and will generate the cash flows after tax (CFAT) of Rs. 30,000 per year for 5 years.

Project B: Buy a machine that requires an initial investment outlay of Rs. 1,25,000 and will generate 'cash flows after tax' (CFAT) of Rs. 27,000 per year for 8 years.

Which project should be undertaken? The company uses 10% cost of capital to evaluate the projects.

Note: Present value of Re. 1 for eight years @10% - 0.9091, 0.8264, 0.7513, 0.6830, 0.6209,
0.5645, 0.5132, and 0.4665.

Solution:

Calculation of Net Present Value

Project A		**(Rs.)**
Initial Investment	(1,00,000×1.000)	(1,00,000)
Cash Inflow After Tax	(30,000×3.791)	1,13,730
NPV 13,730		

Project B		**(Rs.)**
Initial Investment	(1,25,000×1.000)	(1,25,000)
Cash Inflow After Tax	(27,000×5.335)	1,44,045
NPV 19,045		

Equivalent Annual NPV
Project A = 13,730/3.791 = Rs. 3,622
Project B = 19,045/5.335 = Rs. 3,570

Analysis

If it is one time Project, Project B suggested, since its NPV is greater than Project A

If a Project is to be replaced every time after the end of economic life of earlier Project, then Project A is preferable, since its equivalent annual NPV is higher than Project B.

Illustration 12:

XYZ Ltd., an infrastructure company is evaluating proposal to build, operate and transfer a section of 35 kms. of road at a project cost of Rs. 200 crores to be financed as follows:

Equity Share Capital Rs. 50 crores, loan at the rate of interest of 15% p.a. from financial institutions Rs. 150 crores. The Project after completion will be opened to traffic and a toll will be collected for a period of 15 years from the vehicles using the road. The company is also required to maintain the road during the above 15 years and after the completion of that period, it will be handed over to the Highway Authorities at zero value. It is estimated that

the toll revenue will be Rs. 50 crores per annum and the annual toll collection expense including maintenance of the roads will amount to 5% of the project cost. The company considers to write off the total cost of the project in 15 years on a straight line basis. For Corporate Income-tax purposes the company is allowed to take depreciation @ 10% on WDV basis. The financial institutions are agreeable for the repayment of the loan in 15 equal annual installments consisting of principal and interest.

Calculate Project IRR. Ignore Corporate taxation.

Solution :

Road Project cost = Rs. 200 crores
Financed by:
Equity Share Capital = Rs. 50 crores
Term Loan from financial institutions @ 15% p.a. = Rs. 150 crores
Annual net cash inflows = Rs. 50 crores - 5% of Rs. 200 crores
= Rs. 40 crores
Maintenance of road = 15 years
Salvage value at the end of 15 years = NIL

Calculation of IRR

$$\text{Factor to be located} = \frac{\text{Original Investment}}{\text{Average annual cash Inflows}} = \frac{\text{Rs. 200 crores}}{\text{Rs. 40 crores}} = 5.000$$

The Present Value annuity factor appearing nearest to 5.092 for 15 years @ 18%

NPV at 18%		(Rs. Crores)
P.V. of annual cash inflow	(40×5.092)	203.68
Initial cash outlay		200.00
NPV		3.68
NPV at 19%		**(Rs. Crores)**
P.V. of annual cash inflow	(40×4.876)	195.04
Initial cash outlay		200.00
NPV		(4.96)

Now, the IRR of the Project is ascertained by method of interpolation as follows:

$$\text{IRR} = 18\% + \frac{3.68}{3.68 - (4.96)} \times 1\%$$

$$= 18\% = \frac{3.68}{8.64} \times 1\%$$

= 18% + 0.426%
= 18.43%

Illustration 13:

An oil company proposes to install a pipeline for transport of crude from wells to refinery. Investments and operating costs of the pipeline vary for different sizes of pipelines (diameter). The following details have been conducted:

(a) Pipeline diamter (in inches)	3	4	5	6	7
(b) Investment required (Rs. lakhs)	16	24	36	64	150
(c) Gross annual savings in operating Costs before depreciation (Rs. lakhs)	5	8	15	30	50

The estimated life of the installation is 10 years. The oil company's tax rate is 50%. There is no salvage value and straight line rate of depreciation is followed.

Calculate the net savings after tax and cash flow generation and recommend there from, the largest pipeline to be installed, if the company desires a 15% post-tax return. Also indicate which pipeline will have the shortest payback. The annuity P.V. factor at 15% for 10 years is 5.019.

Solution :

Determination of CFAT (Rs. Lakhs)

Pipeline Diameter (inches) (1)	Gross Savings (p.a.) (2)	Savings After tax [(2)X50%] (3)	Deprecation (4)	Tax adv.of Deprecation [(4)X50%] (5)	Total cost Savings/CFAT [(3)X5%] (6)
3	5	2.5	1.6	0.8	3.3
4	8	4.0	2.4	1.2	5.2
5	15	7.5	3.6	1.8	9.3
6	30	15.0	6.4	3.2	18.2
7	50	25.0	15.0	7.5	32.5

Payback Period in Years

Inches	Rs. lakhs	Years
3	16/3.3	4.848
4	24/5.2	4.615
5	36/9.3	3.871
6	64/18.2	3.516
7	150/32.5	4.615

Therefore, Pipeline diameter of 6 inches has shortest payback period.

Determination of NPV (Rs. in lakhs)

Pipeline dia (inches)	CFAT for 10 years	PV factor @ 15% 10 yrs.	Total PV	Cash Outflow	NPV
3	3.3	5.019	16.5627	16	0.5627
4	5.2	5.019	26.0988	24	2.0988
5	9.3	5.019	46.6767	36	10.6767
6	18.2	5.019	91.3458	64	27.3458
7	32.5	5.019	163.1175	150	13.1175

Suggestion: Pipeline of 6 inches diameter has highest NPV and it is recommended for installation.

Illustration 14 :

Indo Plastics Ltd. is a manufacturer of high quality plastic products. Rasik, President, is considering computerizing the company's ordering, inventory and billing procedures. He estimates that the annual savings from computerization include a reduction of 4 clerical employees with annual salaries of Rs. 50,000 each, Rs. 30,000 from reduced production delays caused by raw materials inventory problems, Rs. 25,000 from lost sales due to inventory stock outs and Rs. 18,000 associated with timely billing procedures.

The purchase price of the system in Rs. 2, 50,000 and installation costs are Rs. 50,000. These outlays will be capitalised (depreciated) on a straight line basis to a zero books salvage value which is also its market value at the end of five years. Operation of the new system requires two computer specialists with annual salaries of Rs. 80,000 per person. Also annual maintenance and operating (cash) expenses of Rs. 22,000 are estimated to be required. The company's tax rate is 40% and its required rate of return (cost of capital) for this project is 12%.

Your are required to—

(i) evaluate the project using NPV method;
(ii) Evaluate the project using PI method;
(iii) Calculate the Project's payback period.

Note:

(a) Present value of annuity of Re. 1 at 12% rate of discount for 5 years is 3.605.
(b) Present value of Re. 1 at 12% rate of discount, received at the end of 5 years is 0.567.

Solution:

Determination of NPV	**(Rs.)**
Cost	2, 50,000
Installation expenses	50,000
Total net Cash Outlay	3, 00,000

Project's operating and terminal value cash flows over its 5-year life (Rs.) Savings

Reduction in clerks salaries (4×50,000)	2, 00,000
Reduction in production delays	30,000
Reduction in lost sales	25,000
Gains due to timely billing	18,000
	2, 73,000
Less : Expenses	
Depreciation (3, 00,000/5)	60,000
Add : People cost (80,000×2)	1,60,000
Maintenance cost	22,000
	2, 42,000
Profit before Tax	**31,000**
Less : Tax (40%)	12,400
Profit After Tax	**18,600**

Cash flow = Profit After Tax – Depreciation = 18,600 + 60,000 = Rs. 78,600

The cash flows is the same for the years 1 to 5.

Financial Management Decisions

(i) Evaluation of the Project by using Net Present Value (NPV) Method :

Year	Cash Flow After tax (Rs.)	PV of Annuity of Rs.1. At 12% for five years	Total present value (Rs.)
1 to 5	78,600	3,605	28,3,353
Less : Total Initial Cash Outlay			3,00,000
NPV			(16,647)

Since NPV is negative, therefore, the project is unviable.

(ii) Evaluation of the Project by using PI Method.

Profitability Index (PI) = PV of cash inflow/Initial outlay
= 2, 83,353/3, 00,000 = 0.945
Since PI is less than 1.0, the project is unviable.

(iii)Calculation of the Project Payback Period (Rs.**)**

Year	Net cash flow	Cumulative cash flow
1	78,600	78,600
2	78,600	1,57,200
3	78,600	2,35,800
4	78,600	3,14,400
5	78,600	3,93,000

Hence, the payback period is 3 years plus a fraction of the 4^{th} year. The fraction of the year can be calculated as under:

$$\frac{64,200}{78,600} = 0.82$$

Therefore, the payback period is 3.82 years.

4

INVESTMENT DECISIONS III

Unit Structure :

4.0 OBJECTIVES

After studying the unit the students will be able to:

- Understand the meaning of Capital Rationing.
- Discuss the Factors leading to capital rationing.
- Solve the problems.

4.1 CAPITAL RATIONING

4.1.1 MEANING

Capital rationing is a situation where a constraint or budget ceiling is placed on the total size of capital expenditures during a particular period. Often firms draw up their capital budget under the assumption that the availability of financial resources is limited.

Under this situation, a decision maker is compelled to reject some of the viable projects having positive net present value because of shortage of funds. It is known as a situation involving capital rationing.

4.1.2 FACTORS LEADING TO CAPITAL RATIONING

Two different types of capital rationing situation can be identified, distinguished by the source of the capital expenditure constraint.

I. External Factors - Capital rationing may arise due to external factors like imperfections of capital market or deficiencies in market information which might have for the availability of capital.

Generally, either the capital market itself or the Government will not supply unlimited amounts of investment capital to a company, even though the company has identified investment opportunities which would be able to produce the required return. Because of these imperfections the firm may not get necessary amount of capital funds to carry out all the profitable projects.

II. Internal Factors - Capital rationing is also caused by internal factors which are as follows:

Reluctance to take resort to financing by external equities in order to avoid assumption of further risk

Reluctance to broaden the equity share base for fear of losing control.

Reluctance to accept some viable projects because of its inability to manage the firm in the scale of operation resulting from inclusion of all the viable projects.

4.1.3 SITUATIONS OF CAPITAL RATIONING

Situation I - Projects are divisible and constraint is a single period one:

The following are the steps to be adopted for solving the problem under this situation:

a. Calculate the profitability index of each project
b. Rank the projects on the basis of the profitability index calculated in (a) above.
c. Choose the optimal combination of the projects.

Situation II - Projects are indivisible and constraint is a single period one

The following steps to be followed for solving the problem under this situation:

a. Construct a table showing the feasible combinations of the project (whose aggregate of initial outlay does not exceed the fund available for investment.

b. Choose the combination whose aggregate NPV is maximum and consider it as the optimal project mix.

4.2 SOLVED PROBLEMS ON CAPITAL RATIONING

Illustration 1: In a capital rationing situation (investment limit Rs. 25 lakhs), suggest the most desirable feasible combination on the basis of the following data (indicate justification) :

(Rs. lakhs)

Year	Net cash flow	NPV
A	15	6
B	10	4.5
C	7.5	3.6
D	6	3

Project B and C are mutually exclusive.

Solution :

Determination of feasible combination in Capital Rotationing Situation (Investment Limit Rs. 25 lakhs)

(Rs. lakhs)

Combination	Total outlay	NPV
A & B	25.00	10.50
A & C	22.50	9.60
A & D	21.00	9.00
B & D	16.00	7.50
C & D	13.50	6.60

Analysis : From the above analysis it is observed that projects A&B combination give highest NPV of Rs. 10.50 lakhs. Therefore by undertaking projects A and D, the wealth maximation is possible.

Illustration 2 : The total available budget for a company is Rs. 20 crores and the total cost of the projects is Rs. 25 crores. The projects listed below have been ranked in order of profitability. There is possibility of submitting X project where cost is assumed to be Rs. 12 crores and it has the Profitability Index of 140.

Project	Cost (Rs. crores)	Profitability index (P.V. of cash inflow/PV of cash outflows) x 100
A	6	150
B	5	125
C	7	120
D	2	115
E	5	110
	25	

Which projects, including X, should be acquired by the company?

Solution :

N.P.V of Projects

Project	Cost	PI	P.V. of cash inflow	NPV
(1)	(2)	(3)	(2) x (3) = (4)	(4) - (2) = (5)
A	6	1.5	9.00	3.00
B	5	1.25	6.25	1.25
C	7	1.20	8.40	1.40
D	2	1.15	2.30	0.30
E	5	1.10	5.50	0.50
X	13	1.40	18.20	5.20

Selection of project based on NPV, subject to the availability of total funds Rs. 20 crores.

Project	NPV	Project cost
X	5.20	13
A	3.00	6
	8.20	19

The company will maximize its NPV by undertaking X and A, which require total funds of Rs.19 crores. This option is suggested even though there is no full utilisation of total funds. The surplus funds of Rs. 1 crore can be deployed elsewhere profitably.

The following combination of projects will not maximise NPV :

Project	NPV	Project cost
(i) X	5.20	13
B	1.25	5
	6.45	18
(ii) X	5.20	13
C	1.40	7
	6.60	20
(iii) X	5.20	13
B	1.25	5
D	0.30	2
	6.75	20

Illustration 3: S. Ltd., has Rs. 10,00,000 allocated for capital budgeting purpose. The following proposal and associated profitability indexes have been determined :

Project	Cost Rs.)	Profitability Index
1	3,00,000	1.22
2	1,50,000	0.95
3	3,50,000	1.20
4	4,50,000	1.18
5	2,00,000	1.20
6	4,00,000	1.05

Which of the above investment should be undertaken? Assume that projects are indivisible and there is no alternative use of the money allocated for capital budgeting.

Solution :

Statement Showing Ranking of Projects on the basis of Profitability Index (P.I.)

Project	Cost (Rs.)	P.I	Rank
1	3,00,000	1.22	1
2	1,50,000	0.95	5
3	3,50,000	1.20	2
4	4,50,000	1.18	3
5	2,00,000	1.20	2
6	4,00,000	1.05	4

Statement showing NPV of Projects (Rs.)

Project	Cost	P. I.	Cash inflow (2) x (3)	NPV (4) - (2)
(1)	(2)	(3)	(4)	(5)
1	3,00,000	1.22	3,66,000	66,000
2	1,50,000	0.95	1,42,500	(7,500)
3	3,50,000	1.20	4,20,000	70,000
4	4,50,000	1.18	5,31,000	81,000
5	2,00,000	1.20	2,40,000	40,000
6	4,00,000	1.05	4,20,000	20,000

Selection Projects

- Profitability Index method : Assuming the projects are indivisible and there is no alternative use of unutilized amount, S. Ltd. is advised to undertake investment in projects 1,3 and 5, which will give N.P.V. of Rs. 1,76,000 and unutilized amount will be Rs. 1,50,000.

- Net present value method : As per this method projects 3, 4 and 5 can be undertaken which will be Rs. 1,91,000 and no money will remain unspent.

Suggestion :

From the above analysis, we can observe that, selection of projects under NPV method will maximize S Ltd.'s net 45cash inflow by Rs. 15,000 (i.e., 1,91,000 – 1,76,000), Hence, it is suggested to undertake investment in project 3, 4 and 5.

Illustration 4

Alpha Limited is considering five capital projects for the year 2003 and 2004. The company is financed by equity entirely and its cost of capital is 12%. The expected cash flow of the projects is as below:

Year ended Cash flows

Projects	2003	2004	2005	2006
A	(70)	35	35	20
B	(40)	(30)	45	55
C	(50)	(60)	70	80
D	-	(90)	55	65
E	(60)	(20)	40	50

Note : Figures in brackets represent cash outflows.

All projects are divisible i.e., size of investment can be reduced, if necessary in relation to availability of funds. None of the projects can be or delayed or undertaken more than once.

Calculate which projects Alpha Limited should undertake if the capital available for investment is limited to Rs. 1,10,000 in 2003 and with no limitation in subsequent year. For your analysis, use the following present value factors:

Years	2003	2004	2005	2006
Factors	1.00	0.89	0.80	0.71

Solution:

Calculation of NPV and Profitability Index (PI)

Year Discount Factors @ 12%	Discounted Cash Flows				NPV	PI
	2003 1.00	2004 0.89	2005 0.80	2006 0.71		
Project						
A	(70)	31.15	28	14.20	3.35	1.048
B	(40)	(26.70)	36	39.05	8.35	1.125
C	(50)	(53.40)	56	56.80	9.40	1.091
D	--	(80.10)	44	46.15	10.05	1.125
E	(60)	(17.80)	32	25.30	25.30	1.422

Ranking of Projects Based on Profitability Index

Rank	I	II	III	IV	V
Project	E	D	B	C	A

Anlysis and Selection:
Conditions:

1. Capital available for investment is limited to Rs. 1,10,000 in 2003, with no limitation in subsequent years.
2. All projects are divisible i.e., size of investment can be reduced if necessary in relation to availability of funds.
3. None of the projects can be delayed or undertaken more than once.

Project D's cash outflow will start in the year 2004, and hence this will not form a s constraint in selection of projects. Since there is no scarcity of funds from the year 2004 onwards. This can be taken up in 2004.

Project	**Rank**	**Initial investment (Rs.)**
E	I	60,000
B	II	40,000
C	IV	10,000*

* Since the project C is divisible, the balance funds of Rs. 10,000 (i.e., 1,10,000–60,000–40,000) can be allocated to project C. One of the condition in the problem is none of the projects can be undertaken more than once. Hence project C will continue with initial investment of Rs. 10,000. Project D can be undertaken in the year 2004 since there is no scarcity of funds from the year 2004.

Ranking of Projects excluding 'D' which is to start in 2004 when no limitation on capital availability :

Project	E	B	C	A
Rank	I	II	III	IV

Illustration 5:

Five Projects M, N, O, P and Q are available to a company for consideration. The investment required for each project and the cash flows it yields are tabulated below. Projects N and Q are mutually exclusive. Taking the cost of capital @ 10%, which combination of projects should be taken up for a total capital outlay not exceeding Rs. 3 lakhs on the basis on NPV and Benefit-Cost Ratio (BCR)?
(Rs.)

Project	Investment	Cash flow p.a.	No of years	P.V. @ 10%
M	50,000	18,000	10	6.145
N	1, 00,000	50,000	4	3.170
O	1, 20,000	30,000	8	5.335
P	1, 50,000	40,000	16	7.824
Q	2, 00,000	30,000	25	9.077

Solution:

Total Capital outlay < Rs. 3.00 lakhs

Computation of Net Present Value and Benefit – cost Ratio for 5 Projects. (Rs.)

Project	Investment	Cash Flow p.a.	No. of Years	P.V. @ 10%	P.V.	NPV	BCR (PV/Investment)
M	50,000	18,000	10	6.145	1,10,610	60,610	2.212
N	1,00,000	50,000	4	3.170	1,58,500	58,500	1.585
O	1,20,000	30,000	8	5.335	1,60,050	40,050	1.334
P	1,50,000	40,000	16	7.824	3,12,960	1,62,960	2.086
Q	2,00,000	30,000	25	9.077	2,72,310	72,310	1.362

Statement showing Feasible Combiation of Projects and NPV, BCR

Feasible Combination Of projects	Investment (Rs.)	NPV (Rs.)	Rank	BCR	Rank
(i) M, N and P	3,00,000	2,82,070	1	1.940	1
(ii) M, N and O	2,70,000	1,59,160	4	1.589	4
(iii) O & P	2,70,000	2,03,010	3	1.752	3
(iv) M & Q	2,50,000	1,32,920	5	1.532	5
(v) N & P	2,50,000	2,21,460	2	1.886	2
(vi) N & Q	3,00,000	1,30,810	6	1.436	6

Illustration 6 :
C Ltd. is considering its capital investment programme for 2010 and 2011. The company is financed entirely by equity shares and has a cost of capital of 15% per annum. The company have reduced their initial list of projects to five, the expected cash flows of which are as follows :

Project	Cash Flows			
	2010	2011	2012	2013
A	- 60,000	+ 30,000	+25,000	+25,000
B	- 30,000	- 20,000	+25,000	+45,000
C	- 40,000	- 50,000	+60,000	+70,000
D	0	- 80,000	+45,000	+55,000
E	- 50,000	+ 10,000	+,30,000	+40,000

None of the above projects can be delayed. All the projects are divisible, outlays may be reduced by any proportion and net inflows will then be reduced in the same proportion. No project can be undertaken more than once. C Ltd. is able to invest surplus funds in a bank deposit account yielding an annual return of 10%. C Ltd. cost of capital is 15%.

Required :
(i) Prepare calculations showing which projects C. Ltd. should undertake, if capital is expected to be available as indefinitely large amounts at 15% per annum during all future periods.

(ii) Show how your answer to (i) would vary if capital available for investment was limited to Rs. 1, 00,000 in 2011 but was not limited thereafter.

(iii) Provide a mathematical programming formulation which would assist C Ltd. in choosing investment projects if capital available in 2010 is limited to Rs. 1,00,000, capital is available in 2011 is limited to Rs. 90,000, capital available thereafter without limit at 10% per annum, and the shareholders required return from the company was 15% per annum at all relevant times.

Ignore taxation. Present value factors at 15% year 1-0.8696; 2-0.7561; 3-0.6575.

Solution :

(i) Net Present Value Calculations

	(Rs.)
Project A =	(60,000) + 30,000 × .8696 + 25,000 × .7561 + 25,000×.6575 = 1,428
Project B =	(30,000) + (20,000) × .8696 + 25,000 × .7561 + 45,000×.6575 = 1,098
Project C =	(40,000) + (50,000) × .8696 + 60,000 × .7561 + 70,000×.6575 = 7,911
Project D =	(80,000) × .8696 + 45,000 × .7561 + 55,000× .6575 = 619
Project E =	(50,000) + 10,000 × .8696 + 30,000 × .7561 + 40,000×.6575 = 7,679

Every project should be accepted since each has a positive Net Present Value.

(ii) Preferred Investments.

Project	**Rs.**	**Ranking**
D	0	I
C	40,000	II
E	50,000	III
B	10,000	IV
	1,00,000	

Z (in maximise) 1428 A + 1098 B + 7911 C + 619 D + 7679 E – 0.44F
= 60,000 A + 30,000 B + 40,000 C + 50,000 E + F ≤ 1, 00,000
= 20,000 B + 50,000 C + 80,000 D ≤ 1.1F+30,000 A+10,000 E + 90,000
A, B, C, D, E, F

Working: If invested in Bank Deposit, Yield @ 10% = 1.1
Cost of Capital (if not invested) @15% = 1.15
The Decision of not investing will yield a loss of revenue.
The revised NPV of revenue from the project will be = $\left(\frac{1.1}{1.15}-1\right)=044F$

Illustration 7:

A company is considering a cost saving project. This involves purchasing a machine costing Rs. 7,000 which result in annual savings on wage costs of Rs. 1,000 and on material costs of Rs. 400.

The following forecasts are made of the rates of inflation each year for the next 5 years :

Wages costs	10%
Material costs	5%
General prices	6%

The cost of capital of the company, in monetary terms, is 15%. Evaluate the project, assuming that the machine has a life of 5 years and no scrap value.

Solution:

Calculation of Net Present Value

Year	Labour Cost Saving	Material Cost Saving	Total Savings	DCF @ 15%	Present Value
1	1000 X (1.1) = 1,100	400 X (1.05) = 420	1,520	0.870	1,322
2	1000 X (1.1)2 = 1,210	400 X (1.05)2 = 441	1,651	0.756	1,248
3	1000 X (1.1) 3= 1,331	400 X (1.05) 3= 463	1,794	0.658	1,180
4	1000 X (1.1)4 = 1,464	400 X (1.05) 4= 486	1,950	0.572	1,115
5	1000 X (1.1) 5= 1,610	400 X (1.05) 5= 510	2,120	0.497	1,054
Present Value of Total Savings					5,919
Less: Initial Cash Outflow					7,000
Net Present Value (Negative)					(1,081)

Analysis: Since the present value of cost of project exceeds the present value of savings it is not suggested to purchase the machine.

Illustration 8:

D Limited, has under review a project involving the outlay of Rs. 55,000 and expected to yield the following net cash savings in current terms:

Year	1	2	3	4
Rs.	10,000	20,000	30,000	5,000

The company's cost of capital, incorporating a requirement for growth in dividends to keep pace with cost inflation is 20%, and

this is used for the purpose of investment appraisal. On the above basis the divisional manager involved has recommended rejection of the proposal.

Having regard to your own forecast that the rate of inflation is likely to be 15% in year 1 and 10%, in each of the following years, you are asked to comment fully on his recommendation. (Discounting figures at 20% are 0.833, 0.694, 0.579 and 0.482 respectively for year 1 to year 4.)

Solution :
Calculation of Net Present Value

Year	Cash Inflows	Discount Factor (20%)	Present Value
1	10,000	0.833	8,330
2	20,000	0.694	13,880
3	30,000	0.579	17,370
4	5,000	0.482	2,410
P.V. of cash inflows			41,990
Less: Initial Investment			55,000
Net Present Value			(13,010)

Analysis: Since NPV is negative it is suggested not to take up the project. Company's cost of capital is fixed at 20% keeping in view the requirement for growth in dividend as well as cost inflation.

Calculation: Net Present Value based on Inflation Adjusted Cash Flow (Rs.)

Year	Cash Flow	Inflation Adjustment	Inflation Adjustment	DCF @ 20%	Present Value of Cash Flow
1	10,000	1.15	11,500	0.833	9,580
2	20,000	1.15X1.10	25,300	0.694	17,558
3	30,000	1.15X1.102	41,745	0.579	24,170
4	5,000	1.15X1.103	7,653	0.482	3,689
Present Value of Inflation Adjusted cash Inflows					54,997
Less: Initial Investment					55,000
Net Present Value					(-) 3

Analysis :

The negative NPV is due to rounding of, otherwise it would be zero. Hence, it is indifferent to suggest or reject the proposal.

Illustration 9:

A company is considering a new project. The project would involve an initial investment of Rs. 1, 20,000 in equipment which would have a life of 5 years and no scrap value. The selling price now (year 0) would be Rs. 60 and is expected to increase in line with the retail price index. Sales are expected to be constant at 2000 units each year. The following estimates about unit costs are available:

Cost Element	Cost at year 0 Price Rs.	Rate of Increase
Wages	20	2% per annum faster than retail prices
Other	25	In line with retail prices
Total	45	

All transactions take place at yearly intervals on the last day of the year. No increase in working capital will be required. The following estimates of the rate of increase in retail prices and of interest rates are available :

Year	Rates of increase in retail prices%	Interest rate%
1	15	16
2	20	20
3	25	22
4	40	20
5	30	18

Assuming Purchasing Power Parity Theorem hold in the present case, changes in interest rates will affect the money value. Hence Cost of Capital is taken in money terms.

Solution :

Year	0	1	2	3	4	5
Inflation rate for contribution before wages (interest over previous year)		1.15	1.20	1.25	1.40	1.30
Inflation rate for wages (interest over previous year)		1.17	1.22	1.27	1.42	1.32
Contribution before wages, per unit sold	Rs. 30	Rs. 40.25	Rs. *48.30	Rs. 60.38	Rs. 84.53	Rs. 109.88
Wages per unit	20	23.40	28.55	**36.26	51.49	67.97
Contribution after wages, per unit sold	15	16.85	19.75	24.12	33.04	41.91
Total contribution from 2000 units sold	30,000	33,700	39,500	48,240	66,080	83,820

*35x1.15x1.20; similarly other figures in this row.
**20x1.17x1.22x1.27; similarly, other figures in this row.

Calcaulation of Net Present Value using Money Estimates (Rs.)

Year	Money cash flow	Money discount factor	Present value
0	(1,20,000)	1.000	(1,20,000)
1	33,700	0.862 [1x1/1.16]	29,049
2	39,500	0.718 [0.862x1/1.2]	28,361
3	84,240	0.589 [0.718x1/1.22]	28,413
4	66,080	0.491 [0.589x1/1.2]	32,445
5	83,820	0.416 [0.491x1/1.18]	34,869

NPV - 33,137

Analysis : Since the NPV is Positive, the project is worthwhile.

Illustration 10 : E. Ltd. is considering the replacement of a machine used exclusively for the manufacture of one of its Product Y. The existing machine have a book value of Rs. 65,000 after deducting straight line depreciation from historical costs. However, it could be sold only for Rs. 45,000. The new machine would cost Rs. 1, 00,000. E. Ltd. expects to sell Product Y for four more years. The existing machine could be kept in operation for that period of time if it were economically desirable to do so. After four years, the scrap value of both the existing machine and new machine would be zero.

The current costs per unit for manufacturing Y on the existing machine and on a new machine are as follows :

	Existing Machine			New Machine
Material		22.00		20
Labour	(32 hours @ Rs. 1.25)	40.00	(16 Hrs. @ Rs. 1.25)	20
Overheads	(32 Hours @ 0.60)	19.20	(16 Hrs. @ Rs. 1.80)	28.80
Total Cost		81.20		68.80

Overheads are area allocated to products on the labour hour rate method. The hourly rates are of 0.60 and 1.80 comprise 0.25 and 0.625 for variable overheads and 0.35 and Rs. 1.175 for fixed overheads, including depreciation.

Current sales of Y are 1000 units per annum at Rs. 90 each, if the new machine were purchased, output would be increased to 1200 units and selling price would be reduced it Rs. 80.

E. Ltd. requires a minimum rate of return on investment of 20 per cent per annum in money terms. Material cost, overheads and selling prices are expected to increase at the of 15% per annum, in line with the index of retail prices. Labour costs are expected to increase at the rate of 20% per annum.

You are required to ;-
(i) Give calculations to show whether purchase of the machine would be worthwise.
(ii) Comments on the treatment of inflation and the estimation of 20% money cost of capital.

Solution :
(i) Cost of replacement = 1,00,000 – 45,000 = Rs. 55,000

Manufacturing cost
Fixed items, including depreciation, should be disregarded o the assumption :

(a) Fixed costs do not change as a result of machine.
(b) Additional 200 units of extra production would be sold.
(c) All variable elements in the costs given represent cash flow (i.e., labour, material and variable overheads).

Operating cash flow Comparison

Particular	New Machine (1200 Units) P.U.	Total	Existing Machine (1000 Units)		Incremental Cash Flow
Sales	80	96,000	90	90,000	6,000
Materials	20	24,000	22	22,000	(2,000)
Labour	20	24,000	40	40,000	16,000
Overheads	10	12,000	8	8,000	(4,000)
Net Cash Flows		36,000		20,000	16,000

Operating savings are Rs. 16,000 p.a. in Case of new machine.

Notes :
a. Current prices are assumed in the above table i.e., prices at time 0.

b. Time increase in revenue from new machine Rs. 6,000 is exactly offset by the increases in materials and variable overheads i.e. Rs. 6,000. Revenue, materials and variable overheads are stated to be subject to the same rate of inflation i.e. 15% and therefore will continue to increase at the same rate.

c. The net savings of Rs. 16,000 represent the saving on labour costs which is expected to
increase @ 20% p.a.

Operating cash flow Comparison (Rs.)

Year	Cash Flows	Discount factor @ 20%	PV
0	(55,000)	1.000	(55,000)
1	*19,200	0.833	15,994
2	23,040	0.694	15,990
3	27,648	0.579	16,008
4	33,178	0.482	15,992

Net Present Value 8,984 * 1,600×12

Saving is compounded @ 20% p.a. inflation rate, discounted at 20% money cost of capital, will be Rs. 16,000 p.a.

For 4 years Rs. 16,000×4 = Rs. 64,000.
NPV Rs. 64,000 – Rs. 55,000 = Rs. 9,000.
The above result is due to approximation.

(ii) The relationship between money cost of capital and real cost of capital is given by - (1+m) = (1–r) (1+i) Where, m = money cost of capital

r = real cost of capital
i = is the inflation rate

Hence, 1 + 0.20 = (1+r) (1+0.15)
Hence, r = 4.3%

Analysis : Real cost of capital consists of time value of money return required on a relatively risk less security in a non-inflationary situation and the risk premium to compensate investors for the uncertainty associated with the investment in the said security 4.3% is a very low figure and therefore when inflation is @ 15% p.a., money cost of capital should much higher than 20%. This project might have been rejected if money cost of capital is calculated correctly.

Illustration 11:
A Company is reviewing an investment proposal in a project involving a capital outlay of Rs. 90, 00,000 in plant and machinery. The project would have a life of 5 years at the end of which the plant and machinery could reach a resale value of Rs. 30, 00,000. Further the project would also need a working capital of Rs. 12, 50,000 which would be built during the year 1 and to be released from the project at the end of year 5. The project is expected to yield the following cash profits :

Year	Cash profit (Rs.)
1	35,00,000
2	30,00,000
3	25,00,000
4	20,00,000
5	20,00,000

A 25% depreciation for plant and machinery is available on WDV basis as Income-tax exemption. Assume that the Corporate Tax is paid one year in arrear of the periods to which it relates and the first year's depreciation allowance would be claimed against the profits of year 1.

The Assistant Management Accountant has calculated NPV of the project using the company's corporate target of 20% pre-tax rate of return and has ignored the taxation effect in the cash flows.

As the newly recruited Management Accountant, you realise that the project's cash flows should incorporate the effects of tax. The Corporate Tax is expected to be 35% during the life of the project and thus the company's rate of return post-tax is 13% (65% of 20%).

Your Assistant is surprised to note the difference between discounting the pre-tax cash flows at a pre-tax DCF rate and post-tax cash flows at a post-tax rate.

Required:
a. Calculate the NPV of the project as the Assistant Management Accountant would have calculated it;
b. Re-calculate the NPV of the project taking tax into consideration;
c. Comment on the desirability of the project vis-a-vis your findings in (b).

Solution :
a. Assistant Management Accountant's Calculation (i.e., Ignoring taxation)

Year	Investment		Cash Profit	Net Cash Flows	Discount Factor At 20%	Present Value
	Plant And Machinery	Working Capital				
0	(90.0)	--	--	(90.0)	1.00	(90,000)
1	--	(12.5)	35.0	22.5	0.83	18,675
2	--		30.0	30.0	0.69	20,700
3	--		25.0	25.0	0.58	14,500
4	--		20.0	20.0	0.48	9,600
5	30.0	12.5	20.0	62.5	0.40	25,000
					NPV	(1,525)

It is assumed that working capital (debtors, stocks etc.) reduce cash flows in year 1 and would be recovered soon after the end of year 5. The working capital cash flows are therefore assigned to years 1 and 5.

Here it is observed that NPV is negative and hence, the Assistant Management Accountant would have concluded that the project should be rejected.

(b) Allowing for taxation :
(i) Tax on Cash Profit

Year	Cash Profit	Tax 35%	Year of Tax Payment
1	35	12.25	2
2	30	10.50	3
3	25	8.75	4
4	20	7.00	5
5	20	7.00	6

Year	Reducing Balance	Deprecation	Tax Rebate (Tax payable)	Year of Cash Flows
0	90,000	--	--	--
1	67,500	22,500	7,875	2
2	50,625	16,875	5,906	3
3	37,969	12,656	4,430	4
4	28,476	9,492	3,322	5
5	21,357	7,119	2,492	6
* Profit on Sale of Plant & Machinery (30,000 – 21,357)		(8,643)*	(3,025)	6

Calculation of NPV of the Project:

Year	Investment		Depen. Allow. Tax	Cash Profit	Tax on Profit	Net Cash Flows at 13%	Disc. Factor	Present Value
	Plant & machinery	Working Capital Saved						
0	(90,000)	--	--	--	--	(90,000)	1.00	(90,000)
1	--	(12,500)	--	35,000	--	22,500	0.88	19,800
2	--	--	7,875	30,000	(12,500)	25,625	0.78	19,988
3	--	--	5,906	25,000	(10,500)	20,406	0.69	14,080
4	--	--	4,430	20,000	(8,750)	15,680	0.61	9,565
5	30,000	12,500	3,322	20,000	(7,000)	58,822	0.54	31,764
6	--	--	(0.533)	--	(7,000)	(7,533)	0.48	(3,616)
							NVP	+ 1,581

(c) The NPV is positive, although it is very small in relation to the Capital outlay of Rs. 90 lakhs. It is also apparent the positive NPV depends heavily on the assumption that the plant and machinery would have a resale value of Rs. 30 lakhs at the end of year 5. Such projects which rely on their residual values for their positive NPV should normally be regarded high risk venture. It can be further seen that a drop of around 10% i.e., Rs. 3 lakhs in resale value would make the project negative.

Illustration 12:
SCL Limited, a highly profitable company, is engaged in the manufacture of power intensive products. As part of its diversification plans, the company proposes to put up a Windmill to generate electricity. The details of the scheme are as follows:

(1) Cost of the Windmill - Rs. 300 lakhs

(2) Cost of Land - Rs. 15 lakhs
(3) Subsidy from State Government to be received at the end of - Rs. 15 lakhs
First year of installation

(4) Cost of electricity will be Rs. 2.25 per unit in year 1. This will increase by Rs. 0.25 per unit every year till year 7.
After that it wil increase by Rs. 0.50 per unit.

(5) Maintenance cost will be Rs. 4 lakhs in year 1 and the same will increase by Rs. 2 lakhs
every year.

(6) Estimated life 10 years.

(7) Cost of capital 15%.

(8) Residual value of Windmill will be nil. However land value will go up to Rs. 60 lakhs, at the end of year 10.
(9) Depreciation will be 100% of the cost of the Windmill in year 1 and the same will be allowed for tax purposes.

(10) As Windmills are expected to work based on wind velocity, the efficiency is expected to be an average 30%. Gross electricity generates at this level will be 25 lakh units per annum. 4% of this electricity generated will be committed free to the State Electricity Board as per the agreement.

(11) Tax rate 50%.

From the above information you are required to :
(a) Calculate the net present value. [Ignore tax on capital profits.]
(b) List down two non-financial factors that should be considered before taking a decision.
For your exercise use the following discount factors.

Years	1	2	3	4	5	6	7	8	9	10
Discount Factors	0.87	0.76	0.66	0.57	0.50	0.43	0.38	0.33	0.28	0.25

Solution :

Working Notes:
1. Initial Investment (Rs. lakhs)

Cost of Land	15
Cost of Windmills	300
Total	315

2. Net units generated (No. of units)

Gross units gendered	25 lakhs
Less : 4% Free Supply to SEB	1 lakh
Net Units sold	24 lakhs

3. Cost per unit Rs. 2.25 per unit in year 1. It will increase by Rs. 0.25 per unit every year till year 7. After that it will increase by Rs. 0.50 per unit. Maintenance Cost will be Rs. 4 lakhs in year 1 and the same will increase by Rs. 2 lakhs every year.

Calculation of Net Present Value (Rs. lakhs)

Year Unit Cost (Rs.)	1 2.25	2 2.50	3 2.75	4 3.00	5 3.25	6 3.50	7 3.75	8 4.25	9 4.75	10 5.25
Saving										
(24 lakh unit x unit cost)	54	60	66	72	78	84	90	102	114	126
Maintenance Cost	4	6	8	10	12	14	16	18	20	22
Gross Saving	50	54	58	62	66	70	74	84	94	104
Less: Tax @ 50%	25	27	29	31	33	35	37	42	47	52
Saving after Tax	25	27	29	31	33	35	37	42	47	52
Add: Tax Saving on Depreciation	150	--	--	--	--	--	--	--	--	--
Subsidy	15	--	--	--	--	--	--	--	--	--
Net Savings	190	27	29	31	33	35	37	42	47	52
Discount Factor 15%	0.87	0.76	0.66	0.57	0.50	0.43	0.38	0.33	0.28	0.25
Present Value	165.30	20.52	19.14	17.67	16.50	15.05	14.06	13.86	13.16	13.00

Total Present Value	308.26
Add: Present Value of land (Rs. 60 Lakhs x 0.25)	15.00
	323.26
Less: Initial Cost	315.00
Net Present Value	8.26

(b) Non-financial Factor: The following non-financial factors may be taken into consideration while taking the investment decision.

- Cost of purchase of electricity from State Electricity Board.
- Machinery and skilled manpower availability.
- Wind velocity in the proposed project area.
- Risk coverage.
- Technology availability.
- Authorisation in the Memorandum of Association to take the business etc.

Illustration 13:

TSL Ltd., a highly profitable and taxpaying company is planning to expand its present capacity by 100%. The estimated cost of the project is Rs. 1,000 lakhs out of which Rs. 500 lakhs is to be met out of loan funds. The company has received two offers from their bankers:

	Option 1	Option @
Value of loan	Rs. 500 lakhs	US $ 14 lakhs equal to Rs. 500 lakhs
Interest	15% payable yearly	6% payable (fixed yearly in US $)
Period of Repayment	5 years (in 5 installment is payable after draw down)	5 Years
Other expenses (to be treated as revenue Expenditure)	1% of the value of the loan	1% at US $ = Rs. 36 (Average)
Future Exchange Rate	--	End of 1 year 1 US $ = Rs. 38 thereafter to increase by Rs. 2 per annum

The company is liable to pay income-tax at 35% and eligible for 25% depreciation on W.D. value. You may assume that at the end of 5th year the company will be able to claim balance in WDV for tax purposes. The company follows Accounting Standard AS-11 for accounting changes in Foreign Exchange Rate.

(1) Compare the total outflow of cash under the above options.
(2) Using discounted cash flow technique, evaluate the above offers.
(3) Is there any risk, which the company should take care of?
(4) In case TSL has large volume of exports would your advice be different. The following discounting table may be adopted :

Year	0	1	2	3	4	5
Discount Factor	1	0.921	0.848	0.781	0.720	0.663

Solution :
Option I

Years	Repayment of Principal	Interest At 15%	Other Expenses	Tax saving	Net outflow
0	--	--	5.00	1.75	3.25
1	100	75	--	26.25	148.75
2	100	60	--	21.00	139.00
3	100	45	--	15.75	129.25
4	100	30	--	10.50	119.50
5	100	15	--	5.25	109.75
Total Outflows	500	+225	+5.00	-80.50	649.50

Exchange rate	Year	Repayment of principal US $	Interest US$	Other Charges US $	Total Amt. US $	Repayment of principle Rs. (lakhs)	Balance Being Premiium (Rs. lakh)	Interest (Rs.lakh)	Other Charges (Rs. lakh)	Total Payment (Rs.lakh)	Tax Savings (Rs.lakh)	Net Out Flow (Rs. lakhs)
36	0	--	--	0.140	0.140	--	--	--	5.04	5.04	1.764	3.276
38	1	2.8	0.840	--	3.640	100.00	6.4	31.920		138.32	11.732	126.588
40	2	2.8	0.672	--	3.472	100.00	12.0	26.880		138.88	10.878	128.002
42	3	2.8	0.504	--	3.304	100.00	17.6	21.168		138.768	10.048	128.720
44	4	2.8	0.336	--	3.136	100.00	23.2	14.784		137.984	9.184	128.800
46	5	2.8	0.168	--	2.968	100.00	28.8	7.728		136.528	24.814	111.714

As per AS-11, the premium paid on exchange rate difference, on loans acquired for the purpose of capital expenditure should be capitalised. The same is applicable under the Indian Income-tax Act for tax calculations also.

Tax Savings on Premium Capitalization (Rs.)

Year	Opening Vlaue	Premium	Total	Deprecation on Premium at 25%	Tax Saving at 35%	Cloainfg WDV
1	--	6.40	6.40	1.60	0.56	4.80
2	4.80	12.00	16.80	4.20	1.47	12.60
3	12.60	17.60	30.20	7.55	2.64	22.65
4	22.65	23.20	45.85	11.46	4.01	34.39
5	34.39	28.80	63.19*	63.19	22.11	NIL

*Assumed that full benefit will be claimed for tax purposes.

Tax Saving on Interest, Other Charges and Premium (Rs. lakhs)

Years	Amount of Interest & other charges	Tax savings	Tax saving on premium	Total Tax savings
0	5.040	1.764	-	1.764
1	31.920	11.172	0.560	11.732
2	26.880	9.408	1.470	10.878
3	21.168	7.408	2.640	10.048
4	14.784	5.174	4.010	9.184
5	7.728	2.704	22.110	24.814

(2) Discount Cash Flow : Option I

Year	Net Out flow	Discounting factor	Discounted value
0	3.250	1.000	3.25
1	148.750	0.921	136.99
2	139.000	0.848	117.87
3	129.250	0.781	100.94
4	119.500	0.720	86.04
5	109.750	0.663	72.76
			517.85

Discount Cash Flow: Option II

Year	Gross outflow	Total tax saving	Net outflow	Discounting factor	Discounting value
0	5.040	1.764	3.276	1.000	3.276
1	138.320	11.732	126.588	0.921	116.587
2	138.880	10.878	128.002	0.848	108.545
3	138.768	10.048	128.720	0.781	100.530
4	137.984	9.184	128.800	0.720	92.736
5	136.528	24.814	111.714	0.663	74.066
					495.740

(3) The discounted value of Option II seems to be better than Option I. However the company has to be careful about future exchange rate. The rate indicated is more by rule of thumb than based on any scientific approach. The company should cover the foreign exchange rate and then work out the value.

(4) In case the company has good volume of exports, then it may help the company to hedge the future payments with outflow. In that case the company may take a lenient view of the possible exchange risk.

Illustration 14 :
A large profit making company is considering the installation of a machine to process the waste produced by one of its existing manufacturing process to be converted into a marketable product. At present, the waste is removed by a contractor for disposal on payment by the company of Rs. 50 lakhs per annum for the next four years. The contract can be terminated upon installation of the aforesaid machine on payment of compensation of Rs. 30 lakhs

before the processing operation starts. This compensation is not allowed for deduction of tax purposes.

The machine required for carrying out the processing will cost Rs. 200 lakhs to be financed by a loan repayable in 4 equal installments commencing from the end of year 1. The interest rate is 16% per annum. At the end of the 4th year, the machine can be sold for Rs. 20 lakhs and the cost of dismantling and removal will be Rs. 15 lakhs.

Year	**1**	**2**	**3**	**4**
Sales	**322**	**322**	**418**	**418**
Material consumption	30	40	85	85
Wages	75	75	85	100
Other expenses	40	45	54	70
Factory overheads	55	60	110	145
Depreciation (as per income-tax rules)	50	38	28	21

Initial stock of materials required before commencement of the processing operations is Rs. 20 lakhs at the start of year 1. The stock levels of materials to be maintained at the end of year 1, 2 and 3 will be Rs. 55 lakhs and the stocks at the end of year 4 will be nil. The store of materials will utilise space which would otherwise have been rented out for Rs. 10 lakhs per annum. Labour costs include wages of 40 workers, whose transfer to this process will reduce idle time payments of Rs. 15 lakhs in year 1 and Rs. 10 lakhs in year 2. Factory overheads include apportionment of general factory overheads except to the extent of insurance charges of Rs. 30 lakhs per annum payable on this venture. The company's tax rate is 50%.

Present value factors for four years are as under :

Year	1	2	3	4
Present value factors	0.870	0.756	0.658	0.572

Advice the management on the desirability of installing the machine for processing the waste. All calculations should form part of the answer.

Solution :

Statement of Incremental p

Particulars	Year			
	1	2	3	4
Sales (A)	322	322	418	418
Costs				
Material	30	40	85	85
Wages	60	65	85	100
Other Expenses	40	45	54	70
Factory Overheads (Insurance)	30	30	30	30
Loss of Rent	10	10	10	10
Interest	32	24	16	8
Depreciation (as per IT Act)	50	38	28	21
(B)	252	252	308	324
Incremental profit (A) - (B)	70	70	110	94
Tax @ 50%	35	35	55	47

Statement of Incremental Profit

Particulars	Year				
	0	1	2	3	4
Stokes of Materials Increases	(20)	(35)	-	-	-
Compensation for Contract	(30)	-	-	-	-
Saving of Contract Payment	-	50	50	50	50
Tax on Contract Payment	-	(25)	(25)	(25)	(25)
Incremental Profit	-	70	70	110	94
Tax on incremental Profit	-	(35)	(35)	(55)	(47)
Depreciation added back	-	50	38	28	21
Loan Repayment	-	(50)	(50)	(50)	(50)
Profit on sale of Machinary	-	-	-	-	5
Total Incremental Cash flows	(50)	25	48	58	48
P.V. Factor @	1.00	0.870	0.756	0.658	0.572
NPV OF Cash flow	(50)	21.75	36.288	38.164	27.456

Net Present Value = Rs. 73.66 lakhs.

Analysis: Since the NPV of Cash flows of proposal to install a machine to process the waste into marketable product is positive, the proposal can be accepted.

Assumptions: The following assumptions were considered while computation of NPV of the proposal:
– Material stock increase will lead to cash outflow.
– Idle-time wages are also taken into consideration while calculation of wages.
– Insurance charges are only taken as relevant for Computation of cashflow.
– Interest is calculated at 16% p.a. based on diminishing balance. The repayment of loan is in 4 equal installments.
– Capital gains tax ignored on profit on sale of machinery.
– Saving in contract payment and income-tax thereon considered in computation of cash flows.

Illustration 15:

A company produces main product 'Super' and a co-product 'Mild' . The main product is sold entirely to its collaborator, but the product 'Mild' is sold at the local market. The company increased its capacity as a reslut of which the output of 'Mild' increased to 15,000 m/t per annum at a price Rs. 1,000 per m.t.

However, in the face of increased competition to sell the entire output of 15,000 m/t of 'Mild' the company will have to reduce the sale price by Rs. 50 per m.t. every year for next 5 years and hereafter the price will stabilize at Rs. 750 per m.t.

As an alternative, the company can convert 'Mild' into 'Medium' at a variable cost of Rs. 200 per (metric) tonne. However to enter the market the sale price will have to be Rs. 1,200 per m.t. in the first year and Rs. 1,300 per m.t. in the second year and so on.

The sale of Medium will be 1,000 m/t in the first year and there upon going up by 1,000 m/ t each year. The company will have to invest Rs. 30 lakhs in capital outlay to produce 'Medium'. You are required to present the projected sales volume (quantity and value) of products 'Mild' and 'Medium' and also appraise the investment of Rs. 30 lakhs at 12% per annum for the period of next 5 years.

Present value of Rupee one at 12% p.a.

Year	1	2	3	4	5
Discounted factor	0.89	0.79	0.71	0.64	0.57

Solution:
Alternative I
Present Value of Sales of Mild Product

(Rs. Lakhs)

Year	Quantity M.T.	Price Per M.T. Rs.	Sales	DCF @ 12%	Present value
1	15,000	950	142.5	0.89	126.83
2	15,000	900	135.0	0.79	106.65
3	15,000	850	127.5	0.71	90.52
4	15,000	800	120.0	0.64	76.80
5	15,000	750	112.5	0.57	64.13

Total Present Value of Net Sales 464.93

Calculation of NPV:

Total present values of Net Sales	464.93
Less : Initial investment	30.00
Net Present Value of Alternative	434.93

Alternative II

Year	Quantity M.T.	Contribution Per M.T.	Net Sales	DCF @ 12%	Present value
1	1,000	1,000	10.00	0.89	8.90
2	2,000	1,100	22.00	0.79	17.38
3	3,000	1,200	36.00	0.71	25.56
4	4,000	1,300	52.00	0.64	33.28
5	5,000	1,400	70.00	0.57	39.90
Total Present Value of Net Sales 125.02					

Present Value of Sales of Mild

Year	Quantity M.T.	Price Per M.T. Rs.	Sales	DCF @ 12%	Present value
1	14,000	950	133.00	0.89	118.37
2	13,000	900	117.00	0.79	92.43
3	12,000	850	102.00	0.71	72.42
4	11,000	800	88.00	0.64	56.32
5	10,000	750	75.00	0.57	42.75
Total Present Value of Sales 382.29					

Calculation of NPV

P.V of Sales of medium	125.02
P.V. of sales of mild	382.29
Total present value	507.31
Less : Initial investment	30.00
Net Present Value of Alternative II	477.31

Analysis : Since NPV is higher for alternative II, it is suggested to select Alternative II.

Illustration 16:
B Ltd. is considering whether to set up a division in order to manufacture a new Product A. The following statement has been prepared, showing the projected profitability per unit of the new product :

(Rs.)

Selling price			22.00
Less : Direct labour	(2 hours @ Rs. 2.50 per hour)	5.00	
Material	(3 kg. @ Rs. 1.50 per kg.)	4.50	
Overheads		11.50	21.00
Net profit per unit			1.00

A feasibility study, recently undertaken at a cost of Rs. 50,000, suggests that a selling price of Rs. 22 per unit should be set. At this price, it is expected that 10,000 units of A would be sold each year. Demand for A is expected to cease after 5 years. Direct Labour and Material Costs would be incurred only for the duration of the product life.

Overhead per unit have been calculated as follows :

	(Rs.)
Variable overheads	2.50
Rent (Note 1 : Rs. 8,000/7,000 units)	0.80
Manager's salary (Note 2 : Rs. 7,000/10,000 units)	0.70
Depreciation (Note 3 : Rs. 50,000/10,000 units)	5.00
Head office costs (Note 4 : 2 hours @ Rs. 1.25 per hour)	2.50
	11.50

Notes :

1. Product A would be manufactured in a factory rented specially for the purpose. Annual rental would be Rs. 8,000 payable only for as long as the factory was occupied.

2. A manager would be employed to supervise production of Product A, at a salary of Rs. 7,000 p.a. The Manager is at present employed by B Ltd. but is due to retire in the near future on an annual pension of Rs. 2,000, payable by the company. If he continued to be employed, his pension would not be paid during the period of his employment. His subsequent pension rights would not be affected.

3. Manufacturing of the Product A would require a specialised machine costing Rs. 2, 50,000. The machine would be capable of producing Product A for an indefinite period, although due to its specialised nature, it would not have any resale or scrap value when the production of Product A ceased. It is the policy of B Ltd. to provide depreciation on all fixed asset using Straight Line Method. The annual charge of Rs. 50,000 for the new machine is based on a life of five years, equal to the period which Product A to the company to be produced.

4. B Ltd. allocates its head office fixed costs to all products at the rate of Rs. 1.25 per direct labour hour. Total head office fixed costs would not be affected by the introduction of the Product A to the company's range of products.

The Cost of capital of B Ltd. is estimated at 5% p.a. in real terms and you may assume that all costs and prices given above will remain constant in real terms. All cash flows would arise at the end of each year, with the exception of the cost of the machine which would be payable immediately.

The Management of B Ltd. is very confident about the accuracy of all the estimates given above, with the exception of those relating to product life, the annual sales volume and material cost per unit of Product A.

You are required to:

(i) Decide whether B Ltd. should proceed with manufacture of the Product A.

(ii) Prepare a statement showing how sensitive the NPV of manufacturing Product A is to errors of estimation in each of the three factors : Product life. Annual sales volume and material cost per unit of Product A.

Ignore taxation.
The Present Value of annuity for 3 years, 4 years and 5 years at 5% respectively are 2.72, 3.55 and 4.33.

Solution :

Working Notes :
1. Cost of Machine at 0 years = Rs. 2,50,000

2. Variable Production Cost per annum (Rs.)

Material cost P.U.	4.50
Direct Labour cost P.U.	5.00
Variable overheads P.U.	2.50
	12.00
Total Cost Per annum (10,000 units × Rs. 12)	1,20,000

3. Salary Cost per annum (Rs.)
Salary payable p.a. 7,000
Less : Pension not payable 2,000
Net salary payable 5,000

4. Depreciation is a non-cash item, need not be considered in computation of cash flow.

5. Head office cost is committed cost and is irrelevant for decision-making.

Calculation of N.P.V. (Rs.)

Sales p.a.		2, 20,000
Less : Variable production cost p.a.	1,20,000	
Manager salary p.a.	5,000	
Factory Rent p.a.	8,000	1, 33,000
Cash inflow p.a.		87,000
Present value of cash inflows for 1 to 5 years		
Discount factor @ 5% (87,000×4.33)		3, 76,710
Less : Cost of machine		-2,50,000
Net present value		**1, 26,710**

Since, Net Present Value is positive, it is suggested to manufacture Product A.
(ii) Sensitive of Forecast Errors :

a. Product Life 3.2 years 36% lower limit of error
b. Annual Sales Volume 7074 units 29% lower limit
c. Material Cost Rs. 7,426 65% upper limit

Illustration 17:
ABC Company Ltd. has been producing a chemical product by using Machine Z for the last two years. Now the management of the company is thinking to replace this Machine either by X or by Y Machine. The following details are furnished to you :

(Rs.)

Machine	Z	X	Y
Book Value	1,00,000	--	--
Resale Value Now	1,10,000	--	--
Purchase Price	--	1,80,000	2,00,000
Annual Fixed Cost (including Depreciation)	92,000	1,08,000	1,32,000
Variable Running Costs (Including Labour) per Unit	3	1.50	2.50
Production Per Hour	8	8	12

You are also provided with the following details:

Selling price per unit Rs. 20
Cost of materials per unit Rs. 10
Annual operating hours 2,000
Working life of each of the three machines (as from now) 5 years

Salvage value of Machines Z - Rs. 10,000; X - Rs. 15,000; Y - Rs. 18,000.

The company charges depreciation using straight line method. It is anticipated that an additional cost of Rs. 8,000 per annum would be incurred on special advertising to sell the extra output of Machine Y. Assume tax rate of 50% and cost of capital 10%. The present value of Re. 1 to be received at the end of the year at 10% is as under.

Year	1	2	3	4	5
Present Value	.909	.826	.751	.683	.621

Using NPV Method, you are required to analysis the feasibility of the proposal and make recommendations.

Solution:

Statement showing Computation of Annual Cash Inflow of Three Machine.

	Machines		
	Z	X	Y
Sales (unit)	16,000	16,000	24,000
Sales @ Rs. 20 P.U. (A)	3,20,000	3,20,000	4,80,000
Costs:			
Variable Running Cost	48,000	24,000	60,000
Material Cost	1,60,000	1,60,000	2,40,000
Fixed Cost	92,000	1,08,000	1,32,000
Special Advertising	--	--	8,000
B	3,00,000	2,92,000	4,40,000
PBT (A) – (B)	20,000	28,000	40,000
Less: Tax @ 50%	10,000	14,000	20,000
PAT	10,000	14,000	20,000
Add: Deprecation	20,000	33,000	36,400
Annual Cash Inflow	30,000	47,000	56,400

Computation of Net Present Value:

Year	Discounting Factors @ 10%	Machine					
		Z		X		Y	
		Cash Flow	P.V.	Cash Flow	P.V.	Cash Flow	P.V.
0	1.000	(1,10,000)	(1,10,000)	(1,80,000)	(1,80,000)	(2,00,000)	(2,00,000)
1	0.909	30,000	27,270	47,000	42,723	56,400	51,268
2	0.826	30,000	24,780	47,000	38,822	56,400	46,586
3	0.751	30,000	22,530	47,000	35,297	56,400	42,356
4	0.683	30,000	20,490	47,000	32,101	56,400	38,521
5	0.621	30,000	18,630	47,000	29,187	56,400	35,025
5*	0.621	10,000	6,210	15,000	9,315	18,000	11,178
Net Present Value			9,910		7,445		24,934

* Salvage Value at the end of 5th Year.

Calculation of Profitability Index (PI) = $\frac{\text{P.V. Cash Inflows}}{\text{P.V. Cash inflows}}$

Machine Z = $\frac{1,19,910}{1,10,000} = 1.09$

Machine X = $\frac{1,87,445}{1,80,000} = 1.041$

Machine Y = $\frac{2,24,934}{2,00,000} = 1.12$

Analysis : Based on NPV method, Machine Y is to be selected, since its NPV is highest at Rs. 24,934. But the initial investment of three machines is different, NPV method is not appropriate. Profitability Index Method is most suitable for evaluation. The Profitability Index of Machine Y is highest and hence Machine Z is to be replaced with Machine Y.

Illustration 17:

The Super Specialists Ltd. constructs customized parts for satellites to be launched by USA and China. The parts are constructed in eight locations (including the central head quarters) around the world. The Finance Director, Ms. Kamni, chooses to implement video conferencing to speed up the budget process and save travel costs. She finds that, in earlier years, the company sent two officers from each location to the central headquarters to discuss the budget twice a year. The average travel cost per perosn, including air fare, hotels and meals, is Rs. 18,000 per trip. The cost of using video conferencing is Rs. 550,000 to set up a system at each location plus Rs. 300 per hour average cost of telephone time to transmit signals. A total 32 hours of transmission time will be needed to complete the budget each year. The company depreciates this type of equipment over five years by using straight line method. An alternative approach is to travel to local rented video conferencing facilities, which can be rented for Rs. 1,500 per hour plus Rs. 400 per hour averge cost for telephone charges.

You are Senior Officer of Finance Department. You have been asked by Ms. Kamni to evaluate the proposal and suggest if it would be worthwhile for the company to implement video conferencing.

Solution :

Option I : Cost of travel, in case Video Conferencing facility is not provided (Rs.)

Total Trip = No. of Locations × No. of Persons × No. of Trips per Person 7×2×2 = 28 Trips

Total Travel Cost (including air fare, hotel accommodation and meals) (28 trips × Rs. 18,000 per trip) 5,04,000

Option II : Video Conferencing Facility is provided by Installation of Own Equipment at Different Locations (Rs.)

Cost of Equipment at each location (Rs. 5, 50,000 ×8 locations) 44, 00,000
Economic life of Machines (5 years)
Annual depreciation (44, 00,000/5) 8, 80,000
Annual transmission cost (32 hrs. transmission×8 locations × Rs. 300 per hour) 76,800
Annual cost of operation (8, 80,000+76,800) 9, 56,800

Option III : Engaging Video Conferencing Facility on Rental Basis (Rs.)
Rental cost (32 hrs. ×8 location × Rs. 1,500 per hr) 3, 84,000
Telephone cost (32 hrs.×8 locations ×Rs. 400 per hr.) 1, 02,400
Total rental cost of equipment (3, 84,000+1, 02,400) 4, 86,400

Analysis: The annual cash outflow is minimum, if video conferencing facility is engaged on rental basis. Therefore, Option III is suggested.

Illustration 18:
X Ltd. an existing profit-making company, is planning to introduce a new product with a projected life of 8 years. Initial equipment cost will be Rs. 120 lakhs and additional equipment costing Rs 10 lakhs will be needed at the beginning of third year. At the end of the 8 years, the original equipment will have resale value equivalent to the cost of removal, but the additional equipment would be sold for Rs. 1 lakh. Working Capital of Rs. 15 lakhs will be needed. The 100% capacity of the plant is of 4, 00,000 units per annum, but the production and sales-volume expected are as under :

Year	Capacity (%)
1	20
2	30
3-5	75
6-8	50

A sale price of Rs. 100 per unit with a Profit-Volume Ratio of 60% is likely to be obtained. Fixed Operating Cash Cost are likely to be Rs. 16 lakhs per annum. In addition to this the advertisement expenditure will have to be incurred as under.

Year	**1**	**2**	**3-5**	**6-8**
Expenditure	**30**	**15**	**10**	**4**

The company is subject to 50% tax, straight-line method of depreciation, (permissible for tax purposes also) and taking 12% as appropriate after tax cost of capital, should the project be accepted?

Solution :

Present Value of Cash outflow (Rs.)

Year 0 Equipment cost (1, 20, 00,000 × 1,000)	1,20,00,000
Year 0 Working capital (15, 00,000 × 1,000)	15,00,000
Year 2 Additional equipment (10, 00,000 × 0.797)	7,97,000
P.V. of Cash outflow	**1,42,97,000**

Calculation of cash inflows

Year	1	2	3-5	6-8
Capacity Utilization	20%	30%	75%	50%
Production & Sales (Units)	80,000	1,20,000	3,00,000	2,00,000
Contribution @ 60 p.u. (i)	48,00,000	72,00,000	1,80,00,000	1,20,00,000
Fixed Cost	16,00,000	16,00,000	16,00,000	16,00,000
Advertisement	30,00,000	15,00,000	10,00,000	4,00,000
Depreciation	15,00,000	15,00,000	16,50,000	16,50,000
(ii)	61,00,000	46,00,000	42,50,000	36,50,000
PBT (i) – (ii)	(13,00,000)	26,00,000	1,37,50,000	83,50,000
Less: Tax 50%	--	13,00,000	68,75,000	41,75,000
PAT	(13,00,000)	13,00,000	68,75,000	41,75,000
Add: Deprecation	15,00,000	15,00,000	16,50,000	16,50,000
Cash Inflow	2,00,000	28,00,000	85,25,000	58,25,000

Calculation of Present Value of Cash inflows (Rs.)

Year	Cash inflow	Discount factor	Present Value
1	2,00,000	0.893	1,78,600
2	28,00,000	0.797	22,31,600
3	85,25,000	0.712	60,69,800
4	85,25,000	0.636	54,21,900
5	85,25,000	0.567	48,33,675
6	58,25,000	0.507	29,53,275
7	58,25,000	0.452	26,32,900
8	58,25,000	0.404	23,53,300
8	15,00,000	0.404	6,06,000
	1,00,000	0.404	40,400

P.V. of cash inflow 2, 73, 21,450

NPV = 2, 73, 21,450 – 1, 42, 97,000 = Rs. 1, 30, 24,450

Analysis: Since NPV is positive, the Project can be accepted.

Illustration 19:

Playmates Ltd. manufactures toys and other short-lived fad items. The Research and Development Department has come up with an item that would make a good promotional gift for office equipment dealers. As a result of efforts by the Sales personnel, the firm has commitments for this product. To produce the quantity demanded Playmates Ltd. will need to buy additional machinery and rent additional space. It appears that about 25,000 sq. ft. will be needed; 12,500 sq. ft. of presently unused space, but leased at the rate of Rs. 3 per sq. ft. per year is available. There is another 12,500 sq. ft. adjoining the facility available at the annual rent of Rs. 4 per sq. ft.

The equipment will be purchased for Rs. 9, 00,000. It will require Rs. 30,000 in modification and Rs. 1, 50,000 for installation. The equipment will have a salvage value of about Rs. 2, 80,000 at the end of the third year. It is subject to 25% depreciation on Reducing Balance Basis. The firm has no other assets in this block. No additional general overhead costs are expected to be incurred.

Estimates of revenue and costs for this product for three years have been developed as follows:

Particulars	Year 1	Year 2	Year 3
Sales	10,00,000	20,00,000	8,00,000
Less: Costs:			
Material, Labour and Overheads	4,00,000	7,50,000	3,50,000
Overheads Allocated	40,000	75,000	35,000
Rent	50,000	50,000	50,000
Depreciation	2,70,000	2,02,500	NIL
Total Costs	7,60,000	10,77,500	4,35,000
Earnings before taxes	2,40,000	9,22,500	3,65,000
Less: Taxes	84,000	3,22,875	1,27,750
Earnings after taxes	1,56,000	5,99,625	2,37,250

If the company sets a required rate of return of 20% after taxes, should this project be accepted?

Note : P.V. factor @ 20% for Year 1 = 0.833; Year 2 = 0.694; and Year 3 = 0.579

Solution :

Tax rate = $\frac{84,000}{2,40,000} \times 100 = 35\%$

Calculation of Loss on Sale of Equipment

		(Rs.)
Cost of equipment	9, 00,000	
Modification & installation cost	(30,000+1, 50,000)	1, 80,000
Initial cash outlay	10, 80,000	
Less : 1st Year Depreciation	(10,80,000 ×25/100)	2,70,000
		8,10,000
Less : 2nd Year Depreciation	(8,10,000 ×25/100)	2,02,500
Written down value at the beginning of 3rd year		6, 07,500
Less : Salvage value	2,80,000	
Loss on sale of equipment	3, 27,500	

Opportunity cost of lease rent lost = 12,500 sq. ft. × Rs. 3 = Rs. 37,500

Calculation of Cash Inflow:

Particulars	Year 1	Year 2	Year 3
Sales (i)	10,00,000	20,00,000	8,00,000
Incremental Cost			
Materials, Labour and Overhead	4,00,000	7,50,000	3,50,000
Opportunity cost of lease rent lost	37,500	37,500	37,500
Rent payable	50,000	50,000	50,000
Deprecation	2,70,000	2,02,500	--
(ii)	7,57,500	10,40,000	4,37,500
EBT (i) - (ii)	2,42,500	9,60,000	3,62,500
Less: Tax @ 35%	84,875	3,36,000	1,26,875
EAT	1,57,625	6,24,000	2,35,625
Add: Deprecation	2,70,000	2,02,500	--
Cash Inflow after tax	4,27,625	8,26,500	2,35,625

Calculation Present Value of Cash Inflow After Tax

Year	Cash Inflow	Discount factor	Present Value after tax @ 20%
1	4,27,625	0.833	3.56.212
2	8,26,500	0.694	5.73.591
3	2,35,625	0.579	1.36.427
3 (Salvage value)	2.80.000	0.579	1.62.120
3 Tax advantage on short term loss	1,14,625	0.579	66,368

P.V. of Cash inflow 12, 94,718

NPV = 12, 94,715 – 10, 80,000 = Rs. 2,14,718

Analysis: Since NPV of the Project is positive, it is suggested to accept the Project.

Illustration 20:
X Ltd. has for some years manufactured a product called C which is used as a component in a variety of electrical items. Although the product C is in demand, the technology of the design is becoming

obsolete. The company has developed a new product D which is based on new technology.

The management of X Ltd. is considering whether to continue production of C or discontinue the C and start production of D. The company do not have the resources to produce both the products.

If C is produced, units Sales in year 1 are forecasted to be 24,000 but declining by 4,000 units in each subsequent year. Additional equipment costing Rs. 70,000 must be purchased now if production of C is to continue.

If D produced, then unit sales in year 1 are forecasted to be 6,000 but after that the sales will increase rapidly. Additional equipment costing Rs. 6, 20,000 should be purchased now if production of D is to start.

Relevant details of the two products are as follows : (Rs.)

	C	D
Variable cost per unit	25	50
Selling price per unit	55	105

The company appraises investments using 12% per annum compound cost of Money and ignores cash flows beyond five year from the start of investment.
(a) Advise the company on the minimum annual growth in units sales of D needed to justify starting production of D now. Support your answer with financial evaluation.

(b) Advise management of the number of years to which its investment appraisal time horizon (Currently five years) would have to be extended in order to justify starting production D now if the forecast annual increase in D sales is 2,800 units.

P. V of Re. 1 at 12% discount are as follows:

Year	1	2	3	4	5	6	7	8
P.V.	0.8929	0.7972	0.7118	0.6355	0.5674	0.5067	0.4523	0.4039

Solution:

(a) The minimum annual growth in unit sales of D needed to justify production of D now is approximately 3400 units per annum. As existing fixed costs are unaffected by the decision and the alternatives are mutually exclusive, the relevant cash flows are the extra investment cost for and contributions from D.

Assume that the sales of D Increase by 6000 units per annum

Year	Net Investment	Contribution Foregone from C	Contribution from D	Net cash flow	Discount flow	Present value
0	* (5,50,000)	--	--	(5,50,000)	1.00	(5,50,000)
1	--	(7,20,000)	3,30,000	(3,90,000)	0.8929	(3,48,230)
2	--	(6,00,000)	6,60,000	60,000	0.7972	47,830
3	--	(4,80,000)	9,90,000	5,10,000	0.7118	3,63,000
4	--	(3,60,000)	13,20,000	9,60,000	0.6355	6,10,100
5	--	(2,40,000)	16,50,000	14,10,000	0.5674	8,00,000
NPV						9,22,700

(b) Additional sales of D increase by 2,800 units p.a.

Year	Net Investment	Contribution Foregone from C	Contribution from D	Net cash flow	Discount factor	Present value
0	* (5,50,000)	--	--	(5,50,000)	1.00	(5,50,000)
1	--	(7,20,000)	3,30,000	(3,90,000)	0.8929	(3,48,200)
2	--	(6,00,000)	4,84,000	(1,16,000)	0.7972	(92,500)
3	--	(4,80,000)	6,38,000	1,58,000	0.7118	1,12,500
4	--	(3,60,000)	7,92,000	4,32,000	0.6355	2,74,500
5	--	(2,40,000)	9,46,000	7,06,000	0.5674	4,00,600
					NVP =	(2,03,100)
6		(1,20,000)	11,00,000	9,80,000	0.5066	4,96,500

Therefore the time horizon is extended by approximately $\frac{2,03,100}{4,96,500} = 0.41$ if a year (i.e. 5 months) to 5 years and 5 months.

Illustration 21

Sugar Industries is planning to introduce a new product with projected life of 8 years. The project to be set up a backward region qualifies for a one time (as it's starting) tax free subsidy from the government of Rs. 20 lakhs. Initial equipment cost will be Rs. 140 lakhs and additional equipment costing Rs. 10 lakhs will needed at the beginning of third year. At the end of 8 years, the original equipment will have no resale value, but the supplementary equipment can be sold for Rs. 1 lakh. A working capital of Rs. 15 lakhs will be needed. The sales volume over the eight year period have been forecast as follows :

Year	Units
1	80,000
2	1,20,000
3-5	3,00,000
6-8	2,00,000

A sale price of Rs. 100 per unit is expected and variable expense will amount to 40% of sales revenue. Fixed cash operating costs will amount to Rs. 16 lakhs per year. In addition, an extensive advertising campaign will be implemented, requiring annual outlay as follows :

Year	Rs. (in lakhs)
1	30
2	15
3-5	10
6-8	4

The company is subject to 50% tax rate and considers 12% to an appropriate after tax cost of capital for this project. The company follows the straight line method of depreciation.

Should the project be accepted? Assume that the company has enough income from its existing products.

Note : The present value of Rs. 1 at 12% rate of discount is as follows :

Year	1	2	3	4	5	6	7	8
P.V. Facture	.893	.797	.712	.363	.567	.507	.452	.404

Solution :

By comparing the present value of investment and P.V. of cash inflow (NPV), it can be determined whether the project is to be accepted or not.

A. Investment (Cash Outflow) :

Rs. 140 lakhs

Initial Equipment Cost	Rs. 20 lakhs
Less : Tax-free Subsidy (initially)	Rs. 120 lakhs
Add : Working Capital Required	Rs. 15 lakhs
	Rs. 135 lakhs

Add : Additional Equipment ae the end of 2nd year.
Rs. 10 lakhs x 0.797 = (Present value of Rs. 10 lakhs) Rs. 7.97 lakhs

Total Investment Rs. 142.97 lakhs

As the additional equipment is to be purchased after 2 years, it means Rs. 10 lakhs is to be invested after 2 years, and so the p.v. of Rs. 10 lakhs after 2 years is Rs. 7.97 lakhs.

B. Calculation of cash flow for eight years :

Particulars	Year 1	Year 2	Year 3-5	6-8 Year
Sales 80,000 x Rs. 100 etc.	80	120	300	200
Cost of Sales : Variable Expenses 40% of Sales	32	48	120	80
Fixed Costs	16	16	16	16
Advertisement Expenses	30	15	10	4
Depreciation Rs. 140 / 8 years	17.50	17.50	19	19
Total Cost	95.50	96.50	165	119
Profit / Loss	-15.50	23.50	135	81
50% Taxation	-	4.00	67.50	40.50
Profit / Loss After Taxation	-15.50	19.50	67.50	40.50
Add : Depreciation	17.50	17.50	19.00	19.00
Cash Flow	2.00	37.00	86.50	59.50

Note :

1. The depreciation for first two years has been calculated on the initial investment of Rs. 140 lakhs, which is Rs. 140 lakhs / 8 years = Rs. 17.50 lakhs on the basis of its 8 year-life. But from the third year, additional depreciation has to be calculated on additional equipment of Rs. 10 lakhs which is Rs. 1.50 lakhs (Rs. 10 lakhs – Rs. 1 lakhs re-sale value = Rs. 9 lakhs / 6 years = Rs. 1.50 lakhs). Thus from 3rd year onwards, the total depreciation would be Rs. 17.50 lakhs = Rs. 1.50 lakhs = 19 lakhs.

2. During the first year, no tax is payable as there is a loss. This loss can be carried forward upto 8 years to be set off against the profits of the future 8 years. Hence during the 2nd year, this loss of Rs. 15.50 lakhs is set off against the profit of Rs. 23.50 lakhs and so tax is calculated only on balance profit of Rs. 8 lakhs (Rs. 23.50 – Rs. 15.50) and so tax of only Rs. 4 lakhs at 50% on Rs. 8 lakhs has been considered.

3. The cash flow for 8th year :

As per above calculation Rs. 59.50 lakhs + Working Capital released Rs. 15.00 lakhs + Sale of Equipment Rs. 1.00 lakhs Total cash Flow Rs. 75.50 lakhs

C. Calculation of Net Present Value

Year	Cash Flow (Rs.)	Discounted Factor (Rs.)	Present Value (Rs.)
1	2,00,000	0.863	1,78,600
2	37,00,000	0.797	29,48,900
3	86,50,000	0.712	61,58,800
4	86,50,000	0.636	55,01,400
5	86,50,000	0.567	49,04,500
6	5,95,000	0.507	30,16,650
7	5,95,000	0.452	26,89,400
8	75,50,000	0.404	30,50,200
			2,84,48,500

Net present Value = P.V. of Cash Inflow – P.V. of Investment
= Rs. 2, 84, 48,500 – 1, 42, 97,000
= Rs. 1, 41, 51,500

Recommendation : Net present value (NPV) is positive (+), So the project should be accepted.

Illustration 22:

Nine Gems Ltd. has just installed Machine R at a cost of Rs. 2, 00,000. The machine has a five year life with no residual value. The annual volume of production is estimated at 1, 50,000 units which can be sold at Rs. 6 per unit. Annual operating costs are estimated at Rs. 2, 00,000 (excluding depreciation) at this output level. Fixed costs are estimated at Rs. 3 per unit for the same level of production.

Nine Gems Ltd. has just come across another model called Machine – S capable of giving the same output at an annual perating cost of Rs. 1, 80,000 (excluding depreciation). There will be no change in fixed costs. Capital cost of this machine is Rs. 2, 50,000 and the estimated life is five year with nil residual value.

The company has an offer for sale of machine: R at Rs. 1, 00,000. But the cost of dismantling and removal will amount Rs. 30,000. As the company has not yet commenced operations, it wants to sell Machine –R and purchase machine –S.

Nine Gems Ltd. will be a zero-tax company for seven years in view of several incentives and allowances available.

The cost of capital may be assumed at 14% P.V. factors for five years are as follows :

Year	P.V. Factors
1	0.877
2	0.675
3	0.675
4	592
5	0.519

Advise whether the company should opt for the replacement.

Solution :

A. Present Value of Investment :

Cost of Machine – S		Rs. 2, 50,000
Less : Sales Price of Machine – R		1,00,000
- Removal Exp.	30,000	Rs. 70,000
Net Investment		1, 80,000

B. Calculation of Annual Cash Flow :

	Machine R	Machine S
Sale : 1,50,000 units x Rs. 6 = 9,00,000		
Less : Operating Expenses :		
1. Depreciation :		
R : 2,00,000 / 5 year -	40,000	
S : 2,50,000 / 5 year -	50,000	
2. Fixed Costs : 1,50,000 Units x Rs. 34,50,000		4,50,000
3. Annual Operating Costs	2,00,000	1,80,000
Total Cost	6, 90,000	6, 80,000
Profit before tax	2, 10,000	2, 20,000

(Which is as good as after tax profit)

Because the company is not required to Pay tax for 7 years)		
Add : Depreciation	40,000	50,000
Annual Cash Flow	2,50,000	2,70,000

Additional (Incremental) Cash flow from Machine S = Rs. 2, 70,000 – Rs. 2, 52,000 = Rs. 20,000.

P.V. of Incremental Cash Flow = 20,000 x 3,432 = Rs. 68,640

Therefore NPV of Machine S = 68,640 – 1, 80,000 = - 1, 11,360

As NPV is negative, replacement is not recommended.

C. Net Present Value (Independent Evaluation)

As the amount of cash flow from both the machines is constant for all the years, it would be better to calculate combined P.V. by totaling the P.Vs.

0.877 + 0.769 + 0.675 + 0.592 + 0.519 = 3.432

Present Value of Cash Flow

Machine – R Rs. 2, 50,000 x 3.432 = Rs. 8, 58,000
Machine – S Rs. 2, 70,000 x 3.432 = Rs. 9, 27,000

Net Present Value (NPV)

Machine – R Rs. 8, 58,000 - Rs. 2, 00,000 = Rs. 6,58,000
Machine – S Rs. 9, 27,000 - Rs. 2, 50,000 = Rs. 7,68,000

69,000	50,000

Machine S must be installed as its NPV is more than that of R. Secondly, its excess cash flow or machine R as compared to Machine S is Rs. 69,000, whereas the additional investment is only Rs. 50,000. Hence, it is profitable to install Machines – S.

Illustration 23:

Foresight Ltd. provides you the following information :

	(Rs.)
Purchase Price of each Machine	12, 00,000
Working Capital	6, 00,000
Life of Machine	5 years
Estimated Salvage Value	2, 00,000
Actual Salvage Value Realised at the end of life	2, 40,000
Method of Deprecation	Straight Line
Tax Rate	30%
Cost of Capital	10%
E.B.D. & Tax	

Year	Machine A Rs.	Machine B Rs.	P.V. 10%
1	6,00,000	--	.909
2	6,00,000	2,00,000	.826
3	6,00,000	4,00,000	.751
4	6,00,000	6,00,000	.683
5	6,00,000	24,00,000	.621

Solution:

Cash Outflow:
Machine A: 12, 00,000 + 6, 00,000 = 18, 00,000
Machine B: 12, 00,000 + 6, 00,000 = 18, 00,000

Computation of NPV

Year	1	2	3	4	5
EBD & T	6,00,000	6,00,000	6,00,000	6,00,000	6,00,000
Less: Deprecation $\frac{12,00,000 - 2,00,000}{5}$	2,00,000	2,00,000	2,00,000	2,00,000	2,00,000
E.B.T.	4,00,000	4,00,000	4,00,000	4,00,000	4,00,000
Less Tax 30%	1,20,000	1,20,000	1,20,000	1,20,000	1,20,000
EAT	2,80,000	2,80,000	2,80,000	2,80,000	2,80,000
Add: Depreciation	2,00,000	2,00,000	2,00,000	2,00,000	2,00,000
Cash Inflow	4,80,000	4,80,000	4,80,000	4,80,000	4,80,000
Add: Release of Working Capital					6,00,000
Add: Salvage Value of Realized					2,40,000
Less: Tax on profit on sale					(12,000)
30% (2,40,000 – 2,00,000) CFAT	4,80,000	4,80,000	4,80,000	4,80,000	13,08,000
P.V. at 10%	.909	.826	.751	.683	.621
P.V. of CFAT	4,36,320	3,96,480	3,60,480	3,27,840	8,12,268

	(Rs.)
Total P.V. of Cash Flow after Tax	23, 33,388
Less P.V. of Cash Outflow	18, 00,000
NPV	5, 33,388

Computation of NPV

Year	1	2	3	4	5
EBD & T	-	2,00,000	4,00,000	6,00,000	24,00,000
Less Depreciation	2,00,000	2,00,000	2,00,000	2,00,000	2,00,000
EBT	-2,00,000	-	2,00,000	4,00,000	22,00,000
Less Tax 30%	60,000	-	60,000	1,20,000	6,60,000
EAT	(1,40,000)	-	1,40,000	2,80,000	15,40,000
Add Depreciation	2,00,000	2,00,000	2,00,000	2,00,000	2,00,000
CFAT	60,000	2,00,000	3,40,000	4,80,000	17,40,000
Add Working Capital Released					6,00,000
Add Cash Salvage					2,40,000
Less Tax (30% of 40,000)					(12,000)
Total CFAT	60,000	2,00,000	3,40,000	4,80,000	25,68,000
PV Factor	.909	.826	.751	.683	.621
P.V. of CFAT	54,540	1,65,200	2,55,340	3,27,480	15,94,728

	Rs.
Total P.V. of cash	23, 97,648
Less: Total P.V. of Cash Outflow	18, 00,000
	5, 97,648

Note: It is assumed that the company has taxable income from other sources against which the loss can be adjusted. There will be tax saving of Rs. 60,000 on negative profit of Rs. 2, 00,000.

Conclusion: Machine B is more profitable than Machine A.

Illustration 24

Project Ltd. Furnished following information:

	Rs.
Purchase Price of New Machine	20,00,000
Erection Charges	3,00,000
Training Cost of Workers	1,00,000
Subsidy received from the Government	50% purchase price
Working Capital	6,00,000
Life of Machine	5 Years
Estimated Salvage Value	2,00,000
Cash Salvage Value	2,40,000

Method of Depreciation	Fixed Instilment
Rate of Tax	30%
Cost of Capital	10%
Sales in Units	

Year	Units
1	2,00,000
2	4,00,000
3	6,00,000
4	8,00,000
5	10,00,000

Initial selling price per unit Rs. 20 for first two years and thereafter Rs. 25 per unit.

Variable cost 40% of sales annual fixed cost other than deprecation will be Rs. 4, 00,000 which will increase to Rs. 6, 00,000 after 3rd year calculate NPV.

Solution:

1. P.V. of Cash Outflow		
	P.V.	**Rs.**
Purchase Price of Machine	1	20,00,000
Creation Changes	1	3,00,000
Cost of Training	1	1,00,000
Less: Subsidy from Government	1	(12,00,000)
Add: Working Capital	1	6,00,000
Total P.V. of Cash out flow		18,00,000
2. Depreciation		
Purchase Price of Machine		20,00,000
Less: Subsidy 60%		8,00,000
Add: Erection Charges		3,00,000
Training Cost		1,00,000
		12,00,000
Less: Salvage		2,00,000
		10,00,000

$$\text{Deprecation} = \frac{10,00,000}{5 \text{ years}}$$

$$= 2,\ 00,000$$

Year	1	2	3	4	5
Units	2,00,000	4,00,000	6,00,000	8,00,000	10,00,000
S.P. (Rs.)	20	20	25	25	25
Sales (A)	40,00,000	80,00,000	1,50,00,000	2,00,00,000	2,25,00,000
Less : Cost Variable Cash	16,00,000	32,00,000	60,00,000	80,00,000	1,00,00,000
Depreciation	2,00,000	2,00,000	2,00,000	2,00,000	2,00,000
Fixed Cost	4,00,000	4,00,000	4,00,000	6,00,000	6,00,000
(B)	22,00,000	38,00,000	66,00,000	88,00,000	1,08,00,000
N.P.T. (A-B)	18,00,000	42,00,000	84,00,000	1,12,00,000	1,42,00,000
Less tax 30%	5,40,000	12,60,000	25,20,000	33,60,000	42,60,000
NPAT	12,60,000	29,40,000	58,80,000	78,40,000	99,40,000
Add Depreciation	2,00,000	2,00,000	2,00,000	2,00,000	2,00,000
C FAT	14,60,000	31,40,000	60,80,000	80,40,000	1,01,40,000
Add Release of Working Capital					6,00,000
Add Cash Salvage					2,40,000
Less Tax on Profit on Sale 30% (2,40,000 – 2,00,000)	-	-	-	-	(12,000)
Total CFAT	14,60,000	31,40,000	60,80,000	80,40,000	1,09,68,000
P.V at 10%	.909	.826	.751	.683	.621
P.V of CFAT	13,27,140	25,93,640	45,66,080	54,91,320	68,11,128

Total P.V. Of Cash Flow = 207, 89,308
Less P.V. of Cash Outflow = 18, 00,000
NPV = 1, 89, 89,308

4.3 IMPORTANT POINTS

1. Depreciation should be ignored in the following cases.

(a) If the question does not mention any thing about depreciation & tax.

(b) If there is an instruction in the question that ignore taxes and depreciation.
(c) If it is mentioned in the company is a zero tax bracket and enjoys tax holiday period.

2. Unless otherwise specially mentioned.

(a) Same amount of working capital invested earlier is released.
(b) Same amount of salvage value is assumed to be realized at the life of the project.
(c) It should be assumed that the company has taxable income from other sources. Hence the loss should be adjusted.
(d) The method of depreciation followed is straight line method.

5

MANAGEMENT OF WORKING CAPITAL- I

Unit Structure :

5.0 OBJECTIVES

After studying the unit the students will be able to:

- Define the concept Working Capital and classify the same.
- Elaborate the determinants of Working Capital.
- Explain the advantages of maintaining adequate amount of working capital.
- Discuss the disadvantages of inadequate amount of working capital

5.1 INTRODUCTION

The term working capital is commonly used for the capital required for day-to-day working in a business concern, such as for purchasing raw material, for meeting day-to-day expenditure on salaries, wages, rents rates, advertising etc. But there are much disagreement among various financial authorities (Financiers, accountants, businessmen and economists) as to the exact meaning of the term working capital.

5.2 DEFINITION AND CLASSIFICATION OF WORKING CAPITAL

5.2.1 MEANING AND DEFINITION

Working capital refers to the circulating capital required to meet the day to day operations of a business firm. Working capital may be defined by various authors as follows:

1. **According to Weston & Brigham -** "Working capital refers to a firm's investment in short term assets, such as cash amounts receivables, inventories etc."
2. "Working capital means current assets." **— Mead, Baker and Malott**
3. "The sum of the current assets is the working capital of the business" **— J.S.Mill**

Working capital is defined as "the excess of current assets over current liabilities and provisions". But as per accounting terminology, it is difference between the inflow and outflow of funds. In the Annual Survey of Industries (1961), working capital is defined to include "Stocks of materials, fuels, semi-finished goods including work-in-progress and finished goods and by-products; cash in hand and bank and the algebraic sum of sundry creditors as represented by (a) outstanding factory payments e.g. rent, wages, interest and dividend; b) purchase of goods and services; c) short-term loans and advances and sundry debtors comprising amounts due to the factory on account of sale of goods and services and advances towards tax payments".

The term "working capital" is often referred to "circulating capital" which is frequently used to denote those assets which are changed with relative speed from one form to another i.e., starting from cash, changing to raw materials, converting into work-in-progress and finished products, sale of finished products and ending with realization of cash from debtors.

Working capital has been described as the "life blood of any business which is apt because it constitutes a cyclically flowing stream through the business.

Working Capital may be classified in two ways
A) Concept based working capital
B) Time based working capital

5.2.2 CONCEPTS OF WORKING CAPITAL

1. Gross Working Capital: It refers to the firm's investment in total current or circulating assets.

2. Net Working Capital: The term "Net Working Capital" has been defined in two different ways:

i. It is the excess of current assets over current liabilities. This is, as a matter of fact, the most commonly accepted definition. Some people define it as only the difference between current assets and current liabilities. The former seems to be a better definition as compared to the latter.

ii. It is that portion of a firm's current assets which is financed by long-term funds.

3. Permanent Working Capital: This refers to that minimum amount of investment in all current assets which is required at all times to carry out minimum level of business activities. In other words, it represents the current assets required on a continuing basis over the entire year. Tandon Committee has referred to this type of working capital as "Core current assets".

4. Temporary Working Capital: The amount of such working capital keeps on fluctuating from time to time on the basis of business activities. In other words, it represents additional current assets required at different times during the operating year. For example, extra inventory has to be maintained to support sales during peak sales period. Similarly, receivable also increase and must be financed during period of high sales. On the other hand investment in inventories, receivables, etc., will decrease in periods of depression.

Suppliers of temporary working capital can expect its return during off season when it is not required by the firm. Hence, temporary working capital is generally financed from short-term sources of finance such as bank credit.

5. Negative Working Capital: This situation occurs when the current liabilities exceed the current assets. It is an indication of crisis to the firm.

5.3 NEED FOR WORKING CAPITAL

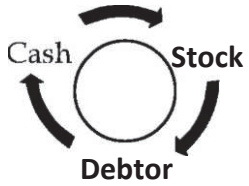
Working capital is needed till a firm gets cash on sale of finished products. It depends on two factors:

i. Manufacturing cycle i.e. time required for converting the raw material into finished product; and

ii. Credit policy i.e. credit period given to Customers and credit period allowed by creditors. Thus, the sum total of these times is called an **"Operating cycle"** and it consists of the following six steps:

1. Conversion of cash into raw materials.
2. Conversion of raw materials into work-in-process.
3. Conversion of work-in-process into finished products.
4. Time for sale of finished goods—cash sales and credit sales.
5. Time for realization from debtors and Bills receivables into cash.
6. Credit period allowed by creditors for credit purchase of raw materials, inventory and creditors for wages and overheads.

In case of trading concern, the operating cycle will be
Cash → Stock → Debtors → Cash



5.4 DETERMINANTS OF WORKING CAPITAL:

The factors influencing the working capital decisions of a firm may be classified as two groups, such as internal factors and external factors. The internal factors includes, nature of business size of business, firm's product policy, credit policy, dividend policy, and access to money and capital markets, growth and expansion of business etc. The external factors include business fluctuations, changes in the technology, infrastructural facilities, import policy and the taxation policy etc. These factors are discussed in brief in the following lines.

I. Internal Factors

1. Nature and size of the business

The working capital requirements of a firm are basically influenced by the nature and size of the business. Size may be measured in terms of the scale of operations. A firm with larger scale of operations will need more working capital than a small firm. Similarly, the nature of the business - influence the working capital decisions. Trading and financial firms have less investment in fixed assets. But require a large sum of money to be invested in working capital. Retail stores, business units require larger amount of working capital, where as, public utilities need less working capital and more funds to invest in fixed assets.

2. Firm's production policy

The firm's production policy (manufacturing cycle) is an important factor to decide the working capital requirement of a firm. The production cycle starts with the purchase and use of raw

material and completes with the production of finished goods. On the other hand production policy is uniform production policy or seasonal production policy etc., also influences the working capital decisions. Larger the manufacturing cycle and uniform production policy -larger will be the requirement of working capital. The working capital requirement will be higher with varying production schedules in accordance with the changing demand.

3. Firm's credit policy

The credit policy of a firm influences credit policy of working capital. A firm following liberal credit policy to all customers require funds. On the other hand, the firm adopting strict credit policy and grant credit facilities to few potential customers will require less amount of working capital.

4. Availability of credit

The working capital requirements of a firm are also affected by credit terms granted by its suppliers - i.e. creditors. A firm will need less working capital if liberal credit terms are available to it. Similarly, the availability of credit from banks also influences the working capital needs of the firm. A firm, which can get bank credit easily on favorable conditions will be operated with less working capital than a firm without such a facility.

5. Growth and expansion of business

Working capital requirement of a business firm tend to increase in correspondence with growth in sales volume and fixed assets. A growing firm may need funds to invest in fixed assets in order to sustain its growing production and sales. This will, in turn, increase investment in current assets to support increased scale of operations. Thus, a growing firm needs additional funds continuously.

6. Profit margin and dividend policy

The magnitude of working capital in a firm is dependent upon its profit margin and dividend policy. A high net profit margin contributes towards the working capital pool. To the extent the net profit has been earned in cash, it becomes a source of working capital. This depends upon the dividend policy of the firm. Distribution of high proportion of profits in the form of cash dividends results in a drain on cash resources and thus reduces company's working capital to that extent. The working capital position of the firm is strengthened if the management follows conservative dividend policy and vice versa.

7. Operating efficiency of the firm:

Operating efficiency means the optimum utilization of a firm's resources at minimum cost. If a firm successfully controls operating

cost, it will be able to improve net profit margin which, will, in turn, release greater funds for working capital purposes.

8. Co-ordinating activities in firm

The working capital requirements of a firm is depend upon the co-ordination between production and distribution activities. The greater and effective the co-ordinations, the pressure on the working capital will be minimized. In the absence of co-ordination, demand for working capital is reduced.

II. External Factors

1. Business fluctuations

Most firms experience fluctuations in demand for their products and services. These business variations affect the working capital requirements. When there is an upward swing in the economy, sales will increase, correspondingly, the firm's investment in inventories and book debts will also increase. Under boom, additional investment in fixed assets may be made by some firms to increase their productive capacity. This act of the firm will require additional funds. On the other hand when, there is a decline in economy, sales will come down and consequently the conditions, the firm try to reduce their short-term borrowings. Similarly the seasonal fluctuations may also affect the requirement of working capital of a firm.

2. Changes in the technology

The technological changes and developments in the area of production can have immediate effects on the need for working capital. If the firm wish to install a new machine in the place of old system, the new system can utilize less expensive raw materials, the inventory needs may be reduced there by working capital needs.

3. Import policy

Import policy of the Government may also effect the levels of working capital of a firm since they have to arrange funds for importing goods at specified times.

4. Infrastructural facilities

The firms may require additional funds to maintain the levels of inventory and other current assets, when there is good infrastructural facilities in the company like, transportation and communications.

5. Taxation policy

The tax policies of the Government will influence the working capital decisions. If the Government follow regressive taxation policy, i.e. imposing heavy tax burdens on business firms, they are

left with very little profits for distribution and retention purpose. Consequently the firm has to borrow additional funds to meet their increased working capital needs. When there is a liberalized tax policy, the pressure on working capital requirement is minimized.

Thus the working capital requirement of a firm is influenced by the internal and external factors.

5.5 MEASUREMENT OF WORKING CAPITAL

There are 3 methods for assessing the working capital requirement as explained below:

a) Percent of Sales Method

Based on the past experience, some percentage of sale may be taken for determining the quantum of working capital

b) Regression Analysis Method

The relationship between sales and working capital and its various components may be plotted on Scatter diagram and the average percentage of past 5 years may be ascertained. This average percentage of sales may be taken as working capital. Similar exercise may be carried out at the beginning of the year for assessing the working capital requirement. This method is suitable for simple as well as complex situations.

c) Operating Cycle Method

As a first step, we have to compute the operating cycle as follows:

i) Inventory period: Number of days consumption in stock = $I / \frac{M}{365}$

Where I - Average inventory during the year
M = Materials consumed during the year

ii) Work-in-process: Number of days of work in process = $W / \frac{K}{365}$

Where W = Average work-in-process during the year
K = Cost of work in process i.e. Material + Labour + Factory Overheads.

iii) Finished products inventory period = $G / \frac{F}{365}$

Where G = Average finished products inventory during the year
F = Cost of finished goods sold during the year

iv) Average collection period of Debtors = $D / \frac{S}{365}$

Where D = Average Debtors balances during the year
S = Credit sales during the year

v) Credit period allowed by Suppliers = C = $\frac{P}{365}$

Where C = Average creditors' balances during the year
P = credit purchases during the year

vi) Minimum cash balance to be kept daily.
Formula: O.C. = M + W + F + D – C

Note : It is also known as working capital cycle. Operating cycle is the total time gap between the purchase of raw material and the receipt from Debtors.

5.6 IMPORTANCE OR ADVANTAGES OF ADEQUATE WORKING CAPITAL

Working capital is the life blood and nerve centre of a business. Just as circulation of blood is essential in the human body for maintaining life, 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:

1. **Solvency of the business:** Adequate working capital helps in maintaining solvency of the business by providing uninterrupted flow of production.

2. **Goodwill:** Sufficient working capital enables a business concern to make prompt payments and hence helps in creating and maintaining goodwill.

3. **Easy loans:** A concern having adequate working capital, high solvency and good credit standing can arrange loans from banks and other on easy and favourable terms.

4. **Cash discounts:** Adequate working capital also enables a concern to avail cash discounts on the purchases and hence it reduces costs.

5. **Regular supply of raw materials:** Sufficient working capital ensures regular supply of raw materials and continuous production.

6. **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 wastages and costs and enhances production and profits.

7. **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.

8. **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.

9. **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 i.e., the future.

10. **High morale:** Adequacy of working capital creates an environment of security, confidence, high morale and creates overall efficiency in a business.

5.7 EXCESS OR INADEQUATE WORKING CAPITAL

Every business concern should have adequate working capital to run its business operations. It should have neither redundant or excess working capital nor inadequate or shortage of working capital. Both excess as well as short working capital positions are bad for any business. However, out of the two, it is the inadequacy of working capital which is more dangerous from the point of view of the firm.

5.7.1 Disadvantages of Redundant or Excessive Working Capital

1. Excessive Working Capital means ideal funds which earn no profits for the business and hence the business cannot earn a proper rate of return on its investments.
2. When there is a redundant working capital, it may lead to unnecessary purchasing and accumulation of inventories causing more chances of theft, waste and losses.
3. Excessive working capital implies excessive debtors and defective credit policy which may cause higher incidence of bad debts.
4. It may result into overall inefficiency in the organization.
5. When there is excessive working capital, relations with banks and other financial institutions may not be maintained.

6. Due to low rate of return on investments, the value of shares may also fall.
7. The redundant working capital gives rise to speculative transactions.

5.7.2 Disadvantages or Dangers of Inadequate Working Capital

1. A concern which has inadequate working capital cannot pay its short-term liabilities in time. Thus, it will lose its reputation and shall not be able to get good credit facilities.
2. It cannot buy its requirements in bulk and cannot avail of discounts, etc.
3. It becomes difficult for the firm to exploit favourable market conditions and undertake profitable projects due to lack of working capital.
4. The firm cannot pay day-to-day expenses of its operations and it creates inefficiencies, increases costs and reduces the profits of the business.
5. It becomes impossible to utilize efficiently the fixed assets due to non-availability of liquid funds.
6. The rate of return on investments also falls with the shortage of working capital.

5.8 WORKING CAPITAL FINANCING

1. Accruals

The major accrual items are wages and taxes. These are simply what the firm owes to its employees and to the government.

2. Trade Credit

Trade credit represents the credit extended by the supplier of goods and services. It is a spontaneous source of finance in the sense that it arises in the normal transactions of the firm without specific negotiations, provided the firm is considered creditworthy by its supplier. It is an important source of finance representing 25% to 50% of short-term financing.

3. Working Capital Advance by Commercial Banks

Working capital advance by commercial banks represents the most important source for financing current assets.

Forms of Bank Finance:

Working capital advance is provided by commercial banks in three primary ways: (i) cash credits / overdrafts, (ii) loans, and (iii) purchase / discount of bills. In addition to these forms of direct

finance, commercials banks help their customers in obtaining credit from other sources through the letter of credit arrangement.

i. **Cash Credit / Overdrafts:** Under a cash credit or overdraft arrangement, a pre-determined limit for borrowing is specified by the bank. The borrower can draw as often as required provided the out standings do not exceed the cash credit / overdraft limit.

ii. **Loans:** These are advances of fixed amounts which are credited to the current account of the borrower or released to him in cash. The borrower is charged with interest on the entire loan amount, irrespective of how much he draws.

iii. **Purchase / Discount of Bills:** A bill arises out of a trade transaction. The seller of goods draws the bill on the purchaser. The bill may be either clean or documentary (a documentary bill is supported by a document of title to gods like a railway receipt or a bill of lading) and may be payable on demand or after a usance period which does not exceed 90 days. On acceptance of the bill by the purchaser, the seller offers it to the bank for discount /purchase. When the bank discounts / purchases the bill it releases the funds to the seller. The bank presents the bill to the purchaser (the acceptor of the bill) on the due date and gets its payment.

iv. **Letter of Credit:** A letter of credit is an arrangement whereby a bank helps its customer to obtain credit from its (customer's) suppliers. When a bank opens a letter of credit in favour of its customer for some specific purchases, the bank undertakes the responsibility to honour the obligation of its customer, should the customer fail to do so.

Regulation of Bank Finance

Concerned about such a distortion in credit allocation, the Reserve Bank of India (RBI) has been trying, particularly from the mid 1960s onwards, to bring a measure of discipline among industrial borrowers and to redirect credit to the priority sectors of the economy. From time to time, the RBI issues guidelines and directives relating to matters like the norms for inventory and receivables, the maximum permissible bank finance, the form of assistance, the information and reporting system, and the credit monitoring mechanism. The important guidelines and directives have stemmed from the recommendations of various committees such as the Dehejia Committee, the Tandon Committee, the Chore Committee, and the Marathe Committee.

However, in recent years, in the wake of financial liberalisation, the RBI has given freedom to the boards of individual banks in all matters relating to working capital financing.

From the mid-eighties onwards, special committees were set up by the RBI to prescribe norms for several other industries and revise norms for some industries covered by the Tandon Committee.

Maximum Permissible Bank Finance: The Tandon Committee had suggested three methods for determining the maximum permissible bank finance (MPBF).

Lending Norms The recommendation of the Tandon Committee regarding the "Lending norms" has far - reaching implications. The lending norms have been suggested in view of the realization that the banker's role as a lender in only to supplement the borrower's resources and not to meet his entire working capitals needs. In the context of this approach, the committee has suggested three alternative methods for working out the maximum permissible level of bank borrowings. Each successive method reduces the involvement of short-term bank credit to finance the current assets.

First Method: According to this method, the borrower will have to contribute a minimum of 25% of the working capital gap from long-term funds, i.e., owned funds and term borrowings. This will give a current ratio of 1.17:1.

The term working capital gap refers to the total of current assets less current liabilities other than bank borrowings.

This can be understood with the help of following example:

Example 1

	Rs.
Total Current assets required by the borrower as per norms	20,000
Current liabilities	5,000
Amount of maximum permissible bank borrowings as per the first method can be ascertained as follows: -	
Working Capital gap (Rs. 20,000 - Rs. 5,000)	15,000
Less: 25% from long-term sources	3,750
Maximum permissible bank borrowings	11,250

Second Method: Under this method the borrower has to provide the minimum of 25% of the total current assets that will give a current ratio of 1.33:1.

Example 2: On the basis of the data given in Example 1, the maximum permissible bank borrowings as per second method can be ascertained as follows:

	Rs.
Current assets as per norms	20,000
Less: 25% to be provided from long - term funds	5,000
	15,000
Less: Current liabilities other than bank borrowings	5,000
Maximum permissible bank borrowings	**10,000**

Third Method : In this method, the borrower's contribution from long term funds will be to the extent of the entire core current assets and a minimum of 25% of the balance of the current assets. The term core current assets refers to the absolute minimum level of investment in all current assets which is required at all times to carry out minimum level of business activities.

Example 3: On the basis of the information given in Example 1, the amount of maximum permissible bank finance can be arrived at the follows if the core current assets are Rs. 2,000

	Rs.
Current assets as per norms	20,000
Less: Core Current Assets	2,000
	18,000
Less: 25% to be provided from long-term funds	4,500
	13,500
Less: Current Liabilities	5,000
Maximum permissible bank borrowings	**8,500**

It will thus be seen that in the third method current ratio has further improved.

Reserve Bank's directive: The Reserve Bank of India accepted the recommendations of the Tandon Committee. It instructed the commercial banks in 1976 to put all the borrowers having aggregate credit limits from banking system in excess of Rs.10 lakhs, under the first method of lending.

Public Deposits

Many firms, large and small, have solicited unsecured deposits from the public in recent years, mainly to finance their working capital requirements.

Inter-corporate Deposits

A deposit made by one company with another, normally for a period up to six months, is referred to as an inter-corporate deposit. Such deposits are usually of three types.

a. **Call Deposits :** In theory, a call deposit is withdrawable by the lender on giving a day's notice. In practice, however, the lender has to wait for at least three days. The interest rate on such deposits may be around 10 percent per annum.

b. **Three-months Deposits :** More popular in practice, these deposits are taken by borrowers to tide over a short-term cash inadequacy that may be caused by one or more of the following factors: disruption in production, excessive imports of raw material, tax payment, delay in collection, dividend payment, and unplanned capital expenditure. The interest rate on such deposits is around 12 percent per annum.

c. **Six-months Deposits :** Normally, lending companies do not extend deposits beyond this time frame. Such deposits, usually made with first-class borrowers, and carry interest rate of around 15 percent per annum.

Short-term Loans from Financial Institutions

The Life Insurance Corporation of India and the General Insurance Corporation of India provide short-term loans to manufacturing companies with an excellent track record.

Rights Debentures for Working Capital

Public limited companies can issue "Rights" debentures to their shareholders with the object of augmenting the long-term resources of the company for working capital requirements. The key guidelines applicable to such debentures are as follows:

(a) The amount of the debenture issue should not exceed (a) 20% of the gross current assets, loans, and advances minus the long-term funds presently available for financing working capital, or (b) 20% of the paid-up share capital, including reference capital and free reserves, whichever is the lower of the two.

(b) The debt. -equity ratio, including the proposed debenture issue, should not exceed 1:1.

(c) The debentures shall first be offered to the existing Indian resident shareholders of the company on a pro rata basis.

Commercial Paper

Commercial paper represents short-term unsecured promissory notes issued by firms which enjoy a fairly high credit rating. Generally, large firms with considerable financial strength are able to issue commercial paper. The important features of commercial paper are as follows:

(a) The maturity period of commercial paper usually ranges from 90 days to 360 days.

(b) Commercial paper is sold at a discount from its face value and redeemed at its face value. Hence the implicit interest rate is a function of the size of the discount and the period of maturity.

(c) Commercial paper is directly placed with investors who intend holding it till its maturity.

Hence there is no well developed secondary market for commercial paper.

Factoring:

Factoring, as a fund based financial service, provides resources to finance receivables as well as facilitates the collection of receivables. It is another method of raising short-term finance through account 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.

5.9 FINANCING AND POLICIES OF WORKING CAPITAL, AND THEIR IMPACT

After arriving the estimation of working capital for any firm, the next step is how to finance the working capital requirement. It is of two sources of financing:

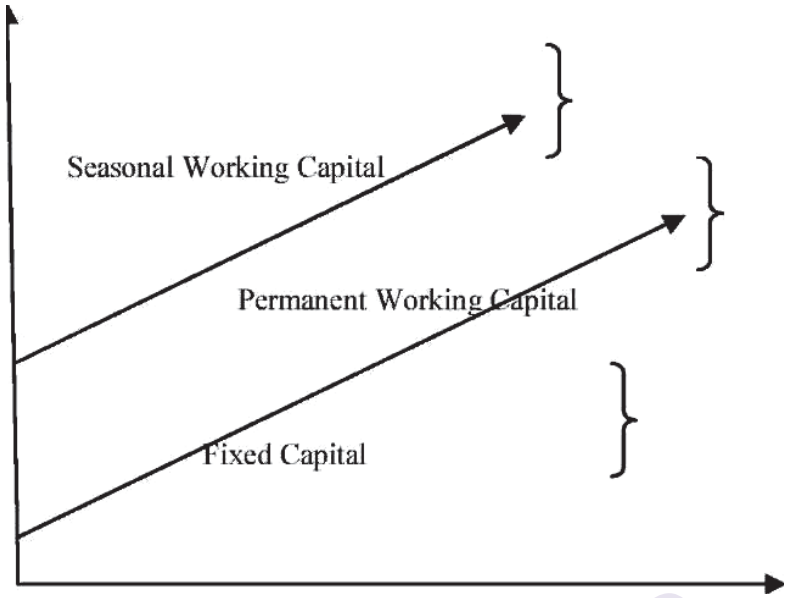
1. Short –term
2. Long – term

Short-term financing refers to borrowing funds or raising credit for a maximum of 1 year period i.e., the debt is payable within a year at the most. Whereas, the Long - term financing refers to the borrowing of funds or raising credit for one year or more. The finance manager has to mix funds from these two sources optimally to ensure profitability and liquidity. The mixing of finances from long-term and short term should be such that the firm should not face either short of funds or idle funds. Thus, the financing of working capital should not result in either idle or shortage of cash funds.

Policy is a guideline in taking decisions of business. In working capital financing, the manager has to take a decision of mixing the two components i.e., long term component of debt and short term component of debt. The policies for financing of working capital are divided into three categories. Firstly, conservative financing policy in which the manager depends more on long term funds. Secondly, aggressive financing policy in which the manager depends more on short term funds, and third, are is a moderate policy which suggests that the manager depends moderately on both long tem and short-term funds while financing. These policies are shown diagrammatically here under.

Matching Approach

The question arising here is how to mix both short term and long term funds while financing required working capital. The guiding approach is known as 'matching approach'. It suggests that if the need is short term purpose, raise short - term loan or credit and if the need is for a long term, one should raise long term loan or credit. Thus, maturity period of the loan is to be matched with the purpose and for how long. This is called matching approach. This matches the maturity period of the loan with the period for how long working capital requires. The following diagram shows the graphic presentation of the matching approach.



Types of Funds	Working capital requirement
Short – term	- Seasonal Working Capital
Long – term	- Permanent Working Capital
Equity Capital	- Fixed Assets

Impact of Working Capital Policies

A firm's sales are Rs. 25 lakhs, and having an EBIT - Rs. 3 lakhs. It has fixed assets of Rs. 8 lakhs. The firm is thinking to hold current assets of different size of Rs. 5 lakhs; Rs. 6 lakhs or Rs. 8 lakhs. Assuming profits and fixed assets do not vary, the impact of these working capital policies are in the following manner which is explained is a hypothetical illustration:

	Types of Policy (Rs. in lakhs)		
	Aggressive	**Moderate**	**Conservative**
Sales	25	25	25
EBIT	3	3	3
Current Assets	5	6	8
Fixed Assets	8	8	8
Total Assets	13	14	16
Return on Assets % (EBIT/total assets)	23.07	21.42	18.75

Lower the level of current assets (aggressive) higher the returns (23.07 percent) higher the level of current assets (conservative) lower the returns (18.75 percent).

Optimal Size of Current Assets

As we have discussed in the earlier paragraphs, current assets and their size depends upon several factors.

Arriving appropriate size of current assets such as cash, raw materials, finished goods and debtors is a challenge to the financial manager of a firm. It happens some times excess or shortage. We have also discussed in the fore-gone paragraphs about the evils of excess working capital and inadequate working capital. Very few firms arrive optimum level of working capital by their sheer experience and scientific approach. The ratio of current assets to fixed assets helps in measuring the performance of working capital management. The higher the ratio, conservative the firm is in maintaining its current assets and lower the ratio, aggressive the firm is in maintaining its current assets. So every firm should balance their level of current assets and make it optimum.

Liquidity Vs. Profitability

Any exercise in working capital management will influence either liquidity or profitability. The working capital management is a razor edge exercise for financial manager of an enterprise. In this context the financial manager has to take several decisions of routine and non-routine such as:

Sufficient cash balance to be maintained;
To raise long term or short term loans decide the rate of interest and the time of repayment; Decide the purchase policy to buy or not to buy materials;

To determine the economic order quantity for inputs,
To fix the price at which to buy the inputs if any;
To sell for credit or not and terms of credit;
To decide the terms of purchase;
To decide the credit period and extent of credit;

In all these aspects the financial manager has to take decisions carefully so that the firm's twin objectives such as profitability and solvency are not affected.

Trade off between Liquidity and Profitability:

If a firm maintains huge amount of current assets its profitability will be affected though it protects liquidity.

If a firm maintains low current assets, its liquidity is of course weak but the firm's profitability will be high.

The trade off between liquidity and illiquidity are shown in the following diagram.

Total Cost	
	^^^y^' Cost of Liquidity
	Profitability Level of
	Current Asset

Optimum Level of Current Asset

A Trade off between Profitability and Liquidity

5.10 EXERCISE

A - Find out the correct option:

1. Working capital is
   a) Excess of fixed assets over current assets
   b) Excess of current assets over current liability
   c) Excess of share capital over loans
   d) None of the above

2. Gross working capital is equal to
   a) Gross fixed assets
   b) Gross current liabilities
   c) Gross current assets
   d) None of the above

3. Permanent working capital is
   a) Minimum working capital required
   b) Seasonal in nature at all the time
   c) Permanently blocked up in stock
   d) None of the above

4. Seasonal working capital is
   a) Permanently required
   b) Fluctuating in nature
   c) Required to meet seasonal needs of
   d) None of the above the organisation

5. Longer the process period
   a) Lesser will be the working capital
   b) Larger will be the working capital
   c) Minimum working capital
   d) None of the above

6. Shortage of working capital may result in
   a) Poor credit worthiness
   b) Higher trade discount
   c) Higher cash discount
   d) None of the above

7. Operating cycle period can be reduced by
   a) Increasing the period of the credit allowed
   b) Decreasing the raw material storage period by creditors
   c) Decreasing the processing period
   d) None of the above

8. Cost of material consumption 67,500
   Opening stock of materials 12,500
   Closing stock of materials 10,000
   One year 360 days

9. Excessive investment in current assets results in
   a) High profitability
   b) Low profitability
   c) High liquidity
   d) b & c

10. higher cash/Bank balance
    a) Decrease profitability
    b) Increase profitability
    c) Increases operating efficiency
    d) None of the above

11. Working capital finance is raised from
    a) Bank overdraft
    b) Cash credit
    c) Bill finance
    d) All of the above

12. Spontaneous source of working capital
    a) Trade creditors
    b) Bills payable
    c) Notes payable
    d) All of the above

13. Internal long term source include
    a) Retained profit
    b) Depreciation
    c) a and b
    d) Share capital

14. External short term source include
    a) Bank overdraft
    b) Cash credit
    c) Public deposits
    d) All of the above

15. Cash credit is permitted against
    a) Pledge
    b) Hypothecation
    c) Mortgage
    d) a and b

16. MPBF refers to
    a) Maximum permissible Bank finance
    b) Minimum permissible bank finance
    c) Bank overdraft
    d) Cash credit

17. Public Deposits are accepted for a maximum of
    a) 2 years
    b) 3 years
    c) 5 years
    d) 1 years

B - State with reasons whether the following statements are true or false:

1. Working capital is excess of current assets over current liabilities.
2. Manufacturing organization requires higher working capital.
3. Cash cost approach is the appropriate basis of estimation of working capital.
4. Stock of finished goods should be valued at cost of production.
5. Longer the period of credit allowed by suppliers lesser will be the requirement of working capital .
6. Credit granted by suppliers reduces working capital requirement.
7. Trade credit is a source of working capital.

8. Average holding period of current assets decides requirement of working capital.
9. Depreciation is an internal source of finance.
10. MPBF stands for minimum bank finance.
11. Floating charge is on a certain asset.

C – Fill in blanks

1. Working capital at cash cost is called _____ capital.
2. Advance from customers brings _____ the requirement of working capital.
3. Margin of safety is _____ to net current assets to get working capital.
4. An organization which grants longer period of credit requires _____ working capital.
5. Bank overdraft is an _____ source of finance.
6. Retained profit is long term _____ source of finance.
7. _____ committee has recommended three norms of working capital finance.
8. Cash credit is a_____ facility.

D- Match the column

1.

	Group A		Group B
1	Gross Working capital	**A**	Minimum working capital
2	Net Working Capital	**B**	To meet seasonal requirements
3	Permanent Working capital	**C**	Valued at cost or at S.P.
4	Seasonal Working capital	**D**	Current assets less current liabilities
5	Debtors	**E**	Total current assets
6	Margin of safety	**F**	Added to net current assets to get working capital
7	Outstanding expenses	**G**	Lag in payment of expenses
8	Large Scale operation	**H**	Larger working capital

2.

	Group A		Group B
1	Open A/c	A	Maximum permissible bank finance
2	MPBF	B	Sale of bill to a bank
3	Bill discounting	C	Goods in possession of bank
4	Pledge	D	Possession of goods with the borrower
5	Hypothecation	E	25%
		F	Credit without legal evidence

E – Answer the following Questions.

1. Discuss the factors determining requirement of adequate working capital.
2. Explain the significance of working capital in the smooth running of a business enterprise and also discuss the various components of working capital.
3. Define working capital
4. Explain the importance of working capital in business.
5. What are the factors that affect the requirements of Working capital?
6. What is cash Working Capital? How is it calculated?
7. Write short notes on 'positive and Negative Working Capital'.
8. What are the short term sources of working capital finance?
9. Explain equity shares as a source of finance.
10. What are the merits and limitations of Public Deposits as a source of finance?
11. Write short notes on:
    a. Cash credit
    b. Bills Discounting
    c. Bank overdraft
    d. Retained earnings
    e. Depreciation as a source of finance

6

MANAGEMENT OF WORKING CAPITAL II

Unit Structure :

6.1 OBJECTIVES

After studying the unit the students will be able to solve the problems of management of working capital

6.2 MANAGEMENT OF WORKING CAPITAL

Working Capital Management involves management of different components of working capital such as cash, inventories, accounts receivable, creditors etc. A brief description follows regarding the various issues involved in the management of each of the above components of working capital.

6.3 PROBLEMS & SOLUTIONS

The working capital estimation as per the method of operating cycle, is the most systematic and logical approach. In this case, the working capital estimation is made on the basis of analysis of each and every component of the working capital individually. As already discussed, the working capital, required to sustain the level of planned operations, is determined by calculating all the individual components of current assets and current liabilities. The calculation of net working capital may also be shown as follows;

Working Capital	=	Current Assets - Current Liabilities
	=	(Raw Materials + Work-in-progress Stock + Finished Goods Stock + Debtors + Cash Balance) – (Creditors + Outstanding Wages + Outstanding Overheads.)

Where,

Raw Materials	= Cost (Average) of Materials in Stock.
Working in Progress	= Cost of Materials + Wages + Overhead of Work-in-progress
Finished Goods Stock	= Cost of Materials + Wages + Overhead of Finished Goods
Creditors for Material	= Cost of Average Outstanding Creditors
Creditors for wages	= Averages Wages Outstanding
Creditors for Overheads	= Average Overheads Outstanding
Thus Working Capital	= Cost of Materials in Stores, in Work-in-progress, in Finished Goods and in Debtors. Less : Creditors for Materials Plus : Wages in Work-in-progress, in Finished Goods and in Debtors. Less : Creditors for Wages. Plus : Overheads in Work-in-progress, in Finished Goods and in Debtors. Less : Creditors for Overheads

The work sheet for estimation of working capital requirements under the operating cycle method may be presented as follows.

Estimation of Working Capital Requirements	Amount	Amount	Amount
I. Current Assets :			
Minimum Cash Balance		****	
Inventories:			
Raw Materials	****		
Work-in-progress	****		
Finished Goods	****	****	
Receivables:			
Debtors	***		
Bills	***	***	***
Gross Working Capital (CA)			
II Current Liabilities:			
Creditors for Purchases	****		

Creditors for Wages	****		
Creditors for Overheads	****	****	***
Total Current Liabilities (CL)	****		***
Excess of CA over CL			***
+ Safety Margin		****	**
Net Working Capital		****	***

The following points are also worth noting while estimating the working capital requirement:

1. Depreciation: An important point worth noting while estimating the working capital requirement is the depreciation on fixed assets. The depreciation on the fixed assets, which are used in the production process or other activities, is not considered in working capital estimation. The depreciation is a non-cash expense and there is no funds locked up in depreciation as such and therefore, it is ignored. Depreciation is neither included in valuation of work-in-progress nor in finished goods. The working capital calculated by ignoring depreciation is known as cash basis working capital. In case, depreciation is included in working capital calculations, such estimate is known as total basis working capital.

2. Safety Margin: Sometimes, a firm may also like to have a safety margin of working capital in order to meet any contingency. The safety margin may be expressed as a % of total current assets or total current liabilities or net working capital. The safety margin, if required, is incorporated in the working capital estimates to find out the net working capital required for the firm. There is no hard and fast rule about the quantum of safety margin and depends upon the nature and characteristics of the firm as well as of its current assets and current liabilities.

Illustration 1

The Cost Sheet of POR Ltd. Provides the following data:

	Cost Per Unit
Raw Material	Rs. 50
Direct Labour	20
Overheads	40
Total Cost	110
Profits.	20
Selling Prices.	130

Average Raw Material in stock is for one month. Average material in work-in- progress is for half month credit by suppliers. One month credit allowed to debtors one month.

Average time lag in payment of wages 10 days average time lag in payment of overheads 30 days 25% of the sales are on cash basis. Cash Balance expected to be Rs. 1,00,000. Finished good lie in the warehouse for one month.

You are required to prepare a statement of the working capital needed to finance a level of the activity of 54,000 Units Of output. Production is carried on evenly throughout the year and wages and overhead accrue similarly. State your assumptions if any clearly.

Solution:

As the annual level of activity is given at 54,000 units, it means that the monthly turn over would be 54,000\ 12=4,500. The Working capital requirement for this Monthly turn over can now be estimated as follow.

Estimate OF Working Capital Requirements.

I. Current Assets.	**Amounts.(Rs.)**
Minimum Cash Balance	1,00,000
Inventories :	
Raw Material (4,500xRs.50)	2,25,000
Work In Progress :	
Material (4,500xRs. 50)/2	1,25,500
Wages 50% of (4,500x Rs.20)/20	22,500
Overheads 50% of (4,500xRs. 30)/2	33,750
Finished Good (4,500xRs. 100)	4,50,000
Debtors (4,500x Rs. 100x75%)	3,75,500
Gross Working Capital	12,81,250
II. Current Laibilities:	
Creditors for Materials (4,500xRs. 50)	2,25,000
Creditors for Wages (4,500xRs. 20)/3	30,000
Creditors for overheads (4,500xRs. 30)	1,35,000
Total Current Laibilities	3,90,000
Net Working Capital	**8,91,250**

Working notes:

(a) The overheads of Rs. 40 per unit include a depreciation of Rs. 10 per unit, which is a non – cash item. This depreciation cost has been ignored for valuation of work – in – progress, finished goods and debtors. The overhead cost, therefore, has been taken only at Rs. 30 per unit.

(b) In the valuation of work in progress, the raw material have been taken at full requirements for 15 days; but the wages and overheads have been taken only at 50% on the assumption that on an average all units in work – in – progress are 50% complete.

(c) Since, the wages are paid with a time lag of 10 days, the working capital provided b wages has been taken by dividing the monthly wages by 3 (assuming a month to consist of 30 days).

Illustration 2

Grow More Ltd. is presently operating at 60% level, producing 36,000 units per annum. In view of favourable market conditions, it has been decided that from 1st January 2009, the company would operate at 90% capacity. The following information's are available:

(1) Existing cost – price structure per unit if given below:

Raw material	4.00
Wages	2.00
Overheads (Variable)	2.00
Overheads (Fixed)	1.00
Profit	1.00

(2) It is expected that the cost of raw material, wages rate expenses and sales per unit will remain unchanged in 2009.

(3) Raw materials remain in store for 2 months before these are issued to production. These units remain in production process for 1 month.

(4) Finished goods remain in godown for 2 months.

(5) Credit allowed to debtors is 2 months. Credit allowed by creditor is 3 month.

(6) Lag in wages and overhead payments is 1 months. It may be assumed that wages and overhead accrue evenly throughout the production level.

You are required to :

a) Prepare profit statement at 90% capacity level; and

b) Calculate the working capital requirements an estimated basis to sustain the increased production level.

Assumption made f any, should be clearly indicate.

Solution:

Statement of Profitability at 90% Capacity

Units (At 90% Capacity)	54,000
Sales (54,000 x Rs.10) (A)	Rs. 5,40,000
Cost:	
Raw Materials (54,000 x Rs. 4)	2,16,000
Wages (54,000 x Rs. 2)	1,08,000
Varaiable overhead (54,000 x Rs. 2)	1,08,000
Fixed overhead (Rs. 1x36,000)	36,000
Total Cost (B)	4,68,000
Net Profit (A-B)	72,000

Statement of Working Capital Requirement

A. current Assets:	**Rs.**	**Rs.**
Stock of Raw materials (2 Months x 4,500 x Rs. 4)		36,000
Work – in – progress:		
Materials (1 month x 4,500 x Rs. 4)	18,000	
Wages (1/2 month)	4,500	
Overheads (1/2 months)	6,000	28,500
Finished Goods (2 months)		78,000
Debtors (2 months x 4,68,000 / 12)		78,000
Total Current Assets		2,20,500
B. CURRENT LIABILITIES		
Sundry creditors (Goods) – 3 Months		54,000
Outstanding wages (`1 month)		9,000
Outstanding overheads (1 month)		12,000
Total Current Liabilities		75,000
Working Capital requirement		1,45,500

Working Notes:
Overhead and wages – The work in progress period is one month. So, the wages and overheads included in work in progress, are on an average, for half month or 1/24 of a year.

$$\text{Wages} = \frac{\text{Rs. } 1,08,000}{24} = 4,500$$

$$\text{Overhead} = \frac{\text{Rs. } 1,08,000 + 36,000}{24} = 6,000$$

The valuation of finished goods can also be arriving at as follows:
Number of units = 4,500 x 2 = 9,000
Variable cost = Rs. 8 per unit
Fixed cost (Rs. 36,000 / 12) x 2 = Rs. 6,000
Total cost of finished goods (9,000 x 8) + 6,000 =Rs. 78,000

As the decision to increase the operating capacity from 60% to 90% is already taken, it has been assumed that the opening balance of raw materials, work in progress and finished goods have already been brought to the desired level. Consequently, goods purchased during the period will be only for the production requirement and not for increasing the level of stock.

Illustration 3
The management of Royal Industries has called for a statement showing the working capital to finance a level of activity of 1,80,000 units of output for the year. The cost structure for the company's product for the above mentioned activity level is detailed below:

	Cost per unit
Raw Materials	Rs. 20
Direct Labour	5
Overheads (include depreciation of Rs. 5 per unit)	15
	40
Profit	10
Selling Price	50

Additional Information:

(a) Minimum desire cash balance is Rs. 20,000

(b) Raw Materials are held in stock, on an average, for two months.

(c) Work in progress (assume 50% competition stage) will approximate to half – a – month's production.

(d) Finished goods remain in warehouse, on an average for a month.

(e) Suppliers of materials extend a month's credit and debtors are provided two month's credit; cash sales are 25% of total sale.

(f) There is time lag in payment of wages of a month; and half – a month in the case of overheads.

From the above facts, you are required to prepare a statement showing working capital requirements.

Solution:

Statement of Total Cost

Raw Material (1,80,000 x Rs. 20)	Rs. 36,00,000
Direct labour (1,80,000 x Rs. 5)	9,00,000
Overheads (excluding depreciation) (1,80,000 x Rs. 10)	18,00,000
Total Cost	63,00,000

Statement of Working Capital requirement

1. Current Assets:	
Cash Balance	20,000
Raw Materials (1/6 of Rs. 36,00,000)	6,00,000
Work – in – progress (Total cost / 24 x 50%)	1,31,250
Finished Goods (Total Cost / 12)	5,25,000
Debtors (75% Rs. 63,00,000) x 1/6	7,78,500
Total Current Assets	20,63,750
2. Current Liabilities:	
creditors (Rs. 36,00,000) x 1/12	3,00,000
Direct Labour (Rs. 9,00,000) x 1/12	75,000
Overheads (Rs. 18,00,000) x 1/24 (excluding dep.)	75,000
Total Current Liabilities	4,50,000
Net working Capital requirement	16,13,750

Note: Depreciation is a non – cash item, therefore, it has been excluded from total cost as well as working capital provided by overheads. Work in progress has been assumed to be 50% complete in respect of materials as well as labour and overheads expenses.

Illustration 4

XYZ Ltd. sells its products on a gross profit of 20% of sales. The following information is extracted from its annual accounts for the year ending 31st March, 2009.

Sales (at 3 months credit)	Rs. 40,00,000
Raw Materials	12,00,000
Wages (15 days in arrears)	9,60,000
Manufacturing and General expenses (1 months in arrears)	12,00,000
Administration expenses (1 month in arrears)	4,80,000
Sales Promotion expenses (payable half yearly in advance)	2,00,000

The company enjoys one months credit from the suppliers of raw materials and maintains 2 months stock of raw materials and 1 ½ 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 requirement of XYZ Ltd.

Solution:

Statement of Working Capital Requirement

1. Current Assets:	**Amt. (Rs.)**
Debtors (40,00,000 x 3 / 12 x 80%) (at cost of goods sold)	8,00,000
Raw Materials stock 2/12 of 12,00,000	2,00,000
Finished Goods stock (1 ½ Months of cost of production) (Cost of Production being 80% of sales of 40,00,000	4,00,000
Advance payment of Sales promotion	1,00,000
Cash	1,00,000
Total Current Assets	16,00,000
2. Current Liabilities	
Sundry Creditors (1/12 of 12,00,000)	1,00,000
Wages (arrears for 15 days) (1/24 of 9,60,000)	40,000
Manu, and Gen, exp. (arrears for 1 month) (1/12 of 12,00,000)	1,00,000

Administrative exp. (arrears for 1 month) (1/12 of 4,80,000)	40,000
Total current liabilities	2,80,000
Excess of current assets and current liabilities	13,20,000
Add 10% Margin	1,32,000
Net working capital	14,52,000

Illustration 5

Hi – Tech Ltd. plans to sell 30,000 units next year. The expected cost of goods sold is as follows:

	(Rs. Per unit)
Raw Material	100
Manufacturing expenses	30
Selling, Administration and financial expenses	20
Selling price	200

The Duration at various stages of the operating cycle is expected to be as follows:	
Raw Materials Stage	2 months
Work in progress stage	1 month
Finished stage	½ months
Debtors Stage	1 month

Assuming the monthly sales level of 2,500 units, estimate the gross working capital requirement. Desired cash balance is 5% of the gross working capital requirement, and work – in – progress in 25% complete with respect to manufacturing expense.

Solution:

Statement of Working Capital Requirement

1. Current Assets:		
Stock of Raw Material (2,500 x 2 x 100)		5,00,000
Work in progress:		
Raw Materials (2,500 x 100)	2,50,000	
Manufacturing Expenses 25% of (2,500 x 30)	18,750	2,68,750
Finished Goods:		
Raw Materials (2,500 x ½ x 100)	1,25,000	

Manufacturing Expenses (2,500 x ½ x 30)	37,500	1,62,500
Debtors (2,500 x 150)		3,75,000
		13,06,250
Cash Balance (13,06,350 x 5/95)		68,750
Working Capital Requirement		13,75,000

Note: selling, administration and financial expenses have not been included in valuation of closing stock.

Illustration 6
Calculate the amount of working capital requirement for SRCC Ltd. from the following information.

	Rs. (Per unit)
Raw Material	160
Direct labour	60
Overheads	120
Total Cost	340
Profit	60
Selling Price	400

Raw Materials are held in stock on an average for one month. Materials are in process on an average for half – a – month. Finished goods are in stock on an average for one month.

Credit allowed by suppliers is one month and credit allowed to debtors is two months. Time lag in payment of wages is 1 ½ weeks. Time lag in payment of overheads expenses is one month. One fourth of the sales are made on cash basis.

Cash in had and at the bank is expected to be Rs. 50,000; expected level of production amount to 1,04,000 units for a year of 52 weeks.

You may assume that production is carried on evenly throughout the year and a time period of four weeks is equivalent of month.

Solution:
Statement of working capital Requirement

1. Current Assets	**Amt. (Rs.)**	**Amt. (Rs.)**
Cash Balance		50,000
Stock of Raw Materials (2,000x160x4)		12,80,000
Work in progress:		
Raw Materials (2,000 x 160 x 2)	6,40,000	
Labour and Overheads (2,000 x 180 x 2) x 50%	3,60,000	10,00,000
Finished Goods (2,000 x 340 x 4)		27,20,000
Debtors (2,000 x 75% 340 x 8)		40,80,000
Total Current Assets		91,30,000

2. Current Liabilities:		
Creditors (2,000 Rs. 160 x 4)		12,80,000
Creditors for wages (2,000 Rs. 60 x 1½)		1,80,000
Creditors for overheads (2,000 Rs. 120 x 4)		9,60,000
Total Current Liabilities		24,20,000
Net Working Capital (CA – CL)		67,10,000

Illustration 7
X Ltd. sells goods at a gross profit of 20%. It includes deprecation as part of cost of production. The following figures for the 12 months ending 31st Dec. 2008 are given to enable you to ascertain the requirement of working capital of the company on a cash cost basis.

In you working, you are required to assume that:
(i) A safety margin of 15% will be maintained;
(ii) Cash is to be held to the extent of 50% of current liabilities.
(iii) There will be no work – in progress;
(iv) Tax is to be ignored.
Stocks of raw materials and finished goods are kept at one month's requirements. All working notes are to form part of your answer.

Sales at 2 Months credit	27,00,000
Materials consumed (suppliers credit is for 2 months)	6,75,000
Total wages (paid at the beginning of the next month)	5,40,000
Manufacturing expenses outstanding at the end of the year (These expenses are paid one month in arrears)	60,000
Total administrative expense (paid as above)	1,80,000
Sales promotion expenses paid quarterly and in advance	90,000

Solution:

Calculation of Manufacturing Cost–(Cash Cost only)

Materials Consumed	Rs.	6,75,000
Wages		5,40,000
Cash manufacturing expenses (Rs. 60,000×12)		7,20,000
A) Cash manufacturing cost		**19,35,000**
B) Cost of sales (cash cost only)		
Cash manufacturing cost (as per 'A' above)		19,35,000
Administrative expenses		1,80,000
Sales promotion expenses		90,000
		22,05,000
C) Current Liabilities		
Creditors for goods (1/6 of materials consumed)		1,12,500
Outstanding wages (1 month) (Rs. 5,40,000/12)		45,000
Cash manufacturing cost (outstanding one month)		60,000
Administrative expenses (outstanding one month)		15,000
		2,32,500
D) Current assets		
Debtors (at cost of sales) (Rs. 22,05,000/12)×2		3,67,500
Stock of raw materials (Rs. 6,75,000/12)		56,250
Finished stock (1/12 of Rs. 19,35,000)		1,61,250
Cash in hand–50% of current liabilities		1,16,250
Advance payment of expenses (sales promotion)		22,500
Total Current assets		**7,23,750**
– Current liabilities		2,32,500
Excess of current assets over current liabilities		**4,91,250**
+ Safety margin 15%		73,687
Working capital on cash cost basis		**5,64,937**

It may be noted that Gross Profit ratio is given at 20%. So, the cost of production (inclusive of depreciation is 80%. For Sales of Rs. 27,00,000, the total cost of goods sold comes to Rs. 21,60,000 (i.e., 80% of 27,00,000). But the cash manufacturing cost

is only Rs. 19,35,000. Therefore, depreciation would have been Rs. 2,25,000 (i.e., Rs. 21,60,000–Rs. 19,35,000).

Illustration 8

A Company has applied a short-term loan to a commercial bank for financing its working capital requirement. You are asked by the bank to prepare an estimate of the requirement of the working capital for that company. Add 10% to your estimated figure to cover unforeseen contingencies. The information about the project Profit and Loss A/c of the company is as under:

Sales		Rs.	21,00,000
Cost of goods sold			15,30,000
Gross Profit			5,70,000
Administrative expenses	Rs. 1,40,000		
Selling expenses	1,30,000		2,70,000
Profit before Tax			3,00,000
Provision for Tax			1,00,000

Cost of goods sold has been derived as follows:

Materials used	8,40,000	
Wages and Manufacturing expenses	6,25,000	
Depreciation	2,35,000	17,00,000
–Stock of finished goods (10% of total production)		1,70,000
		15,30,000

The figure given above relate only to the goods that have been finished and not to W.I.P. goods which is equal to 15% of the year's production (in terms of physical units) on an average, requiring full materials but only 40% of the other expenses. The company believes in keeping 2 months consumption of material in stock.

All expenses are paid one month in arrears. Suppliers of materials extend 1½ months credit. Sales are 20% cash, rest are at 2 months credit. You can make such other assumptions as you deem necessary for estimating working capital requirement.

Solution :

1. Current Assets:

Stock of Raw Materials (2/12 of 8,40,000)	Rs.	1,40,000

Work-in-progress:

Raw materials (15/100 of 8,40,000)	Rs.	1,26,000
Wages and manufacturing (6,25,000×40%×15%)		37,500
		1,63,500
Stock finished goods: [10% of (8,40,000+6,25,000)]		1,46,500

Debtors (2 months):

Cost of goods sold	15,30,000
–Depreciation (2,35,000–23,500)	2,11,500
	13,18,500
Adm. Expenses	1,40,000
Selling Expenses	1,30,000
Total Cost	**15,88,500**
–Cash sales @ 20%	3,17,700
	12,70,800
Debtors (2/12 of 12,70,800)	2,11,800
	6,61,800

2. Current Liabilities:

Creditors (8,40,000/12×1½)	1,05,000
O/S Wages and Manufacturing exp. (1/12 of 6,25,000)	52,083
O/S Administrative expenses (1/12 of 1,40,000)	11,667
Selling expenses (1/12 of 1,30,000)	10,833
	1,79,583
Excess of current assets over current liabilities	4,82,217
+ 10% for contingencies	48,222
Working capital requirement	5,30,439

Illustration 9

JBC Ltd. sells goods on a gross profit of 25%. Depreciation is considered as a part of cost of production. The following are the annual figures given to you:

Sales (2 months credit)	Rs. 18,00,000
Materials consumed (1 months credit)	4,50,000
Wages paid (1 month lag in payment)	3,60,000
Cash manufacturing expenses (1 month lag in payment)	4,80,000
Administrative expenses (1 month lag in payment)	1,20,000
Sales promotion expenses (paid quarterly in advance)	60,000

The company keeps one month's stock each of raw materials and finished goods. It also keeps Rs. 1,00,000 in cash. You are required to estimate the working capital requirements of the company on cash cost basis, assuming 15% safety margin.

Solution:

Statement of Working Capital Requirement

1. Current Assets:	Amt. (Rs.)
Cash-in-hand	1,00,000
Debtors (cost of sales i.e. 14,70,000×2/12)	2,45,000
Prepaid Sales Promotion expenses	15,000

Inventories:	
Raw Materials (4,50,000/12)	37,500
Finished goods (12,90,000/12)	1,07,500
Total current assets	5,05,000
2. Current Liabilities:	
Sundry creditors (4,50,000/12)	37,500
Outstanding Manufacturing exp. (4,80,000/12)	40,000
Outstanding Administrative exp. (1,20,000/12)	10,000
Outstanding Wages (3,60,000/12)	30,000
Total current liabilities	1,17,500
Excess of CA and CL	3,87,500
+ 15% for contingencies	58,125
Working capital required	**4,45,625**

Working Notes:

1. Cost Structure		**Rs.**
Sales		18,00,000
– Gross profit 25% on sales		4,50,000
Cost of production		13,50,000
– Cost of materials	Rs.	4,50,000
– Wages		3,60,000
		8,10,000
Manufacturing expenses (Total)		5,40,000
– Cash Manufacturing expenses		4,80,000
Therefore, Depreciation		60,000

2. Total cash cost:	
Cost of production	13,50,000
– Depreciation	60,000
+ Administrative expenses	1,20,000
+ Sales promotion expenses	60,000
Total Cash Cost	14,70,000

Illustration 10

Prepare a working capital forecast from the following information:

Production during the previous year was 10,00,000 units. The same level of activity is intended to be maintained during the current year.

The expected ratios of cost to selling price are:

Raw material 40%

Direct Wages 20%

Overheads 20%

The raw materials ordinarily remain in stores for 3 months before production. Every unit of production remains in the process for 2 months and is assumed to be consisting of 100% raw material, wages and overheads. Finished goods remain in the warehouse for 3 months. Credit allowed by creditors is 4 months

from the date of the delivery of raw material and credit given to debtors is 3 months from the date of dispatch.

The estimated balance of cash to be held Rs. 2,00,000
Lag in payment of wages 1/2 month
Lag in payment of expenses 1/2 month

Selling price is Rs. 8 per unit. Both production and sales are in a regular cycle. You are required to make a provision of 10% for contingency (except cash). Relevant assumptions may be made.

Solution:
Total Sales = 10,00,000×8=Rs. 80,00,000

Statement of Working Capital Requirement

A. Current Assets:	**Rs.**
Debtors (80,00,000×80%×3/12)	16,00,000
Finished Goods (80,00,000×80%×3/12)	16,00,000
Work-in-progress (80,00,000×80%×2/12)	10,66,667
Raw Materials (80,00,000×40%×3/12)	8,00,000
Total current assets	50,66,667
	50,66,667
B. Current Liabilities:	
Creditors (80,00,000×40%×4/12)	10,66,667
Wages (80,00,000×20%×1/24)	66,667
Expenses (80,00,000×20%×1/24)	66,666
	12,00,000
Excess of CA over CL	38,66,667
+ 10% contingency	3,86,667
	42,53,334
Cash	2,00,000
Working Capital Requirement	**44,53,334**

Illustration 11
On 1st January, 2009, the Board of Directors of Dowell Co. Ltd. wishes to know the amount of working capital that will be required to meet the program of activity they have planned for the year. The following information's are available:

i) Issued and paid-up capital Rs. 2,00,000.

ii) 5% Debentures (secured on assets) Rs. 50,000.

iii) Fixed assets valued at Rs. 1,25,000 on 31.12.2008.

iv) Production during the previous year was 60,000 units. It is planned that the level of activity should be maintained during the present year.

v) The ratios of cost to selling price are—raw materials 60%., direct wages 10%, and overheads 20%.

vi) Raw materials are expected to remain in stores for an average of two months before these are issued for production.

vii) Each unit of production is expected to be in process for one month.

viii) Finished goods will stay in warehouse for approximately three months.

ix) Creditors allow credit for 2 months from the date of delivery of raw materials.

x) Credit allowed to debtors is 3 months from the date of dispatch.

xi) Selling price per unit is Rs. 5.

xii) There is a regular production and sales cycle.

Prepare— a) Working capital requirement forcast; and
b) An estimated Profit and Loss Account and Balance Sheet at the end of the year.

Solution:

Statement of Working Capital Requirement

A. Current Assets:	**Amt. (Rs.)**
Raw Materials (1,80,000/6)	30,000
Work in progress (1 month)	18,750
Finished goods (3 months)	67,500
Debtors (3 months) (2,70,000/4)	67,500
Total Current Assets	**1,83,750**
B. Current Liabilities:	
Creditors (2 months consumption of RM)	30,000
Net working capital (CA–CL)	1,53,750

Working Notes:

1. Computation of Cost and Sales for 60,000 units:

Sales @ Rs. 5 per unit	3,00,000
Cost of production:	
Raw Material (60% of 3,00,000)	1,80,000
Direct Wages @ Rs. 0.50 per unit	30,000
Overheads @ Rs. 1 per unit	60,000
Total Cost of Sales	2,70,000

2. Calculation of work in progress (1 month production):

Raw material (Rs. 1,80,000/12)	Rs.	15,000
Direct Wages (Rs. 30,000/12)×50%		1,250
Overheads (Rs. 60,000/12)×50%		2,500
		18,750

The direct wages and overheads are assumed to have accrued evenly throughout the month. So, only 1/2 month wages and overheads are included in work in progress.

Projected Profit and Loss Account for the year ending December 2009.

Sales (60,000×5)	Rs.	3,00,000
–Raw material @ 60%	Rs.	1,80,000
–Direct Wages @ 10%		30,000
–Overheads @ 20%		60,000
		2,70,000
Gross Profit		30,000
–Debenture Interest @ 5% on 50,000		2,500
New Profit		27,500

Projected Balance Sheet as on Dec. 31, 2009

Liabilities	Amt. (Rs.)	Assets	Amt. (Rs.)
Share capital	2,00,000	Fixed assets	1,25,000
Profit and Loss A/c (Bal. Fig.)	8,750	Raw materials	30,000
Profit for the year 2009	27,500	Finished goods	67,500
5% Debentures	50,000	Work-in-progress	18,750
Creditors	30,000	Debtors	75,000
	3,16,250		**3,16,250**

Illustration 12

Prepare an estimate of net working capital requirement for the WCM Ltd. adding 10% for contingencies from the information given below:

Estimated cost per unit of production Rs. 170 includes raw materials Rs. 80, direct labour Rs. 30 and overheads (exclusive of depreciation) Rs. 60. Selling price is Rs. 200 per unit. Level of activity per annum 1,04,000 units. Raw materials in stock : average 4 weeks; work-in-progress (assume 50% completion stages) : average 2 weeks; finished goods in stock : average 4 weeks; credit allowed by suppliers ; average 4 weeks; credit allowed to debtors : average 8 weeks; lag in payment of wages : average 1.5 weeks, and cash at bank is expected to be Rs. 25,000. You may assume that production is carried on evenly throughout the year (52 weeks) and wages and overheads accrue similarly. All sales are on credit basis only. You may state your assumptions, if any.

Solution:

Statement of Working Capital Requirement

A. Current Assets:	**Rs.**	**Rs.**
i) Raw materials in stock (1,04,000×80×4)/52		6,40,000
ii) Work-in-progress:		
a) Raw materials (1,04,000×80×2)/52		3,20,000
b) Direct Labour 50% of (1,04,000×30×2)/52		60,000
c) Overheads 50% of (1,04,000×60×2)/52		1,20,000
iii) Finished Good Stock (1,04,000×170×4)/52		13,60,000
iv) Debtors (1,04,000×170×8)/52		27,20,000
v) Cash at Bank		25,000
Total Current Assets		**52,45,000**
B. Current Liabilities:		
i) Creditors (1,04,000×80×4)/52		6,40,000
ii) Wages (Lag-in-payment): (1,04,000×30×1½)/52		90,000
Total current liabilities:		7,30,000
Net Working Capital (CA–CL)		45,15,000
+ 10% Contingencies		4,51,500
Working Capital Requirement		49,66,500

Assumptions: Net working capital requirement has been estimated on cash cost basis. Hence, investment in debtor has been computed on cash cost.

Illustration 13

Gulfam Ltd. is presently operating on single shift basis and has the following cost structure (per unit):

Selling Price Rs. 36	Raw Materials	Rs. 12
	Wages (60% Variable)	Rs. 10
	Overheads (20% Variable)	Rs. 10
		Rs. 32

For the year ending March, 31, 2009; the sales amounted to Rs. 8,64,000 and the current asset position on that day was as follows:

Raw material	Rs. 72,000
Finished Goods	1,44,000
Working in progress (Prime Cost)	44,000
Debtors	2,16,000

At present the company receives a credit of 2 months from the Supplier of raw materials and Wages & expenses are payable with a time lag of half a month.

In order to meet the extra demand, the company is preparing to work in double shift. The increase production will enable the firm to get a 10% discount from the supplier of raw materials. There will not be any change in fixed cost, credit policy etc.

Ascertain the effect on requirement for working capital if the proposal of double shift materializes.

Solution:

In order to calculate the working capital requirement for double shift operations, the existing parameters should be ascertained as follows:

Present Position : Sales (Rs. 8,64,000÷36) = 24,000 Units of 2,000 units per month

Debtors : (2,16,000÷8,64,000)×12 = 3 months Outstanding.

Raw Material : (72,000 ÷ 12)=6,000 Units or 3 months requirement.

Work in Process : (44,000 ÷ 22)=2,000 Units or 1 months

Finished Goods : (1,44,000÷32) = 4,500 units or 2.25 months requirement.

New Cost of Raw Material : Rs. 12–10% of 12 = Rs. 10.80

Working Capital Requirement

Single Shift (Present Position)		**Double Shift (Proposed Position).**	
Current Assets Amount		**Current Assets : Amount**	
Raw Materials (Given)	72,000	Raw Material (4,000×3×10.80)	1,29,600
Work in process (Given) (2000x22)	44,000	Work in process (4,000×20.80)	83,200
Finished Goods Given	1,44,000	Finished Goods (4,000×2.25×30.80)	2,77,200
Debtors at cost (4,000×32)	1,92,000	Debtors at cost (4,000×3×3080)	3,69,600
Total Current Assets	**4,52,000**	**Total Current Assets**	**8,59,600**
Less Current Liabilities:		**Less Current Liabilities:**	
Creditors : (2,000×12×2)	48,000	Creditors (4,000×10.80×2)	86,400
Wages & Expenses (2,000×20×½)	20,000	Wages & Expenses (4,000×20×½)	40,000
Working Capital Requirement	3,84,000	Working Capital Requirement	7,33,200

So, the Working Capital requirement will increase by (Rs. 7,33,200–3,84,000) = Rs. 3,49,200 due to change from single shift to double shift operations.

Illustration 14

XYZ Co. Ltd. is a Pipe manufacturing company. Its production cycle indicates that materials, are introduced in the beginning of the production cycle, wages and overhead accrue evenly throughout the period of the cycle. Wages are paid in the next month following the month of accrual. Work in progress includes full units of raw materials used in the beginning of the process and 50% of wages and overheads are supposed to be conversion costs.

Details of production process and the components of working capital are as follows:

Production of pipes	12,00,000 units
Duration of the production cycle	One Month
Raw materials inventory held	One Month Consumption
Finished goods inventory held for	Two Months
Credit allowed by creditors	One MOtnhs
Cost price of raw materials	Rs. 60 per Unit
Direct wages	Rs. 10 per Unit
Overheads	Rs. 20 per Unit
Selling price of finished pipes	Rs. 100 per Unit

Required to calculate:

i) The amount of working capital required for the company.

ii) Its maximum permissible bank finance under all the three methods of lending norms as suggested by the Tandon Committee, assuming the value of core current assets: Rs. 1,00,00,000.

Solution

i) Estimation of Working Capital Requirement

			Rs.
Current Assets:			
Raw Materials Inventory	(12,00,000 x Rs.60 x 1/12)		60,00,000
Work in Progress			
Raw Materials	(12,00,000 x Rs.60 x 1/12)	60,00,000	
Wages	(12,00,000 x Rs.10 x 1/12 x 50/100)	5,00,000	
Overheads	(12,00,000 x Rs.20 x 1/12 x 50/100)	10,00,000	75,00,000
Finished Goods Inventory	(12,00,000 x Rs.90 x 2/12)		1,80,00,000
Debtors	(12,00,000 x Rs.90 x 2/12)		1.80,00,000
Current Liabilities:		(a)	4,95,00,000
Creditors for Raw Materials	(12,00,000 x Rs.60 x 1/12)		60,00,000
Creditors for Wages	(12,00,000 x Rs.10 x 1/12)		10,00,000
		(b)	70,00,000
Net Working Capital		(a) - (b)	4,25,00,000

Ii) Computation of Maximum Permissible Bank Finance(MPBF)

First Method of Lending

	Rs.
Current Assets	4,95,00,000
Less: Current Liabilities	70,00,000
Working Capital Gap	4,25,00,000
Less: 25%from long term sources	1,06,25,000
MPBF	3,18,75,000

Second method of Lending

	Rs.
Current Assets	4,95,00,000
Less: Current Liabilities	70,00,000
Working Capital Gap	4,25,00,000
Less: 25% of current Assets	1,23,75,000
MPBF	3,01,25,000

Third method of Lending

	Rs.
Current Assets	4,95,00,000
Less: Core Current Assets	1,00,00,000
	3,95,00,000
Less: 25% of 3,95,00,000	98,75,000
	2,96,25,000
Less : Current Liabilities	70,00,000
MPBF	2,26,25,000

❖❖❖❖

7

MANAGEMENT OF CASH AND MARKETABLE SECURITIES

Unit Structure :

7.0 OBJECTIVES

After studying the unit the students will be able to:

- Know the significance of cash management.
- Explain the desire for holding cash.
- Know the objectives of cash management.
- Discuss the factors determining the cash needs.
- Explain the strategies for cash management
- Solve the practical problems.

7.1 INTRODUCTION

Cash management is one of the key areas of working capital management. Cash is the most liquid current assets. Cash is the common denominator to which all current assets can be reduced because the other major liquid assets, i.e. receivable and inventory get eventually converted into cash. This underlines the importance of cash management.

The term "Cash" with reference to management of cash is used in two ways. In a narrow sense cash refers to coins, currency, cheques, drafts and deposits in banks. The broader view of cash includes near cash assets such as marketable securities and time deposits in banks. The reason why these near cash assets are included in cash is that they can readily be converted into cash.

Usually, excess cash is invested in marketable securities as it contributes to profitability.

Cash is one of the most important components of current assets. Every firm should have adequate cash, neither more nor less. Inadequate cash will lead to production interruptions, while excessive cash remains idle and will impair profitability. Hence, the need for cash management. The cash management assumes significance for the following reasons.

7.2 SIGNIFICANCE OF CASH MANAGEMENT

1. Cash planning - Cash is the most important as well as the least unproductive of all current assets. Though, it is necessary to meet the firm's obligations, yet idle cash earns nothing. Therefore, it is essential to have a sound cash planning neither excess nor inadequate.

2. Management of cash flows - This is another important aspect of cash management. Synchronisation between cash inflows and cash outflows rarely happens. Sometimes, the cash inflows will be more than outflows because of receipts from debtors, and cash sales in huge amounts. At other times, cash outflows exceed inflows due to payment of taxes, interest and dividends etc. Hence, the cash flows should be managed for better cash management.

3. Maintaining optimum cash balance - Every firm should maintain optimum cash balance. The management should also consider the factors determining and influencing the cash balances at various point of time. The cost of excess cash and danger of inadequate cash should be matched to determine the optimum level of cash balances.

4. Investment of excess cash - The firm has to invest the excess or idle funds in short term securities or investments to earn profits as idle funds earn nothing. This is one of the important aspects of management of cash.

Thus, the aim of cash management is to maintain adequate cash balances at one hand and to use excess cash in some profitable way on the other hand.

7.3 MOTIVES OR DESIRES FOR HOLDING CASH

Motives or desires for holding cash refer to various purposes. The purpose may be different from person to person and situation to situation. There are four important motives to hold cash.

a. Transactions motive - This motive refers to the holding of cash, to meet routine cash requirements in the ordinary course of business. A firm enters into a number of transactions which requires cash payment. For example, purchase of materials, payment of wages, salaries, taxes, interest etc. Similarly, a firm receives cash from cash sales, collections from debtors, return on investments etc. But the cash inflows and cash outflows do not perfectly synchronise. Sometimes, cash receipts are more than payments while at other times payments exceed receipts. The firm must have to maintain sufficient (funds) cash balance if the payments are more than receipts. Thus, the transactions motive refers to the holding of cash to meet expected obligations whose timing is not perfectly matched with cash receipts. Though, a large portion of cash held for transactions motive is in the form of cash, a part of it may be invested in marketable securities whose maturity conform to the timing of expected payments such as dividends, taxes etc.

b. Precautionary motive - Apart from the non-synchronisation of expected cash receipts and payments in the ordinary course of business, a firm may be failed to pay cash for unexpected contingencies. For example, strikes, sudden increase in cost of raw materials etc. Cash held to meet these unforeseen situations is known as precautionary cash balance and it provides a caution against them. The amount of cash balance under precautionary motive is influenced by two factors i.e. predictability of cash flows and the availability of short term credit. The more unpredictable the cash flows, the greater the need for such cash balances and vice versa. If the firm can borrow at short-notice, it will need a relatively small balance to meet contingencies and vice versa. Usually precautionary cash balances are invested in marketable securities so that they contribute something to profitability.

c. Speculative motive - Sometimes firms would like to hold cash in order to exploit, the profitable opportunities as and when they arise. This motive is called as speculative motive. For example, if the firm expects that the material prices will fall, it can delay the purchases and make purchases in future when price actually declines. Similarly, with the hope of buying securities when the interest rate is expected to decline, the firm will hold cash. By and large, firms rarely hold cash for speculative purposes.

d. Compensation motive - This motive to hold cash balances is to compensate banks and other financial institutes for providing certain services and loans. Banks provide variety of services to business firms like clearance of cheques, drafts, transfer of funds etc. Banks charge a commission or fee for their services to the customers as indirect compensation. Customers are required to maintain a minimum cash balance at the bank. This balance cannot

be used for transaction purposes. Banks can utilise the balances to earn a return to compensate their cost of services to the customers. Such balances are compensating balances. These balances are also required by some loan agreements between a bank and its customers. Banks require a chest to maintain a minimum cash balance in his account to compensate the bank when the supply of credit is restricted and interest rates are rising.

Thus cash is required to fulfill the above motives. Out of the four motives of holding cash balances, transaction motive and compensation motives are very important. Business firms usually do not speculate and need not have speculative balances. The requirement of precautionary balances can be met out of short-term borrowings.

7.4 OBJECTIVES OF CASH MANAGEMENT

The basic objectives of cash management are:

(i) to make the payments when they become due and
(ii) to minimize the cash balances. The task before the cash management is to reconcile the two conflicting nature of objectives.

1. Meeting the payments schedule - The basic objective of cash management is to meet the payment schedule. In the normal course of business, firms have to make payments of cash to suppliers of raw materials, employees and so on regularly. At the same time firm will be receiving cash on a regular basis from cash sales and debtors. Thus, every firm should have adequate cash to meet the payments schedule. In other words, the firm should be able to meet the obligations when they become due.

The firm can enjoy certain advantages associated with maintaining adequate cash. They are:

a. Insolvency - The question of insolvency does not arise as the firm will be able to meet its obligations.

b. Good relations - Adequate cash balance in the business firm helps in developing good relations with creditors and suppliers of raw materials.

c. Credit worthiness - The maintenance of adequate cash balances increase the credit worthiness of the firm. Consequently it will be able to purchase raw materials and procure credit with favorable terms and conditions.

d. Availing discount facilities - The firm can avail the discounts offered by the creditors for payments before the due date.

e. To meet unexpected facilities - The firm can easily meet the unexpected cash expenditure in situations like strikes, competition from customers etc. with little strain.

So, every firm should have adequate cash balances for effective cash management.

2. Minimising funds committed to cash balances - The second important objective of cash management is to minimise cash balance. In minimizing the cash balances two conflicting aspects have to be reconciled. A high level of cash balances will ensure prompt payment together with all advantages, but at the same time, cash is a non-earning asset and the larger balances of cash impair profitability. On the other hand, a low level of cash balance may lead to the inability of the firm to meet the payment schedule. Thus the objective of cash management would be to have an optimum cash balance.

7.5 FACTORS DETERMINING CASH NEEDS

Maintenance of optimum level of cash is the main problem of cash management. The level of cash holding differs from industry to industry, organization to organization. The factors determining the cash needs of the industry is explained as follows:

i. Matching of cash flows - The first and very important factor determining the level of cash requirement is matching cash inflows with cash outflows. If the receipts and payments are perfectly coinciding or balance each other, there would be no need for cash balances.

The need for cash management therefore, due to the non-synchronisation of cash receipts and disbursements. For this purpose, the cash inflows and outflows have to be forecast over a period of time say 12 months with the help of cash budget. The cash budget will pin point the months when the firm will have an excess or shortage of cash.

ii. Short costs - Short costs are defined as the expenses incurred as a result of shortfall of cash such as unexpected or expected shortage of cash balances to meet the requirements.

The short costs includes, transaction costs associated with raising cash to overcome the shortage, borrowing costs associated with borrowing to cover the shortage i.e. interest on loan, loss of

trade-discount, penalty rates by banks to meet a shortfall in compensating, cash balances and costs associated with deterioration of the firm's credit rating etc. which is reflected in higher bank charges on loans, decline in sales and profits.

iii. Cost of cash on excess balances - One of the important factors determining the cash needs is the cost of maintaining cash balances i.e. excess or idle cash balances. The cost of maintaining excess cash balance is called excess cash balance cost. If large funds are idle, the implication is that the firm has missed opportunities to invest and thereby lost interest. This is known as excess cost. Hence the cash management is necessary to maintain an optimum balance of cash.

iv. Uncertainty in business - Uncertainty plays a key role in cash management, because cash flows can not be predicted with complete accuracy. The first requirement of cash management is a precautionary cushion to cope with irregularities in cash flows, unexpected delays in collections and disbursements, efaults and expected cash needs the uncertainty can be overcome through accurate forecasting of tax payments, dividends,capital expenditure etc. and ability of the firm to borrow funds through over draft facility.

v. Cost of procurement and management of cash - The costs associated with establishing and operating cash management staff and activities determining the cash needs of a business firm. These costs are generally fixed and are accounted for by salary, storage and handling of securities etc. The above factors are considered to determine the cash needs of a business firm.

7.6 STRATEGIES FOR CASH MANAGEMENT

The strategies for Cash Management are discussed in detail in the Following Lines:

1. **Projection of cash flows and planning** - The cash planning and the projection of cash flows is determined with the help of cash budget. The cash budget is the most important tool in cash management. It is a device to help a firm to plan and control the use of cash. It is a statement showing the estimated cash inflows and cash outflows over the firm's planning horizon. In other words the net cash position i.e., surplus or deficiency of a firm is highlighted by the cash budget from one budgeting period to another period.

2. **Determining optimal level of cash holding in the company** - One of the important responsibilities of a finance manager is to maintain sufficient cash balances to meet the

current obligations of a company. Determining to optimum level of cash balance influenced by a tradeoff between risk and profitability. Every business enterprise holding cash balances for transaction purposes and to meet precautionary, speculative and compensative motives. With the help of cash budget the finance manager predicts the inflows and outflows of cash during a particular period of time and there by determines the cash requirements of the company. While determining the optimum level of cash balance (neither excess nor inadequate cash balances) the finance manager has to bring a tradeoff between the liquidity and profitability of the firm.

The optimum level of cash balances of a company can be determined in various ways : There are Inventory model (Economic Order Quantity) to cash management, Stochastic model, Probability model.

A) Inventory model (EOQ) to cash management - Economic Order Quantity (EOQ) model is used in determination of optimal level of cash of a company. According to this model optimal level of cash balance is one at which cost of carrying the inventory of cash and cost of going to the market for satisfying cash requirements is minimum. The carrying cost of holding cash refers to the interest foregone on marketable securities where as cost of giving to the market means cost of liquidating marketable securities in cash.

Optimum level of cash balance can be determined as follows:

$$= \sqrt{\frac{2AO}{C}}$$

Where Q = Optimum level of cash inventory
A = Total amount of transaction demand
O = Average fixed cost of securing cash from the market (ordering cost of cash / securities)
C = Cost of carrying cash inventory, i.e., interest rate on marketable securities for the period involved.

- **Assumptions**

The model is based on the following assumptions:
The demand for cash, transactions costs of obtaining cash and the holding costs for a particular period are given and do not change during that period.

There is a constant demand for cash during the period under consideration.

Cash payments are predictable:

Banks do not impose any restrictions on firms with respect of maintenance of minimum cash balances in the bank accounts.

- **Limitations –**

The EOQ model to determine the optimum size of cash balances is suffered with several practical problems. The first and important problem (limitation) is related with determination of fixed cost associated with replenishing cash. The fixed cost includes both explicit cost (interest rate at which required capital can be secured from the market and implicit cost (time spent in placing an order for getting financial assistance etc.) The computation of implicit cost is very difficult. The model is not useful and applicable where the cash flows are irregular in nature.

B) Stochastic (irregular) Model - This model is developed to avoid the problems associated with the EOQ model. This model was developed by Miller and Orr. The basic assumption of this model is that cash balances are irregular, i.e., changes randomly over a period of time both in size and direction and form a normal distribution as the number of periods observed increases. The model prescribes two control limits Upper control Limit (UCL) and Lower Control Limit (LCL). When the cash balances reaches the upper limit a transfer of cash to investment account should be made and when cash balances reach the lower point a portion of securities constituting investment account of the company should be liquidated to return the cash balances to its return point. The control limits are converting securities into cash and the vice - versa, and the cost carrying stock of cash.

The Miller and Orr model is the simplest model to determine the optimal behavior in irregular cash flows situation. The model is a control limit model designed to determine the time and size of transfers between an investment account and cash account. There are two control limits. Upper Limit (U) and lower limit (L).

According to this model when cash balance of the company reach the upper limit, cash equal to "U - O" should be invested in marketable securities so that new cash balance touches "O" point. If the cash balance touch the "L' point, finance manager should immediately liquidate that much portion of the investment portfolio which could return the cash balance to 'O' point. (O is optimal point of cash balance or target cash balance)

The "O" optimal point of cash balance is determined by using the formula

$$O = \sqrt[3]{\frac{3TV}{4I}}$$

Where,
0 = target cash balance (Optimal cash balance)
T = Fixed cost associated with security transactions
1 = Interest per day on marketable securities
V = Variance of daily net cash flows.

- **Limitations**

This model is subjected to some practical problems

The first and important problem is in respect of collection of accurate data about transfer costs, holding costs, number of transfers and expected average cash balance.

2. The cost of time devoted by financial managers in dealing with the transfers of cash to securities and vice versa.

3. The model does not take in account the short term borrowings as an alternative to selling of marketable securities when cash balance reaches lower limit.

Besides the practical difficulties in the application of the model, the model helps in providing more, better and quicker information for management of cash. It was observed that the model produced considerable cost savings in the real life situations.

C) Probability Model - This model was developed by William Beranek. Beranek observed that cash flows of a firm are neither completely predictable nor irregular (stochastic). The cash flows are predictable within a range. This occurrence calls for formulating the demand for cash as a probability distribution of possible outcomes.

According to this model, a finance manager has to estimate probabilistic out comes for net cash flows on the basis of his prior knowledge and experience. He has to determine what is the operating cash balance for a given period, what is the expected net cash flow at the end of the period and what is the probability of occurrence of this expected closing net cash flows.

The optimum cash balance at the beginning of the planning period is determined with the help of the probability distribution of net cash flows. Cost of cash shortages, opportunity cost of holding cash balances and the transaction cost.

- **Assumptions:**

1) Cash is invested in marketable securities at the end of the planning period say a week or a month.
2) Cash inflows take place continuously throughout the planning period.
3) Cash inflows are of different sizes.
4) Cash inflows are not fully controllable by the management of firm.
5) Sale of marketable securities and other short term investments will be effected at the end of the planning period.

The probability model prescribed the decision rule for the finance manager that the finance manager should go on investing in marketable securities from the opening cash balance until the expectation, that the ending cash balance will be below the optimum cash balance, where the ratio of the incremental net return per rupee of investment is equal to the incremental shortage cost per rupee.

3. Strategy for economizing cash - Once cash flow projections are made and appropriate cash balances are established, the finance manager should take steps towards effective utilization of available cash resources. A number of strategies have to be developed for this purpose they are:

(a) Strategy towards accelerating cash inflows, and
(b) Strategy towards decelerating cash outflows

a) Strategy towards accelerating cash inflows - In order to accelerate the cash inflows and maximize the available cash the firm has to employ several methods such as reduce the time lag between the movement of a payment to the company is mailed and the movement of the funds are ready for redeployment by the company. This includes the quick deposit of customer's cheques, establishing collection centers and lock - box system etc.

i) Quick deposit of customer's cheques - The inflow are accelerated through quick deposit of cheques in the banks, the moment they are received. Special attention should be given to deposit the cheques without any delay.

ii) Establishing collection centres - In order to accelerate the cash inflows the organization may establish collection centres in various marketing centres of the country. These centres may collect the cheques or payments from the customers and deposit them in the local bank. Thus, these cheques are collected immediately at the collection centre and the bank can transfer the surplus money, if any, to the company's main bank. Thus, the decentralized collection system of the company reduced the time lag in cash remittances and collections.

iii) Lock-box method - The new device which is popular in recent past is lock-box method which will help to reduce the time interval from the mailing of the cheque to the use of funds by the company. Under this arrangement, the company rents lock-box from post offices through its service area. The customer's are instructed to mail cheques to the lock-box. The company's bank collects the mail from the lock-box several times a day and deposit them directly in the company's account on the same day. This will reduce the time in mailing cheques, deposit them in bank and there by reduce overhead costs to the company. But one of the

serious limitations of the system is that the banks will charge additional service costs to the company. However, this system is proved useful and economic to the firm.

b) Strategy for slowing cash outflows - In order to accelerate cash availability in the company, finance manager must employ some devices that could slow down the speed of payments outward in addition to accelerating collections. The methods of slowing down disbursements are as follows:

i) Delaying outward payment - The finance manager can increase the cash turnover by delaying the payment on bills until the due date of the no-cost period. Thus, he can economies cash resources of the firm.

ii) Making pay roll periods less frequent - The firm can economies its cash resources by changing the frequency of disbursing pay to its employees. For example, if the company is presently paying wages weekly, it can effect substantial cash savings if the pay is disbursed only once in a month.

iii) Solving disbursement by use of drafts - A company can delay disbursement by use of drafts on funds located elsewhere. When the firm pays the amount through drafts, the bank will not make the payment against the draft unless the bank gets the acceptance of the issuer firm. Thus the firm need not have balance in its bank account till the draft is presented for acceptance. On the other hand, it will take several days for the draft to be actually paid by the company. Thus finance manager can economies large amounts of cash resources for at least a fort night. The funds saved could be invested in highly liquid low risk assets to earn income there on.

iv) Playing the float - Float is the difference between the company's cheque book balance and the balance shown in the bank's books of accounts. When the company writes a cheque, it will reduce the balance in its books of accounts by the amount of cheque. But the bank will debit the amount of its customers only when the cheque is collected. On the other hand, the company can maximize its cash utilization by ignoring its book balance and keep its cash invested until just before the cheques are actually presented for payment. This technique is known as "playing the float".

v) Centralised payment system - A firm can delay payments through centralized payment system. Under this system, payments will be made from a single central account. This will benefit the company.

vi) By transferring funds from one bank to another bank firm can maximize its cash turnover.

7.7 PROBLEMS AND SOLUTIONS

Illustration 1

United Industries Ltd. projects that cash outlays of Rs. 37,50,000 will occur uniformly throughout the coming year. United plans to meet its cash requirements by periodically selling marketable securities from its portfolio. The firm's marketable securities are invested to earn 12% and the cost per transaction of converting securities to cash is Rs. 40.

a. Use the Baumol Model to determine the optimal transaction size of marketable securities to cash.
b. What will be the company's average cash balance?
c. How many transfers per year will be required?
d. What will be the total annual cost of maintaining cash balances?

Solution:

a) Optimal size = $\sqrt{2TA/I}$ = $\sqrt{(2 \times 40 \times 37,50,000)/0.12}$
= 50000
b) average cash balance = Rs 25000
c) No of transactions per year = 3750000/50000
= 75
d) Total annual cost

Transaction cost	75×40	=	3000
Opportunity cost	50000×1/2×12%	=	3000
			6000

Illustration 2

The Cyber globe Company has experienced a stochastic demand for its product. With the result that cash balances fluctuate randomly. The standard deviation of daily net cash flows is Rs. 1,000, The company wants to impose upper and lower bound control limits for conversion of cash into marketable securities and vice-versa. The current interest rate on marketable securities is 6%. The fixed cost associated with each transfer is Rs. 1,000 and minimum cash balance to be maintained is Rs. 10,000.

Compute the upper lower limits.

Solution:

Standard Deviation		=	1000
Variance	= 1000 x 1000	=	1000000
Interest	= 6% / 365	=	0.016%
T	= 1000		
L	= 10000		

$Z = \sqrt{3}\,(3TV / 4I)$ $= \sqrt{3}\,(3 \times 1000 \times 1000) / (4 \times 0.016\%)$
$= 3573$
Return point $= Z + L$
3573 + 10000 $= 13573$
Upper limit $= 3R - 2L$
40719 – 20000 $= 20719$

Illustration 3
A Ltd. has just established a small manufacturing unit to manufacture a new product which is expected to have a high margin. The company has made the following estimates of production, sales and costs:

Production and Sales (both in units)

Year 2010	Production	Sales
April	2,000	--
May	3,000	--
June	4,000	1,000
July	5,000	2,000
August	5,000	4,000
September	5,000	5,000

Note : Both production and sales will stabilize at 5,000 units from September, 2010 onwards.

Selling price and cost

Selling price per unit		50
Less: Variable Cost:		
Materials	12	
Labour	5	
Overheads	5	22
Contribution per unit		28

Note: Fixed costs are expected to be Rs. 10,000 per month.

The following additional information is also given:

- An initial stock of materials to meet three months requirements will be purchased during April, 2010. Further purchases will be made at the beginning of each month to have sufficient stock of materials for three months.

- Suppliers of materials have agreed to give one month's credit.
- Labour is to be paid half a month in arrears.
- Variable overheard will be paid during the month following the month in which it is incurred.
- Fixed overheads will be incurred in advance at the beginning of every quarter.
- Sales will be 50% cash and the balance will be on two months credit.
- There will be an opening cash balance of Rs. 3, 00,000 (in hand and bank).

Prepare a cash budget of A Ltd. for the six months ending 30th September, 2010. Figures should be given monthly and the months, if any, during which additional funds are required, should be clearly indicated.

Solution:

Purchases Budget **(Units)**

Particulars	April	May	June	July	August	September
Opening Balance	--	7,000	9,000	10,000	10,000	10,000
Add: Purchases	9,000	5,000	5,000	5,000	5,000	5,000
	9,000	12,000	14,000	15,000	15,000	15,000
Less: Consumption	2,000	3,000	4,000	5,000	5,000	5,000
Closing Balance	7,000	9,000	10,000	10,000	10,000	10,000

Payment for Creditors

(Rs.)

Particulars	April	May	June	July	August	September
Purchases (Units)	9,000	5,000	5,000	5,000	5,000	5,000
Purchases (@Rs. 12 p.u.)	1,08,000	60,000	60,000	60,000	60,000	60,000
Payment Made(1 Month Credit)	--	1,08,000	60,000	60,000	60,000	60,000

Collection from debtors

(Rs.)

Particulars	April	May	June	July	August	September
Sales Unit	--	--	1,000	2,000	4,000	5,000
Sales (@50 p.u.)	--	--	50,000	1,00,000	2,00,000	2,50,000
Cash Sales (50%)	--	--	25,000	50,000	1,00,000	1,25,000
Credit Sales (50%) (2 Months Credit)	--	--	--	--	25,000	50,000
Receipts from Sales	--	--	25,000	50,000	1,25,000	1,75,000

Labour and Overheads

(Rs.)

Particulars	April	May	June	July	August	September
Wages	10,000	15,000	20,000	25,000	25,000	25,000
Wages Paid (1/2 Month Arrears)	5,000	12,500	17,500	22,500	25,000	25,000
Variable Overheads	10,000	15,000	20,000	25,000	25,000	25,000
Variable Overheads paid (1 Month Lag)	--	10,000	15,000	20,000	25,000	25,000

Cash Budget

For the year ending 30th September, 2010 (Rs.)

Particulars	April	May	June	July	August	September
Opening Balance	3,00,000	2,65,000	1,34,000	67,000	(15,500)	(500)
Budgeted Receipts:						
Cash Sales	--	--	25,000	50,000	1,00,000	1,25,000
Collection from Debtors	--	--	--	--	25,000	50,000
(i)	**3,00,000**	**2,65,000**	**1,59,500**	**1,17,000**	**1,09,500**	**1,74,500**
Budgeted Payments:						
Payment to Creditors	--	1,08,000	60,000	60,000	60,000	60,000

Wages	5,000	12,500	17,500	22,500	25,000	25,000
Variable Overheads	--	10,000	15,000	20,000	25,000	25,000
Fixed Overheads	30,000	--	--	30,000	--	--
(ii)	**35,000**	**1,30,500**	**92,500**	**1,32,500**	**1,10,000**	**1,10,000**
Closing Balance (i) – (ii)	**2,65,000**	**1,34,500**	**67,000**	**(15,500)**	**(500)**	**64,500**

Illustration 4

Modern Company wishes to arrange overdraft facilities with its bankers during the period April to June, 2012 when it will be manufacturing mostly for stock. Prepare a cash budget for the above period from the following data indicating the extent of facilities the company will be require at the end of each month.

(a)

Month	Sales Rs.	Purchase Rs.	Wages Rs.	Mfg. Expenses Rs.	Office Expenses Rs.	Selling Expenses Rs.
February	1,80,000	1,24,000	12,000	3,000	2,000	2,000
March	1,92,000	1,44,000	14,000	4,000	1,000	4,000
April	1,08,000	2,43,000	11,000	3,000	1,500	2,000
May	1,74,000	2,46,000	12,000	4,500	2,000	5,000
June	1,26,000	2,68,000	15,000	5,000	2,500	4,000
July	1,40,000	2,80,000	17,000	5,500	3,000	4,500
August	1,60,000	3,00,000	18,000	6,000	3,000	5,000

(b) Cash on hand 1-4-2012 (estimated) Rs. 25,000.

(c) 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:

(d) Lag in payment of manufacturing expenses ½ month.

(e) Lag in payment of other expenses 1 month.

Solution:

Cash Budget
For 3 Months April to June 2012

	April Rs.	May Rs.	June Rs.
Opening Balance	25,000	44,500	– 66,750
Budgeted Receipts:			
Sales	1,86,000	1,50,000	1,41,000
	2,11,000	1,94,500	74,250
Budgeted 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
	1,66,500	2,61,250	2,69,750
Closing Balance	44,500	– 66,750	– 1,95,000

1. Collection from credit sales in April will be as follows:
   50% of the credit sales of March Rs. 96,000
   50% of the credit sales of February Rs. 90,000
   Rs. 1,86,000

   Collection from the credit sale will be calculated similarly for May to June.

2. As the time lag of purchases is one month, the payment for March purchases will be made in April, April purchases will be paid in May and May purchases will be paid in June.

3. Similarly, as the time lag for payment of wages, office expenses and selling expense is one month, the payment will be made for the expenses of previous month i.e. March wages will be paid in April and so on.

4. The Time lag for manufacturing expenses is ½ month, which suggests that ½ month's expenses are paid in the next month. Thus in April, ½ mfg. expenses of March will be paid and ½ expenses of April will also be paid.

5. The above budget shows that there will be a deficit of Rs. 66,750 in May, for which arrangement of bank overdraft will have to be made. Similarly, in June, an overdraft will have to be arranged for Rs. 1,95,500.

Illustration 5

Make out cash budget for October to December from the following information:

1. Cash and Bank Balance on 1-10-2012 Rs. 10,000
2. Sales Actual and Budgeted:

	Rs.
June (Actual)	30,000
July (Actual)	32,000
August (Actual)	35,000
September (Estimated)	37,500
October (Estimated)	40,000
November (Estimated)	41,000
December (Estimated)	44,500

3. Purchases – Actual and Budgeted figures are:

	Rs.
June (Actual)	18,000
July (Actual)	20,000
August (Actual)	24,000
September (Estimated)	22,500
October (Estimated)	24,000
November (Estimated)	20,000
December (Estimated)	25,500

4. Wages and Other Expenses – Actual and Budgeted:

	Wages Rs.	Expenses Rs.
August (Actual)	7,500	2,500
September (Estimated)	7,500	3,000
October (Estimated)	9,000	3,000
November (Estimated)	9,000	4,000
December (Estimated)	10,000	4,000

5. Special:
   Advance payment of Income Tax Rs. 2,500 in November.
   Purchase of Plant of Rs. 5,000 in October.
6. Rent payable in advance Rs. 150.
7. 10% of purchases and sales are on cash terms.
8. Time Lag:

Credit sales	2 Months
Credit Purchases	1 Month
Wages	½ Month
Expenses	¼ Month.

Solution:

Cash Budget
For October to December, 2012

	October Rs.	November Rs.	December Rs.
Opening Balance	10,000	6,450	5,300
Budgeted Receipts:			
Cash Sales	4,000	4,100	4,450
Collection from Debtors	31,500	33,750	36,000
	45,500	44,300	45,750
Budgeted Payment:			
Cash purchases	2,400	2,000	2,500
Credit Purchases	20,250	21,600	18,000
Wages	8,250	9,000	9,500
Expenses	3,000	3,750	4,000
Rent	150	150	150
Plant	5,000	--	--
Income Tax	--	2,500	--
Total	39,050	39,000	34,150
Closing Cash Balance	6,450	5,300	11,600

7.8 EXERCISE

A - Find out the correct option:

1. The motives of holding cash include
   a) Transaction
   b) Precautionary
   c) Speculative
   d) All of the above

2. Cash budgets represents
   a) Cash receipts
   b) Cash payments
   c) Cash receipts and payments
   d) None of the above

3. The model which suggest that cash should be managed in the same way as inventory is
   a) Baumol's model
   b) Miller Orr model
   c) Water model
   d) CAP model

4. Availability of cash in future after concideration the financial commitment is known as :
   a) Cash flow
   b) Liquidity
   c) Solvency
   d) Cash Rich

5. One of the following is not an objective of cash management
   a) Cash planning
   b) Cash imbalance
   c) Holding optimum cash
   d) Investment of idle cash

6. Following is not the element of cash budgeting
   a) Determination of capital structure
   b) Selection of time period
   c) Operating cash flow
   d) Financial cash flow

B - State with reasons whether the following statements are true or false:

1. Float is the difference between available balance and the ledger balance.
2. Net float can be minimized by delaying payments.
3. Surplus cash may be invested in units of UTI.
4. Re – scheduling of loans improves liquidity position.
5. Inter – corporate deposit by private sector companies for a certain period are called as debentures.

C – Fill in blanks

1. Municipal bonds are issued by _____ bodies.
2. Increased operating profit creates _____ _____.
3. Daily cash report _____ cash.
4. _____ model applies EOG for cash management.

D- Match the column

	Group A		Group B
1	Fluctuation in prices	A	Expected receipts & payments
2	Cash budget	B	Difference between book balance and available balance
3	Float	C	Speculative motive
4	Cash exactly as per the need	D	Optimal cash balance
5	Ride the yield curve	E	Interest rate risk
		F	Strategy to manage cash

E – Answer the following Questions.

1. What are the motives of holding cash?
2. Explain the various aspects of cash management.
3. What are the strategies of handling excess cash?
4. Explain various models of cash management.
5. What are the criteria of selection of securities?
6. Write short notes on:
   a. Gilt edged securities,
   b. Treasury Bills
   c. Commercial paper

❖❖❖❖

8

MANAGEMENT OF RECEIVABLES

Unit Structure :

8.0 OBJECTIVES

After studying the unit the students will be able to:

- Identify the costs of receivables.
- Explain the benefits of maintaining receivables.
- Discuss the factors affecting the size of receivables.
- Explain the process of Credit evaluation of the customer.
- Solve the practical problems.

8.1 INTRODUCTION

Receivables mean the book debts or debtors and these arise, if the goods are sold on credit. Debtors form about 30% of current assets in India. Debt involves an element of risk and bad debts also. Hence, it calls for careful analysis and proper management. The goal of receivables management is to maximize the value of the firm by achieving a tradeoff between risk and profitability. For this purpose, a finance manager has:

a. to obtain optimum (non-maximum) value of sales;

b. to control the cost of receivables, cost of collection, administrative expenses, bad debts and opportunity cost of funds blocked in the receivables.

c. to maintain the debtors at minimum according to the credit policy offered to customers.

d. to offer cash discounts suitably depending on the cost of receivables, bank rate of interest and opportunity cost of funds blocked in the receivables.

8.2 COSTS OF MAINTAINING RECEIVABLES

The costs with respect to maintenance of receivables can be identified as follows

1. Capital costs - Maintenance of accounts receivable results in blocking of the firm's financial resources in them. This is because there is a time lag between the sale of goods to customers and the payments by them. The firm has, therefore, to arrange for additional funds to meet its own obligations, such as payment to employees, suppliers of raw materials, etc., while awaiting for payments from its customers. Additional funds may either be raised from outside or out of profits retained in the business. In first the case, the firm has to pay interest to the outsider while in the latter case, there is an opportunity cost to the firm, i.e., the money which the firm could have earned otherwise by investing the funds elsewhere.

2. Administrative costs - The firm has to incur additional administrative costs for maintaining accounts receivable in the form of salaries to the staff kept for maintaining accounting records relating to customers, cost of conducting investigation regarding potential credit customers to determine their credit worthiness etc.

3. Collection costs - The firm has to incur costs for collecting the payments from its credit customers. Sometimes, additional steps may have to be taken to recover money from defaulting customers.

4. Defaulting costs - Sometimes after making all serious efforts to collect money from defaulting customers, the firm may not be able to recover the over dues because of the inability of the customers. Such debts are treated as bad debts and have to be written off since they cannot be realised.

8.3 BENEFITS OF MAINTAINING RECEIVABLES

a. Increase in Sales - Except a few monopolistic firms, most of the firms are required to sell goods on credit, either because of trade customers or other conditions. The sales can further be increased by liberalizing the credit terms. This will attract more

customers to the firm resulting in higher sales and growth of the firm.

b. Increase in Profits - Increase in sales will help the firm (i) to easily recover the fixed expenses and attaining the break-even level, and (ii) increase the operating profit of the firm. In a normal situation, there is a positive relation between the sales volume and the profit.

c. Extra Profit - Sometimes, the firms make the credit sales at a price which is higher than the usual cash selling price. This brings an opportunity to the firm to make extra profit over and above the normal profit.

8.4 FACTORS AFFECTING THE SIZE OF RECEIVABLES

The size of accounts receivable is determined by a number of factors. Some of the important factors are as follows:

1. Level of sales - This is the most important factor in determining the size of accounts receivable. Generally in the same industry, a firm having a large volume of sales will be having a larger level of receivables as compared to a firm with a small volume of sales.

Sales level can also be used for forecasting change in accounts receivable. For example, if a firm predicts that there will be an increase of 20% in its credit sales for the next period, it can be expected that there will also be a 20% increase in the level of receivables.

2. Credit policies - The term credit policy refers to those decision variables that influence the amount of trade credit, i.e., the investment in receivables. These variables include the quantity of trade accounts to be accepted, the length of the credit period to be extended, the cash discount to be given and any special terms to be offered depending upon particular circumstances of the firm and the customer. A firm's credit policy, as a matter of fact, determines the amount of risk the firm is willing to undertake in its sales activities. If a firm has a lenient or a relatively liberal credit policy, it will experience a higher level of receivables as compared to a firm with a more rigid or stringent credit policy. This is because of the two reasons:

i. A lenient credit policy encourages even the financially strong customers to make delays in payment resulting in increasing the size of the accounts receivables.

ii. Lenient credit policy will result in greater defaults in payments by financially weak customers thus resulting in increasing the size of receivables.

3. Terms of trade - The size of the receivables is also affected by terms of trade (or credit terms) offered by the firm. The two important components of the credit terms are (i) Credit period and (ii) Cash discount.

4. Credit Period

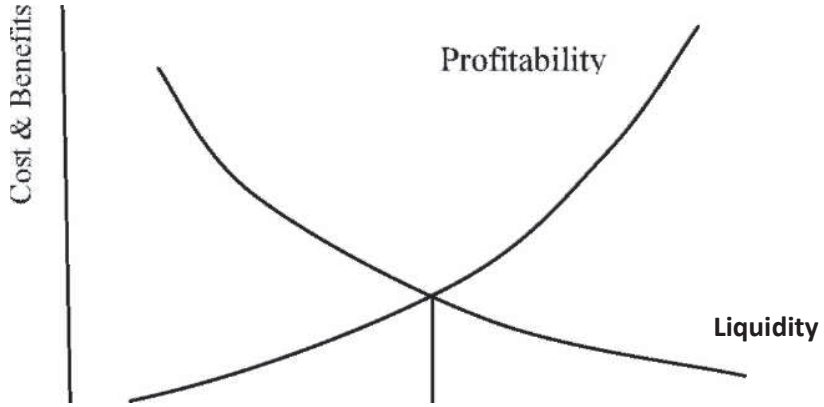
The term credit period refers to the time duration for which credit is extended to the customers. It is generally expressed in terms of "Net days". For example, if a firm's credit terms are "Net 15", it means the customers are expected to pay within 15 days from the date of credit sale.

5. Cash Discount

Most firms offer cash discount to their customers for encouraging them to pay their dues before the expiry of the credit period. The terms of cash discount indicate the rate of discount as well as the period for which the discount has been offered. For example, if the terms of cash discount are changed from "Net 30" to "2/10 Net 30", it means the credit period is of 30 days but in case customer pays in 10 days, he would get 2% discount on the amount due by him. Of course, allowing cash discount results in a loss to the firm because of recovery of less amount than what is due from the customer but it reduces the volume of receivables and puts extra funds at the disposal of the firm for alternative profitable investment. The amount of loss thus suffered is, therefore, compensated by the income otherwise earned by the firm.

8.5 OPTIMUM SIZE OF RECEIVABLES

The optimum investment in receivables will be at a level where there is a trade-off between costs and profitability. When the firm resorts to a liberal credit policy, the profitability of the firm increases on account of higher sales. However, such a policy results in increased investment in receivables, increased chances of bad debts and more collection costs. The total investment in receivables increases and, thus, the problem of liquidity is created. On the other hand, a stringent credit policy reduces the profitability but increases the liquidity of the firm. Thus, optimum credit policy occurs at a point where there is a "Trade-off" between liquidity and profitability as shown in the chart below.



Tight <- Credit Policy -> Loose

8.6 DETERMINANTS OF CREDIT POLICY

The following are the aspects of credit policy:

1. Level of credit sales required to optimise the profit.
2. Credit period i.e. duration of credit, whether it may be 15 days or 30 or 45 days etc.
3. Cash discount, discount period and seasonal offers.
4. Credit standard of a customer : 5 C's of credit :
   a. Character of the customer i.e. willingness to pay.
   b. Capacity ability to pay.
   c. Capital financial resources of a customer.
   d. Conditions special conditions for extension of credit to doubtful customers and prevailing economic and market conditions and
   e. Collateral Security.
5. Profit
6. Market and economic conditions.
7. Collection policy.
8. Paying habits of customers.
9. Billing efficiency, record-keeping etc.
10. Grant of credit-- size and age of receivables.

8.7 OPTIMUM CREDIT POLICY

A firm should establish receivables policies after carefully considering both benefits and costs of different policies. These policies relate to:
(i) Credit Standards, (ii) Credit Terms, and (iii) Collection Procedures.

Each of these have been explained below:

i. Credit standards - The term credit standards represent the basic criteria for extension of credit to customers. The levels of sales and receivables are likely to be high if the credit standards are relatively loose, as compared to a situation when they are relatively tight. The firm's credit standards are generally determined by the five "C's". Character, Capacity, Capital, Collateral and Conditions. Character denotes the integrity of the customer, i.e. his willingness to pay for the goods purchased. Capacity denotes his ability to manage the business. Capital denotes his financial soundness. Collateral refers to the assets which the customer can offer by way of security. Conditions refer to the impact of general economic trends on the firm or to special developments in certain areas of economy that may affect the customer's ability to meet his obligations.

Information about the five C's can be collected both from internal as well as external sources. Internal sources include the firm's previous experience with the customer supplemented by its own well developed information system. External resources include customer's references, trade associations and credit rating organisations such as Don & Brad Street Inc. of USA. This Organisation has more than hundred years experience in the field of credit reporting. It publishes a reference book six times a year containing information about important business firms region wise. It also supplies credit reports about different firms on request.

An individual firm can translate its credit information into risk classes or groups according to the probability of loss associated with each class. On the basis of this information, the firm can decide whether it will be advisable for it to extend credit to a particular class of customers.

ii. Credit terms

It refers to the terms under which a firm sells goods on credit to its customers. As stated earlier, the two components of the credit terms are (a) Credit Period and (b) Cash Discount. The approach to be adopted by the firm in respect of each of these components is discussed below:

(a) Credit period - Extending the credit period stimulates sales but increases the cost on account of more tying up of funds in receivables. Similarly, shortening the credit period reduces the profit on account of reduced sales, but also reduces the cost of tying up of funds in receivables. Determining the optimal credit period, therefore, involves locating the period where the marginal profits on increased sales are exactly offset by the cost of carrying the higher amount of accounts receivable.

(b) Cash discount - The effect of allowing cash discount can also be analysed on the same pattern as that of the credit period. Attractive cash discount terms reduce the average collection period resulting in reduced investment in accounts receivable. Thus, there is a saving in capital costs. On the other hand, cash iscount itself is a loss to the firm. Optimal discount is established at the point where the cost and benefit are exactly offsetting.

iii. Collection procedures

A stringent collection procedure is expensive for the firm because of high out-of-pocket costs and loss of goodwill of the firm among its customers. However, it minimises the loss on account of bad debts as well as increases savings in terms of lower capital costs on account of reduction in the size of receivables. A balance has therefore to be stuck between the costs and benefits of different collection procedures or policies.

8.8 CREDIT EVALUATION OF CUSTOMER

Credit evaluation of the customer involves the following 5 stages

i. Gathering credit information of the customer through:

a. financial statements of a firm,
b. bank references,
c. references from Trade and Chamber of Commerce,
d. reports of credit rating agencies,
e. credit bureau reports,
f. firm's own records (Past experience),
g. other sources such as trade journals, Income-tax returns, wealth tax returns, sales tax returns, Court cases, Gazette notifications etc.

ii. Credit analysis - After gathering the above information about the customer, the credit-worthiness of the applicant is to be analysed by a detailed study of 5 C's of credit as mentioned above.

iii. Credit decision - After the credit analysis, the next step is the decision to extend the credit facility to potential customer. If the analysis of the applicant is not upto the standard, he may be offered cash on delivery (COD) terms even by extending trade discount, if necessary, instead of rejecting the credit to the customer.

iv. Credit limit - If the decision is to extend the credit facility to the potential customer, a limit may be prescribed by the financial manager, say, Rs. 25,000 or Rs. 1,00,000 or so, depending upon the credit analysis and credit-worthiness of the customer.

v. Collection procedure - A suitable and clear-cut collection procedure is to be established by a firm and the same is to be intimated to every customer while granting credit facility. Cash discounts may also be offered for the early payment of dues. This facilitates faster recovery.

8.9 PROBLEMS AND SOLUTIONS

Illustration 1
The following are the details regarding the operations of a firm during a period of 12 months.

Sales	Rs.12,00,000
Selling price per unit	Rs.10
Variable cost price per unit	Rs. 7
Total cost per unit	Rs. 9

Credit period allowed to customers one month. The firm is considering a proposal for a more liberal extension of credit which will result in in-creasing the average collection period from one month to two months. This relaxation is expected to increase the sales by 25% from its existing level.

You are required to advise the firm regarding adoption of the new credit policy, presuming that the firm's required return on investment is 25%.

Solution:
Appraisal of Credit policy

	Present	Proposed	Incremental
Credit period (ACP)	1 month	2 months	
Sales (units)	120000	150000	
Sales @ 10 (in Rs)	1200000	1500000	300000
Total Cost	1080000	1290000	210000
Profit	120000	210000	90000

Investment in receivables 1080000 / 12 = 90000
1290000 / 6 = 215000 125000
Required return on Incremental Investment (125000@ 25%)
= 31250
Actual return on Investment = 90000
(or)
(90000 / 125000) x 100 = 72%

Since the Incremental return is greater than required return on Incremental investment advised to adopt new credit policy

Illustration 2

YASHWANTH Ltd. has received an order from Green Ltd. which insists that the Rs.50,000 of machinery ordered be supplied on 60 days credit. The variable costs of production which would be incurred by YASHWANTH Ltd. in meeting the order amount to Rs.40,000. Green's credit worth while ness is in doubt and the following estimates have been made:

Probability of Green Ltd. paying in full in 60 days 0.6
Probability of Green Ltd. completely defaulting 0.4
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However, if the order is accepted by YASHWANTH Ltd. and if Green Ltd. does not default, then there is felt to be a probability of about 0.7 that a further eight identical orders will be placed by Green Ltd. in exactly 1 year's time, and further orders in later years may also be forth coming. Experience has shown that once a firm meets the credit terms on an initial order, the probability of default in the next year reduces to 0.1. Any work carried out on Green's Ltd. order would take place in otherwise idle time and would not encroach upon YASHWANTH Ltd. other activities. Should Green Ltd. defaults, the legal and other costs of debt collection would equal any money obtained.

YASHWANTH Ltd. finances all trade credit with readily available overdrafts at a cost of 12% p.a. An appropriate discount rate for long term decisions is 15%p.a.

Evaluate the proposal if (i) only one order is expected from Green Ltd., and (ii) if further orders are also expected from it (year may be taken consisting of 360 days)

Solution:
YASHWANTH LTD
Evaluation of credit decision

I. If only one order is expected from GREEN Ltd

If Amount received in full in 60 days

Selling price	50000
(-) variable cost	40000
	10000
(-) finance cost (40000@12%) × (60 / 360)	800
Net profit	9200

If GREEN Ltd defaulted

Loss = 50000

Expected return:

If paid in 60 days	9200 × 0.6	5520
If defaulted	50000 × 0.4	(20000)
		(14480)

If only one order is received from Green Ltd, it need not be accepted by YASHWANTH Ltd, Because net receipt is negative

II. If further Orders are expected from GREEN Ltd

Net return from each order (if not defaulted)	9200
For 8 orders	73600
Return expected if defaulted	(400000)
Net expected return from further orders [(73600 x 0.9) + (-400000) x (0.1)]	26240
PV of expected return from further orders [26240 x (0.7) x (100 / 115)]	15970
Revised value of order [15970 + (-14480)]	1490

Revised value of initial order on the basis of possibility of receiving further orders is Rs1490. so proposal is to be accepted.

Illustration 3

Trinadh Traders Ltd. currently sells on terms of net 30 days. All the sales are on credit basis and average collection period is 35 days. Currently, it sells 500,000 units at an average price of Rs. 50 per unit. The variable cost to sales ratio is 75% and a bad debt to sales ratio is 3%. In order to expand sales, the management of the company is considering changing the credit terms from net 30 to 2/10, net 30. Due to the change in policy, sales are expected to go up by 10%, bad debt loss on additional sales will be 5% and bad debt loss on existing sales will remain unchanged at 3%. 40% of the customers are expected to avail the discount and pay on the tenth day. The average collection period for the new policy is expected to be 34 day's: The Company required a return of'20% on its investment in receivables.

You are required to find out the impact of the change in credit policy on the profit of the company. Ignore taxes.

Solution:

Trinadh Traders

Appraisal of Credit policy:

	Present	Proposed	Gain/(loss)
Credit terms	Net30	(2 / 10)Net 30	
ACP	35 days	34 days	
Discount sales	-	40%	
Bad debts	3%	3 % + 5%	
Sales	500000	550000	
Incremental Profit	[50000 x 50 x 25%]	625000	
Incremental bad debts	[50000 x 50 x 5%]	(125000)	
Discount	[550000 x 40% x 50x 2%]	(220000)	

Investment	[500000 x 50 x (35/360)] = 2430555 [500000 x 50 x (37/365)] + [50000 x 50 x 75% x 34/360] = 2538194			
			107629	
Finance cost		(107629 x 20%)	(21528)	258472

By implementing new credit policy, the profit is increased by Rs258472. So the new credit policy is advised to implement.

Illustration 4

A small firm has a total sales of Rs. 100 lakhs, of which 80% is on credit. It is offering a discount-credit terms of 2/40 Net 30. Of the total, 50% of customers avail of discount and the balance pay in 120 days. The past experience indicates that bad debt losses are around 1% of credit sales. The firm spends about Rs. 1,20,000 per annum to administer its credit sales. These are avoidable as a factor is prepared to buy the firm's receivables. He will charge 2% commission. He will also pay advance against receivables to the firm at an interest rate of 18% after withholding 10% as reserve. Answer the following:

a) What is the total credit sales?
b) What is the average collection period?
c) What is the average receivables?
d) What is the factoring commission payable per annum?
e) What is the disbursable amount to the firm by the factor?
f) What is the total interest chargeable by the factor?
g) What is the cost of factoring?
h) Should the firm avail factoring services?

Solution:

	(Rs.)
a) Total credit sales (100lakhs x 80%)	8000000
b) Average collection period [(40x 0.5) + (120 x 0.5)]	80 days
c) Average debtors (80lakhs x 80 / 360)	1777778
d) Factoring commission (80lakhs x 2%)	160000

e) Disbursable amount

Average receivables	1777778	
(-) Factor reserve @10%	177778	
	1600000	
(-) Commission (1777778 x 2%)	35554	
		1564446

f) Total interest

Interest for 80 days	[1564446 x18% x (80 / 360)]	62578
Interest per year	[62578 x (360 / 80)]	281600

g) Effective cost of factoring

Commission	160000
Interest	281600
	441600
(-) savings in Bad debt	80000
Admin cost	120000
Effective cost	241600

Effective cost of factoring (241600 / 1564446) x 100 = 15.4 %

h) If the firm obtain funds less than 15.4% interest rate, then firm need not accept factoring services. Otherwise advised to accept factoring.

Illustration 5

The turnover of Modern Ltd. Is Rs. 60 lakhs of which 80% is on credit. Debtors are allowed on month to clear off the dues. A factor is willing to advance 90% of the bills raised on credit for a fee of 2% a month plus a commission of 4% on the total amount of debts. Modern Ltd. As a result of this arrangement is likely to save Rs. 21,600 annually in management costs and avoid bad debts at 1% on the credit sales.

A scheduled bank has come forward to make an advance equal to 90% of the debts at an interest rate of 18% p.a. However its processing fee will be at 2% on the debts. Would you accept factoring or the offer from the bank?

Solution:

Factoring vs. Bill Discounting:

Alternative 1: Factoring:

Calculation of Effective Cost of Factoring:

Sale for the year		6000000
Credit sales		4800000
Receivables = (4800000 / 12) x 1 month	=	400000

Cost of factoring: (Per month)

Fee (interest) 400000 x 90 % x 2%	=	7200
Commission 400000 x 4%	=	16000
Cost per month		23200

Savings:

Management cost (21600 / 12)	(1800)
Bad debts (400000 x 1%)	(4000)
	17400

Alternative 2: Bill Discounting:

Cost of Bill Discounting

Average debtors – 400000p.m	
Processing Fee (400000 x 2 %)	8,000
Interest / Discount [400000@90% x 18% x (1 /12)]	5,400
Loss due to bad debts p.m	4000
Administration cost	1800
	19200

Company may Opt Factoring but not Bill discounting.

Illustration 6

Star Limited manufacturers of Colour TV Sets, are considering the liberalization of existing credit terms to three of their large customers A, B and C. the credit period and likely quantity of TV sets that will be lifted by the customers are as follows:

Credit period (Days)			
	A	B	C
0	1,000	1,000	--
30	1,000	1,500	--
60	1,000	2,000	1,000
90	1,000	2,500	1,500

The selling price per TV set is Rs. 9,000. The expected contribution is 20% of the selling price. The cost of carting debtors averages 20% per annum.

You are required:

(a) Determine the credit period to be allowed to each customer. (Assume 360 days in a year for calculation purposes).

(b) What other problems the company might face in allowing the credit period as determined in (a) above?

Solution:

(a) Determination of Credit period to be allowed to customers A, B and C.

In case of Customer A there will be constant sales irrespective of the credit period allowed. Hence, it is suggested not to extend any credit period to Customer A. The only analysis to be made about the profitability of extending different credit period with different sales levels.

	Customers B				Customers C			
Credit Period (Days)	0	30	60	90	0	30	60	90
Sales (Units)	1,000	1,500	2,000	2,500	--	--	1,000	1,500
Sales	90	135	180	225			90	135
Contribution (20% of Sales)	18	27	36	45			18	27
Incremental Contribution (A)		9	9	9	-	-	18	9
Debtors (Credit Period X sales / 360)		11.25	30	56.25	--	--	15	33.75
Incremental debtors		11.25	18.75	26.25	--	--	15	18.75
Cost of Incremental Debtors at 80%		9	15	21	--	--	12	15
Cost of Carrying Incremental Debtors at 20% (B)		1.8	3	4.2	--	--	2.4	3
Net Margin (A) – (B)		7.2	6	4.8	--	--	15.6	6

Conciliation:

(a) It is observed from the above table that incremental contribution on sales exceeds incremental cost carrying additional debtors at each successive credit period. Hence it is suggested to allow credit period upto 90 days to both customers B and C.

(b) By giving credit period of 90 days to Customer B and C and no credit allowed to Customer A may cause to stop purchase T.V. sets from the company by Customer A.

Illustration 7

A trader whose current sales are in the region of Rs. 6 lakhs per annum and an average collection period of 30 days wants to pursue a more liberal policy to improve sales. A study made by a management consultant reveals the following information:

Credit Policy	Increase in Collection Period (Days)	Increase in sales Rs.	% Default Anticipated
A	10	30,000	1.5%
B	20	48,000	2%
C	30	75,000	3%
D	45	90,000	4%

Selling price per unit is Rs. 3, average cost per unit is Rs. 2.25 and variable cost per unit is Rs. 2.

Current bad debt loss is 1%. Require return on additional investment is 20%. Assume 360 days a year. Which of the above policies would you recommend for adoption?

Solution:
Evaluation of Credit Policies

Benefits				
a. Credit Policy	A	B	C	D
b. Credit Period (days)	40	50	60	75
c. Additional Sales (Rs.)	30,000	48,000	75,000	90,000
d. Contribution generated by Additional Sales (Rs.)	10,000	16,000	25,000	30,000
e. Total Sales (Rs.)	6,30,000	6,48,000	6,75,000	3,90,000
f. Bad debts	9,450	12,960	20,250	27,600
g. Additional bad debts (Rs.)	3,450	6,960	14,250	21,600
h. Net additional Contribution i.e. (d) – (g)	6,550	9,040	10,750	8,400

Costs				
a. Credit Policy	A	B	C	D
b. Credit Period (days)	40	50	60	75
c. Total Sales (Rs.)	6,30,000	6,48,000	6,75,000	6,90,000
d. Average Debtors (Rs.)	70,000	90,000	1,12,500	1,43,750
e. Investment in Receivables (Rs.)	46,667	60,000	75,000	95,833
f. Additional investment in Receivables	13,334	26,667	41,667	62,500
g. Return on Additional Investment	2,667	5,333	8,333	12,500
Net Benefit	3,883	3,707	2,417	(-) 4,100

Conclusion: As the net benefit is maximum in case of credit policy A, the company should adopt that policy.

Note:

(a) Additional bad debts will be considered as excess of anticipated bad debts as compared to the existing bad debts.

(b) Additional Investment in Receivables is calculated as below:
Existing Sales – Rs. 6,00,000.
Average Collection Period – 30 Days.
Average Debtors – Rs. 50,000
As variable Cost is 2/3 rd of Selling price,
Investment in Debtors = 50,000 X 2/3 = 33,333.

Illustration 8

X Ltd. currently has an annual turnover of Rs. 20 lakhs and an average collection period of 4 weeks. The company proposes to introduce a more liberal credit policy which they hope will generate additional sales, as shown below:

Proposed Credit Policy	Increase in		Percentage of Default
	Collection Period by	Sales Rs.	
1	2 Weeks	2,00,000	2%
2	4 Weeks	2,50,000	3%
3	6 Weeks	3,50,000	5%
4	8 Weeks	5,00,000	8%

The selling price of the product is Rs. 10 and the variable cost per unit is Rs. 7. The current bad debt loss is 1% and the desired rate of return on investment is 20%. For the purpose of calculation a year is to be taken to comprise of 52 weeks. Indicate which of the above policies you would recommend the company to adopt.

Solution:

	Current	Proposed			
	4 Weeks	**6 Weeks**	**8 Weeks**	**10 Weeks**	**12 Weeks**
Sales	20,00,000	22,00,000	22,50,000	23,50,000	25,00,000
Incremental Sales	--	2,00,000	2,50,000	3,50,000	5,00,000
1. Incremental Contribution (30% of Incremental sales)	--	60,000	75,000	1,05,000	1,50,000
Average Debtor	1,53,846	2,53,846	3,46,154	4,51,923	5,76,923
Incremental Debtors	--	1,00,000	1,92,308	2,98,077	4,23,077
Incremental Investment	--	70,000	1,34,616	2,08,654	2,96,154
2. Return on Investment (20% on incremental Investment in debtors balance)	--	14,000	26,923	41,731	59,231
Percentage of Default	1%	2%	3%	5%	8%
Bad debts on total Sales	20,000	44,000	67,500	1,17,500	2,00,000
3. Incremental Bad Debts	--	24,000	47,500	97,500	1,80,000
Incremental Returns (1) - (2) + (3)	--	22,000	577	(34,231)	(80,231)

Conclusion:

The incremental return is maximized if the credit period allowed is 6 weeks. Hence, it is suggested to 6weeks as credit period for collection of debtors balances.

9

INVENTORY MANAGEMENT

Unit Structure :

9.0 OBJECTIVES

After studying the unit the students will be able to:

- Understand and explain the techniques of Inventory control.
- Solve the practical problems on the techniques of Inventory control.

9.1 INTRODUCTION

Inventory constitutes an important item in the working capital of many business concerns. Net working capital is the difference between current assets and current liabilities. Inventory is a major item of current assets. The term inventory refers to the stocks of the product of a firm is offering for sale and the components that make up the product Inventory is stores of goods and stocks. This includes raw materials, work-in-process and finished goods. Raw materials consist of those units or input which are used to manufactured goods that require further processing to become finished goods. Finished goods are products ready for sale. The classification of inventories and the levels of the components vary from organisaion to organisation depending upon the nature of business. For example steel is a finished product for a steel industry, but raw material for an automobile manufacturer. Thus, inventory may be defined as "Stock of goods that is held for future use". Since inventories constitute about 50 to 60 percent of current assets, the management of inventories is crucial to successful working capital management. Working capital requirements are influenced by inventory holding. Hence, the need for effective and efficient management of inventories.

A good inventory management is important to the successful operations of most organisaions, unfortunately the importance of

inventory is not always appreciated by top management. This may be due to a failure to recognise the link between inventories and achievement of organisational goals or due to ignorance of the impact that inventories can have on costs and profits.

Inventory management refers to an optimum investment in inventories. It should neither be too low to effect the production adversely nor too high to block the funds unnecessarily. Excess investment in inventories is unprofitable for the business. Both excess and inadequate investment in inventories are not desirable. The firm should operate within the two danger points. The purpose of inventory management is to determine and maintain the optimum level of inventory investment.

9.2 TECHNIQUES OF INVENTORY CONTROL

The following are the various measures of selective control of inventory:

A. Economic Ordering Quantity (EOQ)

It is important to note that only the correct quantity of materials is to be purchased. For this purpose, the factors such as maximum level, minimum level, danger level, re-ordering level, quantity already on order, quantity reserved, availability of funds, quantity discount, interest on capital, average consumption and availability of storage accommodation are to be kept in view. There should not be any over stock vis-a-vis no question of non-stock. Balance should be made between the cost of carrying and cost of non-carrying i.e. cost of stock-out. Cost of carrying includes the cost of storage, insurance, obsolescence, interest on capital invested. Cost of not carrying includes the costly purchase, loss of production and sales and loss of customer's goodwill. Economic Ordering Quantity (EOQ) is the quantity fixed at the point where the total cost of ordering and the cost of carrying the inventory will be the minimum. If the quantity of purchases is increased, the cost of ordering decreases while the cost of carrying increases. If the quantity of purchases is decreased, the cost of ordering increases while the cost of carrying decreases. But in this case, the total of both the costs should be kept at minimum. Thus, EOQ may be arrived at by Tabular method by preparing purchase order quantity tables showing the ordering cost, carrying cost and total cost of various sizes of purchase orders.

Economic ordering quantity may also be worked out mathematically by using the following formula.

$$EOQ = \sqrt{\frac{2 \times \text{Annual usage} \times \text{Buying Cost}}{\text{Cost of carrying of one unit expressed as perentage}}}$$

$$EOQ = \sqrt{\frac{2AB}{C}}$$

Note : Buying cost is the ordering cost.

B. Fixing levels (Quantity Control) - For fixing the various levels such as maximum, minimum, etc., average consumption and lead time i.e. the average time taken between the initiation of purchase order and the receipt of materials from suppliers are to be estimated for each item of materials.

a . Maximum Stock Level - The maximum stock level is that quantity above which stocks should not normally be allowed to exceed. The following factors are taken into consideration while fixing the maximum stock level:

1. Average rate of consumption of material.
2. Lead time.
3. Re-order level.
4. Maximum requirement of materials for production at any time.
5. Storage space available, cost of storage and insurance.
6. Financial consideration such as price fluctuations, availability of capital, discounts due to seasonal and bulk purchases, etc.
7. Keeping qualities e.g. risk of deterioration, obsolescence, evaporation, depletion and natural waste, etc.
8. Any restrictions imposed by local or national authority in regard to materials i.e. purchasing from small scale industries and public sector undertakings, price preference clauses, import policy, explosion in case of explosive materials, risk of fire, etc.; and
9. Economic ordering quantity is also considered.

Formula
Maximum Level = Re-order level — (Minimum consumption) x (Minimum lead times) + Reordering quantity

b. Minimum Stock Level - The minimum stock level is that quantity below which stocks should not normally be allowed to fall.

If stocks go below this level, there will be danger of stoppage of production due to shortage of supplies. The following factors are taken into account while fixing the minimum stock level:

1. Average rate of consumption of material.
2. Average lead time. The shorter the lead time, the lower is the minimum level.
3. Re-order level.
4. Nature of the item.
5. Stock out cost.

Formula
Minimum Level = Re-order level - (Average usage x Average lead time)

c. Re-order Level - This is the point fixed between the maximum and minimum stock levels and at this time, it is essential to initiate purchase action for fresh supplies of the material. In order to cover the abnormal usage of material or unexpected delay in delivery of fresh supplies, this point will usually be fixed slightly higher than the minimum stock level. The following factors are taken into account while fixing the re-order level:

1. Maximum usage of materials
2. Maximum lead time
3. Maximum stock level
4. Minimum stock level

Formula
Re-order level = Maximum usage X Maximum lead time or Minimum level + Consumption during lead time.
Re-ordering Quantity (How much to purchase): It is also called Economic Ordering Quantity.

d. Danger Level - This is the level below the minimum stock level. When the stock reaches this level, immediate action is needed for replenishment of stock. As the normal lead time is not available, regular purchase procedure cannot be adopted resulting in higher purchase cost. Hence, this level is useful for taking corrective action only. If this is fixed below the reorder level and above the minimum level, it will be possible to take preventive action.

C. ABC Analysis for value of items consumed

ABC Analysis for Inventory Control: ABC analysis is a method of material control according to value. The basic principle is that high value items are more closely controlled than the low value items. The materials are grouped according to the value and frequency of replenishment during a Period.
'A' Class items: Small percentage of the total items but having higher values.

'B' Class items: More percentage of the total items but having medium values.
'C' Class items: High percentage of the total items but having low values.

- **The general procedure for classifying A, B or C items is as follows:**

1. Ascertain the cost and consumption of each material over a given period of time.
2. Multiply unit cost by estimated usage to obtain net value.
3. List out all the items with quantity and value.
4. Arrange them in descending order in value i.e., ranking according to value.
5. Ascertain the monetary limits for A, B or C classification.
6. Accumulate value and add up number of items of A items. Calculate percentage on total inventory in value and in number.
7. Similar action for B and C class items.

- **Advantages of ABC Analysis**

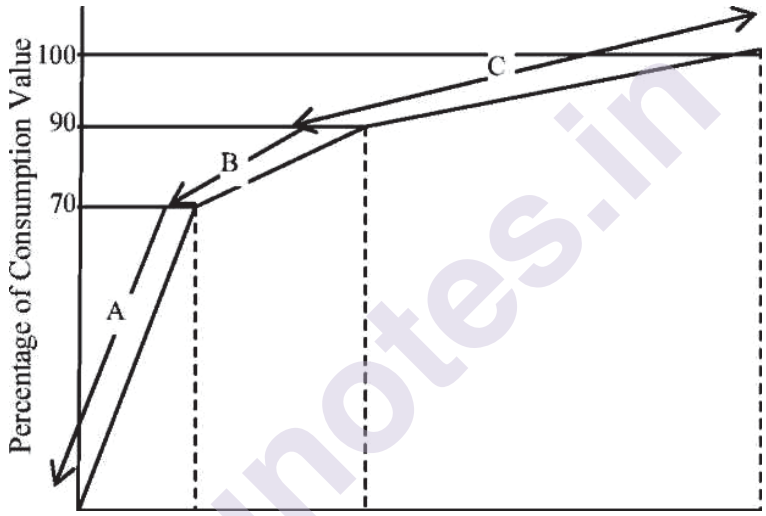
1. To minimize purchasing cost and carrying cost (i.e. holding cost).
2. Closer and stricter control on these items which represent a high portion of total stock value.
3. Ensuring availability of supplies at all times.
4. Clerical costs can be reduced.
5. Inventory is maintained at optimum level and thereby investment in Inventory can be regulated and will be minimum. 'A; items will be ordered more frequently and as such the investment in inventory is reduced.
6. Maintaining enough safety stock for 'C' items.
7. Equal attention to A, B and C items is not desirable as it is expensive.
8. It is based on the concept of Selective Inventory Management and it helps in maintaining high stock-turnover ratio.

Illustration :

A manufacturing concern is having 1,000 units of materials valuing Rs. 1,00,000 in total. Prepare the statement showing the stock according to ABC Analysis.

	Quantity		Value		Average values Rs.
Category	%	No. of items	%	Amount	
A (High value items)	10%	100	70%	70,000	70,000 ÷ 100 = 700
B (Medium value items)	20%	200	20%	20,000	20,000 ÷ 100 = 200
C (Low value items)	70%	700	10%	10,000	10,000 ÷ 700 = 14
Total:	100%	1000	100%	1,00,000	

For the sake of simplicity, the above percentage has been considered. But in practice, the percentage may vary between 5% to 10%, 10% to 20% and 70% to 85%.



In foreign countries, Bin Cards and Stores Ledger Cards are not maintained for 'C' class items. These are issued directly to the production foreman concerned and controlled through norms of consumption based on production targets. By doing this, 70% of the effort required for maintaining the Bin Cards and Stores Ledger Cards is eliminated. With 30% of the effort, an organization will be able to exercise control on the 90% of the inventory values. This reduces the clerical costs and ensures the closer control on costly items in which large amount of capital is invested.

D. Perpetual Inventory System

The Institute of Cost and Management Accountants, London defines the perpetual inventory system as "A system of records maintained by the controlling department, which reflects physical movements of stocks and their current balance."

This system consists of the following three:

a. Bin cards i.e. Quantitative Perpetual Inventory.
b. Stores ledger i.e. Quantitative and Value Perpetual Inventory.
c. Continuous Stock taking i.e. Physical Perpetual Inventory.

E. H.M.L. Classification

In ABC analysis, the consumption value of items has been taken into account. But in this case, the unit value of stores items is considered. The materials are classified according to their unit value as high, medium or low valued items. Combining ABC analysis and HML classification, it will be more useful to an organisation in the sense that the low value components having substantial consumption, that is to say, a small item costing Re. 1 each consumed a lakh numbers will cost Rs.1.00 lakh which is quite high and it is to be controlled properly.

F. F S N Analysis

According to this approach, the inventory items are categorized into 3 types. They are fast moving, slow moving and nonmoving. Inventory decisions are very carefully taken in the case of 'non moving category'. In the case of item of fast moving items, the manager can take decisions quite easily because any error happened will not trouble the firm so seriously. Since risk is less in fast moving items, because they can be consumed quickly unlike the non- moving category which are carried in the godowns for more time period.

As risk is high in case of slow - moving and non - moving - items, the inventory decisions have to be taken carefully without affecting the objectives of profitability and liquidity of the organisation.

G. V.E.D. Classification

The V.E.D. classification is applicable mainly to the spare parts. Spares are classified as vital (V), essential (E) and desirable (D). Vital class spares have to be stocked adequately to ensure the operations of the plant but some risk can be taken in the case of 'E' class spares. Stocking of desirable spares can even be done away with if the lead time for their procurement is low.

Similarly, classification may be done in respect of the plant and machinery as vital, essential, important and normal (VEIN). If the classifications VED and VEIN are combined, there will be 12 different classes as follows:

Vital spares for vital plant, vital spares for essential plant, vital spares for important plant and vital spares for normal plant. Essential spares for essential plant, essential spares for important plant, essential spares for normal plant and essential spares for vital plant, Desirable spares for essential plant, desirable spares for important plant, desirable spares in vital plant and desirable spares for normal plant.

H. Just in Time (JIT)

Normally, inventory costs are high and controlling inventory is complex because of uncertainities in supply, dispatching, transportation etc. Lack of coordination between suppliers and ordering firms is causing severe irregularities, ultimately the firm ends-up in inventory problems. Toyota Motors has first time suggested just - in - time approach in 1950s. This means the material will reach the points of production process directly form the suppliers as per the time schedule. It is possible in the case of companies with respective process. Since, it requires close coordination between suppliers and the ordering firms, and therefore, only units with systematic approach will be able to implement it.

I. Inventory Turnover Ratio

i) Inventory Turnover Ratio: Cost of goods sold / average total inventories. The higher the ratio, more the efficiency of the firm

ii) Work in process turnover ratio

$$= \frac{\text{Cost of Goods Sold}}{\text{Average inventory of finished goods at costs}}.$$

Here, in this ratio also higher the ratio, more the efficiency of the firm.

iii) Weeks inventory of finished goods on hand

$$= \frac{\text{Finished Goods}}{\text{Weekly sales of finished goods}}.$$

The ratio reveals that the lower the ratio, the higher the efficiency of the firm

iv) Weeks raw material on order

$$= \frac{\text{Raw Material on order}}{\text{Weekly consumption of raw material}}.$$

This ratio indicates that the lower the ratio, the higher the efficiency of the firm.

v) Average age of raw material inventory

$$= \frac{\text{Average raw material inventory at cost}}{\text{Average daily purchases of raw material}}.$$

This ratio says that the lower the ratio the higher the efficiency of the firm.

vi) Average age of finished goods inventory

$$= \frac{\text{Average finished goods inventory at cost}}{\text{Average cost of finished goods manufactured per day}}.$$

This ratio indicates that the lower the ratio the higher the efficiency of the firm.

1) Out of Stock Index $= \frac{\text{No. of times out of stock}}{\text{No. of items requisitioned}}$

This ratio indicates the lower the ratio higher the efficiency of the firm.

2) Spare parts index $= \frac{\text{Value of spare parts inventory}}{\text{Value of Capital Equipment}}$

This ratio reveals that the higher the ratio the more the efficiency of the firm.

9.3 PROBLEMS & SOLUTIONS

Illustration 1

From the following particulars, find out average value per item if a stores has 50,000 items of consumption and a yearly consumption is Rs. 60,00,000.

Class	Percentage of Total No. of Items	Percentage of Total Value
A	5	80
B	20	15
C	75	5

Solution:

Category	No. of Items 2	% of Total No. of Items 3	Value Rs. 4	% of the Total Value 5	Average Value Per Item Rs. 6
A	2,500	5	48,00,000	80	1,920
B	10,000	20	9,00,000	15	90
C	37,500	75	3,00,000	5	8
Total	50,000	100	60,00,000	100	

Illustration 2

M/s Air Cool Services Ltd., Jalgaon manufacturers of Air Coolers give the following information in respect of two components namely A and B used in the manufacturing process:

Normal Usage 200 units per week each.
Maximum usage 300 units per week each
Minimum Usage 100 units per week each.

Reorder quantity:
A 1,600 units
B 2,400 units

Reorder Period for:
A 2 to 4 weeks.
B 1 to 2 weeks.

Calculate for each component:

1. Reorder Level
2. Minimum Level
3. Maximum Level
4. Average stock Level

Solution:

	Component A	Component B
1. Reorder Level	= (Maximum Consumption X Maximum Reorder period) = 300 units x 4 weeks = 1,200 Units.	=(Maximum Consumption X Maximum Reorder period) = 300 units x 2 weeks = 600 Units.
2. Minimum Level	= [Reorder Level – (Normal Consumption X Average Period of Delivery)] = 1,200 – (200 X 2+4/2) = 600 Units	= [Reorder Level – (Normal Consumption X Average Period of Delivery)] = 600 – (200 X 1+2/2) = 300 Units
3. Maximum Level	= {Reorder Level + Reorder Quantity – (Minimum Consumption X minimum Time for Reordering)} = 1,200 + 1,600 – (100 X 2) = 2,600 Units	= {Reorder Level + Reorder Quantity – (Minimum Consumption X minimum Time for Reordering)} = 600 + 2,400 – (100 X 1) = 2,900 Units
4. Average stock Level	= (Maximum Level + Minimum Level / 2) = 2,600 +600 / 2 = 1,600 Units.	= (Maximum Level + Minimum Level / 2) = 2,900 +300 / 2 = 1,600 Units.

Illustration 3

POR Ltd. manufactures a special product, which requires 'ZED'. The following particulars were collected for the year 2009 – 10:

1. Monthly demand of Zed	7,500 Units
2. Cost of placing an order	Rs. 500
3. Reorder Period	5 to 8 weeks
4. Cost per unit	Rs. 60
5. Carrying Cost % p.a.	10%
6. Normal Usage	500 Units per week
7. Minimum Usage	250 Units per week
8. Maximum Usage	750 Units per week

Required:

1. Reorder Quantity
2. Reorder Level
3. Minimum Stock Level
4. Maximum Stock Level
5. Average Stock Level

Solution

1. Reorder Quantity = $\sqrt{\frac{2AB}{CS}} = \sqrt{\frac{2\times7500\times12\times500}{60\times10\times100}}$ =3,873 Units.
2. Reorder Level
   = Maximum reorder period x Maximum usage
   = 8 weeks x 750 unit per week
   = 6,000 Units.
3. Minimum Stock Level
   = Reorder Level + (Normal Usage x Normal reorder Period)
   = 6,000 units – (500 x 6.5 weeks)
   = 2,750 Units
4. Maximum stock Level
   = (Reorder level + Reorder quantity) – (Minimum Usage x Minimum reorder period)
   = (6,000 units + 3,873 units) – (250 units x 5 weeks)
   = 9,873 units - 1,250 Units
   = 8,623 units
5. Average Stock Level
   = (minimum Level + ½ reorder quantity) / 2
   = (2,750 units + 8,623 units)/ 2
   = 5,687
6. Minimum Level + ½ reorder quantity
   = 2,750 units + ½ X 3,873 Units
   = 4,686

Illustration 4
M/s Quality products Ltd. Nasik, is offered discounts on its order in the manner stated as follows:

Price per tone	Order (in Tonnes)
Rs. 12.00	Less than 500
Rs. 11.80	500 but less than 1,600
Rs. 11.60	1,600 but less than 4,000
Rs. 11.40	4,000 but less than 8,000
Rs. 11.20	8,000 and over

The annual demand for the material is 8,000 tonnes. Inventory carting costs are 20% of material cost per annum. The delivery cost per order is Rs. 12/-.
Calculate the "Best Quantity order' for M/s Quality Products Ltd.

Solution:
Determination of EOQ

Particulars	**Order Size**	**Order Size**	**Order Size**	**Order Size**	**Order Size**
I Annual Consumption	8,000	8,000	8,000	8,000	8,000
II Order size (units)	400	500	1,600	4,000	8,000
III No of orders (I/II)	20	16	5	2	1
IV Cost per order (Rs.)	12	12	12	12	12
V Total ordering cost (Rs.) (III X IV)	240	192	60	24	12
VI Average Inventory (units)	200	250	800	2,000	4,000
VII Carrying cost per unit (Rs.) 20%	2.4	2.36	2.32	2.28	2.24
VIII Total carrying cost (Rs.) (V+VII)	480	590	1856	4560	8960
IX Total cost of ordering & carrying (V + VIII)	720	782	1916	4584	8972
X Purchase Price (Rs.)	96,000	84,400	92,800	91,200	89,600
Total (IX + X)	96,720	95,182	94,716	95,784	98,572

The EOQ is 1600 units. As the purchase price varies, total cost is considered:

Illustration 5

A company is considering the possibility of purchasing from a supplier a component it now makes. The supplier will provide the components in the necessary quantities at a unit price of Rs. 9. Transportation and storage costs would be negligible.

The company produces the component from a single raw material in economic lots of 2,000 units at a cost of Rs. 2 per unit. Average annual demand is 20,000 units. The annual holding cost is Rs. 0.25 per unit and the minimum stock level is set at 400 units. Direct labour costs for the component are Rs. 6 per unit, fixed manufacturing overhead is charged at a rate of Rs. 3 per unit based on normal activity of 20,000 units. The company also hires the machine on which the components are produced at a rate of Rs. 200 per month.

Should the company make the component?

Solution:

The cost of placing an order can be ascertained on the basis of formula:

EOQ $\sqrt{\frac{2AB}{CS}}$

EOQ = Economic Ordering Quantity

B = Cost of placing an order

A = Annual Demand

CS = Storage cost per unit per annum

Let ost of placing an order be taken as 'X'.

EOQ $= \sqrt{\frac{2\times7500\times12\times500}{60\times10\times100}}$

-

2,000 $= \sqrt{\frac{2\times20000\times X}{0.25}}$

Or 2,000 = 1,60,000 X

Or X = 25

Cost of placing an order Rs. 25

Average stock level = Minimum stock level + ½ EOQ = 400 + ½ (2000) = 1,400 Units.

Computation of cost of Manufacturing the component

			Rs.
Cost of Direct Material	(20,000 X Rs. 2)	40,000	
Add: Storage Cost	(1,400 X Rs.0.25)	350	
Ordering cost	(10 X Rs. 25)	250	40,600
Director Labour	(20,000 X Rs.6)		1,20,000
Hire Charges for machinery	(Rs. 200 X 12)		2,400
			1,63,000

Conclusion: The cost of purchasing the component is 20,000 X Rs. 9 = Rs. 1,80,000. The cost of manufacturing the component is only Rs. 1,63,000. Hence, it will be cheaper to manufacture the component rather than purchasing it from outside. The saving in manufacturing is Rs. 17,000 per annum. Buying could be cheaper only when the facilities rendered surplus on account of not manufacturing the component in the factory could give an income exceeding Rs. 17,000 per annum.

Illustration 6

(a) The following details are available in respect of a firm:

(i) Annual requirement of inventory 40,000 Units
(ii) Cost per unit (other than carrying and ordering cost) Rs.16
(iii) Carrying costs are likely to be 15% per year
(iv) Cost of placing order Rs. 480 per order

Determine the economic quantity

(b) The experience of the firm being out of stock is summarized below:

1.

Stock out (no. of Units)	No. of times
500	1 (1)
400	2 (2)
250	3 (3)
100	4 (4)
50	10 (10)
0	80 (80)

Figure in brackets indicate percentage of time the firm has been out of stock.

2. Stock out costs are Rs. 40 per unit.
3. Carrying cost of inventory per unit is Rs. 20.

Determine the optimal level of stock out inventory.

(c) A firm has 5 different levels in its inventory.
The relevant details are given. Suggest a breakdown of the times into A, B and C Classification:

Item No.	Avg. No. of Unity inventory	Avg. Cost per unit Rs.
1	20,000	60
2	10,000	100
3	32,000	11
4	28,000	10
5	60,000	3.40

Solution:

a) Carrying cost per unit per annum
= Cost per unit X Carting cost % p.a. = Rs. 16 X 0.15 = Rs. 2.40

$$eoq = \frac{2 \times totalConsumptionperAnom \times OrderingCostPerOrder}{CarryingCostPerOrder}$$

$$= \frac{2 \times 40000 \times 480}{2.40}$$

= 4,000 Units

b)

Safety Stock Level (Units)	Stock Out (Units)	Stock out Cost @ Rs. per Unit Rs.	Probability of stock out	Expected Stock Out at this level	Total Expected Stock out cost
500	0	0	0	0	0
400	100	4,000	0.01	40	40
250	250	10,000	0.01	100	
	150	6,000	0.02	120	260
100	400	16,000	0.01	160	
	300	12,000	0.02	240	
	150	6,000	0.03	180	840
50	450	18,000	0.01	180	
	350	14,000	0.02	280	
	200	8,000	0.03	240	
	50	2,000	0.04	80	1,620
0	500	20,000	0.01	200	
	400	16,000	0.02	320	
	250	10,000	0.03	300	
	100	4,000	0.04	160	
	50	2,000	0.10	200	2,800

Safety stock Level (units)	Expected Stock Out Costs Rs.	Carrying cost at Rs. 20 per unit Rs.	Total Safety Stock Cost Rs.
0	2,800	0	2,800
50	1,620	1,000	2,620
100	840	2,000	2,840
250	260	5,000	5,260
400	40	8,000	8,040
500	0	10,000	10,000

Optimum safety stock where the total cost is the least is at 50 units level.

Item No.	Units	% of Total Units	Unit Cost Rs.	Total Cost Rs.	% of total Cost
1	20,000	13.3	60.00	12,00,000	39.5 A
2	10,000	6.7	100.00	10,00,000	32.9 A
3	32,000	21.3	11.00	3,52,000	11.6 B
4	28,000	18.7	10.00	2,80,000	9.2 B
5	60,000	40.0	3.40	2,04,000	6.8
	1,50,000	100.0		30,36,000	100.00

1. 20% of the units falling in category 'A' items are amounting to 72.4% of the total value of the inventory and strict inventory control and management is required for these times.
2. For Category 'B' items, consisting of 40% of the total units but its value is 20.8% of the total value of inventory. For these times moderate control is necessary?

3. The remaining 40% of the units are valuing only 6.8% of the total value of inventory and east controls can be exercised and management attention need not be diverted for management of time falling in Category 'C'.

10

FINANCIAL PLANNING

Unit Structure

10.0 OBJECTIVES

After studying this topic you will be able:

- to understand the basic concepts of budget and budgetary control
- to understand various types of budgets
- to understand the preparation of various types of budgets
- to understand the benefits of budgetary control
- to understand the limitations of budgetary control

10.1 BUDGETS

Budget has been defined by CIMA U. K. as, ‘ A financial and or quantitative statement prepared prior to a defined period of time, of the policy to be pursued during that period for the purpose of achieving a given objective.’

A budget is a statement that is always prepared prior to a defined period of time. This means that budget is always prepared for future period and not for the past. For example, a budget for the year 2011-12 regarding the sales will be prepared in the year 2011-12. another important point is that the time for which it is prepared is certain. Thus a budget may be prepared for the next 3 years / 1 year / 6 months/ 1 month or even for a week, but the point is that the time frame for which it is prepared is certain. It cannot be prepared for indefinite period of time.

Budget is prepared either in quantitative details or monetary details or both. This means that budget will show the planning in terms

of rupees or in quantity or both. For example, a production budget will show the production target in number of units and when the target units are multiplied by the anticipated production cost, it will be a production cost budget that is expressed interms of money. Similarly purchase budget is prepared in quantity to show the anticipated purchase in the next year and when the quantity is multiplied by the expected price per unit, it will become purchase cost budget. Some budgets are prepared only in monetary terms, for example, cash budget, capital expenditure budget etc.

Every organization has well defined objectives, which are to be achieved in a particular span of time. It is of paramount importance that there should be systematic efforts to bring them into reality. As a part of these efforts, it is necessary to formulate a policy and it is reflected in the manpower planning budget as well as other relevant budgets. Thus the policy to be pursued in future for the purpose of achieving well-defined objectives is reflected in the budget.

10.2 BUDGETARY CONTROL

Budgetary control is actually a means of control in which the actual results are compared with the budgeted results so that appropriate action may be taken with regard to any deviations between the two. Budgetary control has the following stages.

A. Developing Budgets:

The first stage in budgetary control is developing various budgets. It will be necessary to identify the budget centers in the organization and budgets will have to develop for each one of them. Thus budgets are developed for functions like purchase, sale, production, manpower planning as well as for cash, capital expenditure, machine hours, labor hours and so on. Utmost care should be taken while developing the budgets. The factors affecting the planning should be studied carefully and budgets should be developed after a thorough study of the same.

B. Recording Actual Performance:

There should be a proper system of recording the actual performance achieved. This will facilitate the comparison between the budget and the actual. An efficient accounting and cost accounting system will help to record the actual performance effectively.

C. Comparison of Budgeted and Actual Performance:

One of the most important aspects of budgetary control is the comparison between the budgeted and the actual performance. The objective of such comparison is to find out the deviation between the two and provide the base for taking corrective action.

D. Corrective Action:

Taking appropriate corrective action on the basis of the comparison between the budgeted and actual results is the essence of budgeting. A budget is always prepared for future and hence there may be a variation between the budgeted results and actual results. There is a need for investigation of the same and take appropriate action so that the deviations will not repeat in the future. Responsibilities can be fixed on proper persons so that they can be held responsible for any such deviations.

10.3 ZERO BASE BUDGET

Zero Base Budgeting is method of budgeting whereby all activities are revaluated each time budget is formulated and every item of expenditure in the budget is fully justified. Thus the Zero Base Budgeting involves from scratch or zero.

Zero Base Budgeting actually emerged in the late 1960s as an attempt to overcome the limitations of incremental budgeting. This approach requires that all activities are justified and prioritized before decisions are taken relating to the amount of resources allocated to each activity. In incremental budgeting or traditional budgeting, previous year's figures are taken as base and based on the same the budgeted figures for the next year are worked out. Thus the previous year is taken as the base for preparation of the budget. However the main limitation of this system of budgeting is that as activity is continued in the future only because it is being continues in the past. Hence in Zero Base Budgeting, the beginning is made from scratch and each activity and function is reviewed thoroughly before sanctioning the same and all expenditures are analyzed and sanctioned only if they are justified.

Besides adopting a 'Zero Base' approach, the Zero BaseBudgeting also focuses on programs or activities instead of functional departments based on line items, which is a feature of traditional budgeting. It is an extension of program budgeting. In program budgeting, programs are identified and goals are developed for the organization for the particular program. By inserting decision packages in the system and ranking the packages, the analysis is strengthened and priorities are determined.

Applications of Zero Base Budgeting:

The following stages/ steps are involved in the application of Zero Base Budgeting.

1. Each separate activity of the organization is identified and is called as a decision package. Decision package is actually nothing but a document that identifies and describes an activity in such a manner that it can be evaluated by the management and rank against other activities competing for limited resources and decide whether to sanction the same or not.

2. It should be ensured that each decision package is justified in the sense it should be ascertained whether the package is consisted with the goal of the organization or not.

3. If the package is consisted with the overall objectives of the organization, the cost of minimum efforts required to sustain the decision should be determined.

4. Alternatives for each decision package are considered in order to select better and cheaper options.

5. Based on the cost and benefit analysis a particular decision package should be selected and resources are allocated to the selected package.

ZBB was first introduced by Peter A. Pyhrr, a staff control manager at Texas Instruments Corporation, U.S.A. He developed this technique and implemented it for the first time during the year 1969-70 in Texas in the private sector and popularized its wider use. He wrote an article on ZBB in Harvard Business Review and later wrote a book on the same. The ZBB concept was first applied in the State of Georgia, U.S.A. when Mr. Jimmy Carter was the Governor of the State. Later after becoming the President of U.S.A. Mr. Jimmy Carter introduced and implemented the ZBB in the country in the year 1987. ZBB has a wide application in the Government Departments but also in the private sector in a variety of business. In India, the ZBB was applied in the State of Maharashtra in 80s and early 90s. Benefits from ZBB can be summarized as follows.

i. ZBB facilitates review of various activities right from the scratch and a detailed cost benefit study is conducted for each activity. Thus an activity is continued only if the cost benefit study is favorable. This ensures that an activity will not be continued merely because it was conducted in the previous year.

ii. A detailed cost benefit analysis result in efficient allocation of resources and consequently wastages and obsolescence is eliminated.

iii. A lot of brainstorming is required for evaluating cost and benefits arising from an activity and this results into generation of new ideas and also a sense o involvement of the staff.

iv. ZBB facilitates improvement in communication and co-ordination amongst the staff.

v. Awareness amongst the managers about the input costs is created which helps the organization to become cost conscious.

vi. An exhaustive documentation is necessary for the implementation of this system and it automatically leads to record building.

The following are the limitations of Zero Base Budgeting.

i. It is very detailed procedure and naturally is time consuming and lot of paper work is involved in the same.

ii. Cost involved in preparation and implementation of this system is very high.

iii. Morale of staff may be very low as they might feel threatened if a particular activity is discontinued.

iv. Ranking of activities and decision-making may become subjective at times.

v. It may not advisable to apply this method when there are non financial considerations, such as ethical and social responsibility because this dictate rejecting a budget claim on low ranking projects.

10.4 PERFORMANCE BUDGETING

It is budgetary system where the input costs are the performance i.e. the end results. This budgeting is used extensively in the Government and Public Sector Undertakings. It is essentially a projection of the Government activities and expenditure thereon for the budget period. This budgeting starts with the broad classification of expenditure according to functions such as education, health, irrigation, Social welfare etc. Each of functions is then classified into programs into activities or projects. The main features of performance budgeting are as follows.

i. Classification into functions, programs or activities
ii. Specification of objectives for each program
iii. Establishing suitable methods for measurement of work as far as possible
iv. Fixation of work targets for each program.

Objectives of each program are ascertained clearly and then the resources are applied after specifying them clearly. The results expected from such activities are also laid down. Annual, quarterly and monthly targets are determined for the entire organization. These targets are broken down for each activity center. The next step is to set up various productivity or performance ratios and finally target for each program activity is fixed. The targets are compared with the actual results achieved. Thus the procedure for the performance budgets include allocation of resources execution of the budget and periodic reporting at regular intervals.

The budgets are finally compiled by the various agencies such as Government Department, public undertakings etc. thereafter these budgets move on to the authorities responsible for reviewing the performance budgets. Once the higher authorities decide about the funds, the amount sanctioned are communicated and the work is started. It is the duty of these agencies to start the work in time, to ensure the regular flow of expenditure, against the physical targets, prevent over runs under spending and furnish report to the higher authorities regarding the physical progress achieved.

In the final phase of performance budgetary process, progress reports are to be submitted periodically to higher authorities to indicate broadly, the physical performance to be achieved, the expenditure incurred and the variances together with explanations for the variances.

Check Your Progress:

1) Define the terms.
a) Budget
b) Budgetary Control
c) Zero Base Budget
d) Performance Budgeting
2) “Budgetary control is actually a means of Control.” Discuss.

10.5 FUNCTIONAL BUDGETS

The Functional Budgets are prepared for each function of the organization. These budgets are normally prepared for a period of one year and then broken down to each month. The following budgets are included in this category.

i. Sales Budget: A Sales budget shows forecast of expected sales in the future period and expressed in quantity of the product to be sold as well as the monetary value of the same. A Sales Budget may be prepared product wise, territories/ area/ country wise, customer group wise, salesmen wise as well as time like quarter wise, month wise, weekly etc.

ii. Production Budget: This budget shows the production target to be achieved in the year or the future period. The production budget is prepared in quantity as well as in monetary terms. Before preparation of this budget it is necessary to study the principal budget or the key factor. The principal budget factor can be sales demand or the production capacity or availability of raw material. The policy of the management regarding the inventory is also taken into consideration. The production budget is normally prepared for a period of one year and broken down on monthly basis. Production targets are decided by adding the budgeted closing inventory in the sales forecast and subtracting the opening inventory from the total of the same. Production Cost Budget is prepared by multiplying the production targets by the budgeted production cost per unit.

iii. Material Purchase Budget: This budget of materials tot be purchased during the coming year. For the preparation of this budget, production budget is the starting point if it is the key factor. If the raw material availability is the key factor, it becomes the starting point. The desired closing inventory of the raw materials is added to the requirement as per the production budget and the opening inventory is subtracted from the gross requirements. This budget is prepared in quantity as well as the monetary terms and helps immensely in planning of the purchase of raw materials. Availability of storage space, financial resources, various levels of materials like maximum, minimum, re-order and economic order quantity are taken into consideration while preparing this budget. A separate material utilization budget may also be prepared as a preparation of material purchase budget.

iv. Cash Budget: a cash budget is an estimate of cash receipts and cash payments prepared for each month. In this budget all expected payments, revenue as well as capital and all receipts, revenue and capital are taken into consideration. The main purpose of cash budget is to predict the receipts and payments in cash so that the firm will be able to find out the cash balance at the end of the budget period. This will help the firm to know whether there will be surplus or deficit at the end of budget period. It will help them to plan for either investing the surplus or

raise necessary amount to finance deficit. Cash budget is prepared in various ways, but the most popular form of the same is by method of Receipt and Payment method.

iv. Master Budget: All the budgets described above are called as 'Functional Budgets' that are prepared for the planning of individual function of the organization. For example, Budgets are prepared for Purchase, Sales, Production, Manpower Planning, and so on. A master budget which is also called as 'Compressive Budget' is a consolidation of all the functional budgets. It shows the projected Profit and Loss account and Balance sheet of business organization. For preparation of this budget, all functional budget are combined together and the relevant figures are incorporated in preparation of the projected Profit and Loss Account and Balance Sheet. Thus Master Budget is prepared for the organization and not for individual functions.

10.6 CAPITAL EXPENDITURE BUDGET

10.6.1 Fixed and Flexible Budgets:

The fixed and flexible budgets are discussed in detail in the following paragraphs.

i. Fixed Budget: When a budget is prepared by assuming a fixed percentage of capacity utilization, it is called as a fixed budget. For example, a firm may decide to operate at 90% of its total capacity and prepare a budget showing the projected profit or loss at that capacity. This budget is defined by The Institute of Cost and Management Accountants of [U.K.] as 'the budget which is designed to remain unchanged irrespective of the level of activity actually attained. It is based on a single level of activity'. For preparation of this budget, sales forecast will have to be prepared along with the cost estimate. Cost estimate can be prepared by segregating the costs according to their behavior i.e. fixed and variable. Cost predictions should be made element wise and the projected profit or loss can be worked out by deducing the cost from the sales revenue. Actually in practice, fixed budgets are prepared very rarely. The main reason is that the actual output differs from the budgeted output significantly. Thus if the budget is prepared on the assumption of producing 50, 000 units and actually the number of units produced are 40, 000, the comparison of actual results with the budgeted ones will be unfair and misleading. The budget may reveal the difference between the budgeted costs and actual costs but the reason for the deviations may not be pointed out. A fixed budget may be prepared when the budgeted output and actual output are quite close and not much

deviation exists between the two. In such cases, maximum control can be exercised between the budgeted performance and actual performance.

ii. Flexible Budgets: a Flexible budget is a budget that is prepared for different levels of capacity utilization. It can be called as a series of fixed budgets prepared for different levels of activity. For example, a budget can be prepared for capacity utilization levels of 50%, 60%, 70%, 80%, 90% and 100%. The basic principle of flexible budget is that if budget is prepared for showing the results at say, 15, 000 units and actual production is only 12, 000 units, the comparison between the expenditures, budgeted and actual will not be fair as the budget was prepared for 15, 000 units. Therefore it is developed for a relevant range of production from 12, 000 units to 15, 000 units. Thus even if the actual production is 12, 000 units, the results will be comparable with the budgeted performance of 12, 000 units. Even if the production slips to 8,000 units, the manager has a tool that can be used to determine budgeted cost at 8,000 units of output. The flexible budget thus, provides a reliable basis for comparison because it is automatically geared to change in production activity. Thus a flexible budget covers a range of activity, it is flexible i.e. easy with variation in production levels and it facilitates performance measurement and evaluation.

iii. While preparing flexible budget, it is necessary to study the behavior of cost and divide them in fixed, variable and semi variable. After doing this, the costs can be estimated for a given level of activity.

iv. It is also necessary to plan the range of activity. A firm may decide to develop flexible budget for activity level starting to plan the range of activity level from 50% to 100% with an interval of 10% in between. It is necessary to estimate the costs and associate them with chosen level of activity.

v. Finally the profit or loss at different levels of activity will be computed by comparing the costs with the revenues.

10.6.2 Preparation of Budget:

A budgetary control is extremely useful for planning and controlling as described above. However, for getting these benefits, sufficient preparation should be made. For complete success, a solid foundation should be laid down and in view of this the following aspects are of crucial importance.

i. Budget Committee: for successful implementation of budgetary control system, there is a need of a budget committee. In small or medium size organizations, there may not

be carried out by the Chief Account himself. Due to the size of organization, there may not be too many problems in implementation of the budgetary control system. However, in large size organization, there is a need of a budget committee consisting of the chief executive, budget officer and heads of main departments in the organization. The functions of the budget committee are to get the budgets prepared and then scrutinize the same, to lay down broad policies regarding the preparation of budgets, to approve the budgets, suggest for revision, to monitor the implementation and to recommended the action to be taken in a given situation.

ii. Budget Centers: Establishment of budget centers is another important pre-requisite of a sound budgetary control system. A budget canter is a group of activities or a section of the organization for which budget can be developed. For example, manpower planning budget, research and development cost budget, production and production cost budget, labor hour and so on. Budget centers should be defined clearly so that preparation becomes easy.

iii. Budget Period: A budget is always prepared prior to a defined period of time. This means that the period for which a budget is prepared is decided in advance. Thus a budget may be prepared for three years, one year, six months, one month or even for a week. The point is that the period for the functional budgets like sales, purchase, production etc. are prepared for one year and then broken down on monthly basis. Budgets like capital expenditure are generally prepared for a period from 1 year to 3 years. Thus depending upon the type of budget, the period of the same is decided and it is important that it is decided well in advance.

iv. Preparation of an Organization chart: There should be an organization chart that shows clearly defined authorities and responsibilities of various executives. The organization chart will define clearly the functions to be performed by each executive relating to the budget preparation and his relationship with other executives. The organization chart may have to be ensure that each budget center is controlled by an appropriate member of the staff.

v. Budget Manual: A budget manual is defined by ICMA as' a document whish sets out the responsibilities of the person engaged in, the routine of and the forms and records required for budgetary control'. The budget manual thus is a schedule, document or booklet, which contains different forms to be used, procedures to be followed, budgeting organization details, and set of instructions to be followed in the budgeting system. It also lists out detail of the responsibilities of different persons and the managers involved in the process. A typical budget manual contains the following.

1. Objectives and of authorities and managerial policies of the business concern.
2. Internal lines of authorities and responsibilities.
3. Functions of the role of budget committee officer.
4. Budget period
5. Principal budget factor
6. Detailed program of budget preparation
7. Accounting codes and numbering
8. Follow up procedures.

vi. Principal Budget Factor: A principal budget factor is that factor the extent of whose influence must first be assessed in order to prepare the functional budgets. Normally sales is the key factor or principal budget factor but other factors like production, purchase, skilled labor may also be the key factors. The key factor puts restrictions on the other functions and hence it must be considered carefully in advance. So continuous assessment of the business situation becomes necessary. In all conditions the key factor is the starting point in the process of preparation of budgets. A typical list of some of the key factor is given below:

Sales: Consumer demand, shortage of sales staff, inadequate advertising

Material: Availability of supply, restrictions on import **Labor:** Shortage of labor

Plant: Availability of capacity, bottlenecks in key processes

Management: Lack of capital, pricing policy, shortage of efficient executive, lack of faulty design of the product etc.

vii. Accounting Records: It is essential that the accounting system should be able to record and analyze the transaction involved. A chart of accounts or accounts code should be maintained which may correspond with the budget centers for establishment of budgets and finally, control through budgets.

Check Your Progress:

1) Define the terms.
a) Functional Budget.
b) Production Budget.
c) Cash Budget.
d) Master Budget.
e) Budget Committee
f) Budget Creators. g) Budget Manual
2) Distinguish between Fixed Budget and Flexible Budget.

Illustration 1

1. Z Ltd., has prepared the following sales Budget for first five months of 2011.

Month	Sales Budget (units)
January	10,800
February	15,600
March	12,200
April	10,400
May	9,800

Inventory finished goods at the end of every month is to be equal to 25 % of sales estimate for the next month. On 1st January 2011, there were 2,700 units of product on hand. There is no work in progress at the end of any month.

Every unit product requires two types of materials in the following quantities;

Material A: 4 Kg. Material B: 5 Kg.

Materials equal to one half of the requirements of the next month's production are to be in hand at the end of every month. This requirement was met on 1st January 2011.

Prepare the following budgets for the quarter ending on 31st marsh 2011

I) Production Budget- Quantity Wise.
II) Materials Purchase Budget- Quantity wise.

Solution:

Z Ltd.
Production Budget [In units] January – March 2011

Particulars	January	February	March
I] Sales	10,800	15,600	12,200
II] Estimated Closing Stock	3,900	3,050	2,600
III] Gross Requirements[I+II]	14,700	18,650	14,800
IV] Opening Stock	2,700	3,900	3,050
V] Net Requirements [III-IV]	12,000	14,750	11,750

Materials Requirement Budget [Quantitative] Material A- January –March 2011

Particulars	January	February	March
Production [As per Production Budget-units]	12,000	14,750	11,750
Requirement for Production: 4 kg per unit	48,000	59,000	47,000
Add: Desired Closing Stock	29,500	23,500	20,500
Gross requirements	77,500	82,500	67,500
Less: Opening Stock	24,000	29,500	23,500
Net Requirements	53,500	53,000	44,000

Materials Requirement Budget [Quantitative] Material B- January –March 2011

Particulars	January	February	March
Production [As per Production Budget-units]	12,000	14,750	11,750
Requirement for Production: 5 kg per unit	60,000	73,750	58,750
Add: Desired Closing Stock	36,875	29,375	25,625
Gross requirements	96,875	1,03,125	84,375
Less: Opening Stock	30,000	36,875	29,375
Net Requirements	66,875	66,250	55,000

Working Notes:

1) Production for April. Sales 10,400 [units] + Closing Stock 2,450 [units] = 12,850 [units] – Opening Sock 2,600 [units] = 10,250 [units].

2) Material required for production in April: A :10,250 X 4 = 41,000 kg. B :10,250 X 5 = 51,250 kg.

Illustration 2

A Ltd. manufactures a single product P with a single grade of labor. The sales budget and finished goods stock budget for the 1st Quarter ending on 30th June 2011 are as follows:
Sales: 1400 units

Opening finished units: 100 units Closing finished units: 140 units
The goods are imported only when the production work is complete and it is budgeted that 10% of finished work will be scrapped.

The standard direct labor content of the product P is 3 hours. The budgeted productivity ratio for direct is 80% only.

The company employs 36 direct operatives who are expected to average 144 working hour each in the 1st quarter.

You are required to prepare,
I] Production Budget
II] Direct Labor Budget
III] Comment on the problem that your direct labor budget reveals and suggest how this problem might be overcome.

Solution:
A Ltd.
Production Budget
April – June 2011

Particulars	**No. of units**
I] Sales Forecast	1,400
II] Estimated Closing Stock	140
III] Gross Requirement [I + II]	1,540
IV] Opening Stock	100
V] Net Production Requirement [III – IV] Good Production	1,440
VI] Wastage [10% of total production – assumed]	160
VII] Total Production Requirement[V + VI]	1,600

Direct Labor Budget

Particulars	**No. of hours**
Total Standard Hours Required: 1,600 units X 3	4,800
Productivity Ratio: 80%	
Actual Hours Required: 4,800/ .80	6,000
Budgeted Hours Available 36 men X 144 hours	5,184
Shortfall	816

Comments: From the Direct Labor Budget it can be seen that the direct labor hours available are not sufficient and hence there is shortage of 816 Hours. Therefore it will be necessary to work overtime, as well as improvement in the efficiency.

Illustration 3
Summarized below are the Income and Expenditure forecast for the month March to August 2011.

Month	Credit Sales Rs.	Credit Purchases Rs.	Wages Rs.	Mfg. Expenses Rs.	Office Expenses Rs.	Selling Expenses Rs.
March	60,000	36,000	9,000	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	9,000	4,000	1,000	4,500
August	60,000	34,000	8,000	3,000	1,500	4,500

You are given following further information

i. Plant Costing Rs. 16,000 due for delivery in June. 10% on delivery and balance after three months
ii. Advance Tax Rs. 8,000 is payable in March and June
iii. Period of credit allowed, Suppliers 2 months and Customers 1 month
iv. Lag in payment of manufacturing expenses half month
v. Lag in payment of all others expenses one month
vi. Cash balance on 1st May 2008 is Rs. 8,000
vii. Prepare Cash Budget for three months starting from 1st May 2010

Solution:
Cash Budget
May-August 2010

Particulars	May	June	July
I] Opening Cash Balance	8,000	15,750	12,750
II] Expected Cash Receipts:			
A] Collections from Debtors [Credit 1 month]	62,000	64,000	58,000
III] Total Expected Receipts	62,000	64,000	58,000
IV] Total Cash Available [I+ III]	70,000	79,750	70,750
V] Expected Payment			
A] Purchases [2 months credit]	36,000	38,000	33,000
B] Manufacturing Expenses [Half month credit]*	3,750	4,000	3,750
C] Wages [Half month credit]	8,000	10,000	8,500
D] Office Expenses [one month credit]	1,500	2,500	2,000
E] Selling Expenses [one month credit]	5,000	4,500	3,500

F] Purchase of Machine			1,600
G] Advance Tax		8,000	
VI] Total Payment [A+B+C+D+E+F+G]	54,250	67,000	52,350
VII] Closing Balance	15,750	12,750	18,400

There is delay of half a month for payment of Manufacturing Expenses and wages and hence current month's 50% and previous month's 50% are paid in the current month.

Illustration 4

A manufacturing company is currently working at 50% capacity and produce 10,000 units at a cost of Rs. 180 per unit as per the following details.
Materials: Rs.100
Labor: Rs.30

Factory Overheads: Rs.30 [40% fixed] Administrative Overheads: Rs.20 [50% fixed] Total Cost Per Unit: Rs.180

The selling price per unit at present is Rs.200. At 60% working, material cost per unit increases by 2% and selling price per unit falls by 2%. At 80% working, material cost per unit increases by 5% and selling price per unit falls by 5%.

Prepare a Flexible Budget to show the profits/ losses at 50%, 60% and 80% capacity utilization.

Solution: Flexible Budget

Particulars	**Capacity Utilization 50%**	**Capacity Utilization 60%**	**Capacity Utilization 80%**
A] Number of Units	10,000	12,000	16,000
B] Selling Price Per Unit	Rs.200	Rs.196	Rs.190
C] Variable Cost Per Unit • Direct Material • Direct Labor • Factory Overheads[60%] • Administrative Overheads[50%]	Rs.100 Rs.30 Rs.18 Rs.10	Rs.102 Rs.30 Rs.18 Rs.10	Rs.105 Rs.30 Rs.18 Rs.10
D] Total Variable Cost Per Unit	Rs.158	Rs.160	Rs.163
E] Total Variable Cost [A X D]	Rs.15,80,000	Rs.19,20,000	Rs.26,08,000

F] Fixed Costs [Rs.12 + Rs.10 = Rs.22 per unit at existing level 10,000 units.]	Rs.2,20,000	Rs.2,20,000	Rs.2,20,000
G] Total Cost[E + F]	Rs.18,00,000	Rs.21,40,000	Rs.28,28,000
H] Sales Revenue [A X V]	Rs.20,00,000	Rs.23,52,000	Rs.30,40,000
I] Profits/ Losses [H – G]	Rs.2,00,000	Rs.2,12,000	Rs.2,12,000

10.7 EXERCISES

1. Select the correct answer from the choices given in each of following:-

1) A budget is A] an aid to management B] a postmortem analysis C] a substitute of management.

2) The budgeted standard hours of factory is 12,000. the capacity utilization ratios for April 2009 stood at 90% while the efficiency ratios for the month came to 120%. The actual production in standard hour for April 2009 was A] 10,800 B]12,960 C] 14,400 D] 12,800

3) A budget is a projected plan of action in A] physical units B] monetary terms C] physical units and monetary units.

4) Flexible budget are useful for A] Planning purposes only B] Planning performance evaluation and feedback control C] Control of performance only

5) The scarce factor of production is known as , A] Key factor B] Linking factor C] Critical factor D] Production factor.

2. State whether the following statements are TRUE or FALSE.

1) Fixed budgets are concerned with acquisition of fixed assets.

2) Functional Budgets are subsidiary to master budget.

3) Budgeting is useful for planning and controlling.

4) Capital expenditures budget is prepared generally for short term.

5) Budgetary control is a technique of costing.

Illustration 1

Prepare a Cash Budget from the following information for ABC Ltd.

Particulars	**1st Quarter [Rs.]**	**2nd Quarter [Rs.]**	**3rd Quarter [Rs.]**	**4th Quarter [Rs.]**
Opening Cash	10,000			
Collection from customers	1,25,000	1,50,000	1,60,000	2,21,000
Payments:				
Purchase of Materials	20,000	35,000	35,000	54,200
Other Expenses	25,000	20,000	20,000	17,000
Salaries and Wages	90,000	95,000	95,000	1,09,200
Income Tax	5,000			
Machinery Purchase				20,000

The company desires to maintain a cash balance of Rs.15,000 at the end of each quarter. Cash can be borrowed or repaid in multiples of Rs.500 at an interest rate of 10% p. a. Management does not want to borrow cash more than what is necessary and wants to repay as early as possible. In any event, loans cannot be extended beyond a quarter. Interest is computed and paid when principal is repaid. Assume that borrowing takes place at the beginning and repayments are made at the end of the quarter.

Illustration 2

A company manufactures two products, X and Y. A forecast units to be sold in first 4 months of the year is given below.

Particulars	**Product X [units]**	**Product Y [units]**
January	1,000	2,800
February	1,200	2,800
March	1,600	2,400
April	2,000	2,000
May	2,400	1,600

Other information is given below:

Particulars	Product X – Rs. Per Unit	Product Y – Rs. Per Unit
Direct Material	12.50	19.00
Direct Labor	4.50	7.00
Factory Overheads per unit	3.00	4.00

There will be no opening and closing work in progress [WIP] at the end of any month and finished product [in units] equal to half the budgeted sale of the next month should be in stock at the end of each month[including previous year]

You are required to prepare,
A] Production Budget for January to April and
B] Summarized production cost budget

Illustration 3
The monthly budget for manufacturing overheads of a manufacturing company is given below.

Particulars	Capacity 80%	Capacity 100%
Budgeted Production	600 units	800 units
Wages	Rs.1,200	Rs.2,000
Consumable Stores	900	1500
Maintenance	1100	1500
Power and Fuel	1600	2000
Depreciation	4000	4000
Insurance	1000	1000
Total	9800	12000

You are required to,
i. Indicate which of the item are fixed, variable and semi variable
ii. Prepare a budget for 80% capacity
iii. Show that total cost, both fixed and variable per unit and output at 60%, 80%, and 100% capacity levels.

11

FINANCIAL POLICY AND CORPORATE STRATEGY

Unit Structure

11.0 LEARNING OBJECTIVES

After learning this unit, learners will be able to:

- Meaning of strategic financial management
- Strategic financial decision-making framework
- Functions of Strategic Financial Management
- Financial Planning

11.1 INTRODUCTION TO STRATEGIC FINANCIAL DECISION-MAKING FRAMEWORK

In an uncertain economic environment, investors want to maximise their wealth by selecting optimal investment and financial opportunities that will provide them with the highest expected returns at the lowest risk. Because management is ultimately accountable to investors, the goal of corporate financial management should be to implement investment and financing decisions that satisfy shareholders by maximising their wealth. Because capital is the limiting factor, the problem that management will face is the strategic allocation of limited funds between alternative uses in such a way that the companies have the ability to sustain or increase investor returns through a continuous search

for investment opportunities that generate funds for their business while also being more favourable to investors. As a result, all businesses must have the three fundamental essential elements listed below:

- A well-defined and realistic strategy
- The necessary financial resources, controls, and systems, as well as the appropriate management team and processes, are required.

Strategy + Finance + Management = Fundamentals of Business

STRATEGY

A strategy is a plan of action that specifies the monetary and physical resources needed to achieve a specific goal or set of goals.

Corporate Strategy

It is a long-term strategy comprised of a portfolio of functional business strategies (finance, marketing, etc.) designed to achieve the specified goal (s)

Financial Strategy

- It is the portfolio component of the corporate strategic plan that includes the best investment and financing decisions needed to achieve a specific goal (s).

- Management is ultimately accountable to the shareholders. Investors maximise their wealth by selecting the best investment and financing opportunities and employing financial models that maximise expected returns while minimising risk. This approach is known as strategic financial management, and it is defined as the application of financial techniques to strategic decisions in order to help the decision maker achieve their goals.

- It is essentially concerned with identifying potential strategies capable of increasing an organization's market value.

- It entails allocating scarce capital resources between competing opportunities.

- It also includes the implementation and monitoring of the chosen strategy in order to achieve the desired results.

There must be a distinction between strategic, tactical, and operational financial planning.

A strategy is a long-term plan of action.
Tactics are intermediate plans designed to meet the goals of the agreed-upon strategy.

Operational financial planning are short-term (even daily) functions (such as inventory control) are required to meet the specified corporate objective(s) in accordance with tactical and strategic plans.

Needless to say, senior management makes strategic decisions, middle management makes tactical decisions, and line management exercises operational control.

11.2 STRATEGIC FINANCIAL MANAGEMENT

For their operations to be successful, all organisations require financial management. It includes components for the acquisition, management, allocation, and financing of resources for an organization's successful growth. Every organisation must effectively manage its finances in order to achieve its mission and goals. Recently, the disciplines of strategic management and financial management merged to form a new discipline known as Strategic Financial Management.

Strategic Financial Management is the study of finance with a long-term perspective that takes into account the enterprise's strategic goals. Strategic financial management is a management approach that employs various financial tools and techniques to develop a strategic decision plan.

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

11.3 NATURE OF STRATEGIC FINANCIAL MANAGEMENT

The following are the key characteristics of Strategic Financial Management:

11.3.1 It is concerned with the long-term management of funds from a strategic standpoint. It seeks to maximise the company's profit and wealth.

11.3.2 It is both structured and flexible.

11.3.3 It promotes the firm's long-term growth, profitability, and survival while increasing shareholder value.

11.3.4 It is an evolving and continuous process in which strategies are constantly adopted and revised in order to achieve the firm's strategic financial objectives.

11.3.5 It entails an innovative, creative, and multidimensional approach to problem solving.

11.3.6 It aids in the development of appropriate strategies and the continuous monitoring of action plans in order to align with long-term goals.

11.3.7 It employs analytical financial techniques with qualitative and quantitative judgement on factual data.

11.3.8 It is a result-oriented resource combination, particularly of financial and economic resources.

11.3.9 While analysing problems in the organisational context, strategic financial management provides a number of solutions.

FUNCTIONSOFSTRATEGICFINANCIALMANAGEMENT:

1. Constantly looking for the best investment opportunities
2. Choosing the most profitable opportunities
3. determining the best mix of funds for the opportunities
4. Installation of internal control systems
5. Results analysis for future decision-making

As capital is the limiting factor, the strategic problem for financial management is allocating limited funds among alternative uses. The pioneering work of Jenson and Meckling (1976), popularly known as 'agency theory,' resolves this dilemma of corporate management. Strategic financial management, according to this theory, is the function of four major components based on the mathematical concept of expected NPV (net present value) maximisation: financing decisions, investment decisions, dividend decisions, and portfolio decisions. The following are some of the key decisions that fall under the purview of financial strategy:

1. Financing decisions: These decisions deal with the mode of financing or mix of equity capital and debt capital.
2. Investment decisions: These decisions involve the profitable utilization of firm's funds especially in long-term projects (capital projects). Since the future benefits associated with such projects are not known with certainty, investment decisions necessarily involve risk. The projects are therefore evaluated in relation to their expected return an drisk.

3. Dividend decisions: These decisions determine the division of earnings between payments to share holders and reinvestment in the company.
4. Portfolio decisions: These decisions involve evaluation of investments based on their contribution to the aggregate performance of the entire corporation rather than on the isolated characteristics of the investments themselves.

11.4 IMPORTANCE OF STRATEGIC FINANCIAL MANAGEMENT

11.4.1 Assists in identifying the capital requirements of the business.

The first and most important function of financial management is to estimate the amount of money required for the business to run smoothly. This is one of the most important responsibilities of financial managers. Every business's financial requirements will differ depending on the size of the operation, the profit target, and various other objectives and missions.

11.4.2 Assists in determining the capital structure's composition.
Once the capital requirements of the business have been calculated, the financial manager must now decide what type of capital structure should be present. This basically involves deciding between short-term and long-term sources of funds, as well as the cost of raising this finance.

11.4.3 Aids in the selection of the appropriate source of funds
As there are various sources of raising funds available in the market. This step simply seeks to select the most appropriate and accurate option. Raising funds through the issuance of shares and debentures, loans from financial institutions, or the issuance of securities such as bonds are the most common types of fundraising methods.

11.4.4 Apportionment of Finance raised
Following the raising of funds, they are invested in various revenue-generating means that are also in line with the business's objectives and goals.

11.4.5 Application of surplus funds
It is concerned with a decision regarding the profit generated by the business and how it should be utilised, and there are basically two options available for this profit utilisation, which are either excess profit distribution as a dividend or retained earnings depending on the company's future plans.

11.4.6 Keeping track of cash outlays
This simply means managing the cash so that neither expense exceeds the budget. It includes various expenses for which cash payments are required, such as salaries and wages, as well as expenses for water and electricity bills, as well as the amount required for the purchase of raw materials, and so on.

11.4.7 Controlling
It is an important function because it plays a very effective role in the achievement of the business's goals and objectives. It ensures that all activities are carried out in accordance with the pre-determined plans, and that appropriate control measures are implemented if they are not.

11.5 ELEMENTS OF STRATEGIC FINANCIAL MANAGEMENT

A corporation will decide to implement strategic financial management throughout the organisation. It frequently entails designing and implementing elements that will increase the company's financial resources. Because there is no standard approach to strategic management, the organisation must be creative. Every company will need to be innovative in order to develop a strategy. It also creates elements that reflect their needs as well as their vision and mission. However, the following are some common financial management elements:

1. Planning
Define your financial goals precisely and clearly. Determine the available and potential resources that will be useful in your financial management. Create a detailed business plan.

2. Budgeting
The company should create a budget that will function with maximum financial efficiency and minimal waste. Highlight the areas with the highest expenditures that exceed the budget. Ensure that there is enough liquidity to cover the operating payments without relying on external sources. Determine which areas of the company should invest in order to achieve the goal more efficiently.

3. Management and assessment of risk
The financial manager should identify, properly analyse, and take steps to reduce uncertainty in investment decisions. You must reconsider all potential financial exposures and examine capital expenditures as well as workplace policies. Risk metrics, such as standard deviation and value at risk strategies, should also be evaluated.

4. Establishment of on going procedures

Gather and analyse data, then make financial decisions that are in line with your vision and mission. Variants, if any, that are the difference between actual and budgeted results, should be tracked and analysed. Identify the issues and take appropriate corrective action.

Finance happens in the "backroom," but it is the lifeblood of an organization's short and long term health. To fully implement a strategy in today's changing world, there should be minute details and projections regarding investments made, costs incurred, potential cash flows, and profits. As a result, finance as a function is required at every stage of strategy execution.

11.6 FINANCIAL POLICY AND STRATEGIC PLANNING

A strategy is a specific plan developed to achieve organisational goals and objectives, whereas a policy is a set of rules developed by the organisation to facilitate rational decision making. Many people are perplexed by the two terms, but they are not synonymous. You should be aware that policies are secondary to strategy.

Definition of Strategy

Strategy is a game plan, chosen to achieve the organizational objectives, gain customer' strust, attain competitive advantage and to acquire a market position. It is a combination of well thought intent and actions which lead to the organization towards its desired position or destination

- The Strategy has the following characteristics: It should be developed by top-level management, but sub-strategies can be developed by middle-level management.
- It should have a long-term outlook.
- It should have a dynamic nature.
- The main goal is to get out of dangerous situations.
- It should be designed in such a way that it makes the best use of scarce resources.

POLICY

The policy is a set of principles and rules that guide the organization's decisions. Policies are developed by the organization's top management to serve as a guideline for operational decision making. It is useful for emphasising the organization's rules, values, and beliefs. Policies assist an

organization's management in determining what should be done in a given situation.

Key Differences between Strategy and Policy

The following are the major differences between strategy and policy

11.6.1 Strategy is the best plan chosen from among several plans to achieve the organisational goals and objectives. A policy is a set of common rules and regulations that serve as the foundation for making day-to-day decisions.

11.6.2 Policy is a principle of action, whereas strategy is a plan of action.

11.6.3 Strategies can be modified as per the situation, so they are dynamic in nature. Policies, on the other hand, are uniform in nature, but exceptions can be made for unexpected situations.

11.6.4 Strategies are action-oriented, whereas policies are decision-oriented.

11.6.5 Top management always develops strategies, but sub strategies are developed at the middle level. In contrast to policy, they are typically made by top management.

11.6.6 External environmental factors are addressed in strategies. Policies, on the other hand, are created for the internal environment of a business.

The distinction between Strategy and Policy is a little more complicated because Policies fall under the purview of Strategies. Aside from that, the policies are designed to support strategies in a variety of ways, such as achieving organisational goals and securing a competitive position in the market. Both are made by top management and are the result of extensive research.

11.7 INTERFACE OF FINANCIAL POLICY AND STRATEGIC MANAGEMENT

The interface of strategic management and financial policy will become clear once we recognise that an organization's starting point is money and its ending point is also money. Without a suitable internally mobilised financial base or both, i.e. internally and externally mobilised financial base, no organisation can run an existing business and promote a new expansion project. The following steps are taken to mobilise the fund:

(1) SOURCES OF FUND

The most important aspect of a strategic plan is its financial sources. Funds may be generated through the use of either owned or borrowed capital. A company may issue equity and/or preference shares to raise ownership capital, as well as debentures to raise borrowed capital. Other sources of short-term finance include overdrafts, cash credits, bill discounting, bank loans, and trade credit.

(2) CAPITAL STRUCTURE

Policymakers should choose a capital structure that reflects the desired mix of equity and debt capital. There are some debt equity ratio standards that must be followed in order to reduce the risks of excessive loans. For example, public sector organisations have a 1:1 ratio, while private sector firms have a 2:1 ratio. It may differ from one industry to the next.

(3) INVESTMENT AND FUND ALLOCATION DECISION

Investment and fund allocation decisions are another important aspect of the strategic management and financial policy interface. A planner must develop policies to govern both fixed and current asset investments. The two most important jobs in fund allocation are project evaluation and project selection. Under resource constraints, the planner must make the best allocation possible.

(4) DIVIDEND POLICY

Dividend policy is yet another area for making financial policy decisions that affect the company's strategy performance. The dividend policy decision is concerned with the amount of earnings to be distributed as dividends and the amount of earnings to be retained for the firm's future expansion scheme. Dividends can be viewed as that portion of total earnings that cannot be profitably utilised by the company in terms of long-term funding of business growth. The consistency of dividend payments is a desirable factor that can have a positive impact on share prices.

A company's financial policy cannot be developed in isolation from other functional policies. It has a broader appeal and a stronger connection to overall organisational performance and direction.

11.8 FINANCIAL PLANNING:

Financial planning is the foundation of business and corporate planning. It aids in defining the feasible operational area for all types of activities and, as a result, defines the overall planning

framework. Financial planning is a systematic approach in which the financial planner assists the customer in maximising his existing financial resources through the use of financial tools in order to achieve his financial goals.

There are 3 major components of Financial planning:

- Financial Resources(FR)
- Financial Tools(FT)
- Financial Goals(FG)

Financial Planning:FR+FT=FG

Financial planning outcomes include financial objectives, financial decision-making, and financial measures for evaluating corporate performance. Financial goals must be established from the start so that the rest of the decisions can be made accordingly. The objectives must be in line with the corporate mission and objectives. Financial decision making assists in an alysing the financial problems that the corporation is facing and deciding on the best course of action to be taken. Financial measures such as ratio analysis and cash flow statement analysis are used to evaluate the Company's performance. The selection of these measures is again determined by the Corporate goal.

One of the most important aspects of the financial manager's job is financial planning. The information contained in a performance plan for the future often determines an organization's success. Not only should one plan for the future with proper forecasts and budgets, but one should also constantly evaluate the firm's performance in comparison to previous forecasts. Financial planning should achieve total integration and coordination of all other functions of the firm's plans. It should estimate the resources needed to carry out the operations and determine how much of these resources can be generated internally and how much must be obtained externally. A control system, on the other hand, entails gathering, processing, and recording information in such a way that it can be easily an alysed, highlighting areas where the firm's operations can be improved. A corporation's financial plan should take into account not only current but also future developments. It should consider current capital needs for fixed assets, working capital, probable earnings, and investor requirements; and it should anticipate future possibilities of expansion, merger with other corporations, higher or lower future interest rates, and so on. All of these considerations should result in a determination of:

1. The amount of funds that needs to be raised;
2. The type and proportion of securities to be issued
3. Policies affecting capital administration

11.8.1 CHARACTERISTICS OF FINANCIAL PLANNING

When planning and executing a financial plan, a financial manager should consider the following factors:

1. Simplicity:

A financial plan should be so simple that even a layperson can understand it. A complex financial structure adds complexity and confusion.

2. Based on Clear-cut Objectives:
Financial planning should be done with the company's overall goals in mind. It should strive to obtain funds at the lowest possible cost in order to improve the business's profitability.

3. Less Dependence on Outside Sources:

Long-term financial planning should strive to reduce reliance on external sources. This can be accomplished by reinvesting a portion of profits. The method of financial operations is the generation of own funds. Outside funds may be required at first, but financial planning should be such that reliance on such funds can be reduced over time.

4. Flexibility:

The budget should not be too strict. It should leave room for adjustments as new situations arise. If new opportunities arise, there may be room for additional funding. Similarly, any idle funds can be invested in short-term, low-risk securities. A plan's flexibility will be useful in dealing with future demands.

5. Solvency and Liquidity:

Financial planning should ensure the enterprise's solvency and liquidity. Solvency requires that short-term and long-term payments be made on the due dates. This will ensure the company's creditworthiness and goodwill.

Solvency will be possible if asset liquidity is maintained. When payments are to be made, there should be enough funds. Proper forecasting of future payments will aid in liquidity planning.

6. Cost:

The cost of raising capital is an important factor to consider when choosing a financial plan. The various sources should be chosen in such a way that the cost burden is kept to a minimum. Interest-

bearing securities should be returned whenever possible to reduce this burden.

7. Profitability:

A financial plan should adjust various securities so that the enterprise's profitability is not jeopardised. The interest bearing securities and other liabilities should be adjusted in such a way that the business can improve its profitability.

8. Varying Risks

A financial plan should account for ventures with varying degrees of risk so that a company can profit handsomely from risky ventures.

9. Planning Foresight

Foresight is required for any business operation plan in order to accurately assess capital requirements.

10. Practical:
A plan should be designed in such a way that it serves a practical purpose. It must be realistic and capable of being used extensively. However, a proper balance of fixed and working capital should be maintained.

11. Implementation
A company should ensure that plans are carried out. The data should be available with the plans at any level of detail and at a regular interval. This would allow a company to take timely and corrective action when necessary.

11.8.2 CONSIDERATIONS INFORMULATING FINANCIAL PLAN:

A financial plan should be carefully thought out. It has a long-term impact on how the business operates. When choosing a financial plan, keep the following factors in mind:

1. Nature of the Industry:

Different industries have different funding requirements. Asset structure, seasonality, and earnings stability are not factors shared by all industries. These factors will have an impact on determining the size and structure of financial requirements.

2. Standing of the Concern:

A company's financial situation will influence its decision. Some of

the factors that will be considered in developing a financial plan are the company's goodwill, credit rating in the market, past performance, and management attitude.

3. Future Plans:

The future plan of a concern should be considered while formulating a financial plan. Plans for future expansion and diversification will necessitate a flexible financial plan. The funding sources should be such that the required funds are easily accessible.

4. Availability of Sources:

Funding can be obtained from a variety of sources. Before making a final decision on the sources, the pros and cons of all available sources should be thoroughly discussed. The sources should be able to provide sufficient and consistent funds to meet needs at different times. A financial plan should be chosen with the dependability of various sources in mind.

5. General Economic Conditions:

The current economic conditions at the national and international levels will influence a financial plan decision. Before making any decisions about funding sources, these conditions should be considered. A favourable economic environment will make it easier to raise funds. Uncertain economic conditions, on the other hand, may make it difficult for even a good company to raise sufficient funds.

6. Government Control:

A financial plan will be influenced by government policies regarding the issuance of shares and debentures, the payment of dividends and interest rates, entering into foreign collaborations, and so on. The legislative restrictions on using certain sources, limiting dividend and interest rates, and so on will make raising funds difficult. As a result, when choosing a financial plan, government controls should be carefully considered.

11.8.3 STEPINFINANCIALPLANNING

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

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

Establishing Objectives

Any business's financial goals are to use capital in whatever proportion is required to increase the productivity of the remaining factors of production over time. Although the extent to which capital is employed varies by firm, the goal is the same in all firms. Businesses operate in a dynamic society, and in order to capitalise on changing economic conditions, financial planners should set both short-term and long-term goals. Any firm's long-term goal is to use capital in the proper proportion.

Policy Formulation

i. Financial policies serve as guidelines for all actions involving the acquisition, administration, and disbursement of funds by businesses. These policies can be divided into several categories.

ii. Policies that govern the amount of capital required for firms to meet their financial goals.

iii. Policies that govern control by the parties who provide capital

iv. Policies that serve as a guideline for the use of debt or equity capital

v. Policies that guide management in the selection of funding sources.

vi. Policies that govern the enterprise's credit and collection activities.

Forecasting

The collection of "facts" is a fundamental requirement of financial planning; however, when financial plans concern the future, "facts" are not available. As a result, financial management must forecast the future in order to predict the variability of factors influencing the type of policies that the enterprise develops.

Formulation of Procedures:

Financial policies are broad guidelines that must be translated into detailed procedures in order to be implemented. This assists the financial manager in carrying out planned activities.

11.8.4 OBJECTIVES OF FINANCIAL PLANNING

Capital requirements will be determined by factors such as the cost of current and fixed assets, promotional expenses, and long-term planning. Capital requirements must be considered from both short- and long-term perspectives.

Capital structure is the composition of capital, i.e., the relative kind and proportion of capital required in the business. This includes short- and long-term debt-equity ratio decisions.

Developing financial policies for cash management, lending, borrowing, and so on. Finance managers ensure that scarce financial resources are used optimally and at the lowest possible cost in order to maximise returns on investment.

11.8.5 NEED FOR FINANCIAL PLANNING:

- Determine the financial resources needed to carry out the company's operating plan.
- Estimate the extent to which these requirements will be met through internal funds generation and the extent to which they will be met through external sources.
- Create the best plans for obtaining the necessary external funds.
- Create and maintain a financial control system that governs the allocation and use of funds.
- Create programmes that provide the best profit-volume-cost relationships.
- Analyze the operational financial results, and
- Report facts to top management and make recommendations on the firm's future operations.

11.8.6 IMPORTANCE OF FINANCIAL PLANNING:

A well-planned financial strategy is essential for the success of any business. It will establish policies and procedures to ensure close coordination among the various business functions. This will result in a reduction in resource waste. Only with a solid financial plan can management take an integrated approach to developing financial policies, procedures, and programmes.

The following are some of the most important advantages of financial planning for a business:

- Financial planning establishes policies and procedures to ensure the smooth operation of the finance function.
- Financial planning leads to the creation of future plans. As a result, new projects could be launched with ease.
- Adequate funding must be ensured.
- Financial planning assists in maintaining stability by ensuring a reasonable balance between outflow and inflow of funds.

- Financial planning ensures that fund suppliers can easily invest in companies that practise financial planning.
- Financial planning aids in the development of growth and expansion plans that aid in the long-term survival of the company.
- Financial planning ensures that funds are available from a variety of sources to ensure the smooth operation of a business.
- There is less uncertainty about the availability of funds. It ensures that business operations run smoothly.
- The goal of financial planning is to strike a balance between the inflow and outflow of funds. Throughout the year, adequate liquidity is ensured. This will improve the company's reputation.
- The cost of financing is kept as low as possible, and scarce financial resources are used wisely.
- Financial planning is the foundation of financial control. The management strives to ensure that funds are used in accordance with the financial plans.
- Financial planning reduces uncertainties associated with changing market trends, which can be easily addressed with adequate funds, and
- Financial planning aids in the reduction of uncertainties that can stymie a company's growth. This contributes to stability.

11.8.7 LIMITATIONS OF FINANCIAL PLANNING

1. Difficulties in forecasting : Plans are decisions, and decisions require future facts. Financial plans are created by factoring in anticipated future events, which are always uncertain. Because future conditions cannot be predicted accurately, planning's adaptability is severely limited. Improving forecasting techniques is one way to overcome the limitation. Another way to overcome this limitation is to revise plans on a regular basis. The development of variable plans that take changing conditions into account will go a long way toward removing this limitation.

2. Difficulty inchange: Another significant challenge in planning is management's unwillingness or inability to change a plan once it has been made, for a variety of reasons. Assets may have to be purchased again, as well as raw materials and costs.

3. Rapid change : The evolving industrial mechanism is causing rapid changes in industrial processes. Every time, new demand is created by production methods, marketing devices, and consumer

preferences. Every time new changes are implemented, the financial plan must be adjusted. Once investments in fixed assets are made, they cannot be reversed. It becomes extremely difficult to adjust the financial plan in order to incorporate rapidly changing solutions. A financial plan's utility is limited unless it aids in the adoption of new techniques.

4. Problem of coordination : Financial functions are the most important of all. Other functions also have an impact on a financial plan decision. When estimating financial resources, production policy, personnel requirements, and marketing opportunities are all considered. Preparing a financial plan becomes difficult without proper coordination among all functions. There is frequently a lack of coordination among various functions. Personnel indecision also disrupts the financial planning process.

Exercise:

Short notes

1. "Functions of Strategic Financial Management" ?
2. Agency Theory
3. Strategic Decision Models and Characteristics
4. Strategy at Different Hierarchy Levels
5. Financial Planning

Answer in brief:

1. Explain in brief about the Interface of Strategic Management and Financial Policy.
2. Discuss the importance of strategic management in today's scenario.