FINANCIAL MANAGEMENT-I
M.Com., I Semester Paper-IV

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M.Com: Financial Management-

FOREWORD

Since its establishment in 1976, Acharya Nagarjuna University has been forging ahead in the path of progress and dynamism, offering a variety of courses and research contributions. I am extremely happy that by gaining 'A' grade from the NAAC in the year 2016, Acharya Nagarjuna University is offering educational opportunities at the UG, PG levels apart from research degrees to students from over 443 affiliated colleges spread over the two districts of Guntur and Prakasam.

The University has also started the Centre for Distance Education in 2003-04 with the aim of taking higher education to the door step of all the sectors of the society. The centre will be a great help to those who cannot join in colleges, those who cannot afford the exorbitant fees as regular students, and even to housewives desirous of pursuing higher studies. Acharya Nagarjuna University has started offering B.A., and B.Com courses at the Degree level and M.A., M.Com., M.Sc., M.B.A., and L.L.M., courses at the PG level from the academic year 2003-2004 onwards.

To facilitate easier understanding by students studying through the distance mode, these self-instruction materials have been prepared by eminent and experienced teachers. The lessons have been drafted with great care and expertise in the stipulated time by these teachers. Constructive ideas and scholarly suggestions are welcome from students and teachers involved respectively. Such ideas will be incorporated for the greater efficacy of this distance mode of education. For clarification of doubts and feedback, weekly classes and contact classes will be arranged at the UG and PG levels respectively.

It is my aim that students getting higher education through the Centre for Distance Education should improve their qualification, have better employment opportunities and in turn be part of country's progress. It is my fond desire that in the years to come, the Centre for Distance Education will go from strength to strength in the form of new courses and by catering to larger number of people. My congratulations to all the Directors, Academic Coordinators, Editors and Lesson- writers of the Centre who have helped in these endeavours.

Prof. P. Raja Sekhar
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HUMAN RESOURCE MANAGEMENT

CONTENTS

LESSON - 1

FINANCIAL MANAGEMENT : AN OVERVIEW

Objectives

> After studying this lesson, you should be able to :

P   know the meaning of Finance and scope of Financial Management

P   discuss the various financial objectives of a company

P   analyse the Financial goals of a company

P   familiarise the major decisions involved in Finance Function

P   explain the concept of time value of money

Structure :

1.1. Introduction

Business is an economic activity which involves the use of economic resources (machine, material, money,men, etc) for the production of goods (refrigerator, tooth paste, soap, truck etc) and services (insurance, banking, communication, transport, etc). These goods and services are expected to be sold at a price which is more than the cost of producing them, resulting in a surplus or profit.

When a business enterprise plans to do any activity, it has to make a market survey to estimate the demand for the product and to estimate the life of the business.

The demand estimate helps in the finalisation of plant capacity (i.e; number of units a plant can manufacture in a specific period of time) or scale of operations. Once the plant capacity is finalised, the area of the site required to construct the business premises (consisting factory buildings, godowns, office building etc); number or personnel (human resource) required, raw material requirement are estimated. The enterprise finanlises its scale of operations and based on it, the capital (both permanent and working capital) requirement is estimated.

Depending upon the nature of business, the size of capital varies. A business with manufacturing activity requires more capital than what is required for a trading business or service organisations. Business of providing services like transportation, communication, banking, insurance, warehousing, etc. involves the need for estimating the capital requirement (i.e; amount of money that is required for investment in various assets)

Once capital requirement is estimated, the enterprise has to find sources of mobilising these funds. It has to identify sources for meeting the permanent capital requirement (i.e; to acquire plant, machinery buildings, technical know-how, patents etc,) and short-term capital requirement (i.e; to buy raw material, to pay for labour etc). From among the various sources that provide long term or short term funds an enterprise has to choose.

A business enterprise strives to achieve a surplus. To achieve this goal, an enterprise invests funds in various income earning assets by obtaining funds from various sources. Thus, the financial function is all about the following activities.

P to determine the funds requirement

P to determine the assets to be acquired

P to determine the pattern of financing the assets.

1.2. Meaning of Finance

P According to the Encyclopedia Britanica **finance** is "the act of providing the means of payment"

P Howard and Upton defines **finance** "as the management of the flow of cash so that the organisation will have the means to carry out its objectives and at the same time meet its obligations as they become due"!

P Wheeler defines **business finance** as "that **business** activity which is concerned with the acquisition and conservation of capital funds in meeting the financial needs and overall objectives of business enterprises"

1.3. Scope of Financial management

(a) Meaning

According to Guthmann and Dougall, business finance can be broadly defined as " the activity concerned with the planning, raising, controlling and administering the funds used in the business"

Financial Management refers to that part of the management activity which is concerned with the planning and controlling of firm's financial resources.

Financial Management study about the process of procuding and judicious use of financial resources with a view to **maximise** the value of a business enterprise thereby the value of the owners is maximised.

In a company form of organisation, according to James C Van Horne financial management, endeavours to make optimal investment, financing and dividend decisions.

(b)   Objectives of a company :
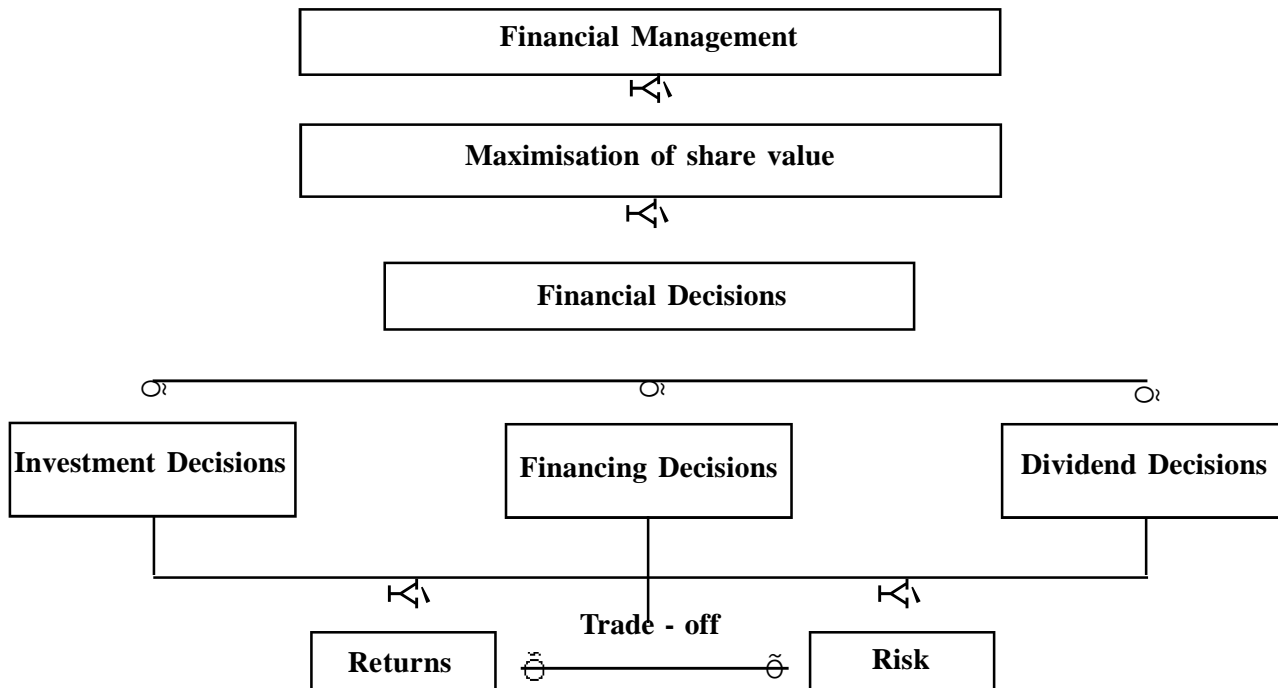
Figure 1.1. :   An Overview of Financial Management

1.4.   Role of a Financial Manager

The functions of a financial manager of a company generally include the following:

P   Estimates capital requirement of various projects.

P   Provides funds for various projects.

P   Maintains liquidity and solvancy to meet the short-term and long term commitments, when they become due

P   Liason with stock exchanges, shareholders, bankers, financial institutions

P   Estimates risk in financial decisions and provide for various measures to minimise risk.

P   Decides the credit policy of the company by taking into consideration the established practices.

P   Reports to various external agencies like financial institutions, tax authorities, shareholders, govt.

P   Meets various obligations under different legistations, like tax laws, SEBI Act, etc.

P   Takes - up internal audit to establish proper checks and controls.

P   Decides the dividend policy of the company.

All the above mentioned functions are supposed to be discharged by a Financial Mmanager, with in the frame work of laws in force, for the ultimate achievement of wealth maximisation of shareholders.

1.5.   Finance Functions.

Finance Functions are important activities in the business management irrespective of nature, size, age and structure of the organisation.   A business finance function expresses the relationship between value of a business enterprise and its various determinants. Value of a business enterprise is nothing but its net worth to the owners. Net worth is the difference between the market value of assets and the value of liabilities (outsiders' claims)

Net Worth = Assets - Liabilities

If net worth of a business enterprise increases it can be interpreted that the value of a business enterprise is rising. The value of a business depends upon the following factors.

1.5.1   Internal :

P   Investment activities

P   financing mix

P   distribution of profits

1.5.2   External :

P   State of the economy

P   Capital market conditions,

P   Tax rates

Among these factors some are controllable and some are uncontrollable. Assuming that the uncontrollable factors are held constant, the value of a business is a function of internal or controllable factors. Therefore, value of a business is a function of investment, financial, distribution of profits.

V = f [I, F, D]

1.6.   Organisation of Finance Function

Finance is an integral part of a company. All functional areas of management are related to finance function. Production, marketing, human resource etc. are related to finance. In the area of finance specific tasks are performed by specialists. The organisation of finance function can be better understood by the following figure 1.1
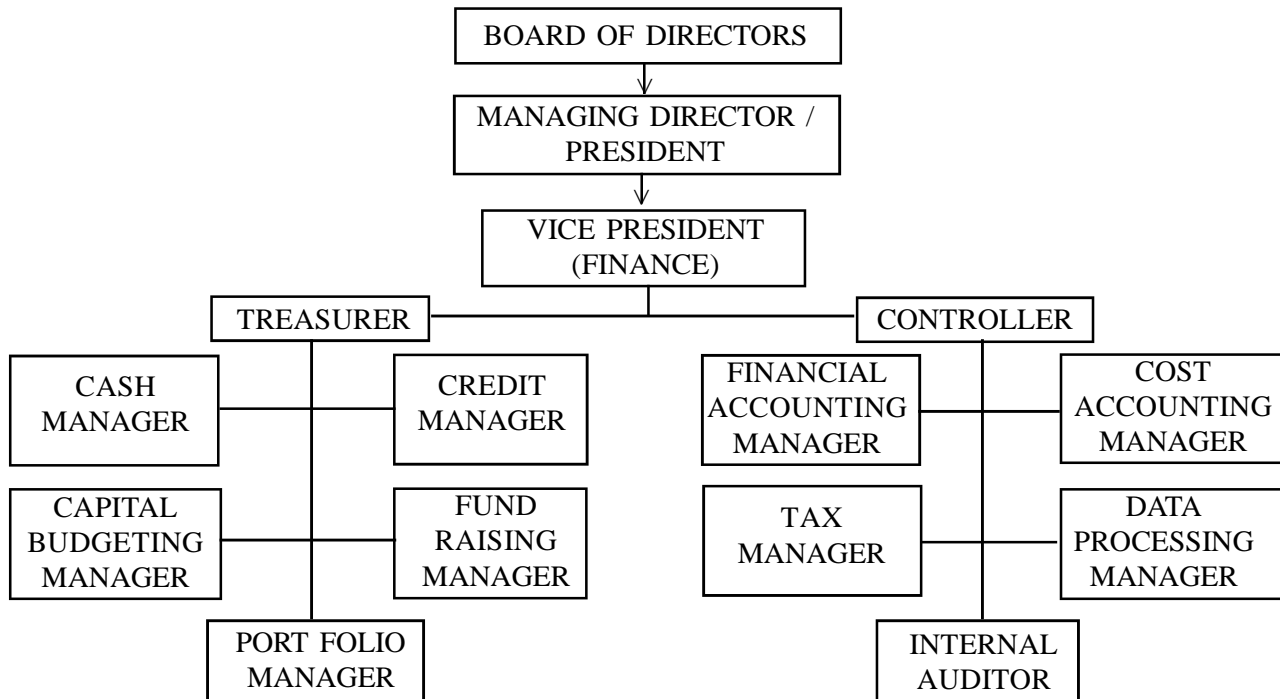
Figure 1.2

Organisation of Finance Function

1.7. Financial goals of the company

Company is a form of organisation in which the ownership and management are separated. Shareholders are the owners and the board of directors are the agents of the shareholders. The team of management takes various decisions involving the profitability and perpetuity of the company. When these strategic decisions are taken, what should be the goal of the firm ? It is the fundamental question which automatically leads us to the economic benefit to the shareholders. As shareholders provide capital and face maximum risk, they expect the company the company to provide them maximum return.

There the two widely discussed approaches to achieve the above objective.

(a)   Profit maximisation

(b)   Wealth maximisation

Should be company aim at maximising profit or wealth ?

1.7.1. Profit Maximisation :

Business is an economic activity, where scarce resources are used to produce goods and services. Business activities involve costs and revenues. The unique measure of efficiency is surplus, i.e, the excess of revenues **over costs**, which is popularly known as profit. Therefore a company should aim at profit maximisation. This goal can be justified on the following grounds.

1. Economic activity aims at utility maximisation. Utility is measured in terms of profits.

2. Profit is a measure of economic efficiency

3. Profit leads to efficient allocation of resources

4. It ensures maximum social welfare

5. It leads to efficient use of important and scarce resources.

Profit maximisation goal of a company is having the following limitations.

i)   Ambiguity :   The goal of profit maximisation is considered to be very vague and ambiguous. Profit has various connotations and amenable to different interpretations by variours persons. For example, profit may be,

short run profit   or   long run profit, total profit or rate of profit,

after tax profit   or   Before tax profit,

return on equity   or   return on total capital employed.

There will be always a dilemma as to which of these variations of profits should a company try to maximise.

ii)   It ignores the timing of benefits : The goal of profit maximisation ignores the differences in the timing of benefits from investment. Between two alternative projects which have different time pattern of profits, the goal makes no difference. For example, project A and project B have the following profits

Time Pattern of Profits

Year Rs	Project A Rs	Project B
1	5000	15000
2	10000	10000
3	15000	5000
Total Profit	30000	30000
Average Profit	10000	10000

Project B is providing high early returns. Basic dictum of financial planning is "EARLIER THE BETTER". According to this principle, Project B is preferable. Profit maximisation goal ignores time value of money.

iii) It ignores the Quality of Benefits : If the expected profits are more certain, with low range of variation the quality is considered to be high. Goal of profit maximisation ignores the quality of benefits. And it does not give weightage to the risk associated with the profits. The following table reveals the above

<div align="center">

Quality of Benefits

</div>

State of the economy	Profit per Annum	
	Project A Rs	Project B Rs
Recession (pessimistic)	9000	0
Normal (most likely)	10000	10000
Boom (optimistic)	11000	20000
Average	10000	10000

Between these two projects, project A has high quality profits as the range is low [Rs 11000 - Rs 9000 = Rs 2000], where as Project B has higher range [Rs 20000 - 0 = 20000] indicating poor quality profits

Profit maximisation goal fails to distinguish between these projects. Therefore, the Profit maximisation by itself cannot be an objective if it results in a disadvantage to the owners or shareholders. If a company invests in new projects by bringing in new capital through the issue of shares, the new profits may not result in the increase of earnings per share (EPS). If the return on the new project is less than what the company has been earnings, the earnings per share will decrease.

Search for high profits may result in the collapse of the company, as it involves high degree of risk. And goes against the interest of the shareholders who are bearing the maximum risk. Therefore, profit maximisation is not considered to be an appropriate goal.

The goal of EPS maximisation also suffers from the following limitations :   (i) its does not specify the time of expected returns (ii) it does not consider risk associated with future earnings, and (iii) it does not take into account the financial risk.

1.7.2. Wealth maximisation : Principle of maximisation of shareholders wealth is the rational guide for running a business. The goal of a company is to maximise the present wealth of the owners i.e. equity shareholders in a company. Company's equity shares are actively traded in the stock market. Shareholders wealth is represented by the market value of equity holdings. Market price of share acts as an index of performance of a company. Shareholders' wealth maximisation means the maximisation or market price of share (MPS). If MPS is a measure of efficiency, the goal or maximisation of wealth helps in the efficient allocation of financial resources in a society.

Implications of Wealth Maximisation :

P   The goal aims at prosperity and perpetuity of a company.

P   The goal helps in measuring the performance of a company

P   The goal helps in allocation / reallocation of scarce resources

P   It helps the company in discharging its responsibilities effectively, such as

     *   Consumer protection

     *   Payment of fair wages

     *   Provision of safe working conditions.

     *   Environmental protection.

     *   Support to social problems.

P   It leads to efficient use of scarce and precious resources

P   It considers risks associated

What is Wealth Maximisation ?

Wealth maximisation means maximising the net present value of a course of action. Net present value (NPV) is the difference between present value of expected benefits and present value of costs.

If the benefits at end of each each year are

A_1 , A_2 , A_3 , ... A_n

the present value of these benefits can be calculated by discounting the future benefits by using a dsicounting factor, i.e.,

$$\frac{A_1}{(1+K)} \ , \quad \frac{A_2}{(1+K)^2} \ , \quad \frac{A_3}{(1+K)^3} \ldots\ldots\ldots\ldots\ldots \frac{A_n}{(1+K)^n}$$

Sum of these present values is the PV of future benefits .

If costs at the end the of each year, are

C_o , C_1 , C_2 , C_3 . . . . C_n

Their present value the investments is calculated as under :

$$C_0 \ , \quad \frac{C_1}{(1+K)^1} \ , \quad \frac{C_2}{(1+K)^2} \ , \quad \frac{C_3}{(1+K)^3} \ ,\ldots\ldots\ldots\ldots\ldots \frac{C_n}{(1+K)^n}$$

Sum of these present values is the PV of costs of investment

NPV = PV of Benefits   -   PV of costs

$$= \left[\frac{A_1}{(1+K)} + \frac{A_2}{(1+K)^2} + \ldots\ldots \frac{A_n}{(1+K)^n} \right] - \left[C_0 + \frac{C_1}{(1+K)} + \frac{C_2}{(1+K)^2} + \ldots\ldots + \frac{C_n}{(1+K)^n} \right]$$

$$NPV = \left[\sum_{t=1}^{n} \frac{A_t}{(1+K)^t} \right] - \left[\sum_{t=0}^{n} \frac{C_t}{(1+K)^t} \right]$$

In the above equation K referes to the discount rate and t refers to the time period.

Every financial decision involves costs and benefits and also result in NPV. Maximisation of this NPV is construed as maximising wealth of financial decisions which have a long term impact on the company. They are strategic, crucial and which involve risk are

P   Investment decision

P   Financing decision

P   Dividend decision

These decisions taken with an objective of maximising Net Present Value (NPV) result in value maximisation of the company and inturn wealth maximisation of shareholders.

Maximisation of wealth of the shareholders

(or)

Maximisation of value of a company

Market price of company's common stock

Financial Decisions

Investment Decision	Financing Decision	Dividend Decision
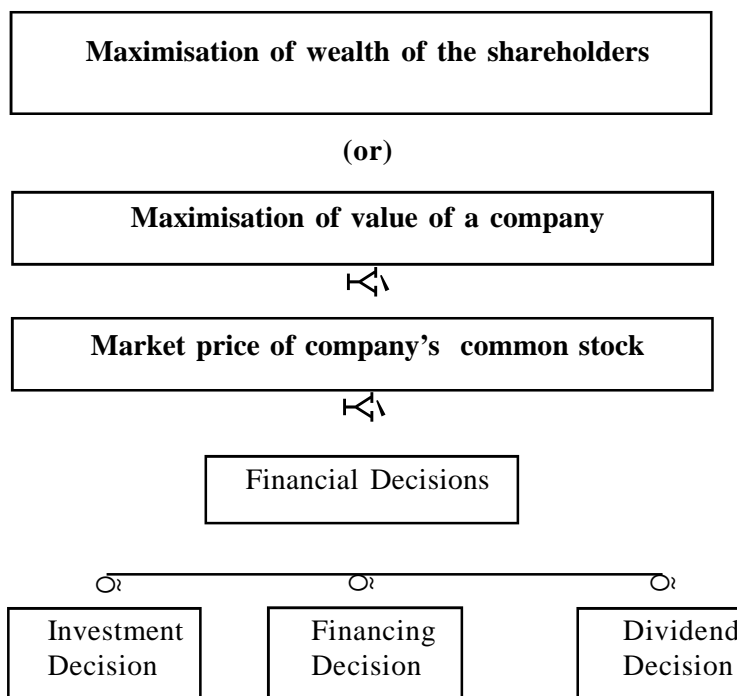
Value of a company = f [Investment, Financing, Dividend decision]

V = f [I, F, D]

1.8. Financial Decisions

The above said activities of Finance Functions are classified as three major Financial Decisiions.

Three major decisions, which are strategic, crucial, which have long term impact and which cannot be reversed without abnormal losses are

(a)   Investment decision

(b)   Financing decision

(c)   Dividend decision

1.8.1. Investment decision : Investment decision relate to the selection of projects or investment opportunities which are financially viable. The process of investment decision involve the following steps

--   Generation of investment ideas or opportunities

-- Defining the objective in quantitative terms

-- Evaluation of each opportunity using techniques of evaluation

-- Selection of the best alternative investment

-- Implementation of the best investment

-- Follow up or monitor whether the investment is providing expected return.

Decisions like (a) make or buy, (b) buy or lease, (c) outright purchase or hire purchase, (d) replacement of manual activities with machine is action, (e) replacement of out / dated technology with latest technology (f) replacement of worn out machinery with a new machine, (g) mergers (h) amalgamation (i) acquisitions , (j) introduction of a new product (k) expansion (l) entering foreign market are some of the investment decisions taken by Financial Manager.

These decisions are based on estimates related to the future. When future is uncertain, there is a chance that actual outcome may deviate from the estimated outcome. This changeis is called risk. Therefore measurement of risk in the investment decisions is essential and crucial.

1.8.2. Financing Decision :

Funds are required in business for financing investment projects and for financing business operations. Thus the financing decision is related to the procurement of funds. Funds can be procured from various forms and in different forms. Equity share capital, preference share capital, debentures , company deposits, long term loans from financial institutions, inter corporate borrowings, bank loans, bank overdraft, cash credit are some of the sources. These sources are broadly divided into : (a) long term, and (b) short term. Some of these sources involve fixed financial commitment on the part of the company.

Equity is ownership capital when as the creditorship capital (debt) involving fixed interest commitment on the part of the company. Preference share capital is a hybrid source with some features of both equity and debt.

Financing decision is related to judicious mix of debt and equity. It decides the capital structure of a company. and also related to the mix of short and long term sources. When investment decision is a trade off between return and risk, financing decision is a trade off between cost and risk. Investment decision involves business or operating or investment risk. Financing decision involves financial risk.

Financial decisions are

➔   Determination of degree of leverage

➔   Raising funds through equity and debt and also raising funds from long term and short term sources

➔   Consideration of tax benefit of usage of debt

1.8.3. Dividend Decision :

Dividend decision is indirectly a financing decision. If sources of funds are classified as internal and external sources, all the sources discussed under the 'financing decision' are external sources. Dividend decision relates to the distribution of profits among the equity shareholders.

No business enterprise will distribute all the profits to the owners. Some of the profits are retained for future purposes of the business. These retained profits are considered as internal source. These retained profits belong to the existing shareholders. Net worth of the shareholders is a sum of equity share capital plus retained earnings. If net worth increases the book value of share increases. It will have a favourable impact on the market price of the shares.

Dividend decision is concerned with the determination of dividend pay-out ratio (percentage earnings to be distributed by way dividends). Dividends provide current earnings to the shareholders, whereas, retained earnings increase the scope for higher future earnings. Taking into consideration the company's future investment opportunities, the company's ability to tap the capital market, tax effect, shareholder's expectations, etc, a dividend decision has to be taken.

Thus, the investment, financing and dividend decision are interrelated. Their impact on the value of the company should be taken into consideration. As they afect the market value of the share by influencing return and risk. The relationship between return and risk can be calculated as :

Return = Risk - free rate + Risk premium

Where the risk fue rate is a comperation for time and risk premium for wish comage. In order to maximise the market value of the firm, a proper balance between return and risk should be maintained. This balance is known as risk - return trade - off, which is shown is Figure 1.3.
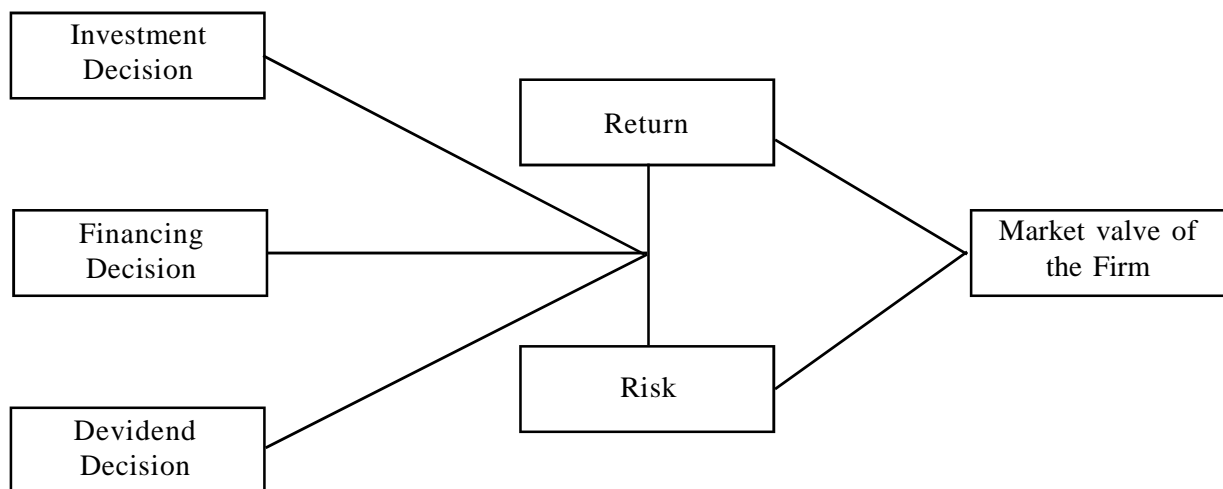
Figure 1.3. : Trade - off between Return and Risk

1.9. Time Value of Money

An important principle in finance is that the value of money is dependent on time. The value of money received today is different from the value of money received after sometime in the future. The principle is based on the fact that what we receive today can be invested and a return can be earned on it. For example, between Rs 100 now or Rs 100 after one year, Rs 100 now will have more time value because it can be invested, for example at 10% rate of interest, and a return of Rs 10 can be earned. Rs 100 becomes Rs 110 a year after.

In business, various decisions involve outflow and inflow of funds. Outflows and the inflows do not take place at the same time. For example, in the case of investment decision outflows in the form of cost of the project takes place first and it is followed by inflows in the form of profits or returns in future.

	Outflows	$\overset{\sim}{\underset{\sim}{O}}$ ────────── Inflows ──────────── $\tilde{O}$			
Time	t_o	t_1	t_2	$t_3 \ldots\ldots\ldots t_n$	
	(Cost of the profect)	Returns(or) profit	Returns (or) profit	Returns(or) profit	Returns (or) profit
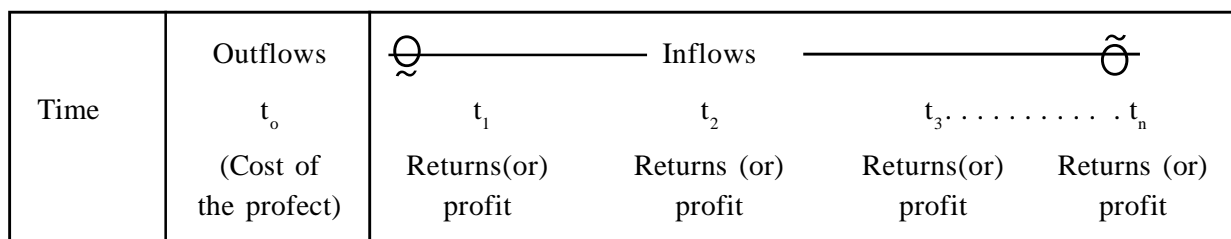
The difference in their timing makes it difficult to compare the costs and benefits. Therefore there is a need to equalise the time values of inflows and outflows for this Time value can be incorporated into financial decisions either by compounding or by discounting.

Let us try to understand these methods.

1.9.1. Compounding : Compounding is the process of finding the Future Value of an amount (which is called present value) at the end of a period using an interest rate. For example, if we want to find the future value of Rs 100 (PV) at the end of one year when interest rate (r) is 12 percent per annum

FV = Present value + Interest for one year at 12%

FV_1 = PV + PV (r) = PV (1+ r)

FV_1 = Rs 100 + 100 (12%) = Rs 100 + Rs 12 = Rs 112.

If we wish to find FV at the end of second year

FV_2 = FV_1 + Interest of second year at 12 %

= FV_1 + FV_1 (interest rate)

= FV_1 + FV_1 (r)

= FV_1 (1 + r)

We know that FV_1 = PV (1 + r)

FV_2 = PV (1 + r) (1 + r) = PV (1 + r)^2

Future value at the end of n years

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

Compounding more than once :

Twice in a year $\qquad$ FV $=$ PV $\left[1 + \dfrac{r}{2}\right]^{2n}$

Quarterly compounding $\qquad$ FV $=$ PV $\left[1 + \dfrac{r}{4}\right]^{4n}$

Yearly compounding $\qquad$ FV $=$ PV $\left[1 + \dfrac{r}{12}\right]^{12n}$

m times a year $\qquad$ FV $=$ PV $\left[1 + \dfrac{r}{m}\right]^{mn}$

As 'm' approaches infinity, the term

$\left[1 + \dfrac{r}{m}\right]^{mn}$ approaches e^{rn}

Where e $=$ 2. 71828 approximately.

FV $=$ PV e^{rn}

Where

$\qquad$ FV $=$ future value

$\qquad$ PV $=$ present value

$\qquad$ r $=$ rate of interest

$\qquad$ n $=$ number of years.

Continuous compounding results in the maximum possible future value at the end of n periods for a given rate of interest (r).

1.9.2. Discounting - Discounting is the process of finding the present value of an amount (future value) expected to be received at the end of a period (n) using a rate of interest (called the discount rate). If we want to find the present value of Rs 100 to be received at the end of one year, when the rate of interest is 12 per cent

$$PV = \frac{FV}{(1+r)} = \frac{100}{1+12\%} = \frac{100}{1.12} = \text{Rs. } 89.29$$

It means that the present value of Rs 100 to be received at the end of one year, when discounted at 12%, is Rs 89.29.

PV of Rs 100 to be received at the end or n' years PV $= \dfrac{FV}{(1+r)^n}$

You are provided with two types of Tables in the Appendix

$\qquad$ (a) $\qquad$ Compound / future / terminal value Tables

$\qquad$ (b) $\qquad$ Present value Tables.

Compound value Tables :

By making use of these tables, we can find the compound value of any amount, for any period, at any rate. In these Tables compound values of Re.1 are provided.

In the compound value formula, the value of the expression $(1 + r)^n$ is given for Re. 1 for a given rate and period. For example, when

PV = Rs 1300 r = 13%   n = 15 years,

What is compound value or ?

CV = PV $(1 + r)^n$ = Rs 1300 $(1 + 0.13)^{15}$

the value of $(1 + 0.13)^{15}$ is given in the Table for Re.1. We can find the C V just multiplying Rs. 1300 with this value which is called compound factor.

CV = Rs 1300 X Compound factor (n = 15 years, r = 13%)
    = Rs 1300 X 6.254
    = Rs 8, 131

For any period and at any rate, we can find the compound value by using these Tables.

Present value tables :

By making use of these Tables, we can find the present value of any amount. In the present value formula, the value of the expression $[1/(1+r)^n]$ for Re.1 is given for a given discount rate and period (n).

For example :

If we wish to know the present value of Rs 5000 to be received at the end of 18 years with a discount rate 15 per cent, then

FV = Rs 5000,   r = 15% n = 18 years.

$$PV \;=\; FV \left[\frac{1}{(1+r)^n} \right]$$

the value of the expression shown in the praranthies can be found out from PV Tables for any n, r.

PV = FV x PV Factor (given r, n)

    = FV x   discount factor (given r, n)

PV = Rs 5000 x PV factor (a + r = 5%, n= 18 years)

    = Rs 5000 X 0.081

    = Rs 405

It means that, the PV of Rs 5000 to be received at the end of 18th Year is Rs 405 when discounted at 15 per cent rate.

Annuity : An Annuity is a stream of constant cash flows (payment or receipt) occurring at regular intervals of time. When cash flows occur at the end of each period we can find the future value by compounding and present value by discounting.

Compound value of annuity. Future or compound value of an annuity (FVA) can be calculated by using the following formula.

$$\text{FVA} = \text{Annuity amount} \times \left[\frac{(1+r)^n - 1}{r} \right]$$

In the above equation, $\left[\dfrac{(1+r)^n - 1}{r} \right]$ expression is compound factor for one rupee annuity received at the end of each year for n years with 'r' compound interest rate.

Compound value Tables given in the Annexure contain CV of annuity of Re.1 for a given period and rate.

For example :

If we wish to find the compound value of Rs 1200 annuity for a period of 10 years and when the interest rate is 12 per cent. Future value of annuity at the end of 10 years will be

FV_{10} = Rs 1200 X CV of annuity of Re.1 (r = 12%, n = 10 years)

= Rs 1200 X 17.549

= Rs. 21058-80

Present value of Annuity :

Present value of an annuity (PVA) can be calculated by using the following formula.

$$\text{PVA} = \text{Annuity amount} \times \left[\frac{1 - \dfrac{1}{(1+r)^n}}{r} \right]$$

The expression $\left[\dfrac{1 - \dfrac{1}{(1+r)^n}}{r} \right]$ is given for Re.1 Annuity Table in the Annexure for given r and n.

For example, if we want to find the present value of Rs 1000 annuity for 10 years when the discount rate is 12 %, we can find the present the value of Re.1 annuity from the Table and multiply it with Rs 1000.

Annuity = Rs 1000 r = 12% n = 10 years

PVA = Rs 1000 X 5.650

= Rs 5650

Having understood the methods of incorporating time value of money, through compounding and discounting, let us now see, how these methods are relevant in financial decision making.

1.9.3. Financial Decisions : Time value of Money

(a) Investment Decision : Investment decision involves current cash outlay for expected stream of cash inflows in future.

Time	t_o	t_1	t_2 . . . . t_n	
cash flows	Current Cash outlay (Co)	cash inflow	cash inflow	cash inflow

The cash flows (outflows and inflows) occur at different timings. Therefore, they are not comparable. Time value of money is taken into consideration by discounting the cash inflows to find the present value of all cash inflows. Then PV of cash inflows is compared with current cash outlay or cost of an investment project.

For example : A project costs Rs.100000.   It is expected to provide cash inflows as follows for 3 years. The company's cost of capital or required rate of return is 15%. Whether the project is acceptable?

Year	1	2	3
cash Inflows	Rs 40000	Rs 50000	Rs 30000

Solution :

PV of cash inflows   = PV of Rs 40000 + PV of Rs 50000 + PV of Rs 30000

                               = [40000 X 0.870] + [50000 X 0.756] + [30000 X 0.658]

                               = Rs 34800 + Rs 37800 + Rs. 19740

                               = Rs. 92340

In this example, the present value of cash inflows is Rs 92340, whereas, the cost of the project is Rs 1 lakh. As the benefits are less than the cost, the project is not acceptable.

(b) Financing Decision : When a company issues debentures, it receives cashflows now. Interest payments (cash outflows) are to be made at the end of each year. At the end of the period the debenture amount is redeemed. Therefore, the financing decision involves cash inflows first, followed by cash outflows

Time	t_o	t_1	t_2 . . . . t_n
cash flows	Sale value of debentures	Interest	Interest	Interest and redemption value

As these cash flows takes place at different times, they cannot be compared. Time value of payment is taken into consideration by finding the discounted value (present value) of interest payments and redemption value. The present value of cash outflows is compared with sale value of debentures and Financing decision is taken whether to take up the issue of debentures.

1.10. Summary

This lesson has provided you an overview of Finance in a business entity. The scope, of financial management and finance function have been covered. The primary financial objectives of a company and the broad goal of a company have been discussed. Profit maximasation vis-a-vis wealth maximisation revealed that profit maximisation goal has certain limitations, which can be overcome with wealth maximisation goal.

The organisation of finance function and role of finance manager provide an insight into organisational chart and various functions of financial manager.

There are three major financial decisions, viz., Investment, Financing and Dividend decision. Investment decision relates to the selection of viable projects and estimating capital budget. Financing decision is concerned with the ways of finding funds to meet the capital budget requirement. Dividend decision is about how the earnings of the company are to be used i.e, a break up between dividends and retention.

Finally, the time value of money has been presented.

1.11. Key words

Financial Management : Concerns the acquisition, financing, and management of assets with some overall goal.

Future Value : The value at some future time of a present amount of money, or a series of payment, evaluated at a given interest rate.

Net Present Value : The Present Value of an investment projects net cash flows minus the projects initial cash outflow.

Present Value : The current value of a future amount of money, or a series of payments, evaluated at a given interest rate.

Price / earning ratio (P / O) : The market price per share of a firm's common stock dividend by the most recent 12 months of earnings per share.

Risk : The variability of returns from those that are expected.

Capital structure : The mix of a firm's permanent long - term financing represented by debt, prefessed stock, and common stock equity.

Compount Interest : Interest paid on any previous interest earned, as well as on the principal borrowed.

Funds	:	Funds include not only cash but also the total current assets or financial resources.
Profit Maximisation	:	It is a criterion for economic efficiency as profits provide a yard stick by which economic performances can be judged under condition of perfect competition.
Wealth Maximasation	:	It stands that the management should seek to maximise the present value of the expected returns of the firm.
Discounting	:	A reduction of some future amount of money to a present value at some approprite rate in accordance with the concept of the time value of money.

1.12 Self - Assessment questions.

1. What do you mean by "Finance" ? Explain the scope of finance Function.

2. What is Financial Management ? What role a Financial Manager plays in a corporate enterprise ?

3. Do you think Wealth Maximisation, as a goal of a company, is superior to Profit Maximisation? Explain.

4. What are the major Financial Decision ? How do you trade off risk and return ?

5. How is Finance Function Organised ? What are the functions that finance officers perform in a large firm ?

6. What do you mean by Time Value of Money ? Explain its relevance in financial decision making.

1.13. Further Readings

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LESSON - 2

ENVIRONMENT OF FINANCE

OBJECTIVES

The objectives of this lesson are to :

P   present various forms of business organisations and their features

P   discuss the tax system and various provisions of the Income Tax Act, 1961

P   explain various government regulations affecting the business enterprises

P   present the financial system consisting of financial assets, financial intermediaries, and financial markets.

STRUCTURE :

2.1   Introduction

The modern business enterprises have to operate in a fast changing and more competitive environment. Managers of these enterprises are required to posses the ability to react quickly and correctly to constantly changing market conditions. In this lesson, let us know about the environment of finance and government regulation.

2.2.   Forms of organisation

There are four main forms of business organisation : (i) Sole Proprietorship (ii) Partnership firm (iii) Joint stock company, and   iv) Cooperatives. In terms of numbers sole proprietary form of organisations rank first, but in terms of volume of business company form stand first. Each of these is briefly discussed in the following paragraphs.

2.2.1. Sole Proprietorship :

A sole proprietorship is a firm owned by an individual. He owns all assets and owes all liabilities of the business. These business organisations can be formed easily with few government regulations. When business is to run on small scale these forms of organisations are best suited.

The sole proprietorship form of organisations cannot raise large amounts of capital. The proprietor has unlimited liability. In this business form, if business debts could not be discharged with its assets, they must be discharged by personal assets. The business comes to an end if the proprietor ceases to exist. Limited resources, unlimited liability, lack of division of labour, lack of competitive edge, short life span, etc are the factors that keep these organisations backward.

2.2.2. Partnership Firm:

A partnership firm is a business unit carried on by two or more persons with an intention to share profits or losses. The major advantage is its low cost and easy formation. The limitations are similar to those associated with proprietorship: (1) unlimited liability (2) limited life (3) difficulty in transferring ownership and (4) limitations in raising funds.

The partners can potentially lose all of their personal assets. Each partner is liable for the business debts. Mutual conflicts, delay in decision making, low public confidence, disruption in continuity are some more negative features of partnership firms.

This form is suitable where the size of the business is small and capital requirement is low. It suits professions like medicine, accounting, legal, management, stock broking, etc.

2.2.3. Joint Stock Company:

A joint company is a legal entity created under the law and empowered to own assets, to incur liabilities, and to engage in business. It is an artificial person created by the law. The capital of a company is divided into small portions and each portion is called a "share". Investors who buy these shares are called shareholders and they are the owners of the company.

The liability of the shareholders is limited to the extent of share value. The shares of a public limited company are freely transferable and shares can be sold or bought. Important feature of company form of organisation is that ownership and management are in the hands of two different groups of people. The management of the company is vested in the hands of board of directors who are elected by the shareholders. A company runs for a long period, therefore has perpetual existence. Every company must be registered as per the provisions of Companies Act, 1956.

A person who makes efforts for bringing a company into being is called a promoter. Promotion is a process in which all factors of business are procured for the formation of a company. Promoters may be persons or institutions or a company. The company form of organisation emerges whenever large scale production or trading activity is taken up, requiring huge amounts of capital.

2.2.4. Co-operatives.

The philosophy behind cooperatives is "all for each and each for all." Cooperative societies are associations formed voluntarily by the people to render service to the members of their society. They are formed to protect and safeguard the economic interest of the weaker sections of the society from the exploitation of stronger sections of the society. Consumer cooperatives, producer cooperatives, marketing cooperatives, housing cooperatives, credit cooperatives, milk-producers cooperatives are some of the examples.

It is easy to form a cooperative society with simple legal formalities. Members have limited liability restricted to the extent of their share capital. Cooperatives offer services to their members. Supply of goods at cheaper reasonable rates, provision of credit facility at low rates of interest, construction of houses, distribution of seeds, fertilisers etc., are some of the services. Cooperatives enjoy perpetual existence.

However, cooperatives suffer from limited financial resources, lack of secrecy, competent management, rise of factionism and rivalries, domination of vested members, etc.

The choice of Form of organisation depends upon the following factors.

P Nature of business.

P Scale of operations.

P Control

P Risk and liability

P Tax considerations

P Financial requirement

2.3. Tax system :

By virtue of the implications of tax system, it has great relevance to finance function. Taxes are broadly classified as (i) direct taxes, and (ii) indirect taxes.

Direct taxes are directly paid by the person concerned, from his income or wealth. Income tax and wealth tax are direct taxes. Indirect taxes are paid indirectly because they are paid by one person but recovers the same from another person. Tax payer pays indirectly while purchasing goods, paying for services, etc. Central Excise (duty on manufacture) customs (duty on imports and exports); Sales tax, Octroi, Entry tax, Service tax, Expenditure tax are indirect taxes.

Various provision of Income Tax Act, 1961 which have a bearing on Financial Decisions are discussed here.

2.3.1. Investment Decision :

Decisions related to various investment projects have to be taken by considering tax incentives available under the Income Tax Act apart from considering return, risk aspects of the project. Following tax incentives are available to companies on various projects.

P Newly established undertakings in free trade zone, electronic software / hardware technology park or software technology park are eligible for a tax holiday for 10 years

P Newly established 100 per cent Export oriented undertaking are eligible for tax holiday for 10 years.

P New industrial undertakings established in North-Eastern Region are eligible for tax exemption for 10 years

P Business establishments can claim depreciation on (i) tangible assets : buildings (10%), Machinery (25%) and furniture (15%) and (ii) intangible assets like technical know-how, patents, copy rights, trade marks, licenses, franchises (25%). In some cases a higher rate of depreciation is also allowed. For example, in case of buildings for installing water supply

or treatment system in the business of providing infrastructure facilities, depreciation is allowed at 100%. In the case of computers, 60%, energy saving devices 80%; pollution control equipment 100%; are the rates of depreciation.

P Apart from normal depreciation, additional depreciation is also allowed at 15% of the actual cost of machinery.

P In the case of profit from projects outside India (foreign projects) the least of the following limits is allowed as a deduction (a) 20% of profits. (b) Amount credited to foreign project Reserve Account (c) amount brought into India in convertible foreign exchange.

P 50 per cent of profits from export of goods and mercandise are deductible

P 50 per cent of profits from export of computer software are deductible

P 50 percent of profits from films software are deductible

P 100% of the profits from industrial undertaking engaged the infrastructure development, telecommunication service, industrial park, special economic zones, power generations, transmission and distribution are allowed as deduction for 10 years.

P Profits from industrial undertaking which are not producing articles specified the Eleventh schedule like alchohol, cosmetic, tobacco products, chocolates, etc; hotels, industrial research institutes, minor oil etc are deductible.

P In respect of certain undertakings in Himachal Pradesh, Sikkim, Uttaranchal and North - Eastern States tax holiday is available

Investment decisions must be taken by giving due weight to the incentives listed above. Make or buy decision, buying by instalments or to hire, own or lease decision are some of the investment decision which have tax implications. To buy an asset with borrowed funds or equity (own) funds is an important decision with tax implications. Tax savings resulting from the above incentives must be taken into account while evaluating a project.

2.3. 2. Financing Decision : Before commencing a new project a crucial decision regarding selecting right type of capital structure has to be taken. An optimum capital structure is one which maximises shareholders wealth. Capital structure decision has a long-term implications. It should take into account financial risk, cost of capital, control and tax considerations.

Under the present tax laws, dividend on shares is not deductible, while interest paid on borrowed capital is allowed as deduction. Cost of raising borrowed funds is deductible in one year while cost of raising equity funds is deductible over 5 years. Since, interest on debt is deductible, effective cost of debt is less than the actual cost of debt.

For example : If debentures are issued with a couponrate of 16.5 per cent per annum and corporate tax rate is 35%. The after-tax cost of debentures will be (16.5. X (1+35%) 10.725 per cent. Investments in debentures or equity shares issued by companies engaged in the business of infrastructures, power, telecommunication, industrial park, special economic zones equity shares are eligible for a tax rebate under the Income Tax Act. Such companies can tap the capital market easily as there is an incentive to the investor.

2.3.3. Dividend Decision : Dividend decisions are crucial as they involve certain tax implications. As per the law existing now, the following points deserve consideration.

i)   Dividends on shares from a domestic company are exempt in the hands of the shareholders.

ii) Long term capital gains arising out of transfer of listed equity shares purchased between 1-3-2003 and 1-3-2004 are exempt from tax in the hands of the shareholders.

iii) Domestic companies distributing dividends have to pay additional tax on distributed profits at a rate of 12.5 per cent (plus surcharge) in addition to normal tax.

2.4.   Government Regulations

In India, a regulatory and monitoring framework is operated by the government and its agencies. Finance Manager has be familiar with these regulations.

2.4.1   Industrial Policy

Industrial policy refers to the policy of the government towards industries - their establishment functioning, growth and management. The policy indicates areas of large, medium and small scale sectors. It specifies the policy towards foreign capital, labour, tariff and the related aspects.

The following industrial policy resolutions were issued by the government since independence.

(a)   Industrial Policy, 1948

(b)   Industrial Policy, 1956

(c)   Industrial Policy, 1991

Industrial policy, 1991 was aimed at drastic changes in the industrial scenario in our country. There are many changes which deviate from the policy followed till 1991. The objectives of the policy are

P   Self - reliance to build on many sided gains already made

P   Encouragement to Indian entrepreneurship, promotion of productivity and employment generation.

P   Development of indigenous technology through greater investment in R & D and bringing in new technology to help Indian manufacturing units to attain world standards.

P   Removing the regulatory system and other weaknesses

P   Increasing the competitiveness of industries for the benefit of the common man.

P   Incentives for the industraialisation of backward regions.

P   Enhanced support to the small-scale sector.

P   Ensure running of public sector undertakings (PSUs) on business lines and cut their losses.

P   Protect the interests of workers.

P   Abolish the monopoly of any sector in any field of manufacture except on strategic or security grounds.

P To link the Indian economy to the global market so that we acquire the ability to pay for imports, and to make us less dependent on aid.

In the following areas the government has taken initative to attain the above mentioned objectives.

(a) Industrial Licensing

(b) Foreign Investment

(c) Foreign Technology agreements

(d) M R T P Act.

(a) Industrial licensing :

P Industrial licensing is governed by the Industries (Development & Regulation) Act, 1951.

P Industrial licensing has been abolished for all industries except those specified.

P Specified industries are subject to compulsory licensing due to security, strategic, social, safety, environmental reasons. Manufacture of products of hazardous nature and articles of elitist consumption come under specified category.

P In case of projects where imported machinery or any capital goods are required, automatic clearance is given if foreign exchange availability is ensured through foreign equity and if the value of the imported capital goods required is less than 25 per cent of the total value of plant subject to a maximum of Rs 2 crores.

P In cities with population less than one million there is no requirement to get approval.

(b) Foreign Investment : In order to invite foreign investment in large private industries requiring huge investments and advanced technology, approval for foreign direct investment upto 51% foreign equity is provided.

(c) Foreign Technology Agreements : Automatic permission is given for foreign technology agreements in high priority industries upto a lum sum payment of Rs 1 crore, 5 percent royalty for domestic sales and 8 percent for exports, subject to total payment of 8 percent of sales over ten year period from the dates of agreement or seven years from the commencement of production

(d) Monoploies and Restrictive Trade Practices Act (MRTP Act) 1999 : To prevent concentration of economic power in the hands of few industrial houses and to check restrictive trade practices M R T P Act was promulgated. Majority of the restrictive provisions have been omitted after 1991 when reforms were introduced.

2.4.2. Foreign Exchange Management Act, (FEMA) 1949

FEMA aims at consolidating law relating to foreign exchange with the objective of facilitating external trade and payment and for promoting the orderly development and maintenance of foreign exchange markets in India.

FEMA is a regulation as well as a facilitator. It encourages Indian businesses to grow into strong Indian-based multinationals.

Following are the important points relating to regulation and management of foreign exchange.

Þ **Dealing Foreign Exchange :** No person shall deal in foreign exchange, make payment to person outside India, receive payment from person outside India and enter into any financial transaction for acquiring any asset outside India.

Þ **Holding of Foreign Exchange :** No person shall acquire, hold, possess or transfer any foreign exchange, foreign security, or any immovable property outside India.

Þ **Capital Account Transation :** Any person may sell or draw foreign exchange to or from Reserve Bank of India.

RBI may regulate :

--- issue of foreign security by person resident in India or out side India

--- borrowing / lending in foreign exchange

--- deposits

--- transfers of immovable property outside India

--- guarantees in respect of any debt

Þ **Export of goods of services :** Exporters shall furnish RBI, details of material and value of export. RBI ensures that export value is received without delay.

Þ **Realisation & Repatriator of Foreign Exchange :** Persons resident in India due to receive foreign exchange shall take necessary steps to realise and repatriate foreign exchange to India within the period specified by RBI.

Automatic Route : Automatic route is permitted for Indian enterprises subject to the fulfillment of the following conditions.

Þ Investment should not exceed $ 50 millions in a block of 3 years in a joint venture abroad

Þ Must be making profits in three preceeding years.

Þ Investment must be in foreign entity engaged in core activity area. Financial services, information technology, entertainment software, pharmaceuticals, biotechnology are permitted in automatic route

Non-Resident investors investing in Indian companies are permitted to take automatic route.

Þ Non resident investors are not allowed in regulated sectors

Þ Investment should be by way of fresh issue of shares

Þ Foreign direct investment into e - commerce, power, petroleum refining, 22 specified consumer goods is permitted.

2.4.3. The Securities And Exchange Board of India Act 1992

The S E B I Act 1992 was promulgated after withdrawing the Capital Issues (Control) Act. S E B I is broad in its application covering wide ranging issues. The powers and functions of S E B I Act are:

P Regulating the business of stock exchanges

P Registering and regulating the working of

--- Stock brokers

--- Sub brokers

--- Share transfer agents

--- Bankers to the Issue

--- Trustees of Trust deeds

--- Registrars to an issue

--- Merchant Bankers

--- Under writers

-- Portfolio managers

--- Investment advisors

P Registrering and regulating the working of
--- depositories
--- custodians of securities
--- credit rating agencies

P Registrering and regulating the working of
--- venture capital fund,
--- Collective Investment Schemes
--- Mutual Funds.

P Promoting self regulating organisations,

P Prohibiting fradulent and unfair trade practices

P Promoting investors education

P Prohibiting insider trading

P Regulating substantial acquisition of shares, takeover of companies

2.4.4. The Security Contracts (Regulation) Act, 1956

The objective of the Act in to prevent undesirable transactions in securities by regulating the business of dealing in securities.

P **Grant of Recognition to Stock Exchanges :** If the Central Government is satisfied that it would be in the interest of trade and also in the public interest to grant recognition to the stock exchange, it would grant subject to certain conditions.

P **Withdrawal of Recognition :** Central Government can withdraw recognition through a notification in the gazette after giving an opportunity of being heard.

P **Listing of securities :** A public company desirous of getting its securities listed shall apply along with

--- Memorandum and Articles of Association

--- Copy of the Trust Deed - in case of debenture issue

--- Copies of all prospectuses issued by the company

--- Copies of offer for sale, circulars, advertisements offering any securities during the last 5 years.

--- Statement of dividends, bonus shares of last 10 years

--- Certified copies of agreement between vendors and promoters, under writers, sub under writers, brokers, sub-brokers.

--- certified copies of agreement with managing agents, selling agents, managing directors, technical directors, general manager, sales manager, secretary.

--- brief history of the company

--- particulars of shares and debentures

--- list of highest 10 holders of each class of securities

At least 25 per cent of each class of securities should be offered to the public through advertisement in newspapers for two days.

2.4.5. The Companies Act, 1956.

The companies Act, 1956, is a control measure used by the Government to regulate the functioning of the corporate sector in India. A company is an association of individuals united for some common purpose, permitted by law to use a common name to change its members without winding up the association. Following are some of the provisions of the Companies Act, 1956.

P **Registration**   : To obtain the registration of a company, an application has to be filed with the Registrar of companies, along with (i) Memorandum of Association (ii) Articles of Association and (ii) list of directors.

P **Certificate of incorporation :** The certificate of incorporation brings the company into existence as a legal person. Upon its issue the company is born.

P **Commencement of business :**   A private company can commence business right from the date of its incorporation. But in the case of public company, a further certificate for the commencement of business has to be obtained. This becomes necessary where a company has issued a prospectus inviting the public to subscribe for its shares.

P **Memorandum of Association :**   It is a document of great importance in relation to the company. It contains the following fundamental clauses (i) Name clause (ii) Registered office clause (iii) Objects clause (iv) Liability clause (v) Capital clause.

P **Articles of Association :** This document contains rules, regulations and bye-laws for the general administration of the company.

P **Public Issue**   :   Company can raise capital from the general public by means of a public issue. A listed public company means a public company which has any of its securities listed in any

recognised stock exchange. A public company need not necessarily go to the public for money. The promoters may be confident of obtaining the required capital through private contracts. The process of issuing securities through a statement in lieu of prospectus is a kind of private placement.

P **Promoters :** Before a company can be formed there must be some persons who have the intention to form a company, and who take necessary steps to carry that intention into operation.

P **Shares   :** Offers for shares are made on application forms supplied by the company. When an application is accepted, it is an allotment. A valid allotment has to comply with the requirements of the Act and principles of the law of contract relating to acceptance of offers.

P **Share Capital :** Capital must be divided into shares of a fixed amount. The Act permitted only two kinds of securities to be issued. (i) Equity shares (ii) Preference Shares. The Companies Amendment Act, 2000 has introduced some other categories of shares (1) Derivatives (2) Hybrid.

P **Directors   :** Appointment - Removal - Powers - Duties - Remuneration

P **Meetings   :** Statutory meeting (first meeting of the shareholders within six months from the date of commenment). Annual general meeting (one meeting of the shareholders each year) - extra ordinary general meeting.

P **Dividends   :** Board of directors should deposit the amount of dividend declared in a separate bank account within 5 days from the date of declaration.

P **Compulsory reserves :** The company shall transfer to the reserves certain percentage of profits not exceeding 10 per cent before any dividend is declared.

P **Accounts   :** Books of Accounts - Accounting record, - preservation of account books - Right of inspection.

P **Auditors   :** Appointment - Remuneration - Qualification - Removal - Power and Duties.

2.5.   Financial System

The financial system consists of a variety of financial instruments or assets, financial intermediaries and financial markets. An understanding of the financial system is essential in financial decision making. A company raises resources through the issue of financial instruments in a financial market. Financial intermediaries facilitate the movement of funds from the investor to the user by providing various services.

According to Robinson, "the primary function of the system is to provide a link between savings and investment for the creation of new wealth...". The objective of the financial system is to supply funds to various sectors and activities of the economy.

2.5.1. Financial Assets :

Financial assets are the basic products of the financial system. Movement of funds from the suppliers of funds takes place when they are exchanged for a financial asset issued by the user of funds. If equity shares are issued by a company, equity share is a financial product, the sale of which is facilitates the movement of funds.

Financial asset is a piece of paper evidencing a claim of the holder (investor) over the issuer (user). Currently financial assets are on de-mat form. They represent claim against the incomes and the assets of the issuing company.

Classification of Financial Assets :

FINANCIAL   ASSETS

Tradable   (transferable or negotiable)

Non tradable (non - negotiable)

Fixed income securities

Variable income securities

Preference Share
Debenture
Bonds
Indira vikasa patram
Kisan vikas patram
Treasury bills
Commercial paper
Certificates of deposits

Equity shares

Bank deposits
Post office deposits
Deposits with NBFCs
Provident funds
National saving scheme
National savings certificates
Life Insurance policies
Units of mutual funds

These assets have different features with regard to the return (yield), risk (variability), liquidity, transferability, maturity, tax consideration, etc.

Financial Derivatives : Financial derivatives derive their value from underlying securities. They are financial contracts. In India stock exchanges have introduced index based derivatives to facilitate hedging of risk exposures and speculations with high leverage. Derivatives are short term in nature with less than a year to expiration issued by investors. Long term derivatives are issued by companies in the process of financing their activities. Options and futures are the examples for short term derivatives. Warrants and convertibles are the examples for long term derivatives.

2.5.2. Financial Intermediaries

In a market for funds, the intermediaries bring users and suppliers of funds together. In India there are two types of financial intermediaries.

Intermediaries who collect funds from the suppliers and lend to the users are one type. These are called financial institutions or development banks. In a market where the expectations of the suppliers and expectations of the users do not coincide, exchange of funds do not take place. For example, a small investor in India looks for a short - term investment which can provide a reasonable rate of return without any risk and with easy liquidity. Whereas, companies require funds for a long term and risk is inherent in long-term investments. Under these circumstances, financial institutions emerged as an intermediary between supplier and user. The service provided by them is called financial intermediation. They help in

* Promoting savings of the economy

* Channelling funds to sectors where funds can be put to best and efficient use.

* Building investor confidence

* Diversification and minimisation of risk to the investor

Financial Institutions

	Development Institutions
Commercial Banks Cooperative credit societies Post office savings Bank Provident Funds Pension Funds	Industrial Finance Corporation of India I C I C I I D B I I R B I Exim Bank NABARD Shipping Credit & Investment coparative of India (S C I C I) Tourism Finance Corporation of India

Second category of financial intermediaries are those agencies which facilitate the smooth and safe movement of funds from the supplier to the users. Under this categorie there are two types of agencies.

1. **Regulatory Agencies**	2. **Financial Service Providers.**
* Reserve Bank of India (R B I) * Securities & Exchange Board of India (SEBI) * Board for Industrial & Financial Reconstruction (B I F R) * Foreign Exchange Management Act (FEMA)	* Merchant bankers * Underwriters * Credit rating agencies * Brokers * Issue Managers

2.5.3. Financial Markets

A financial market is a market where exchange of funds for financial instruments take place. They perform the following functions.

P **Price determination :** Like any other market, financial market facilitate in the determination of prices of financial instruments.

P **Provision of liquidity :** An investor who acquired financial instruments must be in a position to convert it into cash whenever he wants. Financial markets provide the mechanism through which liquidity is ensured.

P   **Minimisation of transation costs :** Market efficiency depends upon the availability of timely and accurate information. Transaction costs like, search cost, information cost, and middlemen brokerage can be minimised by financial markets.

There are different types of financial markets which are based on certain criteria

Criteria	Types	
1. Maturity Time	(a) Money market	(b) Capital market
2. Nature of instrument	(a) Equity market	(b) Debt market
3. Timing of delivery	(a) Spot market	(b) Future market
4. First or second hand	(a) Primary market	(b) Secondary market
5. Trading	(a) Exchange traded	(b) O T C market

P   Market for short term financial instruments is money market e.g. call money market, bill market.

P   Market for long-term financial instruments is capital market e.g : equity shares, debentures, preference shares.

P   Market for equity shares is equity market.

P   Market for all debt instruments or fixed financial claims whether short term or long term is debt market

P   A secondary market where immediate delivery of the instrument takes place after the transfer is effected is cash or spot market.

P   A secondary market where delivery occurs at a pre determined date in future, after the transfer is effected, is futures market.

P   Market where fresh claims are traded is the primary market. When the financial instruments are issued for the first time, it is primary market.

P   Market where already existing financial instruments are traded is secondary market. If a shareholders of X Y Z co. sells his shareholding to another person he is operating in a secondary market.

P   Market which is characterised by a centralised organisation with standard procedures is exchange traded market. Bombay stock exchange, National stock exchange are some of the examples.

P   A decentralised market with customised procedures is an over - the - counter (OTC) market.

2.6.   Summary

Financial manager operating in a constantly changing environment should have the knowledge of the environment in which he is operating. The impact of the constituents of this environment on business decisions should be estimated before taking decisions.

Various forms of business organisation have different implications on business. Tax system, in existence in any economy, contains various provisions which are regulatory in nature. Certain provi-

sions provide various tax incentives, knowledge of which and decision making taking into consideration these incentives, would help in minimising tax burden.

Financial system consisting of financial instruments, financial intermediaries, and financial markets provide the mechanism for channelling funds to the industry. It is a set of complex, closely connected institutions, agents, practices, markets, transactions, claims, liabilities in the economy.

2.7. Keywords

2.8. Self Examination Questions

1. What are various forms of organisation ? Explain their salient features .

2. What are the tax provision that have a bearing on the investment decision ? Discuss.

3. Discuss the importance of Industrial policy, 1991 in the light of recent changes taking place in the Indian economy ?

4. Explain the main fectures of F E M A, 1999

5. "Companies Act 1956 regulates the functioning of the corporate sector in India" - Discuss.

6. What are the constituents of a financial system ?

2.9. Further Readings

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2. Rose, Peter : Money and capital Markets, Mc Graw Hill, New York, 2000.

3. James C. Van Horne and John M. Wachowicz, Jr. Fundamentals of Financial Management, Addison Werley Longman, New Delhi 2001.

4. Girish Ahuja and Ravi Gupta, Direct Taxes : Law & Ractices, Bharat Law House Pt. Ltd, New Delhi 2003.

LESSON - 3

CAPITAL BUDGETING - AN INTRODUCTION

CONCEPTS, CASH FLOWS

3.0   OBJECTIVES

The main objectives of this lesson are to :

1) explain the nature and importance of capital budgeting decision.

2) discuss the types of capital budgeting decisions.

3) impart knowledge about the process of capital budgeting decisions.

4) enable you to estimate the cash flows of the investment projects.

STRUCTURE

3.1 INTRODUCTION

Financial decision making is viewed as an integral part of the overall management of a business concern. The financial manager has to make the financial decision within the framework of overall corporate objectives and policies.   The overall development of a firm depends on market development, entry in new product line, termination of a product which is in declining stage, expansion of the plant, change of location, etc. In all

these issues, study of financial implications is inescapable. According to the modern approach, financial management is concerned with the solution of three major problems relating to the financial operations of the firm, viz., - investment, financing and dividend decisions.

Of these decisions, the investment decision relates to the selection of assets in which funds will be invested by a firm. The assets that can be acquired with these finds are broadly divided into.

Long-term assets and short term assests.

The decision regarding long-term assets which is known as capital budgeting. Whereas the financial decision with reference to investment on short-term assets is designated as working capital management. This lesson is devoted for capital budgeting its nature, process and cash flows and their computation. After studying this you will be also knowing the basic principles of estimating cashflows assuming certainly and also uncertainly as a last part of this lesson.

3.2 NATURE OF CAPITAL BUDGETING DECISION

Efficient allocation of capital is one of the most important functions of the financial management in modern times. This function involves the firm's decision to commit its funds in long-term assets and other profitable activities. The decision to invest funds in the long-term assets of a firm are quite significant and they will influence the firm's market value, growth and also affect the risk of a business.

Weston and Brigham: "Capital budgeting involves the process of planning expenditures whose returns are expected to extend beyond one year".

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

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

James C. Van Horne: "Capital Budgeting involves a current investment in which the benefits are expected to be received beyond one year in the future". It suggests that the investment in any asset with a life of less than a year falls into realm of working capital management, whereas any asset with a life of more than one year involves capital budgeting.

Thus, Capital Budgeting decision may be defined as "the firm's decision to invest its current funds most efficiently in long-term assets, in anticipation of an expected flow of benefits over a series of years".

According to these definitions one can draw the following features of a capital budgeting decesion.

i) the exchange of current funds for future benefits.

ii) the funds are invested in long-term assets.

iii) the future benefits will occur to the firm over a series of years.

Generally, the capital budgeting or investment decisions includes addition, disposition, modification and replacement of fixed assets. The capital budgeting decision include, the following proposals:

1) **Expansion**: The company may have to expand its production capacities on account of high demand for its products or inadequate production capacity. This will need additional capital equipment.

2) **Diversification**: A company may intend to reduce its risk by operating in several activities. In such a case, capital investment may become necessary for purchase of new machinery and facilitates to handle the new products.

3) **Replacement**: The replacement of fixed assets in place of the existing assets, either being worn out or become out-dated on account of new technology.

4) **Research and Development**: Large sums of money may have to be spent for research and development, in case of those industries where technology is rapidly changing. In such cases, large sums of money are needed for research and development activities. So, these are also included in the proposals of capital budgeting.

5) **Miscellaneous Proposals:** A company may have to invest money in projects, which do not directly help in achieving profit-oriented goals. For example, installation of pollution control equipment may be necessary on account of legal requirements. Therefore, funds are required for such proposals also.

3.3 SIGNIFICANCE OF CAPITAL BUDGETING

Capital budgeting decisions are among the most crucial and critical decisions and they have significant impact on the futrue profitability of the from. A special care should be taken while making capital budgeting decisions, because, it influences all the branches of a company such as production, marketing, personnel, etc. The other reasons for keeping more attention on capital budgeting dicesion include the following:

1) **Long-Term Implications:** The effect of a capital budgeting decision will be felt over a long time period. It has an influence on the rate and direction of the growth of the company. The effects of capital budgeting decision extend into the future and have to be put up with for a longer period than the conseqences of current operating expenditures.

2) **Investment of large funds**: Capital budgeting decision requires large amount of capital outlay. Hence, the company should carefully plan its capital budgeting programme, so that it may get the funds at the right time and they must be put to most profitable use. A wise investment can maximize the wealth of the company and an ill-advised and incorrect decision can jeopardise the profitable position and can also be the cause for the closure of the company.

3) **Irreversible Decisions:** The capital budgeting decisions are irreversible in majority of the cases. It is due to the fact that, it is very difficult to find a market for such capital terms once they have required. The only alternative is to treat the entire value of the asset as a scrap. This will result in heavy loss.

4) **Most difficult to make:** Capital budgeting decisions involve forecasting of future benefits which is almost uncertain. It is very difficult to project sales revenue, costs and benefits accurately in quantitative terms because of the influence of economic, political, social and technological factors. Further, the inaccurate forecast of asset needs can result in serious consequences on the companys perfarmance.

5) **Raising of Funds:** There must be a perfect plan to raise the funds systematically. The company, planning for a major capital expenditure, needs to arrange finance in advance, to be sure of having the availability of funds.

6) Ability to compete: Finally, it has been said that, many firms fail not because of lack of capital equipment but because of lack of ability to compete. The conservative approach of having a small amount of capital equipment may be appropriate. But, some times it may be dangerous if the other competitors install modern and automated equipment that permit them to produce a better product and sell it at a lower price. Hence, the investment in capital assets must help the company to face and meet the competition from the other companies of the same industry.

3.4 TYPES OF CAPITAL BUDGETING

Capital budgeting projects may be classified as:

1) Independent Projects: Independent Projects are the projects which do not compete with one another. Based on the profitability of the projects and the availability of funds, a company undertakes any number of projects. In such a case, projects will be taken-up to a level where marginal cost of funds equals to marginal rate of return of the project.

2) Mutually Exclusive Projects: In case of mutually exclusive projects, acceptance of one project causes the rejection of another project. For example, if there are two projects - X and Y, either X or Y should be accepted by the company.

3) Contingent Projects: Acceptance of one project proposal depends on acceptance of one or more projects. A proposal for acquiring new machinery is dependent upon expansion of plant or replacement of old machinery or replacement of labour force.

3. 5 CAPITAL BUDGETING PROCESS

The capital budgeting process involves generation of investment proposals, estimation of cash flows for the proposals, evaluation of cash flows, selection of projects based on acceptance criterion and finally the continual revaluation of investment after their acceptance. The steps involved in capital budgeting process are as follows:

        i)   Project generation
        ii)   Project evaluation
        iii)   Project selection
        iv)   Project execution

i) Project Generation

In the project generation stage, the company has to identify the proposals to be undertaken depending upon its future plan of activity. After identification of the proposals, they can be grouped according to the following categories:

i.   Replacement of Equipment: In this case, the existing old and out-dated equipment may be replaced by purchasing new and modern equipment.

ii.   Expansion: The company can go for increasing capacity in the existing product line by purchasing additional equipment.

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iii. **Diversification**: The company can diversify its product lines by way of producing various products and entering into different markets. For this purpose, it has to acquire the fixed assets to enable producing new products.

iv. **Research and Development**: Where the company can go for installation of research and development wing by incurring heavy expenditure, with a view to innovate new methods of production, new products, new sources, new technology.

ii) **Project Evaluation**:

The process of project evaluation involves two steps:

i. **Estimation of benefits and costs**: These must be measured in terms of cash flows. The benefits to be received are measured in terms of cash inflows, and costs to be incurred are measured in terms of cash outflows.

ii. Selection of an appropriate criterion to judge the desirability of the project.

iii) Project Selection:

There is no standard administrative procedure for approving the investment decisions. The screening and selection procedure would be differ from firm to firm. Due to lot of importance of capital budgeting decision, the final approval of the project may generally rest on the top management of the company. However, the proposals are scrutinized at multiple levels. Sometimes, top management may delegate authority to approve certain types of investment proposals. The top management may do so by limiting the amount of cash outlay, prescribing the selection criteria and holding the lower management levels accountable for the results.

iv) Project Execution:

In the project execution, the top management or the Project Execution Committee is responsible for effective utilization of funds allocated for the projects. It must see that the funds are spent in accordance with the appropriation made in the capital budgeting plan. The funds for the purpose of the project execution must be spent only after obtaining the approval of the Finance Controller.

v) Profit Review :

After the excution, a continous monitoring of the project is imperative so that expected and actual operating results compared. This helps in taking corrective action against the responsible people.

3.6 NEED FOR ESTIMATION OF CASH FLOWS

Capital expenditure decisions are of considerable significance due to their impact on the value of the firm. Thus, the future success and growth of the firm depends heavily on effectiveness of its capital budgeting decisions. To evaluate the effectiveness of the investment opportunities, one has to estimate the cash inflows and outflows of the project. The estimation of inflows and outflows of an investment decision is not a simple task, because, the benefits (inflows) from investments are received in some future period. The future is uncertain. The cost incurred and benefits received from the Capital Budgeting decisions recur in different time periods. These cash flows cannot be compared in straightaway manner, because of time value of money.

Hence, to evaluate the profitability of investment decision, cash inflows and outflows are to be calculated and compared by taking necessary care.

3.7 CASH FLOWS VS. ACCOUNTING PROFIT

As it is already pointed out, to evaluate any Capital investment proposal, it is necessary to estimate future benefits accruing from the investment proposal. Theoretically, two alternative criteria are available to quantify the future benefits: i) Accounting Profits and ii) Cash Flows. The difference between these two is mainly due to the presence of non-cash expenditure i.e. depreciation. Depreciation is non-cash expenditure, which does not involve any cash outflow. Where as the accounting profit is arrived at after deducting the amount of depreciation from the operating profits of the business, so that the amount of depreciation should be added to the profit after tax to know the actual cash inflow. The cash inflow approach of measuring future benefits of the project is superior to the accounting approach.

While considering the investment proposal, the firm is really interested in estimating its economic value. The economic value can be determined by the economic outflows and inflows related to investment project. The use of cash flows avoids accounting ambiguities. There are various ways to value inventory, allocate costs, calculate depreciation and amortisation of various expenses. Different net incomes will be arrived at under different accounting procedures. But, there is only one set of cash flows associated with the project. Further the cash flow approach considering the time value of money, whereas the accounting approach ignoring it.

Under usual accounting practice, revenue is recognized as being generated when the product is sold, but not when the cash is collected from the sale. Sales revenue may remain a paper figure for months or years before payment of the invoice is received. Expenditure is recognized as being made when incurred and not when the actual payment is made. Depreciation is deducted from the gross revenues to determine the earnings before-tax. Such procedure presents an accurate picture of the true benefits of a particular project. But, it ignores the increased flow of funds available for other use. Thus, accounting profits are quite useful for measuring performance, but less useful as decision criteria. The difference between the cash flow approach and the accounting profit approach is explained with the following example.

A comparison of Cash Flow (CFAT) and Accounting profit approaches

Item	Accounting Approach Rs.		Cash Flow Approach Rs. (CFAT)	
Net Revenues		10,00,000		10,00,000
Less: Expenses: Cash				
Non-cash (depreciation)	6,00,000		6,00,000	
	1,50,000	7,50,000		
Earnings before tax		2,50,000		
Less: Taxes @ 50%		1,25,000	1,25,000	7,25,000
Net earnings after taxes/ Cash flow		1,25,000		2,75,000

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The difference between accounting profits (Rs.1,25,000) and cash flows (Rs.2,75,000) attributed to the depreciation charge is Rs.1,50,000. The cash available with the firm is Rs.2,75,000. This can be utilized for further investment. The accounting profit approach indicates that only Rs.1,25,000 is available. Hence, it gives only a partial picture of tangible benefits available. Therefore, in place of earnings, cash flows are used in evaluating capital expenditure alternatives.

3.8 COMPONENTS OF CASH FLOWS

For evaluating the profitability of investment opportunities, net capital outlays of the project are to be compared with the net cash inflows emerging from the project. Further, anticipated streams of cash benefits available during the lifetime of the project have to be computer into present value, so as to make them comparable with net capital outlay being incurred presently. Thus, the following are the components of an investment analysis.

1. Identifying net capital outlay
2. estimating streams of net cash inflows after taxes
3. computation of cash flows in terms of their time value

1. Identification Net Cash outflows :

The total net cash outflows represents the net amount of capital expenditure in executing a capital project. The net capital outlay of a project includes the cost of purchasing land, building, plant and additional working capital required to carryout the investment proposals. If a project results in the replacement of an existing capital asset, its current book value is a sunk cost *. However, its salvage value is deducted from the capital outlay of the new project in order to arrive at the net investment outlay.

Since payment of income tax results in cash expenditure, tax on profit on sale of an existing asset, in case of a replacement decision, is added to the capital outlay of the new project. Investment allowance, if any is deducted from the capital outlay for arriving at the net capital outlay.

2. Estimation of Net Cash inflows : (CFAT)

Net cash inflows are the estimates of future streams of cash inflows resulting from the implementation of a project. These estimates are based on a number of factors. The forecasts relate to production, market share, sales revenues, profit margin, tax laws, state of the economy, etc. Cash inflows at different points of time have to be estimated on the basis of various forecasts. Though based on systematic forecasts and past experiences about the firm and industry, projections of future cash inflows based on these estimates are not absolute. Net cash inflows are estimates of cash revenues minus cash expenditures.

Since depreciation is a book adjustment and does not involve any cash outflows, it is not deducted from cash inflows for estimating the net cash inflows. But tax-benefit result from depreciation appropriation is included in cash inflows. The scrap value of an asset at the end of its operational life is another component of cash inflow. The removal expenses and capital gain taxes, if any, are deducted from the salvage value of the asset. Thus, net cash inflows are equal to cash revenues minus cash expenses plus tax benefit from depreciation appropriation plus salvage value of asset, net of removal expenses and capital gains tax plus value of current assets released.

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* Sunk cost means the cost which cannot be recovered back.

3. Computation of Cash Flows in terms of their Time Value:

After determining the capital outlay of the project and economic gains which will be derived from the project, Finance manager's next task is to reduce them in present value. The present value of the capital outlay need not be calculated because it has to be incurred in the current year. But, in case of cash earnings which will be received over lifetime of the project, the question of finding out their present value arises. An understanding of the concept of present value is, therefore, imminent.

Present Value:

The concept of present value provides the underlying relationship between values of series of payments and revenues at different points of time. It is widely recognised that money has a time value. A rupee to be received a year from now is not worth as much today as a rupee to be received now. Atleast three factors contribute to the time value of money.

3.9   COMPUTATION OF CASH FLOWS:

The data required for capital budgeting are about cash flows i.e. outflows and inflows. Their computation depends on the nature of the proposal. The capital projects can be categorised into:

    i.   single Proposal
    ii.   replacement projects
    iii. mutually exclusive projects

The computation of cash inflows and outflows with reference to these are explained in the following proposals.

i) Cash Flows: Single Proposal

The cash outflows required to carryout the proposed capital expenditure is depicted in the following format.

Format-1:

Cash outflows of a new project (Beginning of the period at zero time, t = 0)

Cost of new project (Land, Building, Plant, Machinery etc.)	x x x
+ Installation cost of plant and equipments	x x x
± Working Capital requirements	x x x
Net Cash Outflow	x x x

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Format-2:

Determination of Cash Inflows (CFAT) : Single Investment Proposal, (t = 1 to N years)	
Cash sales revenue	x x x
Less: Cash operating cost	x x x
Cash flows before depreciation and taxes (CFBT)	x x x
Less: Depreciation	x x x
Profit/Earnings Before Tax (PBT)	x x x
Less: Tax liability	x x x
Profit after tax (PAT)	x x x
Add: Depreciation	x x x
Cash flows after tax (CFAT)	x x x
Add: Salvage value (in 'n' th year)	x x x
Add: adjustment of working capital (in 'n' th year)	x x x

Example-1:

The marketing department of a firm estimates that 10,000 units of a product can be sold annually at a selling price of Rs.20/- per unit. The variable expenses are Rs.12/- per unit, towards, manufacturing and selling the product. It also involves a fixed cost of Rs.10,000 per annum.

A machine with a cost of Rs.1,00,000 and has an useful life of 10 years, be purchased to produce the product. The installation cost would amount to Rs.10,000 and additional working capital requirement is Rs.40,000. The firm uses straight line method of depreciation. The firm is in a tax bracket of 50%.

You are required to compute the relevant cash flows (out flows and inflows) associated with the acquisition of the machine, assuming that:

    a) there is no salvage value
    b) the salvage value is Rs.5000 for depreciation purpose

      i) it is ignored
      ii) it is considered

Solution:

Cash outflows at the beginning (t = 0)	Rs.
Cost of new machine	1,00,000
Add: installation charges	10,000
Add: additional working capital requirement	40,000
Total cash outflow	1,50,000

(a) cash inflow during life of Project (t = 1 to n years) No salvage value.

Year	Sales revenue	operating cost	Depreciation	Taxable Income (2-(3+4))	Taxes @ 50%	Earnings after taxes	Cash Flows After Tax (CFAT) (7+4)
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	2	3	4	5	6	7	8
1-9	2,00,000	1,20,000	11,000	69,000	34,500	34,500	45,500
10	2,00,000	1,20,000	11,000	69,000	34,500	34,500	45,500
Add: Additional working capital recovery:							40,000
							85,500

(b) (i) (salvage value, but ignored for depreciation purpose)

1-9	2,00,000	1,20,000	11,000	69,000	34,500	34,500	45,500
10	2,00,000	1,20,000	11,000	69,000	34,500	34,500	45,500
Add: additional working Capital recovery :							40,000
Salvage Value			Rs.5000				85,500
Less: Tax on salvage value			- 2500				2,500
Represents profit			--				88,000

(b) (ii) salvage value considered for depreciation purpose.

1-9	2,00,000	1,20,000	10,500	69,500	34,750	34,750	45,250
10	2,00,000	1,20,000	10,500	69,500	34,750	34,750	45,250
Add: working capital recovery :							40,000
salvage value (no tax adjustment)							5,000
							90,250

    i) Depreciation $(Rs.1,00,000 + 10,000) \Rightarrow 10$ years $= Rs.11,000$

    ii) Depreciation $([Rs.1,00,000+10,000) - 5000] \Rightarrow 10$ years $= Rs.10,500$

ii) Cash Flows : Replacement Projects :

In case of replacement of an existing asset by a new one, the relevant cash outflows are incremental after tax cash flows. The sale proceeds of the existing asset reduce cash out flows required to purchase a new asset. To determine relevant cash outflows not only the cash proceeds of the existing assets but also their tax effects on cash flows must be taken into consideration. Tax effect on cashflows depends on the relationship between the sale proceeds, the initial purchase price and the present book value of an asset being replaced. There are four distinct possibilities.

    i)   asset is sold for a price more than its initial purchase price.

    ii) asset is sold for a price more than its book value but less than its initial

        purchase price.

    iii) asset is sold for a price which is exactly equal to its book value.

    iv) asset is sold for a price less than its book value.

Format-3:

Cash outflows in a replacement situation	
Cost of new machine	x x x
Add: Installation charges	x x x
Add: Working Capital	x x x
	x x x
Less: Sale proceeds of the existing asset	x x x
Add/Less: Taxes paid/saved on sale of the asset	x x x
Net cash outflow	x x x

Format-4:

Determination of Cash Flows After Tax (CFAT) in Replacement investment decision					
	Year 1	2	3	4	5
Cash Inflow Before Tax (CFBT): (sales revenue - operating cost) proposed/new - existing / old					
surplus (deficiency)	-	-	-	-	-
Less: Taxes	-	-	-	-	-
a) Incremental CFAT	-	-	-	-	-
depreciation (proposed/new-existing/old)					
excess depreciation	-	-	-	-	-
b) tax savings on excess depreciation	-	-	-	-	-
(a+b) Incremental CFAT					
Add/Less: working capital recovery to be added in 'n' th year					

Example-2:

ABC Ltd., is currently using a machine which was purchased two years ago for Rs.1,40,000/- and has a remaining useful life of 5 years. The company is considering to replace the existing machine with a new one which will cost Rs.2,80,000. The installation cost will be Rs.20,000. The increase in working capital will be Rs.50,000. The expected cash inflows before depreciation and tax are as follows:

Years	Existing Machine	New Machine
1	60,000	1,00,000
2	60,000	1,20,000
3	60,000	1,50,000
4	60,000	2,00,000
5	60,000	2,20,000

The company uses straight-line method of depreciation. The average tax on income is 50% and the capital gain tax is 30%.

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calculate incremental cash flows assuming sale value of existing machine.
i) Rs.1,60,000   ii) Rs.1,20,000   iii) Rs.1,00,000 and iv) Rs.60,000

Solution:

Incremental cash outflows at t = 0

(Rs.)

	Different situations			
	(i)	(ii)	(iii)	(iv)
	Rs.	Rs.	Rs.	Rs.
Cost of new machine	2,80,000	2,80,000	2,80,000	2,80,000
Add: Installation cost	20,000	20,000	20,000	20,000
Add: Working capital (additional)	50,000	50,000	50,000	50,000
	3,50,000	3,50,000	3,50,000	3,50,000
Less: Sale proceeds of the existing machine	1,60,000	1,20,000	1,00,000	60,000
	1,90,000	2,30,000	2,50,000	2,90,000
Add: Taxes paid/less taxes saved	+ 26,000	+ 10,000	-	20,000
Net cash outflow	2,16,000	2,40,000	2,50,000	2,70,000

Determination of tax liability/saved.

(Rs.)

	(i)	(ii)	(iii)	(iv)
	Rs.	Rs.	Rs.	Rs.
Current book value of plant (Original cost Rs.1,40,000 - accumulated depreciation @ Rs.20,000 each year for 2 years)	1,00,000	1,00,000	1,00,000	1,00,000
Less: Sale value	1,60,000	1,20,000	1,00,000	60,000
Profit/Loss	60,000	20,000	-	20,000
Tax (payable on profits/savings or losses)	** 26,000	10,000	-	10,000

** Capital gain Rs.20,000 (Rs.1,60,000 - Rs.1,40,000) and ordinary gain Rs.40,000 (Rs. 1,40,000 - Rs.1,00,000)
Taxes are (Rs.20,000 x 30%) + (40,000 x 50%) = Rs.26,000

Incremental cash Inflows After Taxes (t = 1-5)

Flow Years	1	2	3	4	5
Cash before taxes (CFBT)					
New Machine	1,00,000	1,20,000	1,50,000	2,00,000	2,20,000
Old Machine	60,000	60,000	60,000	60,000	60,000
	40,000	60,000	90,000	1,40,000	1,60,000
Less tax @ 50%	20,000	30,000	45,000	70,000	80,000
(a) Incremental CFAT	20,000	30,000	45,000	70,000	80,000

Depreciation:

New machine (Rs.3,00,000 + 5 years)	60,000	60,000	60,000	60,000	60,000
Old machine	20,000	20,000	20,000	20,000	20,000
Excess depreciation	40,000	40,000	40,000	40,000	40,000
(b) Tax saving on excess depreciation	20,000	20,000	20,000	20,000	20,000
Incremental Cash Flows after Tax (a+b)	40,000	50,000	65,000	90,000	1,00,000
Add: working capital recovery					50,000
					1,50,000

ALTERNATIVELY

Incremental Cash Inflows After Taxes (t = 1-5)

(Rs.)

Years

Incremental Cash Flow Before Tax (New-Old)	40,000	60,000	90,000	1,40,000	1,60,000
Less: Excess depreciation	40,000	40,000	40,000	40,000	40,000
Taxable income (incremental)	-	20,000	50,000	1,00,000	1,20,000
Less: Tax @ 50%	-	10,000	25,000	50,000	60,000
Earnings after tax (incremental)	-	10,000	25,000	50,000	60,000
Add: Excess depreciation	40,000	40,000	40,000	40,000	40,000
Cash Flow After Tax (incremental)	40,000	50,000	65,000	90,000	1,00,000
Add: recovery of working capital					50,000
					1,50,000

iii) Cash Flows : Mutually Exclusive projects :

Mutually exclusive projects are the Projects which compete with one another. Acceptance of one will cause the rejection of other projects. Alternatives are mutually exclusive and only one may be chosen. The best alternative automatically eliminates the other alternatives.

Example:

The ABC Ltd., has under consideration two mutually exclusive proposals with the following information:

	Alpha	Beta
Net cash outlay (t = 0)	Rs.4,00,000	Rs.3,00,000
Net cash savings in operating expenses Before depreciation and taxes		
Year 1	1,00,000	72,000
Year 2	1,20,000	80,000
Year 3	1,40,000	88,000
Year 4	1,00,000	80,000
Year 5	80,000	64,000

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You are required to calculate cashflows assuming that the firm is following straight line method of depreciation and its tax rate is 50% and the asset has no salvage value.

Relevant cash flows, mutually exclusive projects

a) Cash outflow of Proposal Alpha Rs.4,00,000   b) Beta Rs.3,00,000

Estimation of CFAT of Mutually Exchange Projects

Year	Savings in operating Expenses (Rs.)	Depreciation (Rs.)	PBT (Rs.)	Tax @ 50% (Rs.)	PAT (Rs.)	CFAT (Rs.)
a) Cash flow of Proposal Alpha:						
1	1,00,000	80,000	20,000	10,000	10,000	90,000
2	1,20,000	80,000	40,000	20,000	20,000	1,00,000
3	1,40,000	80,000	60,000	30,000	30,000	1,10,000
4	1,00,000	80,000	20,000	10,000	10,000	90,000
5	80,000	80,000	-	-	-	80,000
b) Cash flow of Proposal Beta:						
1	72,000	60,000	12,000	6,000	6,000	66,000
2	80,000	60,000	20,000	10,000	10,000	70,000
3	88,000	60,000	28,000	14,000	14,000	70,000
4	80,000	60,000	20,000	10,000	10,000	70,000
5	64,000	60,000	4,000	2,000	2,000	62,000

3.11   SUMMARY:

The ultimate objective of the financial management is to maximise the satisfaction of all stakeholders in general and wealth of shareholders in particular. To achieve these objectives the firm has to allocate its resources in an effective manner. Allocation of current funds with an anticipation of future returns may be known as Capital Budgeting. Capital Budgeting decision is one of the most important decisions of a business concern. It involves the estimation of cash outflows and inflows of a project. It has an impact over the future profitability and survival of the firm. Moreover, they are irreversible and may be difficult.

3.12 KEY WORDS

Capital Budget   :   It is the firm's formal plan for the investment of long-term funds in purchase of fixed assets.

Accept-Reject   :   Evaluation of Capital Budgeting proposals to determine whether
criterion   the project under consideration satisfies the minimum acceptance standard and should be accepted.

Capital Budgeting:		The process of generating, evaluating, selecting and following up on capital expenditure projects. The methods employed to evaluate the worth of the capital expenditure proposals are known as Capital Budgeting techniques.
Cash Outflows / Outlay	:	Investment to be made for acquiring an asset from which benefits would be available beyond one year.
Cash Inflows	:	Expected benefits over a project during its life time.

3.13 SELF ASSESSMENT QUESTIONS:

1. Define the concept of Capital Budgeting and explain its significance.

2. What do you mean by Capital Budgeting Process? Explain the various steps in this process.

3. Differentiate between Cash flow and Accounting Profit.

4. Discuss the various components of Cash flows.

5. Describe the procedure of computation of Cash flows.

3.14 FURTHER READINGS :

Khan & Jain   :   Financial Management, Tata McGraw Hill Co., New Delhi

Pondey, IM   :   Financial Management, Vikas Publications, New Delhi

Hampton   :   Financial Decision Making, Prentice Hall of India, New Delhi

LESSON - 4

CAPITAL BUDGETING: UNDER CERTAINTY

4.0 OBJECTIVES :

The objectives of this lesson are to :

1) make the students familiar about investment criterion.

2) impart knowledge about various techniques for appraisal of investment decisions..

3) make realise the importance of time value of money.

4) inculcate the skill of choosing projects under capital rationing.

STRUCTURE

4.1. INTRODUCTION:

In the previous lesson you have studied about the nature, meaning and importance of capital budgeting. It is also explained about the types and process of capital budgeting decision making. The estimation of cash flows which is a pre requisite for evaluating the projects was also explained. This lesson is devoted to explain the methods of capital budgeting both traditional and discounted cash flow techniques with merits, demerits and their applicability. At the end the conpcet of capital ratining also discussed.

4.2 INVESTMENT CRITERION - METHODS OF APPRAISAL

The capital budgeting appraisal methods or techniques for evaluation of investment proposals will help the company to decide the desirability of an investment proposal, depending upon their relative income generating capacity and rank them in order of their desirability. These methods provide the company a set of norms on the basis of which, either it has to accept or reject the investment proposal. Therefore, a sound appraisal method should enable the company to measure the real worth of the investment proposal. The appraisal methods should posses several good characteristics, which are mentioned as under.

Characteristics of a Sound Appraisal Method

i). It should help the company to rank the investment proposals in order of their desirability.

ii). It should provide a technique for distinguishing between an acceptable and non-acceptable project.

iii). It should provide a criteria to solve the problem of choosing among alternative projects.

iv). It should recognise the importance of time value of money i.e., bigger benefits are preferable to smaller ones and early benefits are preferable to later benefits.

v). It should provide the criteria for the selection of investment proposals.

vi). It should take into account the pattern of cash flows.

The criteria for the appraisal of investment proposals are grouped into two types :

    A. Traditional methods

        i) Pay Back Period Method

        ii) Accounting or Average Rate of Return (ARR)

    B. Time-adjusted or discounted cash flow Techiqurs

        i) Net Present Value (NPV)

        ii) Internal Rate of Return (IRR)

        iii) Profitability Index (PI)

        iv) Discounted payback method

4.3 TRADITIONAL METHODS :

These methods are based on the principles to determine the desirability of an investment project on the basis of its useful life and expected returns. These methods depend upon the accounting information

available from the books of accounts of the company. These will not take into account the concept of 'time value of money' which is a significant factor to determine the desirability of a project in terms of present value.

4.3.1 Pay-back Period :

It is the most popular and widely recognised traditional method of evaluating the investment proposals. It can be defined as "the number of years required to recover the original capital invested in a project". According to Weston and Brigham, "the pay back period is the number of years it takes for the firm to recover its original investment by net returns before depreciation, but after taxes". It can be calculated with the help of the following formula :

$$\text{Pay back period} = \frac{\text{Cash oulay}}{\text{Annual cash inflows}}$$

The pay back period can be used as an accept or reject criterion as well as a method of ranking projects. The pay back period is the number of years to recover the investment made in a project. If the pay back period calculated for a project is less than the maximum pay back period set - up by the company, it can be accepted. As a ranking method it gives the highest rank to a project which has the lowest pay back period, and the lowest rank to a project with the highest pay back period. Whenever a company faces the problem of choosing among two or more mutually exclusive projects, it can select a project on the basis of pay back period, which has shorter period than the other project.

Merits : The following are the merits of the pay back period method.

i. **Easy to caliculate :** It is one of the easiest methods of evaluating the investment projects. It is simple to understand and easy to compute.

ii. **Knowledge :** The knowledge of pay back period is useful in decision-making, the shorter the period better the project.

iii. **Protection from loss due to obsolescence:** This method is very suitable to such industries where mechanical and technical changes are routine practice and hence, shorter pay back period practice avoid such losses.

iv. **Easily availability of information :** It can be computed on the basis of accounting information, what is available from the books.

Demerits: However, the pay back period has certain demerits:

i). **Failure in taking cash flows after payback period :** This methods is not taking into account the cashflows received by the company after the pay back period;

ii). **Not considering time the value of money:** It does not take into account the time value of money;

iii). **Non-consideration of interest factor:** It does not take into account the interest factor involved in the capital outlay.

iv). **Maximisation of market value not possible**: It is not consistent with the objective of maximising the market value of the share;

v). **Failure in taking magnitude and timing of cash inflows**: It fails to consider the pattern of cash inflows i.e., the magnitude and timing of cash inflows.

a) **When cash flows are uniform** : If the proposed project's cash inflows are uniform the following formula can be used to calulate the pay back period.

$$\text{Pay back period} = \frac{\text{Initial Investment}}{\text{Annual cash inflows}}$$

Example 1 A project requires an initial investment of Rs.1,00,000/- with an useful life of 5 years. The projected cash inflows after tax (CFAT) are as follows.

Year	1	2	3	4	5 .
CFAT	Rs.40,000	Rs.40,000	Rs.40,000	Rs.40,000	Rs.40,000

Calculate pay back period.

Solution:-

Since the cashflows of the project are uniform for all the years payback period may be computed by using the following formula.

$$\text{Pay back period} = \frac{\text{Initial Investment}}{\text{Annual cashflow}} = \frac{\text{Rs.1,00,000}}{\text{Rs.40,000}} = 2.5 \text{ years}$$

Note : Pay back period is always expressed in years.

When cashflows are not uniform.

In the previous example, it is assumed that the cash inflows are uniform. But, in practice inflows may change from year to year. In such a case, pay back period can be computed by cumulating the annual cashflows.

Example : 2 A machine costs Rs.4,00,000 and is expected to generate the following cash flows during its lifetime.

Compute the pay back period.

Year	1	2	3	4	5	6	7	8	9	10
CFAT (Rs.)	60,000	80,000	40,000	1,00,000	1,10,000	80,000	60,000	1,50,000	1,40,000	1,80,000

Solution:

Given the cashflows are not uniform we have to calculate cumulative cashflows.

Year	CFAT(Rs)	Cumulative CFAT (Rs.)
1	60,000	60,000
2	80,000	1,40,000
3	40,000	1,80,000
4	1,00,000	2,80,000
5	1,10,000	3,90,000
6	80,000	4,70,000
7	60,000	5,30,000
8	1,50,000	6,80,000
9	1,40,000	8,20,000
10	1,80,000	10,00,000

$$Pay \ back \ period = Base \ year + \frac{Required \ CFAT}{Next \ year \ CFAT}$$

$$Pay \ back \ period = Base \ 5 years + \frac{Rs. \ 10,000}{Rs. \ 80,000} = 5.125 \ years \ \text{(5 years 1manth 15 day)}$$

Example : Dugar Ltd., is producing articles by manual labour and is considering to replace it by a machine. There are two alternative models 'M' and 'N' of the machine. Prepare a statement of profitability showing the pay-back period from the following information:

	Machine M Rs.	Machine N Rs.
Estimated life of the machine	4 years	5 years
Cost of the machine	9,000	18,000
Estimated savings in scrap	500	800
Estimated savings in direct wages	6,000	8,000
Additional cost of maintenance	800	1,000
Additional cost of supervision (ignore taxation)	1,200	1,800

Solution: Statement showing annual cash inlows

	Machine M Rs.	Machine N Rs.
Estimated savings in scrap	500	800
Estimated savings in direct wages	6,000	8,000
Total savings (A)	6,500	8,800
Additional cost of maintenance	800	1,000
Additional cost of supervision	1,200	1,800
Total additional costs (B)	2,000	2,800
Net cashinflow (A-B)	**4,500**	**6,000**

$$\text{Pay back period} = \frac{\text{Original Investment}}{\text{Average Annual cashflows}}$$

$$\text{Machine } M = \frac{Rs. 9,000}{Rs. \ 4,500} = 2 \ years$$

$$\text{Machine } N = \frac{Rs. 18,000}{Rs. \ 6,000} = 3 \ years$$

Machine 'M' has a shorter pay-back period hence it should be preferred to Machine N.

4.3.2 Accounting or Average Rate of Return (ARR) :

This technique uses the accounting information revealed by the financial statements to measure the profitability of an investment proposal. It can be determined by dividing the average income after taxes by the average investment. According to Soloman, accounting rate of return can be calculated as the ratio, of average net income to the initial investment.

On the basis of this method, the company can select all those projects whose ARR is higher than the minimum rate established by the company. It can reject the projects with an ARR lower than the expected rate of return. This method also helps the management to rank the proposals on the basis of ARR.

$$\text{Accounting Rate of Return (ARR)} = \frac{\text{Average Net Income}}{\text{Average Investment}}$$

Merits: The following are the merits of ARR method:

1. It is very simple to understand and calculate;

2. It can be readily computed with the help of the available accounting data;

3. It uses the entire stream of earnings to calculate the ARR.

Demerits: This method has the following demerits:

1. It is not based on cashflows generated by a project;
2. This method does not consider the objective of wealth maximisation;
3. It ignores the length of the projects useful life;
4. It does not take into account the fact that the profits can be re-invested; and
5. It ignores the time value of money.

Example 4 : A Machine costs Rs.10,00,000 has a 5 years life and no scrap. It is depreciated on straight line basis. The expected net earnings after depreciation and taxes are as follows.

Year	1	2	3	4	5
Net Earning after Taxes (in Rs.)	1,00,000	1,50,000	2,00,000	1,80,000	1,70,000

Calculate accounting rate of return.

Solution:-

Averageearningsafter taxes

$$= \frac{Rs.\,1,00,000 + Rs.\,1,50,000 + Rs.\,2,00,000 + Rs.\,1,80,000 + Rs1,70,000}{5}$$

$$= \frac{Rs.\,8,00,000}{5} = Rs.\,1,60,000$$

$$Average\ Investment = \frac{Rs.\,10,00,000}{2} = Rs.\,5,00,000$$

$$Accounting\ Rate\ of\ Re\,turn\,(ARR) = \frac{Rs.\,1,60,000}{Rs.\,5,00,000} \times 100 = 32\%$$

ARR can also be calculated on total investment $= \dfrac{Rs.\,1,60,000}{Rs.\,10,00,000} \times 100 = 1$(

Example 5 : Determine the Average Rate of Return from the following data of two Machines A and B.

	Machine A (Rs)	Machine B (Rs)
Original cost	60,000	60,000
required Net working capital	5,000	6,000
Estimated Salvage Value	3,000	3,000

Annual Estimated Income after Depreciation and Taxes:

	Machine A (Rs)	Machine B (Rs)
Year 1	4,000	12,000
Year 2	6,000	9,000
Year 3	8,000	8,000
Year 4	9,000	6,000
Year 5	12,000	4,000
TOTAL :	39,000	39,000

Estimated life in years		5	5
Income tax rate		50%	50%

Depreciation has been charged on Straight line method.

Solution:

$$ARR = \frac{\text{Average Income}}{\text{Average Investment}} \times 100$$

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

$$\text{Machine } A = \frac{Rs.39,000}{5} = 7,800$$

$$\text{Machine } B = \frac{Rs.39,000}{5} = Rs.7,800$$

$$\text{Average Investment} = \frac{\text{Original Investment} - \text{Scrap Value}}{2} + (\text{working capital require}$$

$$\text{Machine } A = \frac{Rs.60,000 - Rs.3,000}{2} + (Rs.5,000 + Rs.3,000) = Rs.36,500$$

$$\text{Machine } B = \frac{Rs.60,000 - Rs.3,000}{2} + (Rs.6,000 + Rs.3,000) = Rs.37,500$$

$$ARR \text{ for Machine } A = \frac{Rs.7,800}{36,500} \times 100 = 21.37\%$$

$$ARR \text{ for Machine } B = \frac{Rs.7,800}{37,500} \times 100 = 20.8\%$$

Machine A is preferable, because its ARR is higher than machine B.

4.4 DISCOUNTED CASH FLOW TECHNIQUES:

The discounted cash flow methods provide a more objective basis for evaluating and selecting an investment project. These methods consider the magnitude and timing of cashflows in each period of a project's life. Discounted cashflow methods enable us to isolate the differences in the timing of cashflows of the project by discounting them to know the present value. The present value can be analysed to determine the desirability of the project. These techniques adjust the cashflows over the life of a project for the time value of money. The popular discounted cashflow techniques are:

a) Net present value

b) Internal rate of return, and

c) Profitability index

Time Value of Money.

The value of money received today is more than the value of money received after some time in the future. due to the following reasous :

i) **Inflation**: Under inflationary conditions the value of money expressed in terms of its purchasing power over goods and services declines.

ii) **Risk**: Having one rupee now is certain, where as one rupee receivable tomorrow is less certain. That is a bird-in-the-hand principle is most important in the investment decisions.

iii) **Personal consumption preference** : Many individuals have a strong preference for immediate rather than delayed consumption. The promise of a bowl of rice next week counts for little to the starving man.

iv) **Investment opportunities**: Money like any other commodity has a price. Given the choice of Rs.1000/- now or the same amount in one year time, it is always preferable to take Rs.1000/- now. because it could be invested over the next year @ 12% interest, to produce Rs.1,120/- at the end of year. If the risk-free rate of return is 12%, then you would be indifferent in receiving Rs.1000/- now or Rs.1120 in one year's time. In other words, the present value of Rs.1120/- receivable one year hence is Rs.1000/

4.5 Present value:

The value of a firm depends upon the net cash inflows generated by the firm assets and also on future returns. The amount of cash inflows and the risk associated with the uncertainty of future returns forms the basis of valuation. To get the present value, cash inflows are to be discounted at the required rate of return i.e., minimum rate expected by the investor to account for their timing and risk. The cash inflows and outflows of an investment decision are to be compared at zero time period or at the same value by discounting them at required rate of return. The following formula can be used to discount the future inflows of a project to compare with its cash outflows.

$$V_0 = \frac{C_1}{(1+K)^1} + \frac{C_2}{(1+K)^2} + \frac{C_3}{(1+K)^3} + \dots\dots + \frac{C_n}{(1+K)^n}$$

$$V_0 = \sum_{t=1}^{n} \frac{Ct}{(1+.k)^t}$$

Where Vo = present value of cash inflows of the project during its life time.
$C_1, C_2, \dots C_n$ = Expected cash inflows of the project during its life time.
    K   = Discount rate.
    n   = Expected life of the project.

For example, if the annual cash inflows expected to be generated by an investment project for the next 10 years is Rs. 25,000 per annum and the rate of discount is 15%. Then the present value of the asset is :

$$V_0 = \sum_{t=1}^{10} \frac{Rs.25,000}{(1+.15)^{10}}$$

Using the present value of annuity table corresponding to 15% the discount rate for 10 years period the annuity factor is 5.0119.

Present value = Annual cash inflows x Annuity factor for 10 years @ 15%

So the present value is (Rs. 25,000 x 5.0119) Rs. 1,25,475/-

Example : 6

The present value of the cash flows of two machines A and B of example - 5 is calculated as :

Year	Machine A			Machine B		
	CFAT (Rs).	P.V. Factor at 10%	Present Value (Rs.)	CFAT (Rs).	P.V. Factor 0.10%	Present value (Rs).
1	4,000	0.909	3636	12,000	0.909	10908
2	6,000	0.826	4956	9,000	0.826	7434
3	8,000	0.751	6008	8,000	0.751	6008
4	9,000	0.683	6,147	6,000	0.683	4098
5	12,000	0.621	7,452	4,000	0.621	2,484
Total	39,000		28,199	39,000		30,932

Even though the total cashflow after tax (CFAT) for both ma ines, A and B are the same i.e. Rs. 39,000 but the present value of CFAT is different because of converting CFAT into their present value. The present value of CFAT of machine B is Rs. 30,932 which is greater than the present value of CFAT of machine A i.e.,Rs. 28,199. If the investment for both the machines, A and B is same Rs. 25,000 at zero time period investment over machine 'B' is more profitable.

4.4.1 Net present value (NPV) :

The net present value method is a classic method of evaluating the investment proposals. It is one of the methods of discounted cash flow techniques. Which recognises the importance of time value of money. It correctly postulates that cash flows arising at different time periods differ in value and are comparable only with their equivalents i.e., present values are found out.

It is a method of calculating the present value of cash flows (inflows and outflows) of an investment proposal using the cost of capital as an appropriate discounting rate. The net present value will be arrived at by subtracting the present value of cash outflows from the present value of cash inflows. According to Ezra Soloman, "it is a present value of the cost of the investment."

Steps to compute net present value :

i.   An appropriate rate of interest should be selected to discount the cash flows. Generally, this will be the "cost of capital" of the company, or required rate of return.

ii. The present value of inflows and outflows of an investment proposal has to be computed by discounting them with an appropriate cost of capital.

iii. The net present value is the difference between the present value of cash inflows and the present value of cash outflows.

The formula for the net present value can be written as :

$$NPV = \left[\frac{C_1}{(1+K)^1} + \frac{C_2}{(1+K)^2} + \frac{C_3}{(1+K)^3} + \ldots\ldots + \frac{C_n}{(1+K)^n} \right] - Co$$

Thus, the net present value is the difference between the present value of the future cash inflows after tax and the present value of cash outlays. Symbolically the NPV can be expressed as :

$$NPV = \sum PVAs - \sum C_0$$

Where $\sum PVAs$ = Total present values of cash inflows.

$\sum C_0$ = Total present value of cash outlays.

The present values of capital outlays and cash inflows are to be calculated using Present Value Tables given at the end of the book. The decision criteria for accepting or rejecting a project as given here is :

NPV > Zero	Accept
NPV < Zero	Reject
NP = O	may accept or reject

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

PV > Co	Accept
PV < Co	Reject
PV = Co	may accept or reject

Where,

PV = Total present values of cash inflows

C_0 = Total present value of cash outlays.

Zero NPV implies a situation where the firm can only recover the original investment.

Thus, under NPV technique, a project will be selected whose net present value is positive or above zero. If a project's NPV is less than "zero", it gives negative NPV, hence it must be rejected. The ranking of the proposals can be made by way of assigning ranks on the magnitude of positive net present value.

Merits: The following are the merits of the net present value (NPV) method:

(i) **Consideration to total Cash Inflows:** The NPV method considers the total cash inflows of investment opportunities over the entire life-time of the projects unlike the payback period method.

(ii) **Recognition to the Time Value of Money:** This method explicitly recognises the time value of money, which is inevitable for making meaningful financial decisions.

(iii) **Changing Discount Rate:** Since discounting rate changes due to time variations in cash inflows a changing discount rate can be used for the NPV calculations by altering the denominator.

(iv) **Best decision criteria for Mutually Exclusive Projects:** This method is particularly useful for the selection of mutually exclusive projects. It serves as the best decision criteria for mutually exclusive choice proprals.

(v) **Maximisation of the Shareholders Wealth :** finally, the NPV method is instrumental in achieving the objective of the maximisation of the shareholders' wealth. This method is logically consistent with the company's objective of maximising shareholders' wealth in terms of maximising market value of shares, and theoretically correct for the selection of investment proposals.

Demerits: The following are the demerits of the net present value method:

1. It is difficult to understand and use.

2. The NPV is calculated by using the cost of capital as a discount rate. But the concept of cost of capital itself is difficult to understand and determine.

3. It does not give solutions when the comparable projects are involved in different amounts of investment.

4. It does not give correct answer to a question when alternative projects of limited funds are available, with unequal lives.

Example 6: The Beta Co.Ltd., considering the purchase of a new machine. Two alternative machines X and Y have been suggested, each having an initial cost of Rs.40,000/- and requiring Rs.2,000/- as additional working capital at the end of 1st year. Earnings after taxes are expected as fes:

Year	Cash inflows	
	Machine X (Rs.)	Machine Y (Rs.)
1	4,000	12,000
2	12,000	16,000
3	16,000	20,000
4	24,000	12,000
5	16,000	8,000

The company has a target return on capital of 10% and on this basis you are required to compare the profitability of the machines and state which alternative you consider as financially preferable.

Note: The following table gives the present value of Re.1 due in 'n' number of years:

Year	1	2	3	4	5
P. Value 10 %	.909	.826	.751	.683	.621

Solution : Statement showing the profitability of two machines.

Year	P.V Factor	Machine X		Machine Y	
		Cash inflow (Rs.)	Present value (Rs.)	Cash inflow Rs.	Present value Rs.
1.	.909	4,000	3,636	12,000	10,909
2	.826	12,000	9,917	16,000	13,222
3	.751	16,000	12,021	20,000	15,026
4	.683	24,000	16,392	12,000	8,196
5	.620	16,000	9,934	8,000	4,967
Total present value of inflows			51,900		52,320
Total Present value of outflows (Rs. 40,000 + 2,000 x .9091)			41,818		41,818
Net Present value			**10,082**		**10,502**

Recommendation : Machine Y is preferable to Machine X. Though total cash inflow of Machine X is more than the of Machine Y by Rs.4,000/- the net present value of cash flows of Machine Y is more than that of Machine X. Moreover, in case of Machine Y, cash inflow in the earlier years is comparatively higher than that of Machine X.

IIIu. 7 : Ambani Brothers purchased a machine 5 years ago at a cost of Rs.75,000. The machine had an expected life of 15 years at the time of purchase and a zero estimated salvage value at the end of 15 years. It is being depreciated on a straight line basis and has a book value of Rs.50,000/- . The purchase manager reports that he can buy a new machine for Rs. 1,00,000/-. The existing sales are Rs. 1,00,000/- and are expected to go up to Rs.1,10,000/- on account of purchase of the new machine. Further, it will reduce the operating cost from Rs.70,000 to Rs.50,000. The old machine's current market value is Rs.10,000. Taxes at present levied at the rate of 50% and the firm's cost of capital is 10%. Calculate the net cash outlay of the project and net cash inflows.

Solution:

(i) Net cash outlay of the new project

	Rs.	Rs.
Invoice price of new machine		1,00,000
Less: Tax savings*	20,000	
Salvage value of old machine	10,000	30,000
		70,000

(* Taxable income of the firm will be reduced by the amount of loss on sale of machinery amounting to Rs.40,000. The tax rate is 50% and hence, there will be a tax saving of Rs.20,000.
(ii) Estimated net cash in flows)

	Without new machine	With new machine
	Rs.	Rs.
Sales....(I)	1,00,000	1,10,000
Less: Operating costs	{ 70,000	{ 50,000
Depreciation(D) ....(ii)	{ 5,000	{ 10,000
	75,000	60,000
Taxable income..(i)-(ii)	25,000	50,000
Less: Income tax	12,500	25,000
Profit after tax (P)	12,500	25,000
Cash inflow (P)+(D)	17,500	35,000

If the new machine is purchased, there will be an incremental cash inflow of Rs.17,500/-.

4.4.2 Internal Rate of Return (IRR) :

Internal rate of return (IRR) is also known as Time adjusted return or Discounted rate of return. This method is also based on the principle of present value. This method considers the relative importance of magnitude and timing of cash flows. The use of this method for appraising the investment projects was for the first time used by Joel Dean.

According to Grunewald and Nemmers, the internal rate of return (IRR) can be defined as the rate of interest that equates the present value of future period net cash flows, with the present value of the capital expenditure required to undertake a project."

Weston and Brigham defined the internal rate as the rate that equates the present value of the expected future receipts to the investment outlay."

Thus the internal rate of return can be defined as ìthe rate of return which would equate the present valu'e of the investment outlay to the present value of net cash benefits."

If the IRR is greater than the cost of capital, the funds invested will earn more than their cost. When IRR of a project equals the cost of capital, the management would be indifferent to the project as it would not be expected to change the value of the firm.

The following equation is used to calculate the internal rate of return.

Formula:

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

Where,

A_1, A_2, A_n etc. = Expected future cash inflows at the end of year 1,2,3 and so on.

Co = Initial Capital outlay.

6)

r = rate of interest

n = number of years of project life

In order to find out the exact IRR between two near rates, the following formula is to be used.

$$IRR = L + \frac{P_1 - Co}{P_1 - P_2} \times D$$

where

L	=	Lower rate of interest
P_1	=	Present value at lower rate of interest
P_2	=	Present value at higher rate of interest
Co	=	Cash outlay
D	=	Difference in rate of interest

Computation of IRR :

The Internal rate of return is to be determined by trial and error method. The following steps can be used for its computation.

i.   Compute the present value of the cash flows from an investment ,by using an arbitrary selected interest rate.

ii. Then compare the present value so obtained with Capital outlay.

iii. If the present value is higher than the cost, then the present value of inflows is to be determined by using higher rate.

iv. This procedure is to be continued until the present value of the inflows from the investment are approximately equal to its outflow.

v.   The interest rate that brings about this equality is the internal rate of return.

If the internal rate of return exceeds the required rate of return, then the project is accepted. If the project's IRR is lower that the required rate of return, it will be rejected. In case of ranking the proposals, the technique of IRR is significantly used. The projects with highest rate of return will be ranked as first compared to the lowest rate of return projects.

Thus, the IRR acceptance rules are

Accept if   r > k

Reject if   r < k

May accept or reject if   r = k

Where   r   is the internal rate of return

            k   is the cost of capital.

Merits: The following are the merits of the IRR method:

1. **Consideration of Time Value of Money** : It considers the time value of money.

2. **Consideration of total Cash Flows:** It takes into account the cash flows over the entire useful life of the asset.

3. **Maximisation of shareholders' wealth:** It is in conformity with the firm's objective of maximising owners' welfare.

4. **Provision for risk and uncertainty:** This method automatically gives more weight to money values which are nearer to the present period than those which are distant from it. Conversely, in case of other methods like 'Payback Period' and 'Accounting Rate of Return', all money units are given the same weight which is unrealistic. Thus, the IRR is more realistic method of project valuation. This method improves the quality of estimates reducing the uncertainty to minimum.

5. **Elimination of Pre-determined discount rate:** Unlike the NPV method, the IRR method eliminates the use of the required rate of return which is usually a pre-determined rate of cost of capital for discounting the cash flow streams. The IRR method itself provides a rate of return which is more realistic and consistent with the cost of capital. Therefore, the IRR is more reliable measure of the profitability of the investment proposals.

Demerits: The following are the demerits of the IRR :

1. It is very difficult to understand and use

2. It involves a very complicated computational work

3. It may not give unique answer in all situations.

4. The assumption of re-investment of cash flows may not be possible in practice.

5. In evaluating the mutually exclusive proposals, this method fails to select the most profitable project which is consistent with the objective of maximisation of shareholders wealth.

6. The results of this method may be inconsistent compared to NPV method, if the projects differ in their (a) expected lives (b) investment or (c) timing of cash inflows.

Example.8: A company has to select one of the following two projects :

	Project - A (Rs.)	Project - B (Rs.)
Capital outlay	11,000	10,000
Cash inflows (Years)		
1	6,000	1,000
2	2,000	1,000
3	1,000	2,000
4	5,000	10,000

Using the Internal Rate of Return suggest which project preferable.

Solution: The cash inflow is not uniform and hence the internal rate of return will have to be calculated by the trial and error method. In order to have an approximate idea about such rate, it will be better to find out the 'Factor'. The factor reflects the same relationship of investment and 'cash inflows' as in the case of pay back period calculations :

Therefore

$$F = I/C$$

Where,

F = Factor to be located;

I = Original Investment;

C = Average cash inflow per year

The 'Factor' in case of project - A in the above example would be :

$$F = 11,000/3,500 = 3.14$$

Where as in case of project - B the the 'Factor' would be :

$$F = 10,000/3,500 = 2.86$$

The Factor thus calculated will be located the Table value in P.V.Table-II on the line representing the year corresponding to the estimated useful life of the asset. This would give the expected rate of return to be applied for discounting the cash inflows for the internal rate of return.

In case of project-A, the rate comes to 10% while in case of project-B it comes to 15%

Project - A

Year	Cash inflows Rs.	discounting factor at 10%(Table-I)	Present value of cash inflows Rs.
1	6,000	0.909	5,454
2	2,000	0.826	1,652
3	1,000	0.751	751
4	5,000	0.683	3,415
Total Present Value			**11,272**

The present value at 10% comes to Rs.11,272. The initial investments is Rs.11,000. Internal rate of return may be taken approximately at 10%.

But, for knowing the exactness another discount are which is slightly higher than 10% (since at this rate the present value is more than initial investment) may be taken. Let us consider a rate of 12%, the following results would emerge;

Year	Cash inflows Rs.	Discounting factor at 12%	Present value Rs.
1	6,000	0.893	5,358
2	2,000	0.797	1,594
3	1,000	0.712	712
4	5,000	0.636	3,180
Total present value			10,844

The internal rate of return is thus more than 10%. and less than 12% since the present values at the two discount rats are one is more than the capital outlay and another one is less than it. Hence, to get the exact discount rate at which the present values of cash inflows are equal to the capital outlay, the follwing intrapolation can be done by using the following formula.

$$IRR = L + \frac{P_1 - Co}{P_1 + P_2} \times D$$

Where,

L = Lower rate of interest

P_1 = P.V. of cash inflows at lower rate of interest

P_2 = P.V. of cash inflows at higher rate of interest

C_o = Capital outlay

D = difference in the rates, of interests

$$IRR = 10 + \frac{11,2272 - 11,000}{11,272 - 10,844} \times 2\%$$

$$= 10 + \frac{272}{428} \times 2\% = 11.3\%$$

Alternativety :

The exact internal rate of return can also be calculated as follows :

At 10% the present value is + 272

At 12% the present value is - 156

The internal rate would therefore be between 10% and 12% can also be identtifid as under :

$$= 10\% + \frac{272}{(272 + 156)} \times 2$$

$$= 10 + 1.3 = 11.3\%$$

PROJECT - B

Year	Cash inflows Rs.	Discounting factor at 15%	Present value Rs.
1	1,000	0.870	870
2	1,000	0.756	756
3	2,000	0.658	1,316
4	10,000	0.572	5,720
Total present value			**8,662**

Since the present value at 15% comes only to Rs.8,662 and the fore a lower rate of discount should be taken. Let us the a rate of 10%, the following will be the result.

Year	Cash inflows Rs.	Discounting factor at 10%	Present value Rs.
1	1,000	0.909	909
2	1,000	0.826	826
3	2,000	0.751	1,502
4	10,000	0.683	6,830
Total present value			**10,067**

The present value at 10% comes to Rs.10,067 which is more than the initial investment. Hence, the internal rate of return may be taken as 10%. approximately.

In order to have more exactness, the internal rate of return can be intarpolated as done in case of project - A.

At 10% the present value is + 67

At 15% the present value is - 1,338

Alternatively

$$IRR = 10\% + \frac{67}{67 + 1,338} \times 5$$

$$IRR = 10\% + \frac{67}{1,405} \times 5 = 10\% + 0.24 = 10.24\%$$

$$IRR = 10 + \frac{10067 - 10,000}{10067 - 8662} \times 5$$

$$IRR = 10 + \frac{67}{1405} + 5$$

$$= 10.24\%$$

Thus, the internal rate of return in case of project-A is higher as compared to project-B. Hence, project-A is preferable. Which produces more amount of beenfit.

Example. 9 : A firm whose cost of capital is 10% is considering two mutually exclusive projects X and Y, the details are :

	Project X Rs.	Project Y Rs.
Investment	70,000	70,000
Cash flow year 1	10,000	50,000
Cash flow year 2	20,000	40,000
Cash flow year 3	30,000	20,000
Cash flow year 4	45,000	10,000
Cash flow year 5	60,000	10,000
Total cash flows	1,65,000	1,30,000

Compute the Net present value at 10% and Internal rate of return for these two projects.

Solution:

(i) Net present value of the two mutually exclusive projects, cost of capital of the firm being 10 percent.

	Cash Flows (Rs.)		P.V.Factors	Discounted Cash Flows (Rs.)	
Year	Project X	Project Y	at 10%	Project X	Project Y
0	(-) 70,000	(-) 70,000	1.000	(-) 70,000	(-) 70,000
1	10,000	50,000	.909	9,090	45,450
2	20,000	40,000	.826	16,529	33,040
3	30,000	20,000	.751	22,530	15,020
4	45,000	10,000	.683	30,735	6,830
5	60,000	10,000	.621	37,260	6,210
	Net Present Value (Rs.)			**46,135**	**36,550**

(ii) Internal Rate of Return for the two projects:

Project X :

Year	Cash flows (Rs.)	P.V.Factor at 25%	Discounted Cash Flows (Rs.)	P.V. Factor at 30%	Discounted Cash Flows (Rs.)
0	(-) 70,000	1.000	(-) 70,000	1,000	(-) 70,000
1	10,000	.800	8,000	.769	7,690
2	20,000	.640	12,800	.592	11,840
3	30,000	.512	15,360	.455	13,650
4	45,000	.410	18,450	.350	15,750
5	60,000	.328	19,680	.269	16,140
Net Present Value (Rs.)			4,290		(-) 4,930

$$IRR = 25\% + \frac{4,290}{9,220} \times 5$$

$$= 25 + 2.33 = 27.33\%$$

Project Y :

Year	Cash flows (cfat) (Rs.)	P.V.Factor at 35%	Discounted Cash Flows (Rs.)	P.V.Factor at 40%	Discounted Cash Flows (Rs.)
0	(-) 70,000	1.000	(-) 70,000	1,000	(-) 70,000
1	50,000	.741	37,050	.714	35,700
2	40,000	.549	21,960	.510	20,400
3	20,000	.406	8,120	.364	7,280
4	10,000	.301	3,010	.260	2,600
5	10,000	.223	2,230	.186	1,860
Total Present Value			2,370		(-) 2,160

$$IRR = 35 + \frac{2,370}{4,530} \times 5 = 37.61\%$$

Hence, the IRR of project Y is greater (37.61) than the project X (27.33)

4.4.3 Profitability Index (PI) :

This method is also known as 'Benefit Cost Ratio'. According to Van Horne, the profitability Index of a project is "the ratio of the present value of future net cash flows to the present value of initial cash outflows".

$$Profitability\ Index = \frac{Present\ value\ of\ cash\ inflows}{Present\ value\ of\ cash\ outflows}$$

On the basis of this criteria, the projects can be accepted when the profitability index is equal to or greater than '1' (one).

Merits : The merits of this method are :

i.   It takes into account the time value of money

ii.   It helps to accept / reject investment proposals on the basis of value of the index.

iii.   It is useful to rank the proposals on the basis of the highest / lowest value of the index.

iv.   It takes into consideration the entire stream of cash flows generated during the life of the asset.

However, this technique suffers from the following limitations :

i). It is some what difficult to understand

ii). It is difficult to understand the analytical part of the decision on the basis of profitability index.

Example.10

Consider the information given in example 9.

Project : X

The present value of total cash inflow is Rs.1,16,135 and the present value of outflow is Rs.70,000

$$Profitability\ Index\ (P1) = \frac{Rs.\ 1,06,550}{Rs.70,000} = 1.659$$

Project : Y

The present value of total cash inflow is Rs.1,06,550 and the present value of out flow is Rs. 70,000

$$Profitability\ Index\ (P1) = \frac{Rs.\ 1,06,550}{Rs.70,000} = 1.522.$$

Since the profitability Index of project X (1.659) is greater than profitability index of project Y (1.522), it is advisable to accept the project X.

Example 11. Calculate the profitability index from the information given below. Cost of project Rs.60,000 ; life of the project 5 years. Annual cash inflow Rs.20,000; cost of capital 10%

Solution:

Calculation of profitability index :

Year	CFAT	P.V.Factor 10%	Total present Value
1-5	Rs. 20,000	3.791	Rs. 75,820

$$Profitability\ Index\ (PI) = \frac{Rs.75,820}{Rs\ 60,0000} = 1.263.$$

4.5 NET PRESENT VALUE VS. PROFITABILITY INDEX :

In most of the situations the NPV and PI as investment criteria, provide the same accept or reject decision. and both the methods are closely related to each other. Under PI method, the investment proposal will be accepted, if the PI is greater than one, PI will be greater than one when the investment

proposal has a positive NPV. On the other hand, PI will be less than one when the investment proposal has negative NPV. In case of mutually exclusive investment proposals these methods may give different rankings. The following example present such a case.

Year	Project A Rs.	Project B Rs.
O (outflows)	-5,000	-3,500
1 (inflows)	4,000	3,000
2 (inflows)	4,000	3,000
Present value of cash inflows @ 10%	6,944	5,208
Less cash outflows	5,000	3,500
NPV	1,944	1,708

$$\text{Pr ofitability Indedx} = \frac{6,944}{5,000} = 1.39 \quad \frac{5,208}{3,500} = 1.49$$

Thus, project A is acceptable under NPV method, while project B is acceptable under PI method. Which project should the company accept? As explained earlier, the NPV technique is superior so, project A should be accepted. The best project is one which adds the most, among the available alternatives, to the shareholders wealth. So, one can say that NPV method gives a better mutually exclusive choice than PI and guarantees the choice of the best alternatives.

4.6 NET PRESENT VALUE VS. INTERNAL RATE OF RETURN (IRR)

The NPV and IRR methods are similar in several respects. In certain cases they would give the same accept or reject decision but they give different decision in certain other cases. The comparison of these methods involves the discussion of between the methods :

   i) Similarities

   ii) Differences

Similarities :

The two methods would give consistent results in terms of acceptance or rejection of investment proposals in certain situations. If a project is sound it will be indicated by both the methods. If the project does not qualify for acceptance, both methods will indicate that it should be rejected.

Conventional and Independent projects :

In case of conventional and independent projects both NPV and IRR methods will give the same accept-reject decision. A conventional project is one in which the cash flow pattern is such that an initial Capital outlay is followed by cash inflow. capital outflows are confined to the initial period that is, in the beginning.

The independent projects refer to the investment proposals the acceptance of which does not make rejection of another profitable project. All profitable proposals can be accepted, if funds are available. There are no other constraints in accepting all profitable projects. Same projects would be indicated profitable by both NPV and IRR methods. The logic is all projects with positive NPV would be accepted, if NPV method is used or projects with IRR higher than the required rate of return would be accepted, if the IRR method is followed. The last project acceptable under NPV is one which has zero net present value, while using the IRR method this project will have an IRR equal to required rate of return. Projects with positive net present values would also have internal rate of return higher than the required rate of return. Marginal or last project will have zero net present value only, when its internal rate of return is equal to the required rate of return. NPV and IRR methods are equivalent as regards the acceptance or rejection of conventional and independent projects.

Decision Rule :

Accept a project   if NPV is greater than zero (NPV >0)

                          if IRR is greater than required rate of return (IRR > k)

May accept/   if NPV is equal to zero (NPV = 0)

reject a project   if IRR is equal to required rate of return (IRR = K)

reject a project if NPV is Negative or less than zero (NPV <0)

                          if IRR is less than required rate of return (IRR < K)

Projects which have positive NPV will also have an IRR higher than the required rate of return

Projects which have negative NPV will also have an IRR lower than the required rate of return.

Projects which have zero NPV will also have an IRR equal to the required rate of return.

Differences :

In case of independent and conventional Projects, NPV and IRR methods will give the same result. However, in certain situations they will give contradictory answers. If NPV method finds one proposal acceptable, IRR favours another. This happens in case of mutually exclusive projects.

Mutually Exclusive projects:

Mutually exclusive projects are those projects where the acceptance of one proposal makes the rejection of another one. If there are alternative courses of action, only one can be accepted, such alternatives are mutually exclusive. The mutual exclusiveness may be of two types. i) Technical, and ii) Financial.

For example, in order to distribute its products, a company may decide either to establish its own sales organisation or engage outside distributor. The more profitable, out of the two alternatives shall be selected. Ranking projects become crucial in case of mutually exclusive projects. Since, the NPV and IRR rules can give conflicting ranking of projects. In case of ranking given by NPV and IRR methods is different for mutually exclusive projects, it is advisable to use NPV method which is consistent with the objective of maximising wealth of the shareholders.

ii) Non - Conventional Investments:

Non-conventional investments are the investments, whose cash outlay may not yield a series of cash inflows. Further, investment may be required to make use of the project. The project may require additional investment during its life time. A classic example of non-conventional investment pattern is that the purchase of an asset generates cash inflows for a period of years, is overhauled, and again generates a stream of cash inflows for a number of years. A machine may be purchased for Rs.1,00,000/- and generates cash inflows of Rs.25,000/- each for seven year. In the eighth year an outlay (investment) of Rs.40,000/- is required to overhaul the machine, after which, it generates cash inflows of Rs.25,000 each for 7 years.

In this case, the NPV and IRR methods will give conflicting ranking to the projects. Because, IRR methods, yields more than one rate of return. The number of rates of return depend on the number of times the sign of cash flow stream changes. In order to solve this problem, it is advisable to use NPV method in selecting non-conventional investment projects.

NPV and IRR choice of the Methods:

In the case of conventional and independent projects as the both methods, NPV and IRR, give the same results. However, in case of mutually exclusive projects and projects with non-conventional investments NPV and IRR methods give contradictory results. Then it is advisable to use NPV method because of its superiority over IRR. Moreover, the NPV method is consistent with the objective of maximising the wealth of the shareholders.

4.7 CAPITAL RATIONING :

Capital rationing refers to the situation where budgetary or fund constraints are imposed on the firm and the firm may not be in a position to invest its available scarce resources in all the acceptable projects. According to Weston and Brigham, "capital rationing is a situation where a constraint is placed on the total size of funds invested" during a particular periods. "Under the situation of capital rationing, it is not possible on the part of the company to select all the available investment proposals due to financial constraints". Hence, the company has to rank the proposals applying the techniques of appraisals and finally select the best proposals within the available funds.

Causes for Capital Rationing

The reasons for imposing restrictions on the finances of the company and evidence of capital rationing are as follows:

i.   It is difficult to raise funds through external sources;

ii.   Some firms may impose limitations on capital expenditure due to lack of managerial re sources;

iii.   A firm may resort to capital rationing due to the reason that its cost of capital may rise by way of raising additional fundsand ;

iv.   Some may not be interested in further expansion, but they may be interested to stabilise the present position.

Project Selection under Capital Rationing:

Selection of projects under capital rationing is made by :

a. ranking the projects according to Internal Rate of Return or Profitability Index.
b. selecting the projects in descending order of the ranks until the budgeted funds are exhausted.
c. not selecting the investment project with negative Net Present Value (NPV) or Internal Rate of Return (IRR) or below the cost of capital.

4.8 SUMMARY :

Capital budgeting involves the firms decisions to invest its current funds most efficiently in long-term projects, in anticipation of expected flow of future benefits over a series of year.

The capital budgeting decisions include replacement, expansion, diversification, research and development and miscellaneous proposals. Capital budgeting decisions are important because they involve investment of heavy funds, with long - term implications. These decisions are most difficult to take.

The capital budgeting process involves generation of investment proposals, estimation and evaluation of cash flows, selection of projects based on acceptance criterion and finally continuous evaluation of investments

A sound appraisal method should enable the company to measure the real worth of the investment proposal. There are two traditional methods and three discounted cash flow methods for this purpose. They are the pay back method and the accounting rate of return in the first group and the net present value, internal rate of return and profitability index methods in the second group.

Capital rationing is a situation where a constraint is placed on the total size of funds invested during a particular period. Some reasons for capital rationing include self imposed and some are external reasons.

4.9 Key words :

Accounting Rate of Return   Also called Average Rate of Return. It is calculated by dividing the average income after taxes by the initial outlay of a project. A variant of this is presented by the average income after taxes by the average investment.

Benefit Cost Ratio   Also called as Profitability Index. Used to evaluate capital expenditure proposals, it is calculated by dividing the present value of cash inflows by the initial outlay.

Cash Flows   Actual receipts and payments by a firm.

Discounting   The process of finding out the present value of a series of future cash flows.

Investment Decision   Refers to capital budgeting decision i.e. investment in long - term assets.

Payback period   The number of years required to recover the investment required by a project.
Present value The value of sums received in future being discounted by an appropriate capitalisation rate.

Net present value   Net present value represents the difference between the present value of future cash flows associated with a project and the present value of the initial investment to acquire the project.

Internal Rate of Return. The Rate of Return that equates the present value of future cash flows to the initial investment on the project.

4.10 SELF ASSESSMENT QUESTIONS EXERCESIS

Short Questions

1). What is pay bach period ? Discurs its merits and demerits.

2). Why are traditional methods of capital budgeting still popular ?

3). What is time value of money? Explain its impartance in the Financil Decesions.

4). What is Net Present Value Method? How do you calulate with an example ?

Essay questions

5.   What do you mean by Discounted Cash Flow techniques? Explain NPV and Profitability Index methods to fulfill the requirements of time value of money.

6.   Define Internal Rate of Return, How are project selection taken under this method?

7.   Define capital rationing and explain the causes How are the project selection made under capital rationing ?

8.   Following are the details of ree project A,B and C.

Project	A	B	C
Cost (Rs.)	50,000	70,000	70,000
Life	10 Years	12 Years	14 Years
Estimated Scrap (Rs.)	5,000	10,000	7,000
Annual Profit Less Taxation (Rs.)	5,000	6,000	5,500

Calculate the pay back period.

(Ans: Project A 5.26 Years; Project B: 6.36 years, Project C: 7 years)

9.   The Directors of Gama Ltd., are considering the purchase of a new Machine. Two Machines costing Rs.60,000 each are available. Each machine has an expected life of   5 years. The cosporate tax rate is 50%Net profit before tax during the expected life of each machine are given as follows :

Year	Machine X Rs.	Machine Y Rs.
1	15,000	5,000
2	20,000	15,000
3	25,000	20,000
4	15,000	30,000
5	10,000	20,000
	85,000	90,000

Following the method of Return on Investment ascertain which of the alternatives will be more profitable.

(Ans : Average Profit (after tax) : Machine X Rs.8,500; Machine Y Rs.9,000; Average Investment : Machine X Rs.30,000; Machine Y Rs.30,000; Average Rate of Return : Machine X : 28.33%; Machine Y 30% ; Thus, Machine Y is more profitable as against Machine X)

10. Mehta Co. Ltd., is considered the purchase of a new machine. Two Machines A and B are available each costing Rs.1.00.000. Earnings after taxation are as under :

Year	Machine X (Rs.)	Machine Y (Rs.)
1	30,000	10,000
2	40,000	30,000
3	50,000	40,000
4	30,000	60,000
5	20,000	40,000
	1,70,000	1,80,000

Calculate the ARR for each machine.

(Ans : Average Cash Inflows : Machine A Rs.34,000; B Rs.36,000; Average Investment : Machine A Rs.50,000; Machine B Rs.50,000; Annual Depreciation : Machine A Rs.20,000; Machine B Rs.20,000 ; ARR for Machine A 28%; ARR for Machine B 32%)

11. Sundaram Ltd. is planning to increase its present capacity and is considering the purchase of a new machine. Machine M and N are available at a price of Rs.80,000 and Rs.90,000 respectively. The company can buy either of the two machines. Cash flows on there machines are estimated as follows:

Year	Cash Inflows (Rs) Machine M	Machine N
1	25,000	26,000
2	30,000	34,000
3	40,000	28,000
4	28,000	40,000
5	12,000	25,000
6		17,000

There is no salvage value. of both the Machines as the end of their lives .

Which of the two machines should the company buy? Decide on the basis of (i) payback period, and (ii) average rate of return.

(Ans: (i) Payback period : Machine M:2.63 years, Machines N:3.05 years; (ii)ARR : Machine M 27.5%, Machine N 29.6% Machine A is preferable)

12). Praga Tools Ltd., is considering an investment proposal. The cost of the project is Rs.50,000/- and has a life of 5 years with no salvage value, the company's tax rate is 55% and the firm uses straight line method of depreciation. The requird rate return of the proposal is 10%.The estimated cash flows before tax (CFBT) from the proposed investment are :

Year	CFBT(Rs.)
1	10,000
2	11,000
3	14,000
4	15,000
5	25,000

Calculate Pay back period, ARR , IRR, NPV, and PI

(Ans) PBP 4.328 years ; ARR 9% ; IRR 6.59 ; NPV - Rs.4,648 ; and PI 0.907

13) DCM Ltd., considering mutually exclusive project A and B each involving a cost of Rs.3,00,000/-.The expected life of the project is 5 years for which the cash flows after tax (CFAT) are given below.

Year	Project A	Project B
1	1,00,000	50,000
2	1,00,000	50,000
3	1,00,000	1,00,000
4	1,00,000	2,00,000
5	1,00,000	1,00,000

The required rate of return is 15%. Decide which project should be selected by computing a) Pay back period b) Accounting rate of return c) Net present value d) Internal rate of return and e) Profitability index.

(Ans :

14) A machine was purchased 4 years ago for Rs. 70,000/- has been depreciated to a book value of Rs. 50,000/-. The machine originally had a project life of 14 years and a zero salvage value. A new machine will cost Rs. 1,30,000/-. Its installation cost estimated by the technician is Rs. 20,000/-. The technician also estimates that the installation of a new machine will result in a reduced operating cost of Rs. 15,000/- per year for the next 10 years. The old machine could be sold for Rs. 80,000/-. The new machine will have a ten year life with no salvage value. The company's normal income is taxed at 55% and gains at 30%. Assuming the cost of capital is 10%, determine whether the existing machine should be replaced. Use discounted cash flow criteria, i.e. NPV and IRR.

(Ans) NPV Rs. 8,723.75, IRR 7.53%.

8) A company is considering the purchase of a delivery van and is evaluating the following two choices.

1) The company can a used van for Rs. 20,000/- after 4 years sell the same for Rs. 2,500/- (net of taxes) and replace it with another used van which is expected to cost Rs. 30,000/- and lost 6 years with no terminating value.

2) The company can buy a new van for Rs. 40,000/-. The projected life of the van is 10 years and has an expected salvage value (net of taxes) of Rs. 5,000/- at the end of tenth year.

The services provided by both the vans are same. Assuming the cost of capital 10%, which choice is preferable ?

(Ans) : Present value of outflows of choice 1 is Rs. 38,782, whereas the present value of outflows of choice 2 is Rs. 38,070. Hence choice 2 is preferable.

16) A company working against a self-imposed capital budgeting constraint of Rs. 3,50,000/- is trying to decide which of the following investment proposals should be undertaken by it? All the investments are mutually independent (do not affect one another's cash flows). The list of investments along with the investment required and the net present value of the projected cash flows are as follows :

Investments	Outlays (Rs.)	NPV (Rs.)
A	50,000	30,000
B	1,20,000	90,000
C	1,60,000	1,00,000
D	1,10,000	1,50,000
E	90,000	1,00,000

Which investments should be acquired by the company ?

(Ans) D,E and B.

10) A textile company currently expects its after-tax profits (EAT) for the next 5 years to be as follows :

Year	1	2	3	4	5
EAT (Rs.)	34,000	28,000	60,000	44,000	50,000

The firm is considering to replace the existing machine with one costing Rs. 27,000/-. The new machine would cost Rs. 3,000/- to install and would be depreciated over 5 years to zero salvage value. The existing machine was purchased for Rs. 12,000/- three years ago and is being depreciated by the straight line method over an 8-years period. It can be sold for Rs. 15,000/- currently with Rs. 1,000/- removal cost.

If the expected after-tax profits, after the acquisition of new machine are as given below, at what approximate rate of cost of capital would the firm be indifferent regarding the purchase of new machine? The firm is taxed at a rate of 55% on normal income and 30% on capital gains.

Year	1	2	3	4	5
EAT (Rs.)	40,000	28,000	65,000	50,000	55,000

Also suggest at which rates of cost of capital the firm would (i) accept and, (ii) reject the proposed investment ? What is the economic logic for your answer?

(Ans) i) Less than 36%   ii) More than 36%

4.11 FURTHER READINGS

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LESSON : 5

CAPITAL BUDGETING : UNDER RISK

OBJECTIVES :

The objectives of this lesson are to explain :

1) the meaning of risk and sources of risk in capital budgeting.

2) the conventional techniques to handle risk.

3) the use of statistical techniques in handling risk.

4) the concepts of standard deviation and Co-efficient of variation in measuring risk.

5) the various steps involved in constructing decision tree.

STRUCTURE:

> **5.1   Introduction**
>
> **5.2   Risk analysis in capital Budgeting**
>
> **5.3.   Nature of Risk**
>
> **5.4.   Techniques for Measurement of Risk**
>
> **5.5   Summary**
>
> **5.6   Keywords**
>
> **5.7   Self Assessment Questions**
>
> **5.8   Further Readings.**

5.1 INTRODUCTION

In the previous lessons you have learnt the meaning and the process of capital budgeting. along with the various techniques for evaluating capital budgeting proposals. The basic assumption was that the investment proposal did not involve any kind of risk. This assumption made simple the understanding of capital budgeting techniques. In real world situation the firm, in general, and its investment projects in particular, are exposed to different degrees of risk. The risk arises in capital budgeting projects since one cannot estimate the future cash flows with certainty. Consequently we can not predict, accurately, the cash flow sequence.

The objective of this lesson is to explain the meaning and sources of risk and various techniques both conventional and statistical to handle risk.

1

5.2 RISK ANALYSIS IN CAPITAL BUDGETING

It is possible to predict the outcome of some decisions with complete certainty because only one outcome can arise. However, there are many occasions when decisions can lead to more than one possible outcome, such situations are surrounded with uncertainty. The traditional difference between risk and uncertainty is that the uncertainty cannot be quantified while risk can be quantified. Risk is concerned with the use of quantification of the likelihood of future outcomes. The word uncertainty is to cover all future outcomes, which cannot be predicted with accuracy. People have different attitudes towards the future. Some welcome the opportunity to take risk they may be called risk takers or risk seekers and others are risk averse.

An organisation's performance is influenced by the elements contained within its environment. In turn the organisation also has an impact on its environment.   The very survival of an organisation depends critically upon the willingness of its environment to sustain it.   It is the role of the management to predict events that are likely to occur to meet the challenges and to take advantage of any new opportunity.

5.3 NATURE OF RISK

Risk analysis should be incorporated in capital budgeting exercise. The capital budgeting decisions are based on the benefits derived from the project. These benefits measured in terms of cash flows   are estimates. The estimation of future returns is done on the basis of various assumptions. The actual return in terms of cash inflows depends on a variety of factors such as price, sales volume, effectiveness of advertising, competition, cost of raw materials, manufacturing cost and so on. Each of these in turn, depends on other variables like state of the economy, rate of inflation, etc. The accuracy of the estimates of future returns and the reliability of the investment decision would largely depend upon the accuracy with which these factors are forcasted. The actual return will vary from the estimated return, which is technically referred to as risk.

Thus risk with reference to investment decision is defined as "the variability in actual returns arise from a project in future over its working life in relation to the estimated return as forcast at the time of the initial capital budgeting decisions".

5.3.1 Types of Risk: The risk can be broken up into three types

1. **Certainty:** It is a situation where the returns are assured and no variability likely to occur in future returns. For example investment in Government bonds, fixed deposits in a nationalized bank.

2. **Uncertainty :** It is a situation where infinite number of outcomes are possible and probabilities can not be assigned.

3. **Risk:** Risk is the variability that is likely occur in future returns from the investment. In other words, risk is a situation in which the probabilities of future cash flows occuring are known.

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5.3.2 Source of Risk :   As explained above, risk is associated with the variability of future returns of a project.   The factors which will influence the future returns of the projects may be explained as follows :

(a) Size of the investment : The size of the investment in terms of the amount required will determine the risk. Large scale projects are more risky than small scale projects example, a project involves for   Rs. one crore investment involves more risk than a project with Rs.1,00,000/- investment.

(b) Life of the Project : The life of the project will determine the risk involved. Longer the life of projects more is the risk, shorter the life of the projects   less is the risk.

(c) Economic conditions : There are certain conditions which will influence the general level of business activity. For example, economic and political situation in the country, Government monetary and fiscal policies, etc.

(d) Industry Factors : These factors effect all the companies of the industry in the same way. For example : industrial relations in the industry, innovation, material cost, etc.

(e) Company Factors : These are internal to the company which will effect a particular company only. For example, change in the management, strike in the company, fire accident in the company etc.

5.4 TECHNIQUES FOR MEASUREMENT OF RISK :

As seen above, various factors are responsible for variations in the returns of a proposed project. The greater the variability of the expected returns, the riskier the project. However, risk can be reduced (cannot be avoided) by using certain techniques in evaluating and selecting the projects. These techniques include (a) Conventional Techniques (b) Statistical Techniques.

5.4.1 Conventional Techniques :

A number of techniques to handle risk are used by managers in selecting capital budgeting projects. They range from simple rules of thumb to sophisticated statistical techniques. The following are the popular techniques to handle risk.

5.4.1.1 Pay Back Period

Pay back period is one of the oldest and commonly used methods for selecting capital budgeting projects. It is the period required to recover initial investment of the project. Firms using this method prefer short pay back period to longer pay back periods short period involves less risk compared to longer period. For example there are two projects A and B, project A pay back period is 3 years and project B pay back period is 6 years. If the pay back criteria is applied project A should be selected as its pay back period is less than project B. Thus the project A involves less risk than project B. Pay back period method makes an allowance for risk by emphasising liquidity of the firm and by favouring short-term projects.

5.4.1.2 Risk Adjusted Discount Rate

This method is based on the presumption that investors expect more rate of return on risky projects as compared to less risky projects. The required rate of return will be equal to risk free rate

plus risk premium. This method is similar to the net present value method, except adding some percentage of risk premium to risk free rate of return. Net Present Value may be computed by using the following formula.

$$NPV = \sum_{t=1}^{n} \frac{A_t}{(1+k)^t} - Co$$

A_t = Cash inflows for period (t)
n = No. of years
k = Risk adjusted descount rate (Risk free rate + Risk premium)
Co = Cash outflow

The risk adjusted discount rate accounts for risk, by varying the discount rate, depending on the degree of risk of investment projects. A higher rate will be used for with high risk project and lower rate for less risky project. The net present value will decrease with increasing k, indicating that the risky project is perceived, the less likely it will be accepted. For example, consider an investment project costing Rs. 50,000/- and is expected to generate cash flows of Rs.25,000/- and Rs.20,000/-, Rs.10,000/-, Rs. 10,000/-. What is the NPV, if it is discounted at 15% rate of return (10% risk free rate + 5% risk, premium)

$$NPV = \frac{25000}{(1+.15)^1} + \frac{20000}{(1+.15)^2} + \frac{10000}{(1+.15)^3} + \frac{10000}{(1+.15)^4} - 50000 = (-)Rs.845$$

Since the projectís NPV is negative the project should be rejected.

Advantages

    (a) It is easy to understand and simple to calculate
    (b) It recognise the risk involved in projects.

Disadvantages

    (a) There is no easy way to determine risk adjusted discount rate

    (b) If does not make any adjustment in the numerator for the cash flows that are forecast over the future years.

    (c) It is based on the assumption that investors are risk averse.

5.4.1.3 Certainty Equivalent Method

According to this method, the estimated cash flows are reduced to conservative level by applying a correction factor refered as a certainty equivalent coefficient. The correction factor is the ratio of riskless cash flow to risky cash flow.

$$Certainty\ Equivalent\ Coefficient\ (\alpha_t) = \frac{Riskless\ Cash\ flow}{Risky\ Cash\ flow}$$

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For example, if one expected a risky cash flow of Rs. 80,000/- in period t and considers a certain cash flow of Rs. 60,000/- equally desirable, then a_t will be 0.75 = 60,000 / 80,000 under this method, certainty equivalent coefficients are calculated for cash flows of each year. They are then multiplied with the cash flows to ascertain cash flows which may be used for the purpose of determining NPV or IRR.

$$NPV = \sum_{t=1}^{n} \frac{\alpha t A_t}{(1+k_f)^t} - Co$$

Where

A_t	=	The forecast of net cash flow without risk adjustment.
a_t	=	Certainty equivalent coefficient for year t
K_f	=	risk less interest rate
C_o	=	Cash outflow.

A project costs Rs. 6,000 and it has cash flow of Rs. 4,000, Rs. 3,000, Rs. 2,000 and Rs. 1,000 in 1 to 4 years. Assumed that the associated certainty equivalent coefficient factors (α_t) are estimated to be $\alpha_0 = 1.00$, $\alpha_1 = 0.90$, $\alpha_2 = 0.70$, $\alpha_3 = 0.50$, and $\alpha_4 = 0.30$ and the risk free discount rate is 10 percent, the present value will be :

$$NPV = \frac{0.90 x 4,000}{(1+.10)^2} + \frac{0.70 x 3,000}{(1+.10)^2} + \frac{0.50 x 2,000}{(1+.10)^3} + \frac{0.30 x 1,000}{(1+.10)^4} - (1.00 x 6,000) = (-) Rs.37$$

If the IRR is to be calculated we will calculate the rate of discount which equates the present value of certain equivalent cash inflows with present value of certain equivalent cash outflows.

Risk adjusted discounted rate Vs. Certainty equivalent :

The certainty equivalent method recognises the risk in capital budgeting by adjusting estimated cash flows and employ risk free rate to discount the adjusted cash flows. On the other hand, the risk-adjusted discount rate adjusts for risk by adding some risk premium to risk free rate of return and arriving the discount rate. Certainty equivalent approach is theoretically superior technique over the risk adjusted discount approach. It can measure risk more accurately. The risk adjusted discount approach will yield the same results, as the certainty equivalent approach if the risk free rate is constant and the risk adjusted discount rate is same for all future periods.

5.4.1.4 Sensitivity Analysis :

It is a technique, which indicates exactly how much the NPV/IRR will change in response to a given change in an input variable other things held constant. It indicates how sensitive a project NPV or IRR is to changes in particular variables. (Sales volume, price, variable cost, fixed cost, investment, project life etc.). The more sensitive the NPV, the more critical the variable. The following three steps are involved in the use of sensitivity analysis.

(a) Identification of all the variables which have an influence on the projects NPV or IRR.
(b) Establish the relationship between the variables.

(c) Analyse the impact of change in each of the variables on the projects NPV or IRR

The decision maker, while conducting sensitivity analysis computes the projects NPV or IRR for each forecast under three assumptions with the probability of their occurrence. a) pessimistic b) expected, and c) optimistic. It allows him to ask "what if" questions. For example

What is the NPV, if volume increases or decreases ?

What is the NPV, if variable cost or fixed cost increases of decreases ?

What is the NPV, if selling price increase or decreases ?

What is the NPV, if the project is delayed or outlay increases or the projectís life is more or less than anticipated?

A whole range of questions can be answered with the help of sensitivity analysis. It examines the sensitivity of the variables (volume, cost, price, time, investment, life, etc.,) underlying the computation, NPV or IRR rather than attempting to quantify risk.

$$NPV = \sum_{t=1}^{n} \frac{[Q(P-V)-F-D](1-T)+D}{(1+r)^t} + \frac{S}{(1+r)^n} - I$$

Where

NPV	=	net present value of the project
Q	=	number of units sold annually
P	=	selling price per unit
V	=	variable cost per unit
F	=	total fixed cost, excluding depreciation and interest
D	=	annual depreciation charge
T	=	income tax rate
r	=	cost of capital / discount rate / required rate of return
n	=	project life in years
S	=	net salvage value
I	=	initial cost

Advantages :

1) It compels the decision maker to identity the variables which will influence projects NPV or IRR. This helps him in understanding the project in totality.

2) It indicates the critical variables which have negative impact on the project NPV or IRR.

3) It helps to expose in appropriate forecast and thus guides the decision maker to concentrate on relevant variables.

Limitations :

1) It does not provide clear cut results.

2) It fails to focus on the inter-relationship between variables, for example sales volume may be related to price, cost and expenditure over advertisement.

5.4.2 Statistical Techniques (Non-conventional)

In the above part of this lesson you have studied the meaning and sources of risk. In addition to this, conventional techniques to handle risk in capital expenditure projects are also explained. The purpose of this part is to explain the use of statistical techniques such as probability, standard deviation, coefficient of variation and decision tree in handling the risk of capital budgeting projects. These statistical techniques are analytical tools drawn from the fields of mathematics, logic, economics and psychology, enable the decision maker to make decision under certainty.

5.4.2.1 Probability Assignment

The concept of probability is one of the statistical techniques to handle risk in capital budgeting projects. It may be described as a "measure of some one's opinion about the likelihood that an event will occur". If an event is certain to occur, we can say that it has 100% probability of occurance one. If an event is certain not to occur, we can say that its probability of occurring is zero. Thus the probability of occur all events lies between 0 and 1.

A probability of distribution may consist of number of estimates. But in simple form it may consist of a few estimates. Some commonly used form are "high, low and best guess" estimates, or optimistic, most likely and pessimistic" estimates. For example, the annual cash flows expected from a project could be :

Assumption of guess	Annual Cash flows (Rs)
Best	10,000
High	8,500
Low	4,000

It can be seen that this is an improvement over the single forecast. Which is not sufficient. The forecaster should describe more accurately his degree of confidence in his forecasts, i.e., he should describe his feelings as to the probability of these estimates occurring. For example, he may assign the following probabilities to his estimates:

Assumption of guess	Annual Cash flow (Rs)	Probability
Best	10,000	0.20
High	8,500	0.60
Low	4,000	0.20

Once the probability assignments are given to the future cashflows, the next step is to find out the expected net present value. The expected net present value can be found out by multiplying the monetary values of the cash flows by their probabilities. Consider the above example (assume investment as Rs. 6,000).

Assumption of guess	Annual cash flow (Rs)	Probability	Expected cash flow (Rs.)
Best	10,000	0.20	2,000
High	8,500	0.60	5,100
Low	4,000	0.20	800
Total Expected Cash flow			**7,900**

The forecaster considers the chance or probability of annual cash flows being either Rs. 10,000/- (maximum) or Rs. 4,000/- (minimum) is 0.20 (20%) each. There is 0.60 (60%) probability that annual cash flows may be Rs. 8,500/-.

Example : 1 Opec Co.Ltd., has given the following possible cash inflows for two of their projects M and N both projects will require an equal investment of Rs. 5,000/-. You are required to suggest which project should be accepted at 10% discount rate.

Possible Events	Cash flow (Rs)	**Project:M** Probability	**Project : N** Cash flow (Rs)	Probability
A	4,000	0.10	12,000	0.10
B	5,000	0.20	10,000	0.15
C	6,000	0.40	8,000	0.50
D	7,000	0.20	6,000	0.15
E	8,000	0.10	4,000	0.10

Solution :

Calculation of expected cash flows for project M and N

Possible Event	Cash flow (Rs)	Project : M Probability	Expected Cash flow (Rs)	Cash Flow	Proejct : N Probability	Expected Cash flow (Rs.)
A	4,000	0.10	400	12,000	0.10	1,200
B	5,000	0.20	1,000	10,000	0.15	1,500
C	6,000	0.40	2,400	8,000	0.50	4,000
D	7,000	0.20	1,400	6,000	0.15	900
E	8,000	0.10	800	4,000	0.10	400
		Total	**6,000**		**Total**	**8,000**

The above calculations show that project Y has higher expected cash flow as compared to project X. If expected cash flows are discounted @ 10% the net present value for project X will be : Rs.(6,000 x .909)- 5,000/-= Rs.454/-. The net present value of project Y will be (8,000 x .909) - 5,000 = Rs. 2272/-. From these calculations it can be seen that NPV of project Y is more than that or project X. Therefore it is advisable to accept project Y.

5.4.2.2. Standard Deviation and Coefficient of Variation

The probability assignment approach to risk analysis in capital budgeting does not provide the decision maker, about the variability of cash flows and therefore the risk. To overcome this limitation, standard deviation technique is used. Which is an absolute measure of risk. In case of capital budgeting this measure is used to compare the variability of possible cash flows of different projects from their respective mean. A project having larger standard deviation will be more risky as compared to a project having smaller standard deviation.

The following steps are involved in calculating standard deviation :

1) Mean value of possible cash flows is computed.

2) Deviations between the mean value and the possible cash flows are found out.

3) Deviations are squared.

4) Squared deviations are multiplied by the assigned probabilities which give weighted squared deviation.

5) The weighted squared deviations are totalled and their square root is found out. The resulting figure is the standard deviation.

Standard deviation is calculated by using the following formula.

$$\sigma_{NPV} = \sqrt{\sum_{t=1}^{n} (R - \bar{R})^2 \, p_i}$$

Where :   s = standard deviation
n = Number of years
R = expected cash flows
R = Mean of the cash flows
p_i = probability assignments

Example : 2   Consider the date given in example I and calculate the standard deviation

Solution :

Project : X

Events	Cash inflows (Rs)	(R-R)	(R-R)^2	Pi	(R-R)^{2}Pi
A	4,000	-2,000	40,00,000	0.10	4,00,000
B	5,000	-1,000	10,00,000	0.20	2,00,000
C	6,000	0	0	0.40	0
D	7,000	1,000	10,00,000	0.20	2,00,000
E	8,000	2,000	40,00,000	0.10	4,00,00
Total	**30,000**				**12,00,000**

$$R = \frac{\sum R}{N} = \frac{Rs.30,000}{5} = 6,000$$

Standard Deviation of Project "x" = $\sqrt{12,00,000} = Rs\ 1,095$

Project : Y

Events	Cash inflows (Rs)	(R-R) R=8000	(R- R)^2	Pi	(R- R)^{2}Pi
A	12,000	4,000	1,60,00,000	.10	16,00,000
B	10,000	2,000	40,00,000	.15	6,00,000
C	8,000	0	0	.50	0.
D	6,000	-2,000	40,00,000	.15	6,00,000
E	4,000	-4,000	1,60,00,000	.10	16,00,000
Total	40,000				44,00,000

$$\bar{R} = \frac{\sum R}{N} = \frac{Rs.\ 40,000}{5} = Rs.8,000$$

Standard Deviation of Project y= $\sqrt{44,00,000} = Rs.2,098$

The standard deviation of project X is Rs.1,095 where as for the project Y is Rs.2,098. Thus variability of cash flows is more in case of project Y as compared to project X. Hence, project Y is more risky.

Coefficient of Variation

Coefficient of variation is a relative measure of risk. It is defined as the standard deviation of probability distribution devided by its expected value. Which is calculated as :

$$Coefficient\ of\ variation = \frac{Standard\ Deviation}{Expected\ (mean)\ value}$$

Consider the above example and calculate the coefficient of variation.

$$Project\ x = \frac{1095}{6000} = 0.1825$$

The coefficient variation of project Y is more as compared to project X. Hence,

$$Project\ y = \frac{2098}{8000} = 0.2623$$

Here, the project Y is more risky. Where as the acceptance of project X or Project Y will depend upon the investors attitude towards risk. He would prefer project Y if he is ready to bear more risk in order to get higher return, If he has aversion towards to risk, he would accept project X as it is less risky.

The coefficient of variation is a useful measure of risk when we are comparing the projects which have

i)   same standard deviation but different expected values, or

ii)   different standard deviations but same expected values, or

iii)   different standard deviations but different expected values.

5.4.2.3. Probability Distribution Approach

In the earlier part of this lesson while dealing with basic concept of risk, the concept of probability was used for incorporating risk in evaluating capital budgeting proposals. The probability distribution of cash flows overtime provides valuable information about the expected value of return and dispersion of the probability distribution of possible returns. On the basis of this information, accept or reject decision can be taken.

5.4.2.4 Independent and Dependent Cash Flows :

The application of the theory in analysing risk in capital budgeting depends upon the behaviour of cash flows. From the point of view of behaviour, cash flows may be
 i) independent or ii) dependent.

Independent Cash Flows : The assumption is that the cash flows are independent overtime. So that the future cash flows are not affected by cash flows of the preceding years. Thus, the cash flow in year 3 are not dependent on the cash flow of the year 2 and so on.

Dependent Cash Flows : When cash flows in one period depend upon the cash flows in previous periods they are referred to as dependent cash flows. Any of the decisions may be dependent on the outcome of preceding or the outcomes of trial. A decision tree is a diagrammatic representation of the relationship among the decision state of nature and pay-offs or outcomes.

5.4.2.5 Decision Tree Analysis:

Decision tree analysis is another technique of analysing the risk involved in capital budgeting proposals. Decision tree is a "graphic display of relationship between a present decision and possible future events, future decisions and their consequences. The sequence of event is mapped out over time in a format similar to the branches of tree". In other words, it is a pictorial representation in tree form which indicates the magnitude.

The following steps are taken for constructing a decision tree.

1) **Define investment** : The first step in constructing decision tree is to define the proposal. For example, entering a new market or introducing new product line.

2) **Identify decision alternatives** : The decision alternatives should be clearly identified. For example, a firm may be considering the purchase of new plant for manufacturing a new product. It may have three alternatives (a) Purchases a small plant (b) Purchases a large plant (c) Purchase a medium size plant.

3) **Draw a decision tree** : The decision tree is then laid down showing decision point and decision branches.

4) **Analyse data** : The results should be analysed and the best alternative should be selected.

Usefulness of Decision Tree Approach :

The decision tree approach useful in handling the sequential investments the working backwards from future to present, we are able to eliminate unprofitable branches and determine optimum decision at various decision points.

The merits of decision tree are :

i) It clearly brings out the implicit assumptions and calculations for all to see, question and revise.

ii) It allows decision maker to visualise assumptions and alternatives in graphic form, which is easier to understand than abstract form.

However, decision tree diagrams can become more complicated as the decision maker decides to include alternatives and more variables and look farther in time. If the analysis is extended to include interdependent alternatives and variables, it becomes more complicated further. So the diagram becomes cumbersome and calculations become very time consuming and difficult.

Example :3

Suppose a firm has an investment proposal, requiring an outlay of Rs. 20,000/- at present (t = 0). The investment proposal is expected to have 2 years economic life with no salvage value. In year 1, there is 0.3 probability that CFAT will be Rs. 8,000/- ; a 0.4 probability that CAFT will be Rs. 11,000/- and a 0.3 probability that CFAT will be Rs. 15,000/-. In year 2, the CFAT possibilities depend on the CFAT that occurs in year 1. That is, the CFAT for the year 2 are conditional on CFAT for year 1. Accordingly the probabilities assigned with the CFAT for the year 2 are conditional probabilities. The estimated conditional CFAT and their associated conditional probabilities are as under :

If $CFAT_1$ = Rs. 8,000		If $CFAT_2$ = Rs. 11,000		If $CFAT_3$ = Rs. 15,000	
$CFAT_2$ (Rs.)	Probability	$CFAT_2$ (Rs.)	Probability	$CFAT_2$ (Rs.)	Probability
4,000	0.2	13,000	0.3	16,000	0.1
10,000	0.6	15,000	0.4	20,000	0.8
15,000	0.2	16,000	0.3	24,000	0.1

Calculate the Net present value (NPV) with the help of a decision tree diagram.

Solution :

Time = 0	Year 1		Year 2		Path No.	Expected NPV	Joint Probability (Pj)	Expected NPV NPV x Pj
	Probability	CFAT	Probability	CFAT				
			0.2	4,000	1	-9,668	0.06	-580
	0.3	8,000	0.6	10,000	2	-4,886	0.18	-879
			0.2	15,000	3	-901	0.06	-54
			0.3	13,000	4	184	0.12	22
Cash Out Lay Rs.20,000	0.4	11,000	0.4	15,000	5	1,778	0.16	284
			0.3	16,000	6	2,575	0.12	309
			0.1	16,000	7	6,147	0.03	184
	0.3	15,000	0.8	20,000	8	9,335	0.24	2240
			0.1	24,000	9	12,523	0.03	376
							1.00	**Rs.1902**

Joint Probability = Product of Probabilities of CFAT for years 1 and 2.

The above Decision Tree (DT) covers all dimensions of the problem : i) Timing of the CFAT ii) The possible CFAT outcomes in each year and probabilities associated with these outcomes. The DT shows nine distinct possibilities, the project could assumed accepted. For example one possibility is that the CFAT for the 1st year may amount Rs. 8,000/- and for the second year Rs. 4,000/-. A close observation of the figure indicates that this is the worst event could happen. Assuming a 12% discount rate, the NPV could be negative in this situation. Likewise, the best outcome that could occur is CFAT$_1$ = Rs. 15,000/- and CFAT$_2$ = Rs. 24,000/-. The NPV would be the highest in this situation among all the nine possible combinations.

The expected NPV of the project is given by the following mathematical formula :

$$\overline{NPV} = \sum_{j=1}^{n} P_j \; NPV_j$$

Where

Pj = probability of *j*th path occurring which is equal to the joint probability along the path.

NPVj = NPV of *j*th path occurring.

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5.5 SUMMARY :

The analysis of risk and uncertainty is an important element in capital budgeting decisions. The term risk refers to the variability of actual return from the expected returns in terms of cash flows.

The risk involved in capital budgeting can be measured in absolute as well as relative terms. The absolute measure of risk includes sensitivity analysis and standard deviation. The coefficient of variation is a relative measure of risk. There are four well recognised methods of calculation of risk in capital budgeting decision framework :

Risk-adjusted discount rate approach (RAD), Certainty equivalent approach (CEA), Probability distribution approach (PDA) and Decision tree approach (DTA).

5.6 KEYWORDS :

Certainty Equivalent : The return required with certainty to make investors indifferent between the certain return and a particular uncertain return.

Co-efficient of variation : A relative measure of variability of the outcomes associated with an event. It is calculated by dividing the standard deviation of a distribution by the mean.

Decision Tree : It is an analytical technique to set forth graphically the pattern of relationship between decisions and chance events. It is used to handle risk situations.

Risk Adjusted Discount Rate : A discount rate used in capital expenditure decisions that has been adjusted for risk it determines by adding an appropriate risk premium to the risk less rate of return.

Risk Premium : It is the difference between expected rate of return on a risky project and the rate of return on a risk less project.

Sensitivity Analysis : It is the analysis about the effect of the change in certain variable on an outcome, to estimate the variability of the outcome, or risk associated with a project.

5.7 SELF ASSESSMENT QUESTIONS :

1) Why do you measure risk ? Explain the types and sources of risk.

2) "Risk is measured by the possible variation of outcomes around the expected value" Discuss.

3) What makes risk important in the selection of projects ? Explain briefly the various methods of evaluating risky projects ? Can you think of a capital budgeting project that would have perfectly certain returns ?

4) What is risk adjusted discount rate ? Explain its Merits and demerits?

5) Define the certainty equivalent method. Explain the significance of certainty equivalent method.

6)   Compare and contrast risk adjusted discount rate and certainty equivalent method.

7)   "Risk and uncertainty are quite inherent in capital budgeting decisions" comment.

8)   Explain the concept of sensitivity analysis. How it can take care of risk and uncertainty in capital investment decisions?

9)   What are the various statistical techniques to handle risk in capital budgeting decisions ? Explain?

10)   How is risk assessed for a particular investment by using probability distribution ?

11)   What is Decision Tree? Explain the process of constructing a decision tree. Also explain its merits and demerits.

5.8 FURTHER READINGS :

Pandey I.M.   :   "Financial Management", Vikas Publishers, New Delhi

Khan & Jain   :   "Financial Management"
                            Tata Mc Graw Hill publishing co., New Delhi.

Maheswari S.N.   :   "Financial Management", Sultan Chand and sons,
                             New Delhi.

Van Horne J.C.   :   "Financial Management and Policy"
                            prentice-Hall of India, New Delhi.

Solomon E.   :   "Theory of Financial Management"
                             Columbia University press, New York.

Weston J.F. and
Brigham E.F.   :   "Managerial Finance", Holt, Rinehart and Winston

Prasanna Chandra   :   'Financial Management' Tata Mc Graw Hill Publishing co
                            New Delhi.

Lesson - 6

OPERATING LEVERAGE AND BREAK - EVEN ANALYSIS

OBJECTIVES :

After studying this lesson, you will be able to understand :

✭   the concept of operating leverage

✭   technique of break even analysis

✭   the approaches for determination of break even point

✭   the assumptions and limitations of break even analysis

STRUCTURE :

6.1 Introduction:

A firm can raise funds for its long - term requirements through equity or debt capital. The use of debt capital for the benefit of shareholders is known as financial leverage. Further, the firm uses assets involving some fixed operating cost that influences the earnings available to equity shareholders. This effect is indicated by operating leverage. In the present lesson, operating leverage and the technique of break - even analysis are explained. In lesson 7 you will have an understanding of financial leverage and EBIT - EPS analysis.

6.2 Meaning of leverage :

The term leverage refers to "an increased means for accomplishing some purpose". For example, leverage helps us in lifting heavy objects, which may not be otherwise possible. In financial management, the concept of leverage has a special meaning.

Here leverage means the employment of an asset or rource of finance which involves some fixed operating cost or ficad return. This fixed cost or fixed return is the fulcrum of leverage. If a firm is not *required to pay fixed cost or return,* there will be no leverage. Thus, the Leverage influences the earnings of equity shareholders and the risk to them as well. A higher leverage results in higher earnings and greater risk and vice versa.

6.3. Types of leverages :

Leverages are of three types 1) Operating Leverage, 2) Financial Leverage 3) Combined/Composite Leverage.

6.3.1. Operating leverage :

Operating leverage refers to the use of fixed costs in the operation of a firm. If the firm's total cost comprises fixed cost which does not change with the volume of out put or sales, the operating leverage is said to exist. If there are no fixed costs, there will be no operating leverage.

If a firm has greater amount of fixed costs when compared to variable cost, it will have a higher degree of operating leverage and if the fixed cost is less, it will have a lower degree of operating leverage. Thus, operating leverage increases with fixed cost.

Operating leverage indicates the effects of a changes in sales on operating profit, also known as earnings before interest and taxes (EBIT). It is both favorable and unfavorable. A higher operating leverage indicates that even a small change in sales (increase or decrease) will cause a greater change in operating profit.

6.3.2. Measurement of operating leverage :

The existence of fixed costs in the total cost structure of a firm results in operating leverage. Operating leverage is a function of three factors : total fixed cost, contribution and sales volume. Degree of operations leverage is calculated as follows :

$$\text{Operating leverage} = \frac{\text{Contribution}}{\text{Operating profit}} = \frac{\text{Sales} - \text{Variable operating costs}}{\text{EBIT}}$$

Illustration 1

From the following information compute operating leverage and comment :

Fixed cost = Rs. 50,000; Variable cost = 70% of sales

Sales :   Rs. 2,00,000 in the previous year

          Rs. 2,50,000 in the current year

Solution

	Previous year Rs	Current year Rs	Percentage change
Sales	2,00,000	2,50,000	25%
Less : Variable cost (70% of sales)	1,40,000	1,75,000	
Contribution	60,000	75,000	
Less : Fixed cost	50,000	50,000	
Operating Profit (EBIT)	10,000	25,000	150%

$$\text{Degree of Operating leverage} = \frac{\text{Contribution}}{\text{EBIT}}$$

$$= \frac{60,000}{10,000} = 6$$

Comment : The operating leverage of 6 in the above illustation indicates that if sales increase by 1% operating profit shall increase by 6%. Thus, 25% increase in sales has resulted in an increase of 150% in the operating profit.

The degree of operating leverage may also be calculated in a different way. It may be defined as the ratio of percentage change in operating profit to the percentage change in sales. Thus, it is calculated as :

$$\text{Degree of operating leverage} = \frac{\text{Percentage change in operations profits or EBIT}}{\text{Percentage change in sales}}$$

$$= \frac{\Delta \text{EBIT}}{\text{EBIT}} \div \frac{\Delta \text{Sales}}{\text{Sales}}$$

If data from the above illustration is taken, the Degree of operating leverage is as under :

$$\text{DOL} = \frac{150\%}{25\%} = 6$$

6.3.4. Utility of operating leverage :

Operating leverage is very useful in ascertaining the effect of a change in sales on operating profit. A high degree of operating leverage indicates that even a small change in sales will have a large effect on EBIT. In other words, a small increase in sales will have larger increase in operating income. This leverage also adversely affects the earnings of the firm. In case of high degree of leverage, even a small fall in sales will result in a greater decrease in operating profit. Since it is very risky, no firm would like to operate under conditions of high degree of operating leverage.

6.3.5 Operating Risk

Opereting risk is the risk of the firm not being ahle to cover its fixed operating Casts. The lager the magnitude of feed operating costs the larger is the vdome of rales to cover all feed Costs. The higher the feed gereting costs, the higher the degree of operating liverage and the higher the Break even volume In this Contect the break even analysin is presented here under.

6.4 Concept of Break - Even analysis :

Break - even analysis is a widely used technique to study cost, volume and profit relationships. This is a very useful technique that helps the management of a firm in profit planning. In a narrower sense, break - even analysis refers to the technique used for determining that level of activity where total cost equals total revenue. But in a broader sense, it refers to that technique which determines the probable profit at any level of activity. It portrays the relationship between cost of production, volume of production and selling price. Hence, it is also known as cost volume profit analysis (C-V-P Analysis).

Even though break - even analysis and CVP analysis are interchangeably used, there is a slight difference between the two. CVP analysis is broader and it includes the entire gamut of profit planning, while 'break - even analysis' is a techniane used in this process. Hence, CVP analysis is the more appropriate term to be used for studying the CVP relationships. However the term break - even analysis is so popular that these two terms are used as synonymous.

6.4.1. Assumptions of Break - Even analysis :

The technique of break - even analysis is subject to the following assumptions :

1.   The total cost can be segregated into fixed and variable components.

2.   Total fixed cost remains constant at all levels of output.

3.   Variable cost per unit remains constant and total variable cost changes directly in proportion to sales volume.

4.   Selling price per unit remains unchanged at all levels of output.

5.   The firm produces, only one product or in case of multiple products, the sales - mix remains constant.

6.   There is synchronisation between production and sales. It means that there will be no opening or closing stock.

6.4.2. Meaning of Break - Even point and its Determination :

The break - even point may be defined as that level of sales volume at which total revenue is equal to total cost. It is a point of no profit or no loss. At this point of sales, the firm's total revenue breaks evenly with total cost, and hence the name. Any increase in sales beyond this point will fetch profits to the firm and if sales fall below this point, the firm will incur loss. Thus, the break - even point is:

Sales revenue = When Total Variable cost + Total fixed cost

There are two approaches to compute the break - even point

a) Algebraic Formula Approach, and

b) Graphic or Chart Approach

a) The Algebraic formula approach :

By using algebraic formula, the break - even point can be computed, i) in terms of units of sales volume ii) in terms of money value of sales volume, and iii) as a percentage of estimated capacity.

If

F	=	Total fiad costs
V	=	Variable cost per unit
P	=	Prica per unit
Q	=	quality reld
TR	=	total revenue
TC	=	Total cost

Then·

TR	=	Price per unit x quality sold = P.Q
TC	=	Total variable cost + Total fiad cost
	=	{Variable cost per unit x paantity old} + Total

If

F	=	Totalfiard costs
V	=	Variable cost per unit
P	=	Price Per unit
Q	=	Quantity rold
TR	=	Total revence
TC	=	Total Cost

Them

TR	=	Price per unit X Quantity Sold P.Q
TC	=	Total Variable cost + Total Fiad Cost
	=	(Variable cost per unit X Quantity sold) + total fixed cost
	=	V.Q + F

at th eak even point of sales total revence is iqual to total cost therefore

TR	=	TC
P.Q	=	V.Q + F
PQ - VQ	=	F

$$Q\ [P-V]\ =\ \ F$$

$$Q = \frac{F}{P-V} = \frac{F}{C}$$

Here, Q is the break even rales

F is the total Final cost

P is the Price per unit

V is the Variable cost per unit

C is the Cantritution per unit

i) Break - Even point (in units) :

Break - even point is a point of no profit or no loss. It can be calculated with the help of the following formula:

$$\text{Break - even point (in units)} = \frac{\text{Fixed cost}}{\text{Contribution per unit}}$$

Where, contribution per unit = Selling price per unit - Variable cost per unit

Since total contribution is equal to total fixed cost at break - even point, fixed cost is divided by contribution per unit to get the break - even point in units.

ii) Break - Even point (in rupees) :

Break - even point in rupee value can be calculated with the help of following formula :

a) Break - even point (in rupees) $= \dfrac{F}{P-V} = P$

Where,   F = Fixed cost

P = Selling price par unit

υ = Variable cost per unit

b) Break - even point can also be calculated as follows

$$\text{Break - even point (in rupees)} = \frac{\text{Fixed cost}}{\text{P / V Ratio}}$$

Where, P/V Ratio

It is a ratio between contribution and sales. Which is also known as conntribution ratio This ratio indicates the extent to which sales will contribute to meet fixed cost up to break - even point and to total profit of the firm after break - even point. It is calculated as :

$$P/V \text{ Ratio} = \frac{P-V}{P} \times 100 \text{ or } \frac{C}{P} \times 100$$

Where, P = Price, V= Variable cost

C = P - V = Contribution

Since, C = P - V and $\frac{V}{S}$ represents variable cost to sales ratio, the P/V ratio can also be calculated as below :

$$P/V \text{ Ratio} = 1 - \frac{V}{P} \text{ or } 1 - \text{Variable cost ratio.}$$

Thus, if variable cost ratio is 60% or .6, then P/V ratio will be 40% or .4.

Illustration 2 :

Calculate the break - even point in units and in sales value from the following data :

Sales	=	3000 units
Selling prince per unit	=	Rs. 30
Variable cost per unit	=	Rs. 20
Fixed cost	=	Rs. 20,000

Solution :

$$\text{Break - even point (in units)} = \frac{\text{Fixed cost}}{\text{Selling Price per unit} - \text{Variable cost per unit}}$$

$$= \frac{\text{Rs } 20,000}{\text{Rs } 30-20}$$

$$= \frac{\text{Rs } 20,000}{10} = 2000 \text{ Units}$$

$$\text{Break - even point in rupees} = \frac{\text{Fixed cost}}{S-V} \times S \quad \text{Where} \quad S = \text{Selling price per unit}$$

$$V = \text{Variable cost per unit}$$

$$\therefore \text{Break} - \text{even sales} = \frac{\text{Rs } 20,000}{30-20} \times 30$$

$$= \text{Rs.}60,000$$

Alternately, Break - even sales = Break - even point units x selling price

$$= 2000 \text{ units x Rs } 30$$

$$= \text{Rs } 60,000$$

iii) Break - Even point as a percentage of estimated capacity :

Break - even sales can also be expressed as a percentage of estimated capacity of the firm. It is calculated as :

$$\text{Break - even point (as percentage of capacity)} = \frac{\text{Break - even sales}}{\text{Estimated capacity}} \times 100$$

Illustiation 3 :

Total estimated capacity = 1,00,000 units,

Break - even point = 60,000 units, then find out

break - even point as percentage of estimated capacity.

Solution :

$$\text{Break - even point (as percentage of capacity)} = \frac{\text{Break - even po int}}{\text{Estimated capacity}} \times 100$$

$$= \frac{60,000 \text{ units}}{1,00,000 \text{ units}} \times 100$$

$$= 60\%$$

b) Graphic or Chart Approach :

The break - even point can also be shown graphically. A break - even chart portrays a pictorial view of the relationship between costs, volume and profits. The break - even chart shows that the break - even point occurs where the total cost line and total revence, line intersect each other. This chart also shows not only the break - even point but also the profit or loss at various levels of sales.

The break - even chart is drawn by following the steps given below :

1. Volume of output sales (units or rupees) is presented on horizontal axis or x- axis

2. Costs and sales revenue are plotted on vertical or y- axis

3. Fixed cost line is drawn parallel to x-axis as fixed costs remain constant at all levels of activity.

4. Total cost line is drawn starting at fixed cost line touching the y- axis

5. Total revence line is drawn starting at the origin of the two axes.

The mechanism of constructing the break - even chart can be illustrated by using the following data :

Price Per unit = Rs 2

Variable cost : Rs 1.20

Fixed cost = Rs 40,00,000
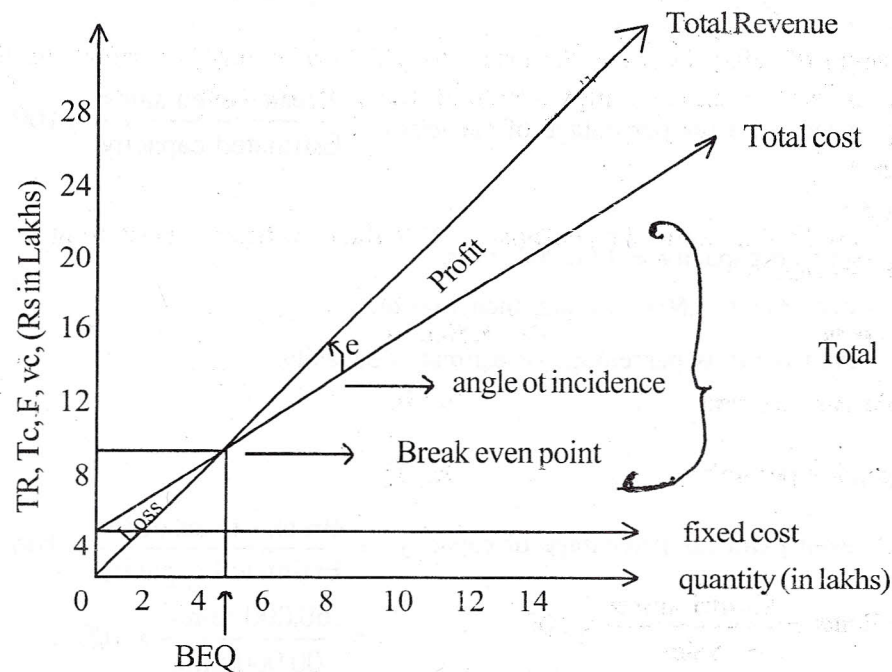
Fig. 6.1 Break Even Chart

Fig.1 shows that the break even point occurs at the point of intersection between total revence and total cost lines. The break - even point for the above firm occurs at sales level of Rs. 5 Lakhs Units. The area to the left of the break - even point represents loss zone and the area to the right represents profit zone.

Angle of Incidence : The angle formed at the point of intersection between total cost line and total sales line is known as the angle of incidence. This angle is significant because it gives us an idea about the profitability of the firm after break - even point. If this angle is larger, the break - even point will be lower and the profitability will be greater after break - even point and vice versa.

Margin of safety :

The excess of actual or budgeted sales over the break - even sales is known as the margin of safety In the above illustration, margin of safety is 5 lach units, it acted sales is 10 lach units

The margin of safety can be expressed as a percentage of sales :

$$\text{Margin of safety} = \frac{\text{actual sales} - \text{Break} - \text{even sales}}{\text{Total sales}} \times 100$$

$$= \frac{10,00,000 - 5,00,000}{10,00,000} \times 100$$

$$= 50 \%$$

The margin of safety indicates the extent to which sales may fall before the firm incurs a loss. A high margin of safety indicates a high degree of safety for the firm.

Illustration 1

From the following particulars, calculate i) P/V Ratio ii) Break - even point (in units), and iii) Break - even point (in rupees.)

Fixed costs	:	Rs. 1,50,000
Variable cost per unit	:	Rs.10
Selling price per unit	:	Rs. 15

Solution :

i) P/V Ratio $= \dfrac{\text{Contribution}}{\text{Sales}} \times 100$

Contribution = Selling price - Variable cost per unit

= Rs 15 - Rs 10 = Rs 5

$\therefore$ P / V Ratio $= \dfrac{Rs.5}{Rs.15} \times 100 = 33\dfrac{1}{3}\%$

ii) Break - even point in units $= \dfrac{\text{Fixed cost}}{\text{Contribution per unit}}$

$= \dfrac{Rs. 1,50,000}{Rs \ 5}$

= 30,000 Units

iii) Break - even point (in rupees) $= \dfrac{\text{Fixed cost}}{\text{P / V Ratio}}$

$$= \frac{\text{Rs. } 1,50,000}{33\frac{1}{3}\%} = 4,50,000$$

Illustration 2

From the following particulars calculate :

1)   Break - even point

2)   Margin of safety

3)   Sales required to earn a profit of Rs. 1,50,000

4)   Profit when sales are of Rs. 10,00,000

5)   Margin of safety available, if the company is earning a profit of Rs. 2,00,000

Fixed costs	:	Rs. 1,50,000
Profit	:	Rs. 1,00,000
Sales	:	Rs. 5,00,000

Solution :

1) Break - even point (in rupees) $= \dfrac{\text{Fixed cost}}{\text{P/V Ratio}}$

P/V Ratio $= \dfrac{\text{Contribution}}{\text{Sales}} \times 100$

Contribution $=$ Fixed cost + Profit

$= 1,50,000 + 1,00,000 = 2,50,000$

$\therefore$ P/V Ratio $= \dfrac{2,50,000}{5,00,000} \times 100 = 50\%$

Hence, break - even point $= \dfrac{\text{Rs. } 1,50,000}{50\%}$ or $\dfrac{1,50,000}{50}$

$= \text{Rs } 3,00,000$

2) Margin of safety $=$ Total sales Break - even sales

$= \text{Rs } 5,00,000 - \text{Rs } 3,00,000$

$= \text{Rs. } 2,00,000$

3) Sales required to earn a profit of Rs. 1,50,000

$$\text{Sales to earn targeted profit} = \frac{\text{Fixed cost} + \text{Target profit}}{\text{P/V Ratio}}$$

$$= \frac{\text{Rs. 1,50,000} + 1,50,000}{50\%}$$

$$= \frac{\text{Rs. 3,00,000}}{50} \times 100$$

$$= \text{Rs 6,00,000}$$

4) Profit when sales are Rs. 10,00,000

Profit $=$ (Sales x P/V Ratio) - Fixed cost

$$= (\text{Rs 10,00,000} \times \frac{50}{100}) - \text{Rs. 1,50,000}$$

$$= \text{Rs 5,00,000} - \text{Rs. 1,50,000}$$

$$= \text{Rs. 3,50,000}$$

5) Margin of safety when profit is Rs. 2,00,000

$$\text{Margin of safety} = \frac{\text{Profit}}{\text{P/V Ratio}}$$

$$= \frac{\text{Rs. 2,00,000}}{50} \times 100$$

$$= \text{Rs. 4,00,000}$$

Illustration 3

The following figures of sales and profits for two periods are available in respect of a firm :

	Sales	Profit
Period I	1,00,000	15,000
Period II	1,20,000	23,000

You are required to calculate :

a) P/V Ratio

b) Break - even point

c) Sales required to earn a profit of **Rs. 20,000**

d) Profit at estimated sales of Rs. 1,50,000

e) Margin of **Safety** at a **profit** of Rs 50,000

Solution :

a) P/V Ratio $= \dfrac{\text{Change in profits}}{\text{Change in Sales}} \times 100$

$= \dfrac{23,000 - 15,000}{1,20,000 - 1,00,000} \times 100$

$= \dfrac{8000}{20,000} \times 100 = 40\%$

b) Break - even point $= \dfrac{\text{Fixed cost}}{\text{P / V Ratio}}$

As fixed cost is not given, it should be computed. Take data of one period and calculate the fixed cost in the following manner.

Profit = (Sales x P/V Ratio) - Fixed cost

$\therefore$ Fixed cost = (Sales x P/V Ratio) - profit

= (1,00,000 . 40%) - 15,000

= 40,000 - 15,000 = 25,000

$\therefore$ Break - even point $= \dfrac{\text{Rs. 25000}}{40\%}$

$= \dfrac{25000}{40} \times 100$

= Rs. 62,500

c) Sales required to earn a profit of Rs. 20,000

Sales for targeted profit $= \dfrac{\text{Fixed cost + Desired profit}}{\text{P / V Ratio}}$

$= \dfrac{\text{Rs } 25,000 + 20,000}{40\%}$

$= \dfrac{45,000}{40} \times 100 = \text{Rs. } 1,12,500$

d) Profit when sales are Rs. 1,50,000

Profit = (sales x P/V Ratio) - Fixed cost

$$= (1,50,000 \times \frac{40}{100}) - 25,000$$

$$= 60,000 - 25,000$$

$$= Rs. \ 35,000$$

e) Margin of safety at a profit of Rs. 50,000

$$\text{Margin of safety} = \frac{\text{Profit}}{\text{P / V Ratio}}$$

$$= \frac{50,000}{40\%} = Rs. 1,25,000$$

6.5 Effect of changes in Fixed cost :

Break - even point of a firm are is affected by the changes in fixed cost.

An Uncrease is Fieed cost results is the lercrease of break even point. The minimum **quantity** required to recover all costs rises
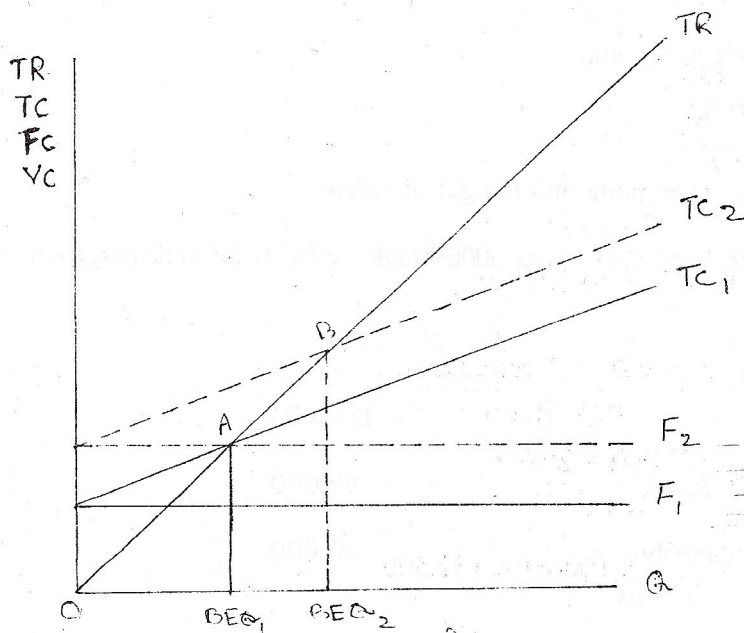
FiG: 6.2. Efect of change in fixed cost

In Fig 6.2 TC, is the imitial to tal cost, TR is the to the revece and BEO is break even quantity when fieed cost is F_1.

When fieed cost uncreased from F_1 to F_2 the total cost carve shifted free TC_1 to TC_2. Break even point nereed to point 'B' from 'A' Break even quantity increased from BEO_1 to BEO_2

Similary, if fieed cost deereased from F_2 to F_1 the total cost carve shifts free TC_2 to TC_1 movery the break even ponto BEO_1 from BEO_2

Effect of changes in fixed costs :

A change in fixed costs does not affect P/V ratio. Other factors remaining constant, a decrease in fixed costs will lower the break - even point and raise the profits. On the other hand, an increase in fixed costs will result in a higher break - even point and lower amount of profits.

The effect of the changes in these factors can be shown with the the help of the following illustration:

Illustration 4 :

ABC Ltd has prepared the following budget estimates for the year 2003 - 2004 :

Sales   :   15,000 units

Fixed expenses :   Rs. 34,000

Sales   :   Rs. 1,50,000

Variable costs :   Rs. 6 per unit

You are required to :

i) find out the P/V Ratio, break - even point and margin of safety.

ii) Show the effect of increase in fieed cost by Rs 6000 break - even point and margin of safety :

Solution :

i) When the F =Rs 34,000

Sales   :   Rs. 1,50,000

Less Variable cost (15000 x Rs 6)   :   90,000

                    Contribution :   60,000

                              Rs
Price per unit   :   10
Legs Varable cost per unit :   6
Cantribution per unit   :   4

Break even antity $= \dfrac{F}{P-V}$

$= \dfrac{34000}{10-6}$

$= 8500$ Units

Margine of Safcty $\quad =$ Actual Sales - Break Evesn Seles

$= 15000-8500$

$= 6500$ units

(ii) when to Fincreases by Rs 6000

$BE\varphi = \dfrac{40000}{4} = 10,000$ Units

Marging Sagety $=$ Actiul Sales - Break even Sales

$= 15000 - 10000$

$= 5000$ units

When the fieed cost uncreesed fran Rs 34000 toRs 40000 the break even point also rose from 885000 units to 10,000 units. The nearger of safety decreesed from 6500 units to 5000 units similarly, if fieed cost decreases from Rs 40,000 to Rs 36000, break even quantity decreases from 10000 units to 8500 units.

6.6 Utility and limitations of Break - Even analysis :

Break - even analysis is a very useful technique of profit planning and control for managers. It has the following advantages.

1)   It is a simple technique to understand the accounting data for those business executives who are unable to understand financial statements.

2)   It helps the management in identifying causes of increasing break - even point and falling profits and the measures to be taken

3)   It provides the basic information that enables the management to further investigate the ways for profit improvement.

4)   It helps in considering the risk implications of alternative actions of profit planning.

Limitations :

Break - even analysis is a useful technique which helps the management in its profit planning. But, it is based on certain assumptions which limit the utility and the applicability of this technique. These limitations should be considered while using this technique to get meaningful results. The CVP analysis suffers from the following limitations :

1)   One important assumption of break - even analysis is that costs can be separated into fixed and variable components. But this classification is not always possible. Most of the expenses belong to mixed category.

2)   Total fixed costs do not remain constant at different level, of output. In practice, they are constant over a relevant range of output and would increase in a step - wise fashion.

3)   The assumption of a constant variable cost per unit is unrealistic. Total variable costs do not change proportionately to output.

4)   The assumption of a constant selling price may be valid under conditions of perfect competition. But under imperfect market conditions selling price should be reduced to sell more units of output.

5)   The break - even analysis is best suited for a single product firm. But it is difficult to use this technique for a multi - product firm. The break - even point for a multi - product firm as a whole is valid only if the sales mix is constant.

6)   The break - even analysis is short - term technique of profit planning and has a limited use in long - range planning.

7)   The break - even analysis is a static tool. It shows the relationship between costs, volume and profit of afirm at a given point of time assuming that costs and sales to be static.

6.7 Summary :

In financial management, leverage refers to the employment of an asset or source of funds for which the firm pays a fixed cost or return. Leverages are of three types - **operating leverage**, **financial leverage** and **composite leverage**.

Operating leverage refers to the use of fixed costs in the operation of a firm and indicates the effect of a change in sales on EBIT.

Break - even analysis or CVP analysis shows the relationship between costs, volume and profit. Break - even point is that level of activity or volume of output at which there is no profit or loss. Break - even analysis is a very useful technique to help the management in profit planning. In spite of its limitations, it is a very popular technique in ascertaining cost, volume and profit relationships.

6.8 Key words :

Leverage : The employment of an asset or source of funds for which a fixed cost or return paid.

Operating leverage : The existence of fixed costs in the cost structure of the firm.

Degree of operating leverage : The percentage change in operating income in response to a percentage change in sales

Break - even point : The level of activity or output at which there is no profit or loss.

P/V Ratio : A ratio between contribution and sales.

Margin of safety : The difference between total sales and break - even sales. It indicates the quantum of sales, the firm can afford to lose before incurring any loss.

Angle of incidence : The angle formed at break - even point between total sales and total cost lines. It indicates the profit making capacity after break - even point.

6.9 Self - assessment Questions :

1) What is Operating Leverage ? How does it help in magnifying earnings of a firm ?

2) What is break - even analysis ? Explain the assumptions and limitations of the technique.

3) What is break - even point ? How is it calculated ?

4) What is break - even chart ? Explain different methods of constructing break - even chart.

5) Explain the following concepts ?

        a) P/V Ratio   b) Margin of safety   c) Angle of incidence

6.10 Further readings :

1.	James C. Van Horne	Financial Management
2.	Khan and Jain	Financial Management
3.	Pandey I.M.	Financial Management

Chapter – 7

BUDGETS – BUDGETARY CONTROL

Objectives :

After reading this unit you should be able to :
- understand the meaning of budget and budgetary control
- find out the essentials of a budgetary control system
- understand the budgetary control organization of a company.
- Know the advantages and limitations of budgetary control.

Structure :

7.1 Introduction
7.2 Budgetary Control
7.3 Essentials of a Good Budgetary Control System
7.4 Budgetary Control Organization
7.5 Advantages of Budgetary Control
7.6 Limitations of Budgetary Control
7.7 Self Assessment Questions
7.8 Reference Books

7.1. INTRODUCTION

Cost accounting aims at ascertaining costs accurately. Additionally, it seeks to control costs through careful planning. To this end, management tries to fix targets for all important activities in advance. A comparison of actual performance with these pre-determined targets is then made and reasons for variance are looked into with a view to reduce costs and thereby improve performance continuously. Budgetary control is an important managerial tool that helps to achieve these objectives.

7.1.1 Meaning of Budget:

The Institute of Cost and Management Accountants, London, defines budget as a financial and/or quantitative statement prepared to a definite period of time, of the policy to be pursed during that period for the purpose of attaining a given objective.

George R. Terry: "A budget is an estimate of future needs arranged according to at an orderly basis covering some or all the activities of an enterprise for a definite period of time.

H.J.Weldon: A budget is thus, a standard with which to measure the actual achievement of people, department etc.

Hemass C. Heiser: Budget is an overall blue print of a comprehensive plan of operations and actions expressed in financial terms.

Thus, the essential features of a budget are:
1. It is statement in terms of money or quantity or both.
2. It is prepared for a definite future period.
3. It is prepared in advance.
4. Its purpose is to attain a given objective.

Budget presents the plans, objectives and policies of an enterprise in numerical terms. It is a short-term operational plan used as a tool by management for planning as well as controlling the activities of the organisation and also ensure the coordination among the different departments in the organisation to achieve its predetermined goals. In a broad sense, a budget constitutes a statement of planned or expected results (of any proposed course of action) in quantitative terms for a specified future period. It may be expressed either in financial or physical terms like machine hours, man hours, units or products, or in any other numerically measurable terms.

7.1.2 Budgetary Control

The use of budget to monitor and regulate the operational activity of the organisation in a systematic manner is called 'budgetary control'.

The Institute of Cost and Management Accountants, London, defines budgetary control as 'the establishment of budgets, relating the responsibilities of executive to the requirements of a policy and the continuous comparison of actual with budgeted results either to secure by individual action or to provide a firm basis for its revision.

A budgetary control system secures control over costs and performances in various parts of an enterprise by:

1. establishing budgets;
2. comparing actual results with budgeted ones; and
3. taking corrective action or revising the budget if necessary.

As stated above, Budgeting means the process of preparing budgets. It is an act of planning the activities of a firm and expressing the same in numerical terms. Budgetary control is the act of adhering to the plan.

Rowland and Harry have stated the difference between budgets, budgeting and budgetary control. According to them, budgets are the individual objectives of a department, etc., whereas

Budgeting may be said to be the act of building budgets. Budgetary control embraces all and in addition includes the science of planning the budgets themselves and the utilisation of such budgets to effect an overall management tool for the business planning and control. In the words of Van Sickle, "the budget is the financial plan. Budgetary control results from the administration of the financial plan."

7.1.3 Forecast and Budget

Forecast is a statement of probable events. Budget is an operating and financial plan of a firm. At planning stage, it is essential to prepare forecasts of probable courses of action for the business in future. Plans or budgets are prepared on the basis of these forecasts. A forecast is, therefore, the basis for the budget. The following are the differences between 'forecast' and 'budget'.

Differences between a Forecast and Budget

	Forecast	Budget
1.	It is concerned with probable events	It is concerned with planned events
2.	It is prepared for a long period	It is usually prepared for each accounting period.
3.	It deals with only a limited activity of business, e.g., sales forecast purchase forecast	It deals with the entire unit.
4.	Forecasting may not be very precise and it may lack control orientation	It is definite and precise and is an important control tool.
5.	It is a preliminary step in budgeting	It begins when forecasting ends Forecasts are converted into budgets.

7.2 BUDGETARY CONTROL

Budgetary control could be described as 'forward costing' establishment of budgets and then their application with a view to ensure control over the activities of concern. The basic purpose is to improve the efficiency and profitability of the concern.

7.2.1 Objectives of Budgetary Control:

The following are the objectives of budgetary control.
1. To provide a detailed plan of action for a business over a period of time;
2. To coordinate the different units and activities of the organization with a view to utilize resources judiciously;
3. To motivate organizational members to perform well; and

4. To exercise control on cost through comparison of actual results with budgeted ones and initiating rectificational steps promptly.

7.2.2 Distinction between Budgeting and Budgetary Control:

Budgeting and Budgetary control are accounting exercises which act as a tool of management at all level. Budgeting differs from budgetary control in the following respect.

	Budgeting	**Budgetary Control**
1.	Budgeting is the preparation in advance of the quantitative as well as financial statements to indicate the intention of the management in respect of the various aspects of the business.	Budgetary Control is a system by which budgets are used as a means of planning and controlling all the aspects of a business.
2.	Budget is a statement showing the probable items of work to be carried out by the various departments specifying the quantities and monetary values.	Budgetary control is a means of control by which the actual position is compared with that planned for to enable the management to take appropriate action if there are any deviations.
3.	Budget is a plan of operations expressed in monetary terms	Budgetary control is the very essence of financial control.
4.	It is an overall statement in financial terms of the plan of operations. It includes the sales to be made, the expenses to be incurred and the income to be received during the budget period.	Its main objective is to control all aspects of production and selling. The results revealed by the budgets if found unsatisfactory indicates a need for change in policy itself.
5.	Budget should be prepared by the department to which it relates.	Budgetary control in employed by a budget committee or controller.

7.3. ESSENTIALS OF A GOOD BUDGETARY CONTROL SYSTEM

The following are the essentials of good budgetary control system.

1. **Management Support:** Top management's support and cooperation is essential for successful implementation of the budgets. It should take interest in setting the targets and finalising the budgets. It should also in constantly monitor the actual performance to find out the deviations, if any and take curative steps. Then the top management should motivate the personnel and reward the good performers.

2. **Determination of Organisational Objectives:** The organisational goal should be quantified and clearly stated. These goals should be set within the framework of

corporate objectives and strategies. A well defined corporate policies and strategies are pre-requisites to budgeting.

3. **Creation of Effective Organisation Structure:** There should be a well-planned organisational structure with clearly defined authority and responsibility of different levels of management. Role and responsibilities of Budget Committee and its president must be made known to the people in the organisation.

4. **Existence of accurate and reliable accounting system:** The organisation should have good accounting system so as to generate precise, accurate, reliable and prompt information which is essential for successful implementation of budget system.

5. **Participation of all level of staff:** This is the fundamental requirement. If the budgets are prepared from "the bottom up," they will in general work as they were intended to be. The top management must understand and give enthusiastic support to the system. In fact, it requires education and participation at all levels.

6. **Need for flexibility in budgeting:** If conditions change from those prevailing at the time of making the budget, the budget must be recast. If the budget is subject to annual review, it can deal with several conditions as they may arise. The flexible budget, also called variable or sliding scale budget, takes both fixed and variable manufacturing costs into account.

7. **Budget period:** The usual budget period is the normal financial year, but not necessary so. In most of the business, operations from month to month are not uniform. They have seasonal periods during which purpose, quarterly or even monthly as regards time coverage, budgets can be divided into two types: (a) period budgets covering a fixed period of time generally one year, and (b) continuous budgets where monthly or quarterly budgets are continuously extended.

8. **Codes and headings:** For budgeting, accounting and costing to be meaningful, it is important that an ideal scheme of classifying codes and headings is adopted. Code numbers or symbols avoid the use of long and complex account titles. The data feeding, tabulation and analysis becomes easier with this process of budgeting.

9. **Integration of budgets:** The various budgets must be integrated so that they reflect the operating plans for the specified future period. A budgetary control system, to be successful, must develop this attribute.

10. **Control Statements:** For implementing the system of budgetary control, it is necessary that control statements are to be submitted periodically. These serve as feed back reports on whose basis further planning could be made. Reports will be rendered as necessary – daily, weekly and monthly. Generally the daily reports will be for the lower

levels of management and they will be followed by summaries at longer intervals – weekly and monthly for the higher levels of management.

11.   Communication of Results: Finally, the communication systems should be established for management reporting and information service so that information pertaining to actual performance is presented to the concerned manager timely and accurately so that remedial action is taken wherever necessary.

7.4. BUDGETARY CONTROL ORGANISATION

The following steps should be considered in detail for sound be considered in detail for sound budgets and for successful implementation of the budgetary control system.

7.4.1 Organisation for Budgeting

(i) Budget Centre: The organisation must have a clear perspective of the objectives that are sought to be achieved through budgetary control. After outlining such objectives, budget centres must be established. A budget centre is a section of an undertaking defined for the purpose of budgetary control. A budget centre must be clearly demarcated to facilitate the formulation of various budgets with the help of the heads of the departments concerned. For example, the production manager must be consulted for the preparation of the production budget. The responsibility of each executive must also be clearly defined.

(ii) Budget Manual: It is a written document or booklet containing standing instructions regarding the procedures to be followed and the time schedules to be observed. It is usually maintained in a loose-leaf form so as to facilitate easy alterations from time to time. The main purpose behind the Budget Manual is to inform line executives beforehand about the procedures to be followed rather than issuing frequent instructions from the controller's office, and thereby avoid friction between line and staff officials.

The budget manual clearly states the functions of various officials connected with the formulation of budgets. It sets out steps in the preparation of various budgets including submission, review, approval and final adoption. It also indicates the time table for budget operations and the records, reports and forms to be maintained for the purpose.

7.4.2 Responsibility for Budgeting

Budget Controller: The budgetary control organisation is usually headed by a top executive known as Budget Controller. He should be a man of wide experience and should posses through knowledge regarding budget matters, since he is expected to command the respect of all members in the organisation. The budget controller is a staff man providing advice to management on various important issues (i.e., preparation of budgets, informing management of the need to revise budgets, collecting information as to how the budgets

could be operated more efficiently etc.), and is answerable to the Chairman of the company directly.

Budget Committees: The Budget Controller may have a budget committee under him to help in his work. It will have the representatives from various departments like production, finance, marketing, administration and accounts. The members of the committee discuss the budget figures thoroughly before coming out with a mutually agreed programme for the organisation.

7.4.3 Fixation of the Budget Period

Budget Period: It refers to the period of time covered by a budget. The length of budget period depends on the nature of business, the production period, the control aspect etc. Industries experiencing a high rate of change generally go for annual budgets (Ex.: electronics, consumer goods industries), whereas in industries like ship-building, the period of budget may vary between 5 to 10 years.

7.4.4 Determination of the Key Factors

Budget Key Factor: Key factor is also known as limiting factor or governing factor. It has been defined as the factor the extent of whose influence must first be assessed in order to ensure that the functional budgets are reasonably capable of fulfilment. It proves to be an obstacle in the achievement of the targeted figures constrained in the functional budgets. Stated otherwise, it is a factor of such importance that it influences all other budgets so that the coordination must be centered round it. The following are the examples of key factors:

(a) **Materials:** Non-availability of supply in terms of quality as well as quantity.
(b) **Labour:** Shortage of skilled labour; problems of high turnover.
(c) **Working Captial:** Shortage due to lack of funds, Inefficient use of working capital.
(d) **Plant:** Constraints of finance, space etc., shortage of plant capacity due to import restrictions.
(e) **Management:** Limited availability of expertise, technical and managerial.

7.4.5 Reporting on results

Budget report: Establishing budgets is in itself of no use unless a comparison is made regularly between actual performance and budgeted performance, and the results brought to the notice of management through reports. The budget reports should be prepared in such a way that will reveal the responsibility of a department or an executive and give full reasons for the variances so that proper corrective action may be taken.

7.5 ADVANTAGES OF BUDGETARY CONTROL

Budgetary control makes all the difference between drifting in an uncharted sea and following a well planned course towards predetermined destination. It serves as invaluable aid to management through planning, coordination and control.

7.5.1 As an Aid in Planning

i. **Habit of thinking ahead:** Budgetary control forces management to follow the principle of 'look before you leap'. It compels management to make an early study of problems and outline ways of tackling the same.

ii. **Pooled judgement and experience:** It reflects the combined efforts of best brains in the organisation. The combined judgement, experience of executives can be used to determine the most profitable course of action for future use.

iii. **Realistic goals and policies:** It gives planning a reality and sense. It helps the enterprise to clarify the goals and policies to be pursued in operational and realistic terms.

iv. **Planned way to secure economy:** This is a planned approach to expenditure and financing of the business so that economy is achieved in the use of resources. The resources are used to the best advantage. It directs enterprise activity towards maximisation of efficiency, productivity and profitability.

v. **Reduces uncertainty:** Uncertainty is reduced to minimum. It forces executives to map out future courses of action clearly. These are periodically examined, restated and reformulated in the light of changed circumstances. This helps an organisation to face future challenges with confidence.

7.5.2 As an aid in Co-ordination:

i. **Establishes co-ordination:** Budgetary control forces executives to think as a group. All the departments in an organisation tend to move in a well-coordinated manner, trying to implement the planned courses of action in a systematic way. There is very little room for internal friction.

ii. **Relates business activity with general economic trend:** Budgetary control helps management to coordinate the activities of the business to the signals of high and low economic trends. The danger signals in the economy are promptly taken care of. The entire organisational machinery is kept ready to overcome environmental and competitive challenges.

7.5.3 As an Aid in Control

i.   **Indicates weaknesses:** It establishes divisional and departmental responsibility. As a result executives cannot seek shelter behind a mountain of rules and regulations for their inefficiency. They cannot indullge in buck-passing when budget figures are not met. By pin-pointing responsibility for inefficient performance, budgeting helps management trace weakspots early and take remedial steps.

ii. **Prevents waste:** Budgeting wages a continuous war against wastages of all kinds. It conducts a searching analysis of all items of expenditure and keeps them under check. There is a conscious attempt to channel activities through profitable channels. Capital is put to profitable use.

iii. **Facilitates standard costing:** The use of performance standards especially in operational activities and financial matters help the adoption of standard costing technique.

iv. **Management by exception:** Budgetary control helps in finding out deviations from pre-planned courses of action. Management can probe into the causes and concentrate on important factors causing the trouble.

v.   **Motivates people:** The method of evaluating performance against standards set in advance, enables employees to find out their strengths and weaknesses It makes them work for assigned goals show performance and obtain the rewards. In other words, they are made to earn their rewards by showing superior performance.

7.6 LIMITATIONS OF BUDGETARY CONTROL

Budgetary control is not always on the credit side of the ledger. It has its own limitations. These include:

1. **Accuracy is open to doubt:** Budgetary control begins with formulation of budgets which are more estimates. The adequacy of budgetary control, therefore, depends upon the accuracy with which these estimates are made. Budgeting based on inaccurate forecasts is useless as a yardstick for measuring performance.

2. **Constant review needed:** Budgeting should be a flexible exercise. When conditions change, budget estimates loose their usefulness. The effectiveness of a budget, thus, depends on how the budget revisions are made in the light of changed circumstances. Usually budget makers do not show much interest in reviewing the budgets. In that case budget becomes a self-defeating exercise.

3. **Cost may be prohibitive:** The cost involved in installation and maintenance of the budgetary control system is somewhat prohibitive. Small concerns may find it to be

a luxury. Again, revising budget becomes a strenuous and demanding job and small concerns may find these revisions too taxing and troublesome.

4. **Impersonal approach:** Budgetary control does not guarantee success automatically. There is, however, an erroneous impression that budgeting brings about success. There is no doubt that budgeting direct enterprise activities along right routes. But this impersonal approach needs to be supported by proper administration. Top management must be willing to cooperate and extend its continued blessings to budget planners and administrators. Sufficient training and education must be imparted to employees before budgets are translated into meaningful action. This would not only help in overcoming employee resistance to changes but also enable the organisation to bring about cost consciousness among employees.

7.7 SELF ASSESSMENT QUESTIONS

1. What purpose is served by instituting a Budgetary Control System to any organization having both manufacturing and selling activities? Discuss the main factors to be considered in framing the Purchase Budget in such an organization.
2. Distinguish between a Forecast and Budget
3. What are the objectives of Budgetary Control?
4. Describe briefly the purpose and uses of a system of budgetary control and explain its relation to the financial accounts of a company.
5. What additional advantages do you consider likely to follow the adoption of Budgetary Control by a manufacturing business in which standard costing technique is already employed?
6. Distinguish between budget and budgeting.
7. State the difference between Budget and Budgetary Control.
8. "Budgets are not merely accounting documents, they are blue prints for managerial action during a budget period." Examine this statement.
9. State the essentials of a good budgetary control system.
10. State the essentials of a good budgetary control system.
11. What is Budget Centre?
12. What is Budget Manual?
13. What are budget committees?
14. "A budget is an aid to management and not a substitute for management." Explain.
15. How does budgetary control serve as a planning and control device? Point out its limitations and the requisites for successful operation.
16. "For the success of a system of budgetary control it is essential that there should be a sound organisation for budget preparation, budget maintenance, and budget administration." Discuss.
17. What are the essentials of an effective system of budgetary control?
18. What is Zero based Budgeting?

19. What is Performance Budgeting?
20. What is Flexible Budget? Explain
21. Write short notes on the following:
    a. Capital Expenditure budget
    b. Zero based budget
    c. Performance budget
22. Explain the latest developments in the field of budgeting and budgetary control.

7.8 REFERENCE BOOKS

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Chapter – 8

CLASSIFICATION OF BUDGETS

Objectives :

After reading this unit you should be able to
- explain the type of budget in an organization
- know the differences between fixed and flexible budgets
- analyse the current developments in budgeting

Structure :

8.1 Types of Budgets
8.2 Fixed and Flexible Budgets
8.3 Current Developments in Budgeting
8.4 Self Assessment Questions
8.5 Exercises
8.6 Reference Books

8.1 TYPES OF BUDGET

Budgets may be classified on the basis of scope, the capacity or efficiency to which they are related, the condition on which they are based and the periods they cover.

Though budgets can be classified according to various points of view, the following basis of classification are generally followed in practice.

a. Functional classification
b. Classification on the basis of time factor.
c. Classification on the basis of flexibility.

8.1.1 Functional Classification:

A master budget is the summary budget for the entire enterprise and embodies the summarised figures for various activities. It is the consolidation of all functional budgets. A functional budget is a budget which relates to any of the functions of an undertaking; e.g., production, sales, finance etc.

Functional Budgets: The following are the principal functional budgets:

(a) Sales Budget: The sales budget is a forecast of total sales expressed in terms of money and quantity. In practice, quantitative budget is prepared first, then it is translated into monetary terms.

(b) Production Budget: It is a forecast of the production for the budget period. It may be expressed in units or standard hours. A standard hour is the quantity of output or amount of work which should be performed in one hour. While preparing the production budget, the production budget, the production executive will take into account the physical facilities like plant, power, factory space, materials, labour availability for the period.

(c) Materials Budget: It shows the details of raw materials to be consumed. It is expressed in terms of physical quantities and values of materials to be issued from the stores for production purpose. This budget provides that right materials of right quantity and quality are procured.

(d) Labour Budget: It shows the details of labour requirements in quantity, with estimated costs. This budget gives detailed information relating to the number of employees, rates of wages and cost of labour hours to be employed.

(e) Manufacturing Overhead Budget: It shows the estimated costs of indirect materials, indirect labour and indirect manufacturing expenses during the budget period to achieve the predetermined targets.

(f) Administration Cost Budget: This comprises the salaries and expenses of administrative office and management for a specified period. It is prepared with the help of past experience and expected changes in future.

(g) Selling Expenses Budget: All expenses concerned with sale of products to customers are included in this budget. It is generally prepared territory-wise by the sales manager of each territory, on the basis of past records.

(h) Research and Development Budget: This budget lists all the research and development activities together with their likely costs.

(i) Cash Budget: It is prepared after all the functional budgets are prepared by the chief accountant either on a monthly or weekly basis. It shows the sum total of the requirements of cash in respect of various functional budgets and of estimated cash receipts for a stipulated period.

(j) Capital Expenditure Budget: This budget shows the estimated expenditure on fixed assets like plant, land, machinery, building etc. It is a long-term budget, usually set for three

to five years. The budget requires frequent revision because of changes in cost of land, buildings, machinery and equipment. It gives an indication of the cash requirements. If financial resources are not available with the company, arrangements have to be made to raise them from outside. The following are the advantages of capital expenditure budget.

i.   It estimates the capital expenditure requirements and accordingly provides or arranges for it.

ii.   The priority of procuring assets can be determined. Those assets which are very important and unavoidable is given first preference and others are postponed to a later period.

iii. It serves as a tool of controlling capital expenditure.

Illu.1: From the following information prepare a monthly cash budget for the three months ending 31st December, 2002.

Month	Sales	Materials	Wages	Overheads Production	Admn. Selling etc.
2002	Rs.	Rs.	Rs.	Rs.	Rs.
June	3,000	1,800	650	225	160
July	3,250	2,000	750	225	160
Aug.	3,500	2,400	750	250	175
Sept.	3,750	2,250	750	300	175
Oct.	4,000	2,300	800	300	200
Nov.	4,250	2,500	900	350	200
Dec.	4,500	2,600	1,000	350	225

i.   Credit terms are: (a) Sales – 3 months to debtors. 10% of sales are on cash.   On an average, 50% of credit sales are paid on the due dates while the other 50% are paid in the month following (b) Creditors for material – 2 months.

ii.   Lag in payment: Wages ¼ months, overheads – ½ months.

iii. Cash and Bank Balance on 31st October expected Rs.1,500

iv.   Other information (a) Plant and Machinery to be installed in August at a cost of Rs.24,000. It will be paid for by monthly instalments of Rs.5,000 each from 1st October; (b) Preference share dividend @ 5% on Rs.50,000 are to be paid on 1st December; (c) Calls on 250 equity shares @ Rs.2 per share expected on 1st November; (d) Dividends from investments amounting to Rs.250 are expected on 31st December; (e) Income tax (advance) to be paid in December Rs.500

Solution:

Cash Budget
Period: 3 months ending 31ˢᵗ December, 2002

Details	October Rs.	November Rs.	December Rs.
Balance b/d	1,500.00	537.50	350.00
Receipts (Estimated)			
Sales	3,212.50	3,462.50	3,712.50
Capital	-	500.00	-
Dividends	-	-	250.00
Total (A)	4,712.50	4,500.00	4,312.50
Payments:			
Creditors	2,400.00	2,250.00	2,300.00
Wages	787.50	875.00	975.00
Overheads:			
Production	300.00	325.00	350.00
Adm., Selling and Distribution	187.50	200.00	212.50
Pref. Dividend	-	-	2,500.00
Income tax	-	-	500.00
Plant and Machinery Rs.500 each	500.00	500.00	500.00
Total (B)	4,175.00	4,150.00	7,337.50
Balance c/d (A-B)	537.50	350.00	(-) 3,025

Calculation of Amount of Sales:

2002 Month	Sale Rs.	October Rs.	November Rs.	December Rs.
June	3,000	1,350.00	-	-
July	3,250	1,462.50	1,462.50	-
Aug.	3,500	-	1,575.00	1,575.00
Sep.	3,750	-	-	1,687.50
Oct.	4,000	400.00	-	-
Nov.	4,250	-	425.00	-
Dec.	4,500	-	-	450.00
Total	-	3,212.50	3,462.50	3,712.50

Wages Calculation:
   ¼ Wages of September and ¾ wages of October
      Thus (¼ × 750) = 187.50 + (¾ × 800) Rs.600 = Rs.787.50
   The wages of other months will be calculated on the same pattern.

Illu.2: The following are the details regarding the budgeted and actual production for six months ending 31ˢᵗ December, 2001.

	Unit 40,000 Budgeted Rs.	50,000 Actual Units Rs.
Material consumed 45,000 units	1,35,000	55,000 = 1,90,000
Wages at 3 hours per unit		
Rs.1.50 per hour	1,80,000	2,45,000
Variable Overhead at Rs.2 PU	80,000	1,25,000
Fixed overheads	75,000	1,00,000
Total	4,70,000	6,60,000

During the budgeted period:
  i.   **Production is expected to go up to 60,000 units**
  ii. **The prices of materials are expected to increase further in the same manner as they had increased over the budgeted price.**
  iii. **Labour charges are expected to increase by 50 paise per hour above the actual rate shown above through efficiency is expected to decline by 20%**
  iv. **Fixed overheads are expected to increase by 20%**
  v.   **Loss of materials is expected to be uneffected.**
  vi. **Variable overheads are expected to increase by 10%**
  Prepare a production budget for the six months ending 30ᵗʰ June, 2002

Solution:

Production Cost Budget

	Budget - 6 months Ending December 2001		Actual - 6 months Ending December, 2001		Budget - 6 months Ending June, 2002	
Production Level		40,000		50,000		60,000
Material	45,000 × 3	1,35,000	45,000 × 3	1,90,000	65,000 × 3.978	2,58,570
Wages	3 hr × 1.50	1,80,000	3 hr × 1.633	2,45,000	3 hr – 36 mts. 2.133	4,60,728
Variable Overheads	2 × 4,000	80,000	2.5 × 500	1,25,000	2.75 × 60,000	1,65,000
Fixed Overheads		75,000		1,00,000		1,20,000
		4,70,000		6,60,000		10,04,298

Working Notes:

1. Material cost increase is 15% over Budget figures. For six months ending June, 2002 an increase of 15% over Rs.3,455 is assumed.
2. Efficiency decrease by 20% leads to 20% more time i.e., 36 minutes. Total time required i.e. 2,16,000 hours. Per hour rate increases by 50 paise to Rs.2,133.

Illu.3: The sales director of Navabharat Manufacturing Company reports that next year he expects to sell 54,000 units of a certain product. The production manager consults his store keeper and casts his figures as follows:

Two kinds of raw materials A and B are required for manufacturing the product. Each unit of the product required 2 units of A and 3 units of B. The estimated opening balances at the commencement of the next year are:
Finished product – 10,000 units; A – 12,000 units; B – 15,000 units.
The desirable closing balances at the end of next year are:
Finished product – 14,000 units; A – 13,000 units; B – 16,000 units.
Prepare the Materials Budget for the next year.

Solution:

Materials Budget for the year ending……

	Finished Products Units	Raw Materials	
		A Units	B Units
Desired Production @ 2 units for A and 3 units for B	54,000	1,08,000	1,62,000
Add: Opening Balance	10,000	12,000	15,000
	64,000	1,20,000	1,77,000
Less: Closing Balance	14,000	13,000	16,000
Estimated Sales	50,000	-	-
Materials to be purchased	-	1,07,000	1,61,000

8.1.2 Preparation of Master Budget:

The Master budgets combine all functional budgets into one harmonious unit. It is a summary plan of overall proposed operations developed by management for the company, covering a specific period. It is a summary budget incorporating its functional budgets which is finally approved, adopted and employed. This budgeting contains the details of sales budget, production budget, cash budget etc. When it is complete, the budget committee will review all the details and if approved, it will be submitted to the board of directors. Once it is accepted and approved it becomes the target for the company during a specific period to achieve the desired targeted results.

Illu.4: A Glass Manufacturing Company requires you to calculate and present the budget for the next year from the following information:

	Rs.
Sales:	
Product A	**3,00,000**
Product B	**5,00,000**
Direct materials Cost	**60% of Sales**
Direct Wages	**20 Workers @ Rs.150 per month**
Factory Overheads:	
Indirect labour i.e.,	
Works Manager Rs.500 per month	
Foreman Rs.400 per month	
Stores and Spares	**2½% on sales**
Depreciation on machinery	**Rs.12,600**
Light and Power	**Rs.5,000**
Repairs and Maintenance	**Rs.8,000**
Other Sundries	**10% on direct wages**
Administration, selling and distribution expenses	**Rs.14,000 per year**

Solution:

Master Budget

		Rs.	Rs.
A.	**Sales Budget:**		
	Budgeted Sales:		
	Product A		3,00,000
	Product B		5,00,000
			8,00,000
	Less: Administrative, selling and distribution expenses		14,000
	Net sales value		7,86,000
B.	**Product Cost Budget**		**4,80,000**
	Direct materials 60% of sales		36,000
	Direct wages (20 × 150 × 12)		
	Prime Cost		5,16,000
	Factory overhead		
	Variable : Stores & spares (2 ½ % of sales)	20,000	
	Light & power	5,000	
	Repairs & maintenance	8,000	33,000
			5,49,000
	Fixed : Indirect labour:		
	Works manager	6,000	

		Rs.	Rs.
	Foreman	4,800	
	Depreciation	12,600	
	Sundries	3,600	27,000
			5,76,000
C.	**Expected Profit (A-B)**		**2,10,000**

8.1.3 Classification according to time factor:

In terms of time factor, budgets are broadly of the following three types.

1. **Long-term Budgets:** They are concerned with planning the operations of a firm over a perspective of five to ten years. They are usually in terms of physical quantities.

2. **Short-term Budgets:** They are usually for a period of a year or two and are in the nature of production plan in monetary terms.

3. **Current Budgets:** They cover a period of month or so and they will be adjusted to current conditions or prevailing circumstances.

8.1.4 Budgets based on Flexibility:

On the basis of flexibility budgets may be classified into a) fixed and b) flexible budgets.

Fixed Budget: Fixed budget is a budget in which targets are rigidly fixed. Such budgets are usually prepared from one to three months in advance of the fiscal year to which they are applicable. Thus, twelve months or more may elapse before figures forecast for the December budget are used to measure actual performance. Many things may happen during this intervening period and they may make the figures go widely out of line with the actual figures. Though it is true that a fixed, or static budget as it is sometimes called, can be revised whenever the necessity arises, it smacks of rigidity and artificially so far as control over costs and expenses are concerned.

Flexible Budget: Flexible budget or variable budget is one which provides estimates for different levels of activities. It is a budget which, by recognising the difference in behaviour between fixed and variable costs in relation to fluctuations in output or turnover, is designed to change appropriately with such fluctuations. A flexible budget may, for example, provide estimates for 50%, 60%, 70% and 80% production capacities. The actual production can be compared with the appropriate estimate in the budget.

8.2 FLEXIBLE BUDGET

As stated above budget may be established, either as a fixed budget or a flexible budget. A fixed budget is a budget designed to remain unchanged irrespective of the level of activity actually attained. It does not change with the change in the level of activity actually attained and does not conform with the budgeted one. As a result, fixed budgets can be established only for a small period of time when the actual output is not anticipated to differ much from the budgeted output. Obviously, fixed budgets have only limited application and are ineffective as managerial tools.

8.2.1 Need for Flexible Budget

A flexible budget is a budget designed to change in accordance with the level of activity actually attained. It is also known as **variable or sliding scale budget.** It is prepared in such a way as to present the budgeted cost for different levels of activity. It is more realistic and practical in that the changes expected at various levels of activity are given due weightage. Flexible Budgeting is desirable in the following cases:

(i) Where sales are not predictable and certain because of the peculiar nature of the business e.g. business dealing in luxury or semi-luxury goods.
(ii) Where the venture is a new and accurate demand forecasting is a tedious task, particularly when there is a question of specific customers' tastes and fashions.
(iii) Where the business is subject to the vagaries of nature such as soft drinks etc.
(iv) Where the production cannot be estimated because of uncertainties as regards availability of material or labour.

8.2.2 Features of flexible budgets
1. They are prepared for a range of activity instead of a single level.
2. They provide a sound basis for comparison because they are automatically geared to changes in volume.
3. They provide a ready-made budget for a particular volume.
4. These are based upon adequate knowledge of cost behaviour pattern.

Illu.5: Prepare a flexible budget for the production of 80% and 100% activity on the basis of the following information.

Production at 50% capacity	**5,000 units**
Raw Material	**Rs.80 per unit**
Direct Labour	**Rs.50 per unit**
Direct Expenses	**Rs.15 per unit**
Factory Expenses	**Rs.50,000 (50%) fixed**
Administration expenses	**Rs.60,000 (variable)**

Solution:

Flexible budget

Capacity of Output units	50%	80%	100%
	5,000	8,000	10,000
	Rs.	Rs.	Rs.
Raw material	4,00,000	6,40,000	8,00,000
Labour	2,50,000	4,00,000	5,00,000
Direct expenses	75,000	1,20,000	1,50,000
Prime Cost	7,25,000	11,60,000	14,50,000
Factory expenses			
Variable	25,000	25,000	25,000
50% fixed (50,000)	25,000	40,000	50,000
Factory cost	7,75,000	12,25,000	15,25,000
Administration expenses			
Fixed 40% (60,000)	24,000	24,000	24,000
Variable (60%)	36,000	57,600	72,000
Total cost	8,35,000	13,06,600	16,21,000

Illu.6: With the following data at 60% activity prepare a budget at 80% and 100% activity.

Production at 60% capacity, 600 units
Materials Rs.100 per unit
Labour Rs.40 per unit
Expenses Rs.10 per unit
Factory expenses Rs.40,000 (40% fixed)
Administrative expenses RS.30,000 (60% fixed)

Solution:

Flexible budget

Level of Activity	60%	80%	100%
Output (Units)	600	800	1,000
Variable Expenses:	Rs.	Rs.	Rs.
Material	60,000	80,000	1,00,000
Labour	24,000	32,000	40,000
Expenses	6,000	8,000	10,000
Factory expenses	24,000	32,000	40,000
Administrative expenses	12,000	16,000	20,000
Total Variable cost	1,26,000	1,68,000	2,10,000
Fixed Expenses:			
Factory expenses	16,000	16,000	16,000
Administrative expenses	18,000	18,000	18,000
Total cost	1,60,000	2,02,000	2,44,000

Illu.7: Prepare a flexible budget at 60%, 80% and 100% capacities from the following information.

    a. **Fixed expenses Rs.1,49,500**
    b. **Semi-variable expenses of 50% capacity – Rs.89,500**
    c. **Variable expenses at 50% capacity – Rs.2,67,000**

Semi variable expenses remained constant between 40% and 70% capacity, increase by 10% between 70% and 85% capacity and 15% between 85% and 100% capacity. Sales at 60% are Rs.5,10,000, at 80% capacity Rs.6,80,000 and at 100% capacity Rs.8,50,000. Assume that all products are sold.

Solution:

Flexible budget

	60% capacity	80% capacity	100% capacity
Sales (A)	5,10,000	6,80,000	8,50,000
Variable expenses	3,20,400	4,27,200	5,34,000
Semi-variable expenses	89,500	98,450	1,02,925
Fixed expenses	1,49,500	1,49,500	1,49,500
Total expenses (B)	5,59,400	6,75,150	7,86,425
Profit/Loss	(-) 49,400	4,850	63,575

Illu.8: The following data are available in a manufacturing company for a yearly period.

	Rs. (lakhs)
Fixed Expenses	
Wages and Salaries	9.5
Rent, Rates and taxes	6.6
Depreciation	7.4
Sundry administration expenses	6.5
Semi-variable expenses (at 50% of capacity)	
Maintenance and repairs	3.5
Indirect labour	7.9
Sales department salaries	3.8
Sundry administrative expenses	2.8
Variable expenses (at 50% of capacity)	
Material	21.7
Labour	20.4
Other expenses	7.9

Assume that the fixed expenses remain constant for all levels of production, semi-variable expenses remain constant between 45% and 65% of capacity, increased by 10% between 65% and 80% capacity and by 20% between 80% and 100% capacity. Sales at various levels are:

	Rs. (lakhs)
50% capacity	100
60% capacity	120
75% capacity	150
90% capacity	180
100% capacity	200

Prepare a flexible budget for the year and forecast the profit at 60%, 75%, 90% and 100% of capacity.

Solution:

Flexible Budget

	50% Rs. (Lakhs)	60% Rs. (Lakhs)	75% Rs. (Lakhs)	90% Rs. (Lakhs)	100% Rs. (Lakhs)
(A) Sales	100	120	150	180	200
Variable expenses					
Material	21.70	26.04	32.55	39.06	43.40
Labour	20.40	24.48	30.60	36.72	40.80
Other expenses	7.90	9.48	11.85	14.22	15.80
Semi-variable expenses:					
Maintenance and Repairs	3.50	3.50	3.85	4.20	4.20
Indirect labour	7.90	7.90	8.69	9.48	9.48
Sales dept.salaries	3.80	3.80	4.18	4.56	4.56
Sundry administrative Expenses	2.80	2.80	3.08	3.36	3.36
Fixed Expenses:					
Wages and salaries	9.50	9.50	9.50	9.50	9.50
Rent rate and taxes	6.60	6.60	6.60	6.60	6.60
Depreciation	7.40	7.40	7.40	7.40	7.40
Sundry administrative Expenses	6.50	6.50	6.50	6.50	6.50
(B) Total cost	98.00	108.00	124.80	141.60	151.60
Profit (A-B)	2.00	12.00	25.20	38.40	48.40

Illu.9: A factory is currently working to 50% capacity and produces 10,000 units. Estimate the profits of the company when it works to 60% and 80% capacity and offer

your critical comments. At 60% working material cost increases by 2% and selling price falls by 2%. At 80% raw material cost increases by 5% and selling price falls by 5%.

At 50% capacity working the product costs Rs.180 per unit and is sold at Rs.200 per unit. The unit cost is Rs.180 is made up as follows:

	Rs.
Material	100
Labour	30
Factory overhead	30 (40% fixed)

Solution:

Flexible Budget

	50% 10,000 Units		60% 12,000 Units		80% 16,000 Units	
	Per Unit	Amount	Per Unit	Amount	Per Unit	Amount
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Material	100	10,00,000	102	12,24,000	105	16,80,000
Labour	30	3,00,000	30	3,60,000	30	4,80,000
Factory overheads						
Fixed	12	1,20,000	10	1,20,000	7.50	1,20,000
Variable	18	1,80,000	18	2,16,000	18	2,88,000
Administrative overheads						
Fixed	10	1,00,000	8.33	1,00,000	6.25	1,00,000
Variable	10	1,00,000	10	1,20,000	10	1,60,000
Total cost	180	18,00,000	178.33	21,40,000	176.75	28,28,000
Sales	200	20,00,000	196.00	23,52,000	190.00	30,40,000
Profit	20	2,00,000	17.67	2,12,000	13.25	2,12,000

8.3. CURRENT DEVELOPMENTS IN BUDGETING

8.3.1 Zero Based Budgeting (ZBB):

Zero Based Budgeting is a relatively new approach to budgeting. This is increasingly employed in the budget preparation of such items as the administrative costs, special programmes, and other clearly identifiable projects. The key element in ZBB is future objective orientation of past objectives Instead of taking the last year's budget and the adjusting them for

finding out the future level of activity and preparation of budgets therefrom. ZBB forces managers to review the current, ongoing objectives and operations.

ZBB is, therefore, a type of budget that requires managers to rejustify the past objectives, projects, and budgets and to set priorities for the future. The essential idea of ZBB that differentiates from traditional budgeting is that it requires managers to justify their budget request in detail from scratch without any reference to the level of previous appropriations. It tantamounts to recalculations of all organisational activities to see which should be eliminated founded at reduced level, founded at the current level of increased finances must be provided.

8.3.2 Performance Budgeting:

The basic aim of performance budgeting (also known as programme budgeting) is to focus attention on the work to be carried out, services to be rendered rather than things to be spent for or acquired. It concentrates attention on physical aspects of achievement. Here, there is not only a financial plan but also a work plan in terms of work done. It takes a systems view of activities by trying to associate the inputs of the expenditure with the output of accomplishment in terms of services, benefits etc.

8.3.3 Responsibility Accounting:

It is method of accounting in which costs are identified with persons assigned to their control rather than with products of functions. In this system devision of units of an organisation under specified authority of a person are developed as a responsibility centre and evaluated individually for their performance.

8.4 SELF ASSESSMENT QUESTIONS

1. What do you consider to be the purposes and special features of a flexible budget?
2.   "A budget is an aid to management and not a substitute for management." Explain.
3. How does budgetary control serve as a planning and control device? Point out its limitations and the requisites for successful operation.
4. "For the success of a system of budgetary control it is essential that there should be a sound organisation for budget preparation, budget maintenance, and budget administration." Discuss.
5. What is Zero based Budgeting?
6. What is Performance Budgeting?
7. What is Flexible Budget? Explain
8. Write short notes on the following:
    a. Capital Expenditure budget
    b. Zero based budget
    c. Performance budget
9. Explain the latest developments in the field of budgeting and budgetary control.

5.5 EXERCISES

1. A company manufacturers two products A and B. The sales manager forecasts the sales in units as follows:

	Jan.	Feb.	March	April	May	June	July
Product A	28	28	24	20	16	16	18
Product B	10	12	16	20	24	24	20

    It is assumed that there will be no work-in-progress at the end of any month and finished units equal to half the sales for the following month will be kept in stock. Prepare a production budget for each month.
    [Ans.: Jan. 1,100; Feb. 1,400; Mar. 1,800; April 2,200; May 2,400; June 2,200]

2. The sales director of a manufacturing company reports that next year he expects to sell 54,000 units of a certain product. Production manager consults his store keeper and casts his figures as follows:
    Two kinds of raw materials A and B are required for manufacturing of the product. Each unit of the product required 2 units of A and 3 units of B. The estimated opening balances at the commencement of the next year are:

    Finished Product – 10,000 units; A – 12,000 units; B – 15,000 units.
    The desirable closing balances at the end of the next year are:
    Finished Product – 14,000 units; A – 13,000 units; B – 16,000 units.
    Prepare the material budget for the next year.
    [Ans.: Materials to be purchased A – 1,17,000 units; B – 1,75,000 units]

3. You are required to prepare a selling overhead budget from the estimates given below:

	Rs.
Advertisement	1,000
Salaries of the Sales Department	1,000
Expenses of the Sales Department (fixed)	750
Salesmen's Remuneration:	
Salaries and Dearness Allowance	3,000

    Commission @ 1% on sales affected
    Carriage outwards: Estimated @ 5% on sales
    Agent's commission: 6¼ % on sales
    The sales during the period were estimated as follows:

Rs.80,000 including Agent's sales	Rs.8,000
Rs.90,000 including Agent's sales	Rs.10,000
Rs.1,00,000 including Agent's Sales	Rs.10,000

    [Ans.: Rs.7,450; Rs.7,775; Rs.7,875]

4. From the following information, prepare cash budget for the month of January to April.

Expected Sales		Expected Purchase	
	Rs.		Rs.
January	60,000	January	48,000
February	40,000	February	80,000
March	45,000	March	81,000
April	40,000	April	90,000

Wages to be paid to workers Rs.5,000 each month. Balance at bank on 1st January Rs.8,000. It has been decided by the Management that:

i. In case of deficit fund within the limit of Rs.10,000 arrangements can be made with bank.

ii. In case of deficit fund exceeding Rs.10,000 but within the limits of Rs.42,000 issue of debentures is to be preferred.

iii. In case of deficit fund exceeding Rs.42,000, issue of shares is preferred (considering the fact that it is within the limit of authorised capital)

[Ans.: Cash Closing Balance : January Rs.15,000; February – Nil; March – Nil; April – Nil]

Comment: It is presumed that Shares/Debentures are issued by the company precisely to meet the deficit arising in each month.

5. Prepare Cash budget of a company for April, May, June 2002 in a columnar form using the following information.

Month	Sales	Purchases	Wages	Exp.
	Rs.	Rs.	Rs.	Rs.
January (Actual)	80,000	45,000	20,000	5,000
February (Actual)	80,000	40,000	18,000	6,000
March (Actual)	75,000	42,000	22,000	6,000
April Budget	90,000	50,000	24,000	6,000
May Budget	85,000	45,000	20,000	6,000
June Budget	80,000	35,000	18,000	5,000

You are further informed that:

a. 10% of purchase and 20% of Sales are for cash.

b. The average collection period of the Company is ½ month and credit purchases are paid off regularly after one month.

c. Wages are paid half monthly and the rent of Rs.500 excluded in expense is paid monthly.

d. Cash and Bank balance on April 1, was Rs.15,000 and the company wants to keep it on end of every month below this figure, the excess cash being put in fixed deposits.

[Ans.: Cash Closing Balance: April Rs.21,700; May Rs.12,700; June Rs.13,200]

6. The Delta Ltd., manufacturers two brands of pen one sold under the name of 'Bright' and one under the name of 'Hans'. The sales department of the company has three departments in different areas of country.

   The sales budgets for the year ending 31st December, 2002 were:

   Bright – Department I – 3,00,000; Department II – 5,62,500; Department III – 1,80,000; and Hans – Department I – 4,00,000; Department II – 6,00,000; and Department III – 20,000. Sales prices are Rs.3 and Rs.1.20 for Bright and Hans respectively, in all departments.

   It is estimated that by forced sales promotion the sale of 'Hans' in Department I will increase by 1,75,000. It is also expected that by increasing Production and arranging extensive advertisement. Department III will be enable to increase the sale of 'Hans' to 50,000.

   It is recognised that the estimated sales by Department II represent an unsatisfactory target. It is agreed to increase both estimates by 20%.

   Prepare a Sales Budget for the year to 31st December, 2002.
   [Ans.: Quantity : Bright 11,55,000; Hans 13,65,000; Amount : Bright Rs.34,65,000; Hans Rs.16,38,000]

7. The following information has been made available from the accounting records of payment of Precision Tools Ltd., for the last six months of 2001 (and of only sales for January, 2002) in respect of fishplates X produced by it.
   i. The units to be sold in different months are:

July	2,200	November	5,000
August	2,200	December	4,600
September	3,400	January, 2002	4,000
October	3,800		

   ii. There will be no work-in-progress at the end of any month.
   iii. Finished units equal of half the sales for the next month will be in stock at the end of every month (including June, 2001)
   iv. Budgeted production and production costs for the year ending December, 2001 are as thus:

Production	44,000
Direct materials per unit	Rs.10.00
Direct wages per unit	Rs.4.00
Total factory overheads apportioned to product	Rs.88,000

It is required to prepare: Production budget for the last six months of 2001; and

a.   Production cost budget for the same period.

[Ans.: Production required total for 6 months 22,100 units; Product cost budget total for 6 months Rs.3,53,600; Factory Overhead per unit Rs.2]

8.   Binaka Ltd., have prepared the budget for the production of a lakh units of the only commodity manufactured by them for a costing period as under:

	Rs.
Raw material	2.52 per unit
Direct labour	0.75 per unit
Direct expenses	0.10 per unit
Works overhead (60% fixed)	2.50 per unit
Administration overheads (80% fixed)	0.40 per unit
Selling overheads (50% fixed)	0.20 per unit

The actual production during the period was only 60,000 units. Calculate the revised budgeted cost per unit.

[Ans.: Cost per unit Rs.7.75]

9.   The expenses budgeted for production of 10,000 units in a factory are furnished below:

	Per unit Rs.
Materials	70
Labour	25
Variable overheads	20
Fixed overheads (Rs.1,00,000)	10
Variable expenses (Direct)	5
Selling expenses (10% fixed)	13
Distribution expenses (20% fixed)	7
Administrative expenses (Rs.50,000)	5
Total cost of sales per unit (to make and sell)	155

Prepare a Budget for production of (a) 8,000 units and (b) 6,000 units.
Assume that administration expenses are rigid for all levels of production.

[Ans.: Total cost at 10,000 units Rs.15,50,000; at 8,000 units Rs.12,75,400; at 6,000 units Rs.10,00,800]

10. A factory is currently working to 50% capacity and the product cost is Rs.180 per unit as follows:

Material	Rs.100
Labour	Rs.30
Factory overhead	Rs.30 (40% fixed)
Administration overhead	Rs.20 (50% fixed)

The product is sold at Rs.200 per unit and the factory produces 10,000 units at 50% capacity.

You are required to estimate profit if the factory works at capacity of 60%. At the working level of 60% the raw cost increases by 20% and the selling price falls by 20%.

[Ans.: At 60% Total Cost: Rs.23,56,000; per unit Rs.196.33; Loss Rs.4,36,000; per unit Rs.(-) 36.33; Sales Rs.19,20,000; per unit Rs.160]

11. The monthly budget for a producing unit for two levels were as follows:

Capacity	60%	100%
Units	300	500
Indirect wages	600	1,000
Consumable Stores	450	750
Depreciation	2,000	2,000
Insurance	1,000	1,000
Maintenance	800	1,000
Power and Fuel	1,450	1,750

Prepare a budget of 80% activity segragating fixed and variable cost in total and per unit. At 80% activity indirect wages will rise by 5%.

[Ans.: At 60%: Total Cost Rs.6,300; per unit Rs.21; At 80%: Total Cost Rs.6,940; per unit Rs.17.35; At 100%: Total Cost Rs.7,500; per unit Rs.15]

5.7 REFERENCE BOOKS

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Chapter – 9

CONCEPT OF CAPITAL BUDGETING

Objectives :

After reading this lesson we should able to :
* understand the concept of capital budgeting
* analyse the nature of capital budgeting decisions in an organizations
* know the importance of capital budgeting decisions
* analyse the process of the capital budgeting with reference to specific proposals.

Structure :

9.1 Concept of Capital Budgeting
9.2 Nature of Capital Budgeting Decision
9.3 Importance of capital Budgeting Decisions
9.4 Capital Budgeting Process
9.5 Evaluation of Proposals
9.6 Self Assessment Questions
9.7 Reference Books

9.1 CONCEPT OF CAPITAL BUDGETING

Efficient allocation of capital is one of the most important functions of the financial management in modern times. This function involves the firms decision to commit its funds in long-term assets and other profitable activities. The decision to invest funds in the long term assets of a firm are quite significant and they will influence the firms wealth, determine the size, get the pace and direction of its growth and also affect the business risk.

The capital investment refers to the investment in various fixed assets whose returns would be available only after a year. The investment in fixed assets will be quite heavy and to be made immediately, but the returns will be available after a period of one year. The investment decision of a company are commonly called as the capital budgeting decisions or capital expenditure decisions.

James C. Van Horne: "Capital budgeting involves a current investment in which the benefits are expected to be received beyond one year in the future." It suggests that the investment in any asset with a life of less than a year, falls into realm of working capital management, whereas any asset with a life or more than one year involves capital budgeting.

Weston and Brigham: "capital budgeting involves the entire process of planning expenditures whose returns are expected to extend beyond one year".

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

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

Thus, Capital budgeting decision may be defined as he firms decision to invest its current funds most efficiently in long-term projects, in anticipation of an expected flow of future funds over a series of years.

It involves the process of generation of investment proposals, estimation of cash flows for the proposals, evaluation of cash flows, selection of projects based upon an acceptance criterion an finally continuous revaluation of investment projects after their acceptance.

9.2 NATURE OF CAPITAL BUDGETING DECISIONS

Generally, the company's capital budgeting decisions include additions, disposition, modification and replacement of fixed assets. The capital budgeting decisions include the following proposals:

1. **Replacement:** Replacement of fixed assets on account of the existing assets, either being worn out or become out-dated.

2. **Expansion:** The company may have to expand its production capacities on account of high demand for its products or inadequate production capacity. This will need additional capital investment.

3. **Diversification:** A company may intend to reduce its risk by operating in several markets. In such case, capital investment may become necessary for purchase of new machinery and facilitates to handle the new products.

4. **Research & Development:** Large sums of money may have to be spent of research and development, in case of those industries where technology is rapidly changing. In such cases, large sums of money are needed for these proposals. So these are also included in the proposals of capital budgeting

5. **Miscellaneous Proposals:** A company may have to invest money in projects which do not directly help in achieving profit-oriented goals. For example, installation of pollution control equipment, may be necessary on account of legal requirements. Hence, funds will be required for such proposals also.

9.3 IMPORTANCE OF CAPITAL BUDGETING DECISIONS

Capital budgeting decisions are among the most crucial and critical business decisions. A number of factors are responsible for capital budgeting decisions. Care must be taken while making capital budgeting decisions influence all the departments of a company such as production, marketing, personnel etc. The other reasons for keeping more attention include the following.

1. **Investment of Huge Funds:** Capital budgeting decisions require large capital outlays. Hence, the company should carefully plan its investment programme so that it may get the funds at the right time and they must be put to most profitable use. An opportune investment decision can give rise for spectacular result. On the other hand, an ill-advised and incorrect decision can jeoparadise the profitable position and can also be the cause for closure of the company.

2. **Long-Term Implications:** The effect of a capital budgeting decision will be felt by the company over a long period and therefore they have decisive influence on the rate and direction of the growth of the company, For example, if a company purchases a new machine by paying heavy amount and the project comes out to be unprofitable, the company will have to bear the burden of fixed cost upto a stage, where the company decides to write off the machine completely. Apart from this, if the results are extended for a long period of time, it may result in loosing the flexibility of the decision maker, because it involves lot of uncertainty about the future of the investment. Further, it may be influenced by several future unforeseen events.

3. **Irreversible Decisions:** Capital budgeting decisions are irreversible in majority of the cases. It is due to the fact that, it is very difficult to find a market for the capital assets. The only alternative is to treat the entire value of the asset as a scrap. This will result in heavy loss.

4. **Capital Budgeting Decisions are most difficult to take:** Capital budgeting decisions involve assessment of future events which are most uncertain. It will be very difficult to project sales revenues, costs and benefits accurately in quantitative terms because of economic, political, social and technological factors. Further, the erroneous forecast of asset needs can result in serious consequences for a company.

5. **Raising of Funds:** Another reason for the importance of capital budgeting is that always asset acquisition involves substantial amount of funds on the part of the company. Before a firm spends large amount of funds, it must plan them to raise systematically because funds are not always available with the company. The company contemplating a major capital expenditure programme, may need to arrange its financing requirements several years in advance, to be sure of having the availability of funds for expansion.

6. **Ability to Compete:** Finally, it has been said that many firms fail, not because they have too much capital equipment but because they have too little ability to complete. The conservative approach of having a small amount of capital equipment may be appropriate. At times, such approach may also be fatal if the other competitors install modern and automated equipment that permit them to produce a better product and sell it a lower price. Hence, the investment in capital assets must help the company to face and meet the competition from the other companies in the same industry.

9.4 CAPITAL BUDGETING PROCESS

The capital budgeting process involves generation of investment proposals, estimation of cash flows for the proposals, evaluation of cash flows, selection of projects based on acceptance criterion, and finally the continual revaluation of investment after their acceptance. The steps involved in capital budgeting process are as follows:

1. project generation
2. project evaluation
3. project selection
4. project execution

9.4.1 Project Generation:

In the project generation, the company has to identify the proposals to be undertaken depending upon its future plans of activity. After identification of the proposals, they can be grouped according to the following categories:

i. **Replacement of Equipment:** In this case, the existing out-dated equipment and machinery may be replaced by purchasing new and modern equipment.

ii. **Expansion:** The company can go for increasing additional capacity in the existing product line by purchasing additional equipment.

iii. **Diversification:** The company can diversify its product lines by way of producing various products and entering into different markets. For this purpose, it has to acquire the fixed assets to enable producing new products.

iv. **Research and Development:** Where the company can go for installation of research and development wing by incurring heavy expenditure, with a view to innovate new methods of production, new products etc.

9.4.2 Project Evaluation:

The process of project evaluation involves two steps:

a) **Estimation of benefits and costs:** These must be measured in terms of cash flows. Benefits to be received are measured in terms of cash inflows, and costs to be incurred are measured in terms of cash outflows.
b) Selection of an appropriate criterion to judge the desirability of the project.

9.4.3 Project Selection:

There is no standard administrative procedure for approving the investment decisions. The screening and selection procedure would differ from firm to firm. Due to lot of importance of capital budgeting decision, the final approval of the project may generally rest on the top management of the company. However, the proposals are scrutinised at multiple levels. Sometimes top management may delegate authority to approve certain types of investment proposals. The top management may do so by limiting the amount of cash outlay, prescribing the selection criteria and holding the lower management levels accountable for the results.

9.4.4 Project Execution:

In the project execution the top management or the Project Execution Committee is responsible for effective utilisation of funds allocated for the projects. It must see that the funds are spent in accordance with the appropriation made in the capital budgeting plan. The funds for the purpose of the project execution must be spent only after obtaining the approval of the Finance Controller. Further, to have an effective control, it is necessary to prepare monthly budget reports to show clearly the total amount appropriated, amount spent and the amount unspent.

9.5 EVALUATION OF INVESTMENT PROPOSALS

Evaluation on Investment opportunities implies comparison of the net investment outlay of the project with the net cash earnings from the project. Further anticipated streams of cash benefits available during lifetime of the project have to be converted into their present value so as to make them comparable with net investment outlay being incurred presently. Thus, the following constitutes components of an investment analysis.

1. Estimating Net Investment outlay
2. Estimating streams of net cash benefits after taxes
3. Evaluation of cash flows in terms of their time value.

9.5.1 Net Cash outflows or Net Capital Investment:

The total net capital investment of total net cash outflows refer to incremental or marginal investment in a capital expenditure project at a point of time or over a period of time. If represents the net amount of capital expenditure in executing a capital project. The net capital investment outlay of a capital project includes the cost of purchasing land, building and plant. It also includes an increase in the level of working capital required to carry out the investment proposals. If a project results in the replacement of an existing capital asset, its current book value is a sunk cost.[*] However, its salvage value is deducted from the capital outlay of the new project in order to arrive at the net investment outlay.

Since payment of income tax results in cash expenditure, tax on profit on sale of an existing asset in case of a replacement decision is added to the capital outlay of the new project. Investment allowance, if any, is deducted from the capital outlay for arriving at the net investment outlay.

9.5.2 Net operating Cash inflows:

Operating cash inflows are the estimates of future streams of cash inflows resulting from the implementation of a capital project. These estimates are based on a number of estimates. The forecasts relate to production, plant performance, market share, sales revenues, profit margin, tax laws, state of the economy, etc. Cash inflows at different points of time have to be estimated on the basis of various forecasts. Though based on systematic forecasts and past experience of the firm and industry, projection of future cash inflows based on these estimates are not absolute. Net cash inflows are estimates of cash revenues minus cash expenditures.

Since depreciation is a book adjustment and does not involve any cash outflows, it is not deducted from cash inflows for estimating the net cash inflows. But tax-benefit result from depreciation appropriation is included in cash inflows. The scrap value of an asset at the end of its operational life is another component of cash inflow. Removal expenses and capital gains taxes, if any, are deducted from the salvage value of the asset. Thus, net cash inflows are equal to cash revenues minus cash expenses plus tax benefit form depreciation appropriation plus salvage value of asset, net of removal (expenses and capital gains tax plus value of current assets released.

9.5.3 Evaluation of Cash Flows in Terms of their Time Value:

After determining the investment outlay of the project and economic gains which will be derived from the project, finance manager's next task is to reduce them in present value. Present value of the investment outlay need not be calculated because it has to be incurred in the current year. It is not in respect of cash earnings which will be available in future over

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[*] Sunk cost means the costs which cannot be recovered back.

lifetime of the project that question of finding out their present value arises. An understanding of the concept of present value is, therefore, imminent.

Present Value:

The concept of present value provides the underlying relationship between values of series of payments and revenues at different points of time. It is widely recognised that money has time value. A rupee to be received a year from now is not worth as much today as a rupee to be received now. Atleast three factors contribute to the time value of money.

1. This is just like a bird in hand worth more than twice in a bush. It means uncertainty increases with the futurity of an event so that promise of one rupee in tenth year is usually worth less than a similarly promise in one year.

2. Inflation reduces the purchasing power of the rupee over time, so if inflation is expected to continue, future rupees will have a depreciated value compared to current ones.

3. There are opportunity costs associated with any expenditure, which again makes future rupees worthless than current ones. Opportunity costs arise because a rupee today can be profitably invested and as a result will be worth more than a rupee in the future. Opportunity costs are not losses in the absolute sense but they are relative to what could have been, had the decision maker made the best use of available resources.

Since money has a time value, the finance manager needs a method of determining whether a cash outlay made now in an investment project can be justified in terms of expected receipts from the project in future years. That is, he must have a means of expressing future receipts in present rupee terms so that the future receipts can be compared on an equivalent basis with whatever investment is required in the project under consideration. Infact, the theory of interest provides the manager with the means of making such a comparison.

9.5.4 Distinction between Cash Flow Ability and Profitability

One of the most important tasks in capital budgeting is estimating future cash flows for a project. The final results we obtain are only as good as the accuracy of our estimates. Since cash, not income, is central to all decisions of the firm, we express whatever benefits we expect from a project, in terms of cash flows rather than income. A distinction should be made between cash flows and profits. Changes in profits do not necessarily mean corresponding changes in cash flows. It is possible for a firm to experience shortage of cash at a time when its profits are increasing and vice versa. Receipt of cash is an objective and cash flow is a clearly defined concept and it avoids the complications of measuring accounting profits.

9.5.5 Importance of Cash Flow Ability in Selection of a Project

A cash flow stream is a series of cash receipts and expenditure over the life of the investment project. The estimates of amount and timing of cash flows-inflows and outflows, resulting from an investment, should be carefully made while selecting a project. The information on cash flows is required for investment analysis. In investment analysis, it is the inflow and outflow of cash which is important. The concept of cash flow is important because receipt of cash is an objective and clearly defined concept. The firm invests cash now in a hope of receiving cash returns in a greater amount in the future. It is cash which can be invested, reinvested or distributed to shareholders by the firm in the form of dividends. Thus, for the very purposes of evaluating investment proposals, the very crucial information to be collected is the estimates of cash flows.

9.6 SELF ASSESSMENT QUESTIONS

1. Define the concept of capital budgeting and explain its significance.
2. Examine the nature of capital budgeting decision. Give suitable examples.
3. What do you mean by capital budgeting process? State the various steps in this process.
4. What is the distinction between cash flow ability and profitability?
5. Why is cash flow ability important in the selection of a project?
6. Define capital budgeting.

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Chapter – 10

METHODS OF CAPITAL BUDGETING

Objectives :

After studying this unit we should be able to :
- know the methods of capital budgeting
- Explain various methods of capital budgeting including traditional and non-traditional methods of capital budgeting.
- find out the problems relating to capital rationing

Structure :

10.1. METHODS OF CAPITAL BUDGETING

The capital budgeting appraisal methods or techniques of evaluation of investment proposals will help the company to decide upon the desirability of an investment proposal depending upon their relative income generating capacity and rank them in order of their desirability. These methods provide the company a set of norms on the basis of which, either it has to accept or reject the investment proposal. Therefore, a sound appraisal method should enable the company to measure the real worth of the investment proposal. The appraisal methods should possess several good characteristics.

10.1.1 Characteristics of a Sound Appraisal Method

1. It should help the company to rank the investment proposals in order of their desirability.
2. It should provide a technique for distinguishing between an acceptable and non-acceptable project.
3. It should provide criteria to solve the problem of choosing among alternative projects.
4. It should recognise the importance of time value of money i.e., bigger benefits are preferable to smaller ones and the early benefits are preferable to later benefits.

5. It should provide the criteria for the selection applicability to any conceivable investment proposals.
6. It should take into account the life pattern of cash flows.
    The criteria for the appraisal of investment proposals are grouped into two types, viz.,

1. Traditional methods
   i) Pay Back Period Method,
   ii) Accounting Rate of Return or Average Rate of Return (ARR).

2. Time-adjusted or discounted cash flow method
   i) Net Present Value (NPV)
   ii) Internal Rate of Return (IRR)
   iii) Profitability Index (PI)
   iv) Discounted payback method
   Let us now discuss methods are discussed below in detail:

10.2 TRADITIONAL METHODS

These methods are based on the principles to determine the desirability of an investment project on the basis of its useful life and expected returns. These methods depend upon the accounting information available from the books of accounts of the company. These will not take into account the concept of 'time value of money', which is a significant factor to determine the desirability of a project in terms of present value.

10.2.1 Pay-back Period Method:

It is the most popular and widely recognised traditional method of evaluating the investment proposals. It can be defined as the "the number of years required to recover the original cash outlay invested in a project". According to Weston and Brigham, "the pay back period is the number of years it takes for the firm to recover its original investment by net returns before depreciation, but after taxes." On the other hand, James C.Vanhorne has defined the pay back period as the number of years required to recover initial cash investment. It is the ratio of the initial fixed investment over the annual cash inflow for the recovery period." It can be calculated with the help of the following formula:

$$\text{Pay back period} = \frac{\text{Cash outlay}}{\text{Annual cash inflows}}$$

The pay back period can be used as an accept or reject criterion as well as a method of ranking projects. The pay back period is the number of years to recover the investment made in a project. If the pay back period calculated for a project is less than the maximum pay back period set up by the company, it can be accepted. As a ranking method it gives highest rank to a project which has lowest pay back period, and lowest rank to a project with highest pay back

period. Whenever a company faces the problem of choosing among two or more mutually exclusive projects, it can select a project on the basis of pay back period, which has shorter pay back period than the other project.

Merits: The following are the merits of the pay back period method.
  i. **Easy Calculation:** It is one of the easiest methods of evaluating the investment projects. It is simple to understand and to compute.
 ii. **Less Cost:** It does not involve any cost for computation of the period of pay back.
iii. **Knowledge of Pay-Back Period:** The knowledge of pay back period is useful in decision-making, the shorter the period better the project.
 iv. **Protection from loss due to obsolescence:** This method is very suitable to such industries where mechanical and technical changes are routine matter and hence, shorter pay back period view avoid such losses.
  v. **Easy availability of information:** It can be computed on the basis of accounting information available from the books.
 vi. **More useful to small sector:** It is one of the widely used methods in small scale industry sector**.**

Demerits: However, the pay back period has certain demerits:
1. **Failure in taking cash flows after payback period:** This method fails to take into account the cash flows received by the company after the pay back period;
2. **Failure in considering time value of money:** It does not take into account the importance of time value of money;
3. **Non-consideration of interest factor:** It does not take into account the interest factor involved in an investment outlay;
4. **Maximisation of Market value not possible:** It is not consistent with the objective of maximising the market value of the company's share;
5. **Failure in taking magnitude and timing of cash inflows:** It fails to consider the pattern of cash inflows i.e., the magnitude and timing of cash inflows.

    Illu.1: A Project costs Rs.10,00,000. Its annual income is Rs.1,60,000 after depreciation @ 20% p.a. but before tax which is 50%. Calculate pay back period. Also calculate pay back period when the cash inflow is Rs.2,00,000 in the first year Rs.2,50,000 in second year; Rs.2,50,000 in third year, Rs.3,00,000 in forth year.

Solution (a) :

	Rs.
Project before tax	1,60,000
Less: 50% tax	80,000
Profit after tax	80,000
Add: Depreciation 20% Rs.10,00,000	2,00,000
	2,80,000

$$\text{Annual cash inflow pay back period} = \frac{\text{Cash Investment}}{\text{Annual Cash inflows}}$$

$$= \frac{10,00,000}{2,80,000} = 3.57 \text{ years.}$$

(b) When cash is not uniform:

Year	Annual cash inflow (Rs.)	Cumulative Cash inflow (Rs.)
1	2,00,000	2,00,000
2	2,50,000	4,50,000
3	2,50,000	7,00,000
4	3,00,000	10,00,000

Pay back period = 4 years.

Illu.2: Sai Trading Co., Ltd., propose to increase the production of the company. They are willing to purchase a new machine. There are three types of in the market. The following are the details regarding them.

	Alpha Rs.	Beta Rs.	Gama Rs.
Cost of Machine	17,500	12,500	9,000
Estimated savings in scrap	400	750	250
Wages per operator	250	300	250
Cost of indirect materials	--	400	--
Expected savings in indirect material	100	--	250
Additional cost of maintenance	750	550	500
Operations required (number)	11	20	9
Estimated life of machine	10 years	6 years	5 years
Taxation at 50% of the profit			

 You are required to advise the management which type of the machine should be purchased.

Solution:

Profitability Statement

	Alpha Rs.	Beta Rs.	Gama Rs.
Machine cost	17,500	12,500	9,000
Life of the machine	10 years	6 years	5 years
Savings (per year) in cos:			
Wages	2,750	6,000	2,250
Scrap	400	750	250
Indirect materials	100	--	250
Total (A)	3,250	6,750	2,750

	Alpha Rs.	Beta Rs.	Gama Rs.
Additional Expenditure:			
Indirect material	--	400	--
Supervision	--	800	--
Maintenance	750	550	500
Total (B)	750	1,750	500
Marging Profit (A-B)	2,500	5,000	2,250
Net savings after tax of 50%	1,250	2,500	1,125
Pay back period	14 years	5 years	8 years
Pay back profitability	Nil	2,500	Nil

The company is advised to purchase Machine Type Beta since it ranks first both in payback as well as payback profitability criteria. In the case of Type Alpha and Type Gama the life of each machine is shorter than the payback period.

Illu.3: Durga Ltd., is producing articles mostly by manual labour and is considering to replace it by a new machine. There are two alternative models 'M' and 'N' of the new machine. Prepare a statement of profitability showing the pay-back period from the following information:

	Machine M Rs.	Machine N Rs.
Estimated life of the machine	**4 years**	**5 years**
Cost of the machine	**9,000**	**18,000**
Estimated savings in scrap	**500**	**800**
Estimated savings in direct wages	**6,000**	**8,000**
Additional cost of maintenance	**800**	**1,000**
Additional cost of supervision	**1,200**	**1,800**
(Ignore taxation)		

Solution:

Statement showing Annual Cash Inflows

	Machine M Rs.	Machine N Rs.
Estimated savings in scrap	500	800
Estimated savings in direct wages	6,000	8,000
Total savings (A)	6,500	8,800
Additional cost of maintenance	800	1,000
Additional cost of supervision	1,200	1,800
Total additional costs (B)	2,000	2,800
Net Cash inflow (A-B)	4,500	6,000

$$\text{Pay back period} = \frac{\text{Original Investment}}{\text{Annual average cash inflows}}$$

$$\text{Machine M} = \frac{9,000}{4,500} = 2\,\text{years}$$

$$\text{Machine N} = \frac{18,000}{6,000} = 3\,\text{years}$$

Machine 'M' has a shorter pay-back, hence it should be preferred to Machine N.

Illu.4: An engineering company is considering the purchases of a new machine for its immediate expansion programme. There are three possible machines suitable for the purpose. Their details are as follows:

	Machines		
	1	2	3
	Rs.	Rs.	Rs.
Capital cost	3,00,000	3,00,000	3,00,000
Sales (at standard prices)	5,00,000	4,00,000	4,50,000
Net cost of production:			
Direct material	40,000	50,000	48,000
Direct Labour	50,000	30,000	36,000
Factory overheads	60,000	50,000	58,000
Cost of production	1,50,000	1,30,000	1,42,000
Administrative costs	20,000	10,000	15,000
Selling and distribution costs	10,000	10,000	10,000
Total cost	1,80,000	1,50,000	1,67,000

The economic life of machine no.1 is 2 years, while it is 3 years each for the other two. The scrap values are Rs.40,000, Rs.25,000 and Rs.30,000 respectively.

Sales are expected to be at the rates shown for each year during the full economic life of the machines. The costs relate to annual expenditure resulting from each machine.

Tax to be paid is expected at 50% of the net earnings of each year. It may be assumed that all payables and receivables will be settled promptly, strictly on cash basis with no outstanding from one accounting year to another. Interest on capital has to be paid at 8% per annum.

You are requested to show which machine would be the most profitable investment on the principle of "pay-back method."

Solution:

Statement showing the net cash flow of three machines.

	Machine-1 Rs.	Machine-II Rs.	Machine-III Rs.
Capital cost	3,00,000	3,00,000	3,00,000
Sales (i)	5,00,000	4,00,000	4,50,000
Cost of production	1,50,000	1,30,000	1,42,000
Administration cost	20,000	10,000	15,000
Selling and Distribution cost	10,000	10,000	10,000
Total cost (ii)	1,80,000	1,50,000	1,67,000
Profit before depreciation and interest (i)-(ii)=(iii)	3,20,000	2,50,000	2,83,000
Depreciation: $\dfrac{\text{Capital cost less scrap value}}{\text{Divided by economic life}} =$	1,30,000	91,667	90,000
Add: back interest on borrowing	24,000	24,000	24,000
Depreciation and Interest(iv)	1,54,000	1,15,667	1,14,000
Profit before tax (iii)-(iv)	1,66,000	1,34,333	1,69,000
Less taxation (50%)	83,000	67,167	84,500
Profit after tax	83,000	67,166	84,500
Add: Depreciation	1,30,000	91,667	90,000
Net Cash flow	2,13,000	1,58,833	1,74,500
Pay-back period	1.41 yrs	1.89 yrs	1.72 yrs

Selection: Machine No.I is most profitable

Working Notes:
  i) It has been presumed that interest on borrowings will have to be paid throughout the economic life of the asset.
  ii) Factory overheads do not include depreciation
  iii) No borrowings will be required for working capital.

10.2.2 Accounting or Average Rate of Return (ARR) Method:

It is an accounting method, which uses the accounting information revealed by the financial statements to measure the profitability of an investment proposal. It can be determined by dividing the average income after taxes by the average investment, i.e., the average book value for depreciation. According to Solomon, accounting rate of return on an investment can be calculated as the ratio of accounting net income to the initial investment.

$$\text{Average Rate of Return (A.R.R.)} = \frac{\text{Average net income}}{\text{Average investment}}$$

On the basis of this method, the company can select all those projects whose ARR is higher than the minimum rate established by the company. It can reject the projects which an ARR lower than the expected rate of return. This method can also help the management to rank the proposals on the basis of ARR. A highest rank will be given to a project with highest ARR, whereas a lowest rank to a project with lowest ARR.

Merits: The following are the merits of this method:
1. It is very simple to understand and calculate;
2. It can be readily computed with the help of the available accounting data
3. It uses the entire stream of earnings to calculate the ARR.

Demerits: This method has the following demerits:
1. It is not based on cash flows generated by a project;
2. This method does not consider the objective of wealth maximisation;
3. It ignores the length of the projects useful life;
4. It does not take into account the fact that the profits can be re-invested; and
5. It ignores the time value of money.

Illu.5: Determine the Average Rate of Return from the following data of two Machine A and B.

	Machine A Rs.	Machine B Rs.
Original cost	56,125	56,125
Additional Investment in Net working capital	5,000	6,000
Estimated Salvage Value	3,000	3,000

Annual Estimated Income after Depreciation and Taxes:

	Rs.	Rs.
1st Year	3,375	11,375
2nd Year	5,375	9,375
3rd Year	7,375	7,375
4th Year	9,375	5,375
5th Year	11,375	3,375
	36,875	36,875
Estimated Life in years	5	5
Average Income Tax Rate	55%	55%

Depreciation has been charged on Straight Line Method.
Solution:

$$\text{Machine A} = \frac{Rs.56,125 - Rs.3,000}{2} + Rs.5,000 + Rs.3,000 = Rs.34,562.50$$

$$\text{Machine B} = \frac{Rs.56,125 - Rs.3,000}{2} + Rs.6,000 + Rs.3,000 = Rs.35,562.50$$

$$\text{ARR for Machine A} = \frac{Rs.7,375}{Rs.34,562.50} \times 100 = 21.34\%$$

$$\text{ARR for Machine B} = \frac{Rs.7,375}{Rs.35,562.50} \times 100 = 20.74\%$$

Hence Machine A is preferable.

Illu.6: M/s Bharat Industries Limited purchased a machine five years ago. A proposal is under consideration to replace it by a new machine. The life of the machine is estimated to be 10 years. The existing machine can be sold at its written down value. As cost accountant of the company, you are required to submit your recommendations based on the following information:

	Existing Machine Rs.	New Machine Rs.
Initial cost	25,000.00	50,000.00
Machine hours per annum	2,000.00	2,000.00
Wages per running hour	1.25	1.25
Power per hour	0.50	2.00
Indirect materials per annum	3,000.00	5,000.00
Other expenses per annum	12,000.00	15,000.00
Cost of materials per unit	1.00	1.00
Number of units produced per hour	12.00	18.00
Selling price per unit	2.00	2.00

Interest to be paid at 10% on fresh capital invested.

Solution:

	Existing Machine Rs.	New Machine Rs.
Production (units)	24,000.00	24,000.00
Selling price per unit (Rs.)	2.00	2.00
Sales (Rs.)	48,000.00	72,000.00
Cost of Sales: (Rs.)		
Materials	24,000.00	36,000.00
Wages	2,500.00	2,500.00
Power	1,000.00	4,000.00
Indirect materials	3,000.00	5,000.00

	Existing Machine Rs.	New Machine Rs.
Other expenses	12,000.00	15,000.00
Depreciation	2,500.00	5,000.00
Interest	---	3,750.00
	45,000.00	71,250.00
Total profit	3,000.00	750.00
Cost per unit	1.87	1.98
Profit per unit	0.13	0.02

Decision: The above analysis shows that it is better to continue with the existing machine than replacing it by a new machine.

On the basis of accounting rate of return also, it is better to continue with the existing machine, because of the ARR is higher in the case of old machine as per details shown below:

			Rs.
Profit on installation of new machine before charging interest	Rs.750+3,750	=	4,500
Incremental profit	Rs.4,500-3,000	=	1,500
Incremental investment	Rs.37,500		
Rate of return	1,500/37,500 ×	=	4%

Working Notes: Interest has been calculated as follows:

	Rs.
Investment in the new machine	50,000
Less: Sale value of the old machine (Rs.25,000 – Dep. Rs.12,500 on fixed instalment basis)	12,500
Additional investment required	37,500
Interest @ 10% p.a. on Rs.37,500	3,750

In case the rate of return is calculated on average investment (i.e. ½ of Rs.37,500) it will be 8%. This is not even sufficient to pay interest at 10% on additional investment required. Thus, it is advisable to continue with the existing machine.

Illu.7: The Directors of New Reliance Limited are contemplating the purchase of a new machine to replace a machine which has been in operation in the factory for the last 5 years.

Ignoring interest but considering tax at 50% of net earnings, suggest which of the two alternative should be preferred.

The following are the details.

	Old machine	New machine
Purchase price (Rs.)	40,000.00	60,000.00
Estimated life of machine	10 years	10 years
Machine running hours per annum	2,000.00	2,000.00
Units per hour	24.00	36.00
Wages per running hour (Rs.)	3.00	5.25
Power per annum (Rs.)	2,000.00	4,500.00
Consumables (Rs.)	6,000	7,500
All other charges per annum (Rs.)	8,000.00	9,000.00
Material cost per unit (Rs.)	0.50	0.50
Selling price per unit	1.25	1.25

You may assume that the above information regarding sales cost of sales will hold good through out the economic life of each of the machine. Depreciation has to be charged according to straight-line method.

Solution:

Profitability Statement

	Rs.	Old machine Rs.	Rs.	New machine Rs.
Cost of the machine (Rs.)		40,000		60,000
Life of machine (years)		10		10
Output(units)		48,000		72,000
Sales (Rs.)		60,000		90,000
Less: Cost of sales: (Rs.)				
Direct material	24,000		36,000	
Wages	6,000		10,500	
Power	2,000		4,500	
Consumable stores	6,000		7,500	
Other charges	8,000		9,000	
Depreciation	4,000		6,000	
		50,000		73,500
Profit before tax		10,000		16,500
Less: Tax at 50%		5,000		8,250
Profit after tax		5,000		8,250

Calculation of Accounting Rate of Return:

	Old Machine	New Machine
i. $\dfrac{\text{Average Net Earnings}}{\text{Original investment}} \times 100$	$\dfrac{5{,}000}{40{,}000} \times 100 = 12.5\%$	$\dfrac{8{,}250}{60{,}000} \times 100 = 13.75\%$
ii. $\dfrac{\text{Average Net Earnings}}{\text{Average investment}} \times 100$	$\dfrac{5{,}000}{20{,}000} \times 100 = 25\%$	$\dfrac{8{,}250}{30{,}000} \times 100 = 27.50\%$
iii. $\dfrac{\text{Incremental Earnings}}{\text{Incremental investment}} \times 100$	$\dfrac{3{,}250}{60{,}000 - 20{,}000} \times 100$	$\dfrac{3{,}250}{40{,}000} \times 100 =$ 8%(approx.)

Thus replacement of the old machine by a new machine (ignoring interest) is profitable.

Note: It is assumed that the old asset will be sold at book value i.e.Rs.20,000.

Illu.8: Balrampur Engineering Works manufactures of Part A which is used in Air Coolers which they sell. The quantity required is 7000 units per year. The direct cost of manufacturing this part is Rs.4 per unit. They have received a proposal from a Cuttack firm offering to meet the entire requirement @ Rs.5 per unit. If the Balrampur Works discontinue making this part, they can use their existing facilities for manufacturing a new product for sale which would involve the following:

Investment in a new machine (Life of 40,000 hrs)	Rs.40,000
Material cost	Rs.3 per unit
Direct labour	Rs.2 per unit
Indirect expenses (other than depreciation) for 2,000 hours	Rs.12,000

Estimated volume of Sales 8,000 units at Rs.9 per unit.
State whether the proposal of the Cuttack firm should be accepted or not if:
  i.   the current cut-off rate is 25%
  ii.   the current cut-off rate is 30%

Solution:

Profitability of New Product

	Rs.	Rs.
Sales (8,000 units × Rs.9)(Rs.)		72,000
Less: **Cost of Production:**		
Material cost (8,000 × Rs.3)	24,000	
Direct labour (8,000 × Rs.2)	16,000	
Indirect expenses	12,000	
Depreciation (8,000 × Rs.1)	8,000	60,000
		12,000
Less: Extra cost for Part-A payable to Cuttack firm		7,000
Profit		5,000

	Rs.	Rs.
Average investment in the New project (Rs.)		20,000
Rate of Return at 25% cut-off rate		5,000
Rate of Return at 30% cut-off rate		6,000

The proposal may be accepted at cut-off rate of 25%. However, it is not acceptable at cut-off rate of 30%.

10.3 DISCOUNTED CASH FLOW METHODS

The discounted cash flow methods provide a more objective basis for evaluating and selecting an investment project. These methods consider the magnitude and timing of cash flows in each period of a project's life. Discounted cash flow methods enable us to isolate the difference in the timing of cash flow of the project by discounting them to know the present value. The present value can be analysed to determine the desirability of the project. These techniques adjust the cash flows over the life of a project for the time value of money. The popular discounted cash flow techniques are:

a) Net present value method
b) Internal rate of return method, and
c) Profitability index method

Each one of these methods are discussed below in greater detail:

10.3.1 Net Present Value (NPV) Method:

The net present value method is a classic economic method of evaluating the investment proposals. It is one of the methods of discounted cash flow. It recognises the important of time value of money. It correctly postulates that cash flows arising at different time period differ in value and the comparable only when their equivalent i.e., present values are found out.

It is a method of calculating the present value of cash flows (inflows and outflows) of an investment proposal using the cost of capital as an appropriate discounting rate. The net present value will be arrived at by subtracting the present value of cash outflows from the present value of cash inflows. According to Ezra Solomon, "it is a present value of future returns, discounted at the required rate of return, minus the present value of the cost of the investment". The steps to compute net present value are given below:

1. An appropriate rate of interest should be selected to discount cash flows. Generally, this will be the "cost of capital" of the company.
2. The present value of inflows and outflows of an investment proposal, has to be computed by discounting them with an appropriate cost of capital.

3. The net present value is the difference between the 'present value of cash inflows' and 'the present value of cash outflows'.'

Thus, the net present value is the difference between the present value of the future cash inflows after tax and the present value of cash outlays. Symbolically the NPV can be expressed as follows:

Net Present Value (NPV) = $\sum$PV - $\sum$C

Where,

$\sum$ PV = Total of Present Values of Cash Inflows

$\sum$ C = Total of Present Values of Cash Outlays

The present values of investment outlays and cash inflows are to be calculated using Present Value tables given at the end of the chapter. The decision criteria for accepting or rejecting a project a given under:

NPV > Zero	Accept the Proposal.
NPV < Zero	Reject the Proposal.

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

PV > C	Accept the proposal
PV < C	Reject the proposal

Where,

PV = Total present values of cash inflows

C = Total present value of cash outlays.

Zero NPV implies a situation where the firm can only recover the original investment.

Thus, under NPV technique, only that project will be selected whose net present value is positive or above zero. If a project's NPV is less than "zero", it gives negative NPV, hence, it must be rejected. The ranking of the proposals can be made by way of assigning ranks on the magnitude of positive net present value.

Merits: The following are the merits of the net present value (NPV) method:

1. **Recognition to the Time Value of Money:** This method explicitly recognises the time value of money, which is inevitable for making meaningful financial decisions.
2. **Consideration to Total Cash Inflows:** The NPV method considers the total cash inflows of investment opportunities over the entire life-time of the projects unlike the payback period method.

3. **Best Decisions Criteria for Mutually Exclusive Projects:** This method is particularly useful for the selection of mutually exclusive projects. It serves as the best decision criteria for mutually exclusive choice problems.

4. **Changing Discount Rate:** Since discounting rate changes due to time variations in cash inflows a changing discount rate can be used for the NPV calculations by altering the denominator.

5. **Maximization of the Shareholders Wealth:** Finally, the NPV method is instrumental in achieving the objective of the maximization of the shareholders wealth. This method is logically consistent with the company's objective of maximizing shareholders' wealth in terms of maximizing market price of shares, and theoretically correct for the selection of investment proposals.

Demerits: The following are the demerits of the net present value method:

1. It is difficult to understand and use
2. The NPV is calculated by using the cost of capital as a discount rate. But the concept of cost of capital itself is difficult to understand and determine.
3. It does not give solutions when the comparable projects are involved in different amounts of investment.
4. It does not give correct answer to a question when alternative projects or limited funds are available, with unequal lives.

Illu.9: The Alpha Co. Ltd., is considering the purchase of a new machine. Two alternative machines (A and B) have been suggested, each living an initial cost of Rs.4,00,000 and requiring Rs.20,000 as additional working capital at the end of 1st year. Earnings after taxation are expected to be as follows:

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

The company has a target of return on capital of 10% and on this basis, you are required to compare the profitability of the machines and state which alternative you consider as financially preferable.

Note: The following table gives the present value of Rs.1 due in 'n' number of years:

Years	Present Value at 10%
1	0.91
2	0.83
3	0.75
4	0.68
5	0.62

Solution: Statement showing the profitability of two machines.

Year	Discount Factor	Machine A Cash inflow Rs.	Machine A Present value Rs.	Machine B Cash inflow Rs.	Machine B Present value Rs.
1.	0.91	40,000	36,400	1,20,000	1,09,200
2.	0.83	1,20,000	99,600	1,60,000	1,32,800
3.	0.75	1,60,000	1,20,000	2,00,000	1,50,000
4.	0.68	2,40,000	1,63,200	1,20,000	81,600
5.	0.62	1,60,000	99,200	80,000	49,600

	Rs.	Rs.
Total present value of inflows of cash	5,18,400	5,23,200
Total present value of outflows of cash	4,18,200	4,18,200
(Rs.4,00,000+20,000× .91)		
Net present value	1,00,200	1,05,000

Recommendations: Machine B is preferable to Machine A. Though total cash inflow of Machine A is more than that of Machine B by Rs.40,000, the net present value of the cash flows of Machine B is more than that of Machine A. Moreover, in case of Machine B, cash inflow in the earlier years is comparatively higher than that in case of Machine A.

Illu.10: A computer is available at a cash purchase price of Rs.4,40,000. If taken on hire, the charges would be Rs.15,400 per month for a minimum period of 36 months, and thereafter the rate would be reduced to Rs.7,500 per month. The rentals fall due for payment at the end of each month.

A company, planning to acquire the above computer, wants advice whether it would be more economical to purchase the machine or take it on hire, What would be your advice if the cost of capital is to be taken as 10% per annum? The present value of Re.1 and Rs.1.5 paid monthly at the end of n years, both at 10% are as follows:

After year (n)	Present value of Rs.1.5 paid monthly	Present value
1	0.950	0.909
2	0.864	0.826
3	0.785	0.751
4	0.714	0.683
5	0.649	0.621
6	0.591	0.564

Solution:

(a) In case the computer is purchased:

Statement of Present Value of cash outflows

Year	Cash flows (Rs.)	Discount factor	Present value of cash outflows Rs.	Present value of cumulative cash outflows (Rs.)
0	4,40,000	1.000	4,40,000	4,40,000
1	44,000	0.909	39,996	4,79,996
2	44,000	0.826	36,344	5,16,340
3	44,000	0.751	33,044	5,49,384
4	44,000	0.683	30,052	5,79,436
5	44,000	0.621	27,324	6,06,760
6	44,000	0.564	24,816	6,31,576
Net Present values of Of cash outflows			6,31,576	

Rs.4,40,000 are used for purchasing the computer. The amount invested somewhere else should have been given a minimum return of 10%. Hence, every year Rs.44,000 is being lost which has been taken as cash outflow.

b) In case the computer is hired:

Statement of Present Value of cash outflows

Year	Cash flows (Rs.)	Discount factor	Present value of cash outflows Rs.	Present value of cumulative cash outflows (Rs.)
1	1,84,800	0.950	1,75,560	1,75,560
2	1,84,800	0.864	1,59,667	3,35,227
3	1,84,800	0.785	1,45,068	4,80,295
4	90,000	0.714	64,260	5,44,555
5	90,000	0.649	58,410	6,02,965
6	90,000	0.591	53,190	6,56,155
Net Present values of Of cash outflows			6,56,155	

The present value of cash outflows (ignoring taxation) in case of purchase of computer is lower by Rs.24,579 as compared to hiring of the computer. Moreover, the cumulative cash outflows in case of purchase of computer is constantly decreasing. Hence, the purchase of computer may prove to be further profitable if the computer does not become obsolete after six years and continues to be serviceable. Even if it become obsolete, it will have some disposable value. **Hence, the company may be advised to purchase the computer instead of hiring.**

Illu.11: Maheshwari Brothers purchased a machine 5 years ago at a cost of Rs.75,000. The machine had an expected life of 15 years at the time of purchase and a zero estimated salvage value at the end of 15 years. It is being depreciated on a straight line basis and has a book value o f Rs.50,000 at present. The purchase manager reports that he can buy a new machine for Rs.1,00,000. The existing sales are Rs.1,00,000 and are expected to go up to Rs.1,10,000 on account of purchase of the new machine. Further, it will reduce the operating cost from Rs.70,000 to Rs.50,000. The old machine's current market value is Rs.10,000. Taxes are at present levied at the rate of 50% and the firm's cost of capital is 10%. Calculate the net cash outlay of the project and net cash inflows.
Solution:

(i) Net cash outlay of the new project

	Rs.	Rs.
Invoice price of new machine		1,00,000
Less: Tax savings*	20,000	
Salvage value of old machine	10,000	30,000
		70,000

*Taxable income of the firm will be reduced by the amount of loss on sale of machinery amounting to Rs.40,000. The tax rate is 50% and hence, there will be a tax saving of Rs.20,000.

(ii) Estimated net cash in flows

	Without new machine Rs.	With new machine Rs.
Sales...(i)	**1,00,000**	**1,10,000**
Less: Operating costs	70,000	50,000
Depreciation(D)	5,000	10,000
...(ii)	**75,000**	**60,000**
Taxable income..(i)-(ii)	25,000	50,000
Less: Income tax	12,500	25,000
Profit after tax (P)	**12,500**	**25,000**
Cash inflow (P)+(D)	17,500	35,000

Thus, in case the new machine is purchased, there will be an incremental cash inflow of Rs.17,500.

10.3.2 Internal Rate of Return (IRR) Method:

Internal rate of return (IRR) is also known as Time adjusted return or Discounted rate of return.

This method is based on the principle of present value. This method considers the relative importance of magnitude and timing of cash flows. The use of this method for appraising the investment projects was for the first time used by Joel Dean. According to Grunewald and Nemmers, the internal rate of return (IRR) can be defined as "the rate of interest that equates the present value of future periodic net cash flows, with the present value of the capital investment expenditure required to undertake a project." The net cash flow may be defined as the difference between the anticipated cash income of the firm during the year, if the project is approved and the anticipated cash income, if the project is rejected.

Weston and Brigham defined the internal rate as "the interest rate that equates the present value of the expected future receipts to the cost of the investment outlay."

Internal rate of return can thus be defined as that rate of return which would equate the present value of the investment outlay to the present value of net cash benefits.

The IRR is the rate of discount which would reduce the sum of the present value of net cash flows over the project life to zero. If this rate is greater than the cost, it means that the funds committed will earn more than their cost. When IRR of a project equals the cost of capital, the management would be indifferent to the project as it would not be expected to change the value of the firm.

The following equation is used to calculate the internal rate of return.

Formula:

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

Where,

    C = Initial Capital outlay

    A_1, A_2, A_3 etc. = Expected future cash inflows at the end of year 1,2,3 and so on.

      r = rate of interest

      n = number of years of project

    In order to findout the exact IRR between two near rates, the following formula is to be used.

$$L = \frac{P_1 - C}{P_1 - P_2} \times D$$

Where,

L = Lower rate of interest

P_1 = P.V at lower rate of interest

P_2 = P.V at higher rate of interest

C = Cash outlay

D = Difference in rate of interest

Computation of IRR

The Internal Rate of Return is to be determined by trial and error method. The following steps can be used for its computation.

1. Compute the present value of the cash flows from an investment, by using an arbitrarily selected interest rate.
2. Then compare the present value so obtained with investment cost.
3. If the present value is higher than the cost, then the present value of inflows is to be determined by using higher rate.
4. This procedure is to be continued until the present value of the flows from the investment are approximately equal to its cost.
5. The interest rate that brings about this equality is the 'internal rate of return'.

If the internal rate of return exceeds the required of return, then the project is accepted. If the project's IRR is lower than the required rate of return, it will be rejected. In the case of ranking the proposal, the technique of IRR is significantly used. The projects with highest rate of return will be ranked as first, compared to the lowest rate of return projects.

Merits: The following are the merits of the IRR method:

1. **Consideration of Time Value of Money:** It considers the time value of money.

2. **Consideration of Total Cash Flows:** It takes into account the cash flows over the entire useful life of the asset.

3. **Easier appeal to the users:** It has a psychological appeal to the users, because when the highest rate of return projects are selected, it satisfies the investors in terms of the rate of return on capital. It always suggests to accept the projects with maximum rate of return.

4. **Maximisation market share possible:** It is in conformity with the firm's objective of maximising owner's welfare.

5. **Provision for risk and Uncertainty:** This method automatically gives more weight to money values which are nearer to the present period than those which are distant from it. Conversely, in case of other methods like 'Payback Period' and 'Accounting Rate of Return', all money units are given the same weight which is unrealistic. Thus, the IRR is more

realistic method of project revaluation. This method improves the quality of estimates reducing the uncertainty to minimum.

6. **Elimination of Pre-determined Discount rate:** Unlike the NPV method, the IRR method eliminates the use of the concept of required rate of return which is usually a pre-determined rate of cost of capital for discounting the cash flow streams. The IRR method itself provides a rate of return which is more realistic and consistent with the cost of capital. The IRR is therefore, a more reliable measure of the profitability of investment proposals under consideration.

Demerits: The following are the demerits of this method:

1. It is very difficult to understand and use
2. It involves a very complicated computational work
3. It may not give unique answer in all situations.
4. The assumption of re-investment of cash flows may not be possible in practice.
5. In evaluating the mutually exclusive proposals, this method fails to select the most profitable project which is consistent the objective of maximisation of shareholders' wealth.
6. The results of this method may be inconsistent compared to NPV method, if the projects differ in their (a) expected lives (b) investment or (c) timing of cash inflow.

Illu.12: A company has to select one of the following two projects:

	Project-A	Project-B
Cost (Rs.)	**11,000**	**10,000**
Cash inflows (Years) Rs.:		
1	**6,000**	**1,000**
2	**2,000**	**1,000**
3	**1,000**	**2,000**
4	**5,000**	**10,000**

Using the Internal Rate of Return Method suggest which project is preferable.

Solution: The cash inflow is not uniform and hence the internal rate of return will have to be calculated by the trial and error method. In order to have an approximate idea about such rate, it will be better to find out the 'Factor'. The factor reflects the same relationship of investment and 'cash inflows' as in the case of pay back calculations:
Thus-

$$F = \frac{I}{C}$$

Where,

F = Factor to be located;

I = Original Investment;

C = Average cash inflow per year

The 'factor' in case of project – A would be:

$$F = \frac{11,000}{3,500} = 3.14$$

The 'factor' in case of project – B would be:

$$F = \frac{10,000}{3,500} = 2.86$$

The factor thus calculated will be located in P.V.Table-II on the line representing number of years corresponding to estimated useful life of the asset. This would give the expected rate of return to be applied for discounting the cash inflows for the internal rate of return.

In case of project-A, the rate comes to 10% while in cases of project-B it comes ot 15%.

Project – A

Year	Cash inflows Rs.	Discounting factor at 10% (Table-I)	Present value Rs.
1	6,000	0.909	5,454
2	2,000	0.826	1,652
3	1,000	0.751	751
4	5,000	0.683	3,415
Total present value			11,272

The present value at 10% comes to Rs.11,272. The initial investment is Rs.11,000. Internal rate of return may be taken approximately at 10%.

In case more exactness is required, another trial rate which is slightly higher than 10% (since at this rate the present value is more than initial investment) may be taken. Taking a rate of 12%, the following results would emerge;

Year	Cash inflows Rs.	Discounting factor at 12%	Present value Rs.
1	6,000	0.893	5,358
2	2,000	0.797	1,594
3	1,000	0.712	712
4	5,000	0.636	3,180
Total present value			10,844

The internal rate of return is thus more than 10% but less than 12%. The exact rate may be calculated using the following formula.

$$L + \frac{P_1 - C}{P_1 - P_2} \times D$$

Where,

 L = Lower rate of interest
 P_1 = P.V. at lower rate of interest
 P_2 = P.V. at higher rate of interest
 C = Cash outlay.
 D = Difference in rate of interest

$$= 10 + \frac{11,272 - 11,000}{11,272 - 10,844} \times 2\%$$

$$= 10 + \frac{272}{428} \times 2\% = 11.3\%$$

Alternatively:

 The exact internal rate of return can also be calculated as follows:
 At 10% the present value is + 272
 At 12% the present value is – 156
 The internal rate would therefore be between 10% and 12% calculated as follows:

$$= 10\% + \frac{272}{272 + 156} \times 2 = 10 + 1.3 = 11.3\%$$

Project – B

Year	Cash inflows Rs.	Discounting factor at 15%	Present value Rs.
1	1,000	0.870	870
2	1,000	0.756	756
3	2,000	0.658	1,316
4	10,000	0.572	5,720
Total present value			8,662

 Since present value at 15% comes only to Rs.8,662 a lower rate of discount should be taken. Taking a rate of 10%, the following will be the result.

Year	Cash inflows Rs.	Discounting factor at 10%	Present value Rs.
1	1,000	0.909	909
2	1,000	0.826	826
3	2,000	0.751	1,502
4	10,000	0.683	6,830
Total present value			10,067

The present value at 10% comes to Rs.10,067 which is more or less equal to the initial investment. Hence, the internal rate of return may be taken as 10%.

In order to have more exactness, the internal rate of return can be interpolated as done in case of project-A.

At 10% the present value is +67

At 15% the present value is –1,338

$$= 10\% + \frac{67}{67 - 1,338} \times 5$$

$$= 10\% + \frac{67}{1,405} \times 5 = 10\% + 0.24 = 10.24 \text{ or } 10.24\%$$

Thus, internal rate of return in case of project-A is higher as compared to project-B. Hence, project-A is preferable.

Illu.13: A firm whose cost of capital is 10% is considering two mutually exclusive project X and Y, the details which are:

	Project X Rs.	**Project Y** Rs.
Investment	70,000	70,000
Cash flow Year 1	10,000	50,000
Cash flow Year 2	20,000	40,000
Cash flow Year 3	30,000	20,000
Cash flow Year 4	45,000	10,000
Cash flow Year 5	60,000	10,000
Total Cash flows	1,65,000	1,30,000

Compute the net present value at 10% profitability index and internal rate of Return for two projects.

Discount Factors

Year	10%	15%	20%	25%	30%	35%	40%
1	.909	.870	.833	.800	.769	.741	.714
2	.826	.756	.694	.640	.592	.549	.510
3	.751	.658	.579	.512	.455	.406	.364
4	.683	.572	.482	.410	.350	.310	.260
5	.621	.497	.402	.328	.226	.223	.186

Solution:

i. Net Present Value of the two mutually exclusive projects, cost of capital of the firm being 10 per cent.

Year	Cash Flows		P.V. Factors	Discounted cash Flows	
	Project X Rs.	Project Y Rs.	at 10%	Project X Rs.	Project Y Rs.
0	(-) 70,000	(-) 70,000	1.000	(-) 70,000	(-) 70,000
1	10,000	50,000	.909	9,090	45,450
2	20,000	40,000	.826	16,520	33,040
3	30,000	20,000	.751	22,530	15,020
4	45,000	10,000	.683	30,735	6,830
5	60,000	10,000	.621	37,260	6,210
Net Present Value				46,355	36,550

(ii) Profitability Indices:

$$\text{Project X}: \frac{\text{Discounted Cash inflow}}{\text{Discount Cash outflow}} = \frac{1,16,135}{70,000} = 1.659$$

$$\text{Project Y}: \frac{\text{Discounted Cash inflow}}{\text{Discount Cash outflow}} = \frac{1,06,550}{70,000} = 1.522$$

(iii) Internal Rate of Return for the two projects:

Project X:

Year	Cash flows Rs.	P.V. Factor at 25%	Discounted Cash Flows Rs.	P.V. Factor at 30%	Discounted Cash Flows Rs.
0	(-) 70,000	1.000	(-) 70,000	1,000	(-) 70,000
1	10,000	.800	8,000	.769	7,690
2	20,000	.640	12,800	.302	11,840
3	30,000	.512	15,360	.455	13,650
4	45,000	.410	18,450	.350	15,750
5	60,000	.328	19,680	.269	16,140
			4,290		(-) 4,930

$$\text{IRR} = 25\% + \frac{4,290}{9,220} \times 5$$
$$= 25 + 2.326 = 27.326\%$$

Project Y:

Year	Cash flows Rs.	P.V. Factor at 25%	Discounted Cash Flows Rs.	P.V. Factor at 30%	Discounted Cash Flows Rs.
0	(-) 70,000	1.000	(-) 70,000	1,000	(-) 70,000
1	50,000	.741	37,050	.714	35,600

Year	Cash flows Rs.	P.V. Factor at 25%	Discounted Cash Flows Rs.	P.V. Factor at 30%	Discounted Cash Flows Rs.
2	40,000	.549	21,960	.510	20,400
3	20,000	.406	8,120	.364	7,280
4	10,000	.301	3,010	.260	2,600
5	10,000	.223	2,230	.186	1,860
			2,370		(-) 2,260

$$IRR = 35\% + \frac{2,370}{4,630} \times 5 = 37.56\%$$

10.3.3 Profitability Index (PI):

This method is also known as 'Benefit Cost Ratio'. According to Van Horne, the profitability index of a project is the ratio of the present value of future net cash flows to the present value of initial cash outflows.

$$Profitability\ Index : \frac{Present\ value\ of\ cash\ inflows}{Present\ value\ of\ initial\ cash\ outflows}$$

On the basis of this criteria, the projects can be accepted when the profitability index is equal to or greater than '1'(one).

Merits: The merits of this method are as given under:

1. It takes into account the time value of money
2. It requires less computational work than IRR method
3. It helps to accept/reject investment proposals on the basis of value of the index.
4. It is useful to rank the proposals on the basis of the highest/lowest value of the index.
5. It takes into consideration the entire stream of cash flows generated during the useful life of the asset.

Demerits: However, this technique suffers from some of the following demerits:
1. It is some what difficult to understand
2. Some people may feel no limitation for index numbers due to several limitations involved in their computations
3. It is very difficult to understand the analytical part of the decision on the basis of profitability index.

Illu.14: NIIT Ltd. is contemplating to purchase a machine. Two machine A and B are available each costing Rs.5,00,000. In comparing the profitability of the machines a discounted rate of 10% is to be used. Earnings after taxation are expected as follows:

Cash Flow

Year	Machine "A"	Rupees Machine "B"
I	1,50,000	50,000
II	2,00,000	1,50,000
III	2,50,000	2,00,000
IV	1,50,000	3,00,000
V	1,00,000	2,00,000

Indicate which of the machine would be profitable using the following methods of ranking investments proposals.

i) Pay back method;
ii) Net Present value method;
iii) Post pay back profitability;
iv) Return on investment method.

The discount factor at 10% is:

1st Year	0.9091
2nd Year	0.8264
3rd Year	0.7513
4th Year	0.6830
5th Year	0.6209

Solution: (i) Payback Method:

	Machine A Rs.
I Year	1,50,000
II Year	2,00,000
III Year (balance)	1,50,000

$$\text{Total}: 5,00,000 \text{ i.e., } 2 \text{ years} + \frac{1,50,000}{2,50,000} = 2\frac{3}{5} \text{ years Pay back period.}$$

	Machine B
I Year	50,000
II Year	1,50,000
III Year	2,00,000
IV Year (balance)	1,00,000
Total:	5, 00,000

$$\text{i.e., } 3 \text{ Years} + \frac{1,00,000}{3,00,000} = 3\frac{1}{3} \text{ years Pay back period.}$$

Machine "A" would be preferable under Pay back Method.

iii) Net Present Value Method (NPV)

Year	Machine – 'A'			Machine – 'B'		
	Cash Flow Rs.	Discount Factor at 10%	Present Value Rs.	Cash Flow Rs.	Discount Factor at 10%	Present Value Rs.
I	1,50,000	0.9091	1,36,365	50,000	0.9091	45,455
II	2,00,000	0.8264	1,65,280	1,50,000	0.8264	1,23,960
III	2,50,000	0.7513	1,87,825	2,00,000	0.7513	1,50,260
IV	1,50,000	0.6830	1,02,450	3,00,000	0.6830	2,04,900
V	1,00,000	0.6209	62,090	2,00,000	0.6209	1,24,180
Total			6,54,010			6,48,755
Less: Investment			5,00,000			5,00,000
N.P.V.			1,54,010			1,48,755

Under Net Present Value Method, Machine 'A' would be preferable as it will have higher positive Net Present Value.

iv) Post Pay Back Profitability:

	Machine – 'A'	Machine – 'B'
Total cash flow	8,50,000	9,00,000
Less: Investment	5,00,000	5,00,000
Post Pay Back Profits	3,50,000	4,00,000

Machine 'B' would be preferable.

iv) Return on Investment Method (R.O.I)

Particulars	Machines	
	'A'	'B'
Total Cash Flow in 5 years-	8,50,000	9,00,000
	$= \dfrac{8,50,000}{5}$	$= \dfrac{8,50,000}{5}$
	= 1,70,000	= 1,80,000
Return on Investment	$= \dfrac{1,70,000}{5,00,000} \times 100$	$= \dfrac{1,80,000}{5,00,000} \times 100$
	= 34%	= 36%

Machine 'B' would be preferable under R.O.I. Method

Selection of Machine under Different Methods of Evaluation:

Method	Preference for Machine
i) Pay back method	'A'
ii) N.P.V. Method	'A'
iii) Post Pay back Profitability	'B'
iv) R.O.I. Method	'B'

10.3.4 Discounted Payback Method:

It measures the time required for discounted cash flow to cover initial investment. Unlike the payback period, discounted payback period considers time value of money. The discount rate is the firm's cost of capital.

Illu.15: Initial Investment is Rs.7,00,000 and the cash flows are 1 year Rs.1,60,000; 2nd year Rs.2,60,000; 3rd year Rs.3,00,000; 4th year Rs.3,50,000; 5th year Rs.4,00,000. Compute Discounted payback assuming cost of capital at 15%.

Solution:

Year	Cash Flow	P.V.@ 15%	Cumulative PV
1.	1,60,000	1,39,200	1,39,200
2.	2,60,000	1,96,560	3,35,760
3.	3,00,000	1,97,400	5,33,160
4.	3,50,000	2,00,200	7,33,360
5.	4,00,000	1,98,800	9,32,160

Discounted Pay back = 4 year (Approximately)

Illu.16: Using the information given below, compute the pay-back under (a) Traditional Pay-back method and (b) Discounted Pay-back method and comment on the results.

	Rs.
Initial outlay	**80,000**
Estimated life	**5 years**
Profit after tax:	
End of year 1	**6,000**
2	**14,000**
3	**24,000**
4	**16,000**
5	**Nil**

Depreciation has been calculated under straight line method. The cost of capital may be taken at 20% p.a. and P.V. of Rs.1 at 20% p.a. is given below:

Year	1	2	3	4	5
P.V.factor	.83	.69	.58	.48	.40

Solution:

Traditional Pay-back Method

Year	Profit after tax (Rs.)	Depreciation (Rs.)	Cash inflows (Rs.)	Cumulative Cash inflows (Rs.)
1.	6,000	16,000	22,000	22,000
2.	14,000	16,000	30,000	52,000
3.	24,000	16,000	40,000	92,000
4.	16,000	16,000	32,000	1,24,000
5.	Nil	16,000	16,000	1,40,000

Cumulative cash inflows upto 2 years Rs.52,000: Balancing investment to be recovered is 28,000 (i.e.Rs.80,000-52,000)

Pay-back period = Period for which part of the investment is recovered

$$+ \frac{\text{Balance of Investment to be recovered}}{\text{Cash inflow in the subsequent year of the period in which part of the investment is recovered}}$$

$$\text{Pay-back period} = 2 + \frac{28,000}{40,000} \text{ yrs} = 2.7 \text{ years.}$$

Discounted Pay-back Method

Year	Cash inflows (Rs.)	Discount Factor	Discounted cash inflows (Rs.)	Cumulative discounted cash inflows (Rs.)
1.	22,000	.83	18,260	18,260
2.	30,000	.69	20,700	38,960
3.	40,000	.58	23,200	62,160
4.	32,000	.48	15,360	77,520
5.	16,000	.40	6,400	83,920

$$\text{Discounted Pay-back period} = 4 + \frac{3,920}{6,400} \text{ yrs} = 4.61 \text{ years.}$$

10.4 . CAPITAL RATIONING

Capital rationing refers to the situation where budgetary or fund constraints are imposed on the firm and the firm may not be in a position to invest its available scarce resources in all the acceptable projects. According to Weston and Brigham, "capital rationing is a situation where a constraint is placed on the total size of funds invested during a particular period." Under the situation of capital rationing, it is not possible on the part of the company to select all the available investment proposals due to financial constraints. Hence, the company has to rank the proposals applying the techniques of appraisals and finally select the best proposal within the available funds

10.4.1 Causes for Capital Rationing

The reasons for imposing restrictions on the finances of the company and evidence of capital rationing situation are as follows:

1. non-availability of funds;
2. it is difficult to raise funds through external sources;
3. some firms may impose limitations on capital expenditure due to lack of managerial resources;
4. some firms may resort to capital rationing due to the reason that its cost of capital may rise by way of raising additional funds;
5. some company's may not be interested in further expansion, but they may be interested to stabilise the present position.

10.4.2 Project Selection under Capital Rationing:

Selection of projects under capital rationing is made by:

1. ranking the projects according to Internal Rate of Return (IRR) or Profitability Index.
2. Selecting the projects in descending order of the ranks, until the budgeted funds are exhausted
3. not selecting the investment project with negative Net Present Value (NPV) or Internal Rate or Return (IRR) below the cost of capital.

10.5. CONCLUSION

Capital budgeting involves the firm's decisions to invest its current funds most efficiently in long-term projects, in anticipation of expected flow of future funds over a series of years.

The capital budgeting decisions include replacement, expansion, diversification research and development and miscellaneous proposals. Capital budgeting decisions are important because they involve investment of heavy funds with long term implications. These decisions are most difficult to take.

The capital budgeting process involve generation of investment proposals, estimation and evaluation of cash flows, selection of projects based on acceptance criterion and finally continuous evaluation of investments.

A sound appraisal method should enable the company to measure the real worth of the investment proposal. There are two traditional methods and three discounted cashflow methods for this purpose. They are the pay back method and the accounting rate of return in the first group and the net present value method, internal rate of return method and profitability index method in the second group.

Capital rationing is a situation where a constraint is placed on the total size of funds invested during a particular period. Some reasons for capital rationing include be self imposed and some are external reasons.

10.6 SELF ASSESSMENT QUESTIONS

Short Questions:

1. Why are traditional methods of capital budgeting which are still popular?
2. What is time value of money?
3. What is Net Present Value Method?
4. What is capital rationing?

Essay questions:

1. Why are Pay Back and ARR methods still popular? Explain their relative merits and demerits.
2. What do you mean by Discounted Cash Flow techniques? Explain NPV and Profitability Index methods to fulfill the requirements of time value of money.
3. Define Internal Rate of Return, How are project selection decisions taken under this method?
4. Define capital rationing and explain the causes, How are the project selection decisions made under capital rationing?

10.7 EXERCISES

1. Following are the details of three project A,B and C.

	A	B	C
Cost (Rs.)	50,000	70,000	70,000
Life	10 Years	12 Years	14 Years
Estimated scrap (Rs.)	5,000	10,000	7,000
Annual Profit less Taxation (Rs.)	5,000	6,000	5,500

Calculate the pay back period.
   [Ans.: A – 5.26 years, B – 6.36 years; C – 7 years]

2. A choice is to be made between two competing proposals which require an equal investment of Rs.50,000 and are expected in generating net cash flows as under:

Year	Project I Rs.	Project II Rs.
1	25,000	10,000
2	15,000	12,000
3	10,000	18,000
4	Nil	15,000
5	12,000	8,000
6	6,000	4,000

Select the project under payable method.
   [Ans.: Project I 3 years; Project II 3.4 years]

3. The directors of Alpha Ltd., are considering the purchase of a new Machine. Two Machines costing Rs.60,000 each are available. Each Machine has an expected life of 5 years. Net profit before tax during the expected life of each Machine are given as follows:

Year	Machine X Rs.	Machine Y Rs.
1	15,000	5,000
2	20,000	15,000
3	25,000	20,000
4	15,000	30,000
5	10,000	20,000
	85,000	90,000

Following the method of Return on Investment ascertain which of the alternatives will be more profitable. The Average rate of tax may be taken as 50%.

[Ans.: Average Profit (after tax) : Machine X Rs.8,500; Machine Y Rs.9,000; Average Investment : Machine X Rs.30,000; Machine Y Rs.30,000; Average Rate of Return : Machine X : 28.33%; Machine Y 30%; Thus Machine Y is more profitable as against Machine X]

4. Mehta Co. Ltd., is considered the purchase of a new machine. Two Machine X and Y are available each costing Rs.1,00,000. Earnings after taxation are as follows:

Year	Machine X Rs.	Machine Y Rs.
1	30,000	10,000
2	40,000	30,000
3	50,000	40,000
4	30,000	60,000
5	20,000	40,000
	1,70,000	1,80,000

`
Work of the ARR for each machine.

[Ans.: Average Cash inflows: Machine X = Rs.34,000; Machine Y Rs.36,000; Average Investment : Machine X Rs.50,000; Machine Y Rs.50,000; Annual Depreciation : Machine X Rs.20,000; Machine Y Rs.20,000; ARR for Machine X = 28%; ARR for Machine Y = 32%]

5. Sundaram Ltd. is planning to increase its present capacity and is considering the purchase of a new machine. Machine A and B are available at a price of Rs.80,000 and Rs.90,000 respectively. The company can buy either of the two machines. Profit before depreciation but after taxation is estimated as follows:

Year	Cash inflows	
	Machine A Rs.	Machine B Rs.
1	25,000	26,000
2	30,000	34,000
3	40,000	28,000
4	28,000	40,000
5	12,000	25,000
6	--	17,000

There is no salvage value.

Which out of the two machines should be company buy? Decide on the basis of (i) payback period and (ii) average rate of return.

> **[Ans.: (i) Payback period : Machine A – 2.63 years, Machine B – 3.4 years; (ii) ARR : Machine A – 21.5, Machine B – 29.6; Machine A is preferable]**

6. Calculate the 'pay back period', 'average rate of return' and 'net present value' for a project which requires an initial outlay of Rs.10,000 and generates year ending cash flows of Rs.6,000; Rs.2,000; Rs.5,000; and Rs.5,000 from the end of the first year to the end of fifth year. The required rate of return is 10 per cent and pays tax at 50 per cent rate. The project has a life of five years and depreciated on straight line basis.

Year	Discounting factor at 10%
1	.909
2	.826
3	.751
4	.683
5	.621

> **[Ans.: Pay back period $3^3/_7$ years; Average rate of return 22%; Net present value Rs.1,768]**

7. A Company is considering the possibility of manufacturing a particular component which at present is being bought from outside. The manufacture of the component would call for an investment of Rs.7,50,000 in a new machine besides an additional investment of Rs.50,000 in working capital. The life of the machine would be 10 years with a salvage value of Rs.50,000. The estimated savings (before tax) would be Rs.1,80,000 p.a. The income tax rate is 50%. The company's required rate of return is 10%. Depreciation is considered on straight line system.
Should the company make this investment?

Note: The present value of Re.1 at 10% discount rate is as follows:

Year	1	2	3	4	5	6	7	8	9	10
P.V.	.91	.83	.75	.68	.62	.56	.51	.47	.42	.39

The present value (at 10% discount rate) of an annuity of Re.1 payable each year for different years is as follows:

Year	1	2	3	4	5	6	7	8	9	10
P.V.	0.91	1.74	2.49	3.17	3.79	4.35	4.87	5.33	5.76	6.14

Ignore impact of income-tax for the system of depreciation followed:

[Ans.: NPV is Negative by Rs.1,43,180 and hence the new machine should not be purchased]

8. A company has to select one of the two alternative projects, the particulars in respect of which are given below:

	Project A Rs.	Project B Rs.
Initial outlay	1,20,000	1,10,000
Net Cash Flow		
End of the Year 1	70,000	20,000
2	50,000	40,000
3	30,000	50,000
4	20,000	40,000
5	10,000	20,000
6	Nil	10,000

The company can arrange fund at 15%. Compute the Net Present Value and Internal Rate of Return of each project and comment on the result.

Present value of Re.1 payable or receivable at the end of each period is as under:

Year	1	2	3	4	5	6
15%	.8696	.7561	.6575	.5718	.4972	.4323
16%	.8621	.7432	.6407	.5523	.4761	.4104
17%	.8547	.7305	.6244	.5337	.4561	.3898
18%	.8475	.7182	.6086	.5158	.4371	.3704
19%	.8403	.7062	.5934	.4987	.4191	.3521
20%	.8333	.6944	.5787	.4823	.4019	.3349
21%	.8265	.6830	.5645	.4665	.3855	.3186
22%	.8197	.6719	.5507	.4514	.3700	.3033
23%	.8130	.6610	.5374	.4369	.3552	.2888

[Ans.: Machine A should be selected as its NPV and IRR are higher]

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

Year	Machine X Rs.	Machine Y Rs.	Discount factor at 10%
1st	15,000	5,000	.9091
2nd	20,000	15,000	.8264
3rd	25,000	20,000	.7513
4th	15,000	30,000	.6830
5th	10,000	20,000	.6209

Estimate the two alternatives according to :

i) Payback method:

ii) Return on investment method:

iii) Net present value method a discount rate of 10% is to be used.

[Ans.: (i) Pay back period : Machine X 1$^5/_6$ years, Machine Y 2$^1/_3$ years; (ii) ROI : Machine X – 14%; Machine Y – 16%; (iii) NPV : Machine X – Rs.52,309; Machine Y – Rs.52,783]

10. Calculate the 'pay back period', 'average rate of return' and 'net present value' for a project which requires an initial out lay of Rs.10,000 and generates year ending cash flows of Rs.6,000; Rs3,000; Rs.2,000; Rs.5,000 and Rs.5,000 from the end of the first year to the end of fifth year. The required rate of return is 10 percent and pays tax at 50 per cent rate. The project has a life of five years and depreciated on straight line basis.

Year	Discounting factor at 10%
1	.909
2	.826
3	.751
4	.683
5	.621

[Ans.: Pay back period – 3.43 years; ARR – 22%; NPV – Rs.1,768]

11. An Engineering Company is considering the purchase of a machine. There are two possible machines which will produce the additional output. Details of these machines are given below:

	Machine X Rs.	Machine Y Rs.
Capital cost	30,000	30,000
Sales (at standard prices)	50,000	40,000
Costs:		
Labour	5,000	3,000

	Machine X Rs.	Machine Y Rs.
Materials	4,000	5,000
Factory overhead	6,000	5,000
Administrative costs	2,000	1,000
Selling costs	1,000	1,000
Expecting life in years	2	3

Show the most profitable investment on the facts given above, by the following methods:

a) Payback period

b) Return on investment

c) Present value return on investment (at 10% discount)

Discounting factor at 10%:

    1 year – 0.909

    2 years – 0.826

    3 years – 0.751

[Ans.: (a) Payback period – Machine X : 0.94 years, Machine Y : 1.2 years; (b) Return on Investment – Machine X : 213%; Machine Y : 167%; (c) Present Value return : Machine X – 1.85; Machine Y – 2.07; Machine X is preferable under payback and return on investment method. Machine Y is preferable under present value return on investment method.]

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Chapter – 11

FUNDS FLOW ANALYSIS

Objectives :

After going to this unit you should be able to
- understand the meaning of funds flow analysis
- find out the significance of funds flow statement
- go through the steps involved in the preparation of funds flow statement
- explain the schedule of changes in working capital

Synopsis:

11.1 INTRODUCTION

Significant technique of financial analysis is 'Funds Flow Analysis'. It is designed to highlight changes in the financial condition of a business concern between two points of time which generally conform to beginning and ending financial statement dates. Funds Flow statement is also termed as a 'Statement of Sources and Applications of Funds', 'Statement of Changes in Working Capital', 'Statement of Changes in Financial Position,' Statement of Funds Supplied and Applied.' 'Statement of Funds Generated and Expended, 'Where Got and Where Gone Statement', Funds Statement.

Although financial statements supply useful information to the management and describe the nature of changes in ownership as a result of the period's productive and commercial activities, these statements fail to mirror the funds changes that have taken place over a given time span. They do not spell out the movement of funds. It is more important to describe the sources from which additional funds were derived and the uses to which these funds were put, because the ultimate success of a business enterprise depends on where got and where gone situations. The funds flow statement is, therefore, prepared to uncover the information which the financial statements fail to describe clearly.

11.1.1Funds Flow Statement:

The following are the definitions of Funds Flow Statement.

R.N. Anthony: "The Funds Flow Statement describes the sources from which additional funds were derived and the uses to which these funds were put.

R.A. Foulk: "A Statement of Sources and Applications of Funds is a technical device designed to analyse the changes in the financial condition of a business between two dates."

Bierman: "It is a statement which highlights the underlying financial movements and explains the changes of working capital from one point of time to another."

Thus, funds flow statement is a report which summarises the events taking place between the two accounting periods. It spells out the sources from which funds were derived and the uses to which these funds were put. This statement is essentially derived from an analysis of the changes that have occurred in assets and liabilities items between two balance sheet dates. In this statement, only the net changes are shown s that the outcome of a transaction or of a series of transactions upon the financial condition of a business enterprise, is reflected more sharply.

11.1.2 Concept of Fund:

The term 'Funds' has a variety of meanings. Some people take funds synonymous to cash, and to them there is no difference between a Cash Flow Statement prepared on this basis and a Funds Flow Statement. While others include marketable securities and cash to constitute business funds. However, the most common definition of the term 'funds' is 'Working Capital' or Net Current Assets'. Thus the difference between Current Assets and Current Liabilities is called 'Funds'.

11.2. SIGNIFICANCE OF FUNDS FLOW STATEMENT

Funds Flow Statement is an important tool of financial analysis. The utility of the funds flow statement from the fact that it enables management, shareholders, investors, creditors and other interested in the enterprise to evaluate the uses of funds by the enterprise and to determine how these uses are financed.

11.2.1 Useful in Decision Making to the Management:

The Funds Flow Statement serves as valuable tool of financial analysis to the finance manager. It helps in understanding the financial stability and efficiency of financial policies of the management.

i. **Decisions relating to Financing:** With the help of the funds flow statement, the analyst can evaluate the financing pattern of the enterprise. An analysis of the major sources of funds in the past reveals what portion of the growth was financed internally and what portion externally. The statement is also meaningful in judging whether the company has grown at too fast a rate, credit has increased out of proportion to expansion in current assets and sales. If trade credit has increased at relatively higher rate, one would wish to evaluate the consequences of slowness in trade payments on the credit standing of the company and its ability of finance in future.

ii. **Decisions on Capitalisation:** The funds flow statement serves as handmaid to the finance manager in deciding the make-up of capitalization. Estimated uses of funds for new fixed assets, working capital, dividends and repayment of debt are made for each of several future years. Estimates are made of the funds to be provided by operations, and the balance must be obtained by borrowing or issuance of new securities. If the indicated amount of new funds required is greater than what the finance manager thinks possible to raise, then plans for new fixed asset acquisition and the dividend policies are re-examined so that the uses of funds can be brought into balance with the anticipated sources of financing them. In particular, funds statements are very useful in planning intermediate and long-term financing.

iii. **Reveals the reasons for financial difficulties:** The funds flow statement reveals clearly the causes for the financial difficulties of the company. The difficulties may be due to improper mix of short and long term sources, unnecessary accumulation of inventory of fixed assets etc. These can be found out by a careful study of the funds flow statement.

iv. **Other uses:** Funds Flow Statement is useful to the management in the following cases.
   a. estimating the amount of funds needed for growth;
   b. improving the rate of income on assets;
   c. planning the temporary investment of idle funds;
   d. securing additional working capital when needed;
   e. securing economies in the centralised management of cash in organization whose management is decentralised;
   f. planning the payment of dividend to shareholders and interest to creditors; and
   g. easting the effects of insufficient cash balance.

11.2.2 Useful as a control Device:

The funds flow statement also serves as a control device in that the statement compared with the budgeted figures will show to what extent the funds were put to use according to plan. This enables the finance manager to find out deviation from the planned course of action and take remedial steps to correct the deviations.

11.2.3 Useful to the external parties:

The outside parties can have a clear knowledge about the financial policies that the company has pursued. In the light of the information so supplied by the statement, the outsiders can decide whether or not to invest in the enterprise and on what terms funds have to be invested. The funds statement provides an insight into the financial operations of a business enterprise – an insight immensely valuable to the finance manager in analysing the past and future expansion plans of the enterprise and the impact of these plans on its liquidity. He can detect imbalances in the uses of funds and undertake remedial actions.

Thus, the funds statement draws the attention of the finance manager to problems which call for detailed analysis and immediate action. In view of these, funds flow statement is becoming more popular which management. Even some bank managers make it obligatory for the borrowers to furnish a funds statement along with their annual balance sheet. Now a days many Indian companies are publishing this statement in their annual reports although they are not obliged to do so under the Companies Act.

11.3. FINANCIAL STATEMENTS AND FUNDS FLOW STATEMENT

Financial Statement means the profit and loss account and the balance sheet. All the organizations more particularly, the company form of organisations is required to present the annual financial statements every year. The financial statements differ with the funds flow statement in many ways.

A Funds Flow Statement is a statement measuring the inflows and outflows of net working capital that result form any type of business activity between two dates. An Income Statement in a statement measuring the inflows and outflows of net asses of revenue nature that result form rendering goods or services to customers between two dates.

A Funds Flow Statements has become a useful tool in the hands of financial analyst. That is because the financial statements, i.e., Income Statements measures the flows restricted to transaction relating to rendering of goods and services to customers. It is not capable of any accurate information of the resources from operating unless the income data is converted into founds data. The Balance Sheet is merely a static statement of assets and liabilities as on a particular date. It does not depict the major financial transactions which have resulted in changes in Balance Sheet.

11.4. PREPARATION OF FUNDS FLOW STATEMENT

In order to prepare a Funds Statement, it is necessary to find out the **"sources"** and **"applications"** of funds.

11.4.1 Sources of funds:

1. **Funds from Operations:** Funds from operations is the only internal source of funds. Some adjustments are to be made in calculating funds from operations to the net profit given in the financial statement.

Calculation of Funds from Operations:

The following procedure is to be followed in the calculation of funds from operations.

1. **Start with the Net Profit given in the profit and loss account.**
2. **Add the following items to the Net Profit as they do not result in outflow of funds.**
   i. Depreciation on fixed assets.
   ii. Preliminary expenses or goodwill etc., written off.
   iii. Contribution to debenture redemption fund, transfer to general reserve etc., if they have been deducted before arriving at the figure of net profit.
   iv. Provision for taxation and proposed divided. These may be taken as appropriations of profits or current liabilities for the purposes of Funds Flow Statement. Tax or dividends actually paid are taken as applications of funds. Similarly, interim dividend paid is shown as an application of funds. All these items will be added back to net profit if already deducted, to find funds from operations.
   v. Loss on sale of fixed assets.
3. **Deduct the following items from Net Profit as they do not increase the funds.**
   i. Profit on sale of fixed assets, since the full sale proceeds are taken as a separate source of funds and inclusion here will result in duplication.
   ii. Profit on revaluation of fixed assets.
   iii. Non-operating incomes such as dividend received or accrued rent. These items increase funds but they are non-operating incomes. They will be shown under separate heads as "sources of funds" in the Funds Flow Statement.

   In case the Profit and Loss account shows 'Net Loss' this should be taken as an item which decreases the funds.

Illu.1: Calculate funds from operation from the following profit and loss accounts for M/S Reliance & Co.

Dr.   **Profit and Loss Account**   **Cr.**

	Rs.		Rs.
To Salaries	10,000	**By Gross Profit**	2,00,000
To Rent	3,000	**By Profit on sale of Machine**	5,000
To Commission	2,000	**By Refund of Tax**	3,000
To Discount Allowed	1,000	**By Dividends received**	2,000

	Rs.		Rs.
To Provision for Depreciation	14,000		
To Transfer to General	20,000		
Reserve			
To Provision for Tax	10,000		
To Loss on sale of	5,000		
Investments			
To Discount on issue of			
Debentures	2,000		
To Preliminary Expenses	3,000		
To Selling Expenses	20,000		
To Net Profit	1,20,000		
	2,10,000		2,10,000

Solution:

Funds from operations can be arrived at by starting with gross profit or net profit in a statement form. It can also be arrived at through accounting form. All the forms are given below:

By taking Gross Profit as base

Particulars	Rs.	Rs.
Gross Profit		2,00,000
Less: Operating Expenses:		
Salaries	10,000	
Rent	3,000	
Commission	2,000	
Discount allowed	1,000	
Preliminary Expenses	3,000	
Selling Expenses	20,000	39,000
Funds from operation (Source)		1,61,000

By taking Net Profit as base:

Particulars	Rs.	Rs.
Net Profit		1,20,000
Add: Non-operating expenses and losses:		
Provision for depreciation	14,000	
Transfers to General Reserve	20,000	
Provision for tax	10,000	
Loss on sale of investment	5,000	
Discount on issue of debentures	2,000	51,000
		1,71,000

Less: Non-operating incomes and gains:	Rs.	Rs.
Profit on sale of Machine	5,000	
Refund of tax	3,000	
Dividends received	2,000	10,000
Funds from operation (Source)		1,61,000

Account Form:

Profit & Loss Adjustment a/c

Particulars	Rs.	Particulars	Rs.
To Provision for depreciation	14,000	By Profit on sale of Machine	5,000
To Transfer to General Reserve	20,000	By Refund of tax	3,000
To Provision for tax	10,000	By Dividends received	2,000
To Loss on sale of Investments	5,000	By Funds from Operations (Source)	1,61,000
To Discount of issue of debentures	2,000	(Balancing figure)	
To Net Profit	1,20,000		
	1,71,000		1,71,000

11.4.2 Applications of funds:

The uses to which funds are put to are called 'applications of funds'. Following are some of the purposes for which funds may be used:

i. **Purchase of fixed assets:** Purchase of fixed assets such as land, buildings, plant, machinery, long-term investments, etc., result in decrease of current assets without any decrease in current liabilities. Hence, there will be an outflow of funds. But in case shares or debentures are issued for acquisition of these fixed assets, there will be no outflow of funds.

ii. **Payment of dividend:** Payment of dividends results in decrease of a fixed liability and therefore, it affects funds. Generally, recommendation of directors regarding declaration of dividend (i.e., proposed dividends) is simply taken as an appropriation of profits and not as an item affecting the working capital.

iii. **Payment of fixed liabilities:** Payment or redemption of redeemable preference shares results in reduction of working capital and hence it is taken as an application of funds.

iv. **Payment of tax liability:** Provision for taxation is generally taken as an appropriation of profits and not as an application of funds. But if the tax has been paid, it will be taken as an application of funds.

v. **Increase in Working Capital:** Working capital is increased, if current assets increase and current liabilities decrease. Funds are required in both the cases i.e., in order to acquire more current assets or paying current liabilities and thus funds are said to have been applied or used.

11.4.3 Statement of Changes in Working Capital:

The increase or decrease in working can be calculated by preparing the schedule of changes in working capital.

'Working capital represents the excess of current assets over current liabilities. Several items of all current assets and current liabilities are the components of working capital. In order to ascertain the working capital at the beginning and at the end of the period and to measure the increase or decrease therein it is necessary to prepare a Statement or Schedule of Changes in Working Capital'.

Statement of Changes in Working Capital

	Previous Year	Current Year	Effect on Working Capital	
			Increase	Decrease
	Rs.	Rs.	Rs.	Rs.
Current Assets: (A)				
Stock				
Debtors				
Cash				
Bank				
Bills Receivable				
Prepaid expenses				
Total (a)				
Current Liabilities (B)				
Creditors				
Bills payable				
Outstanding expenses				
Total (b)				
Working Capital: (A-B)				
Increase/Decrease in Working Capital				
Total				

While preparing a schedule of changes in working capital it should be noted that:

1. a. an increase in current assets increases working capital;
    b. a decrease in current assets decreases working capital;
    c. an increase in current liabilities decreases working capital;
    d. a decrease in current liabilities increases working capital;
    e. an increase in current asset and increase in current liability does not affect working capital.
    f. a decrease in current asset and decrease in current liability does not affect working capital.
    g. Changes in fixed (non-current) assets and fixed (non-current) liabilities affects working capital.

2. The changes in all current assets and current liabilities are merged into one figure only – either an increase or decrease in working capital over the period for which funds statements has been prepared. If the working capital at the end of the period is more than the working capital at the beginning thereof, the difference is expressed as 'increase in working capital'. On the other hand, if the working capital at the end of the period is less than at the commencement, the difference is called 'decrease in working capital'.

Current Assets:

The expression 'current assets' denotes those assets which are continually on the move. Since they are constantly in motion, they are also known as the circulating capital of the business. These assets can or will be converted into cash during a complete operating cycle of the business. Current assets include:

   a. Stock-in-trade or inventories;
   b. Debtors;
   c. Payments in advance or prepaid expenses;
   d. Stores;
   e. Bills receivable;
   f. Cash at bank;
   g. Cash in hand;
   h. Work-in-progress, etc.

Current Liabilities:

Current liabilities' are those liabilities which are to be paid in the near future, i.e., during a complete operating cycle of the business. Such liabilities include:
   a. Trade creditors.
   b. Accrued or outstanding expenses.
   c. Bills payable.
   d. Income-tax payable.
   e. Dividends declared;
   f. Bank overdraft.

Note: Some experts are of the opinion that as bank overdraft has a tendency to become more or less a permanent source of financing, and hence it need not be included among current liabilities.

Illu.2: Find out changes in working capital from the particulars of Amararaj Batteries Ltd., given below.

Capital and Liabilities	31-12-96	31-1-97	Assets	31-12-96	31-12-97
Share capital	3,00,000	3,75,000	Machinery	70,000	1,00,000
Trade Creditors	1,06,000	70,000	Stock	1,21,000	1,36,000
Profit & loss a/c	14,000	31,000	Debtors	1,81,000	1,70,000
			Cash	48,000	70,000
	4,20,000	4,76,000		4,20,000	4,76,000

Solution:

Schedule of changes in Working Capital

Particulars		1996 Rs.	1997 Rs.	Changes in the Working Capital Increase Rs.	Changes in the Working Capital Decrease Rs.
Current Assets:					
Cash		48,000	70,000	22,000	
Debtors		1,81,000	1,70,000		11,000
Stock		1,21,000	1,36,000	15,000	
Total Current Assets	(A)	3,50,000	3,76,000		
Current Liabilities:					
Trade Creditors	(B)	1,06,000	70,000	36,000	
Working Capital (A-B)	(C)	2,44,000	3,06,000		
Net Increase in Working Capital (Application)					62,000
				73,000	73,000

11.5 SELF ASSESSMENT QUESTIONS

1. What is funds flow statement? Discuss the significance of funds flow statement as a tool of financial analysis.
2. Discuss in detail the methodology of preparing funds flow statement.
3. What is cash flow concept of the term 'funds'? How is funds flow statement prepared under this concept?
4. What do you understand by the working capital concept of the term 'funds'? How is funds flow statement drawn under this concept?

5. Examine the managerial uses of 'funds flow statement'?
6. What are the differences between Funds Flow Statement and Balance sheet?

11.6 EXERCISES

1. Calculate fund from operations from the information given below:

	Rs.
Net profit as per profit and loss a/c	8,00,000
Gain on sale of building	38,500
Goodwill written off	21,500
Loss on sale of Machine	13,500
Transfer to Reserve	1,15,500
Depreciation on fixed assets	1,25,000

[Ans.: Funds from operations Rs.10,37,000]

2. Calculate funds from operations from the following Profit and Loss a/c.

Dr.	P & L a/c		Cr.
	Rs.		Rs.
To Rent, Salaries paid	75,000	By Gross Profit	1,12,500
To Depreciation	17,500	By Gain on sale of land	15,000
To Loss on sale of Machine	1,000		
To Discount	50		
To Goodwill	5,000		
To Net Profit	28,950		
	1,27,500		1,27,500

[Ans.: Funds from operations Rs.37,500]

3. Calculate fund from operations from the following profit and loss account.

	Profit and Loss account		
	Rs.		Rs.
To Expenses paid	3,00,000	By Gross Profit	4,50,000
To Depreciation	70,000	By Profit on sale of land	60,000
To Loss on sale of machine	4,000		
To Discount on shares	200		
To Goodwill	20,000		
To Net Profit	1,15,800		
	5,10,000		5,10,000

[Ans.: Funds from operations Rs.1,49,800]

11.7 REFERENCE BOOKS

1. R.S.N. Pillai, & Bagavathi, Management Accounting, S. Chand & Company Ltd., New Delhi

2. M.A. Sahaf, Management Accounting – Principles & Practice, Vikas Publishing House Pvt. Ltd., New Delhi.

3. Shashi K. Gupta & R.K. Sharma, Management Accounting, Kalyani Publishers,

4. Charles thorn Gaxy Sundem, Introduction to Management Accounting –

5. N. Vinayakam, Tools & Techniques of Management Accounting

6. SP Gupta, Management Accounting

7. Manmohan & Goyal, Management Accounting

8. V. Krishna Kumar, Management Accounting

9. Dr.Kulsreshtha and Gupta, Practical Problems in Management Accounting

10. SP. Jain & KL Narang, Advanced Cost and Management Accounting

Chapter – 12

STATEMENT OF SOURCES AND APPLICATION OF FUNDS

Objectives :

After going to this unit you should be able to
● know various types of funds from operations
● find out the funds from long term loans
● explain funds from increase in share capital
● analyse the reasons for declining working capital

Structure :

12.1 Statement of Sources and Application of Funds
12.2 Treatment of Adjustments
12.3 Self Assessment Questions
12.4 Exercises
12.5 Reference Books

12.1 STATEMENT OF SOURCES AND APPLICATIONS OF FUNDS:

1. **Funds from Operations:** It is an internal sources of funds. Funds from operations is to be calculated as per the method stated above.

2. **Funds from long-term loans:** Long-term loans such as debentures, borrowings from financial institutions will increase the working capital and therefore, there will be inflow of funds. However, if the debentures have been issued in consideration of some fixed assets, there will be no inflow of funds.

3. **Sale of fixed assets:** Sale of land, buildings, long-term investments will result in generation of funds.

4. **Funds from increase in share capital:** Issue of shares for cash or for any other current asset or in discharge of a current liability is another source of funds. However, shares allotted in consideration of some fixed assets will not result in funds. However, it is recommended that such purchase of fixed assets as well as issue of securities to pay for them be revealed in Funds Flow Statement.

5. **Decrease in Working Capital:** Decrease in working capital is the result of decrease in current asset or increase in current liabilities. In both the cases inflow of funds takes place. Suppose stock, a current asset reduces from Rs.15,000 to Rs.12,000 the decrease of Rs.3,000 is assumed to be due to the disposal of stock which undoubtedly brings funds into the business. In the same way increase in current liabilities means lesser payment, so retaining funds is also a source.

Funds Flow Statement

	Rs.
Sources of Funds:	
Issue of shares	xxxxx
Issue of debentures	xxxxx
Long-term borrowings	xxxxx
Sale of Fixed assets	xxxxx
Operating profit	xxxxx
Decrease in Working capital*	xxxxx
Total Sources	xxxxx
Applications of Funds:	
Redemption of redeemable	xxxxx
Preference shares	xxxxx
Redemption of debentures	xxxxx
Payment of other long-term loans	xxxxx
Purchase of fixed assets	xxxxx
Payment of dividends, taxes, etc.	xxxxx
Increase in working capital	xxxxx
Total Uses	xxxxx

*Only one will be there.

The Funds Flow Statement can also be prepared in 'T' shape as shown below:

Funds Flow Statement

Sources of Funds	Rs.	Applications of Funds	Rs.
Issue of Shares	xxx	Redemption of Redeemable Preference Shares	xxx
Issue of Debentures	xxx	Redemption of Debentures	xxx
Long-term Borrowings	xxx	Payment of other Long-term loans	xxx
Sale of Fixed Assets	xxx	Purchase of Fixed Assets	xxx
Operating Profit	xxx	Operating loss	xxx
Decrease in Working Capital*	xxx	Payment of Dividends taxes, etc.	xxx
		Increase in Working Capital*	xxx
	xxx		xxx

*Only one will be there.

12.2 TREATMENT OF ADJUSTMENTS

Sometimes the factors affecting the funds from operations may not be given in the problems directly and there may be some hidden information. As such, some of the transactions have to digged out using the additional information provided as adjustments to the balance sheet. These items include:
a. Provision for tax;
b. Proposed dividends;
c. Sale or Purchase of fixed assets.

11.2.1 Provision for Tax:

It is a current liability. While preparing a Funds Flow Statement, there are two options available.

(i) Provision for tax may be taken as a current liability. In such a case, when provision for tax is made the transaction involves profit and loss Appropriation Account which is a fixed liability and provision for tax account, which is a current liability. It will thus decrease the working capital. On payment of tax there will be no change in working capital because it will involve one current liability (i.e., Provision for Tax) and the other a current assets (i.e., Bank or Cash Balance).

(ii) Provision for tax may be taken only as an appropriation of profit. It means that there will no change in working capital position when provision for tax is made since it will involve two fixed liabilities, i.e., Profit and Loss Appropriation Account and Provision for Tax Account. However, when tax is paid, it will be taken as application of funds, because it will when involve 'provision for tax account' which has been taken as a fixed liability and 'bank account' which is a current assets.

12.2.2 Proposed dividends:

Whatever has been said about the "provision for tax" is also applicable to "proposed dividends". Proposed dividends can also be dealt within two ways:

(i) Proposed dividends may be taken as a current liability since declaration of dividends by the shareholders is simply a formality. Once the dividends are declared in the general meeting, they will have to be paid within 42 days of their declaration. In case proposed dividends is taken as a current liability, it will appear as one of the items decreasing working capital in the 'schedule of changes in working capital'. It will not be shown as an application of funds when dividend is paid later on.

(ii) Proposed dividends may simply be taken as an appropriation of profits. In such a case proposed dividend for the current year will be added back to current year's profit in order to find out funds from operations if such amount of dividend has already been charged to profits. Payment of dividend will be shown as an "application of funds".

12.2.3 Sale or Purchase of fixed assets:

For arriving at the final figure we have to prepare the asset account, depreciation account assets sold or purchased account. This can be illustrated well with the following extracts of the balance sheet.

Balance Sheet

Liabilities	Assets	31st March 2001	31st March 2002
	Plant & Machinery	2,00,000	2,50,000
	Less: Accumulated depreciation	40,000	60,000
	Net value	1,60,000	1,90,000

Adjustment:

During the year, a machinery costing Rs.50,000 over which depreciation accumulated to Rs.12,000 was sold for Rs.30,000. You are required to find out the value of machinery purchased and profit/loss on sale.

Solution:

In the absence of additional information, one would have come to the superfluous conclusion that additional machinery purchased during the year was Rs.50,000 and that the depreciation charged during the year was Rs.20,000. The real position can be ascertained if the following three accounts are prepared.

(i) Asset account (Plant and Machinery Account): This is maintained at the cost price. The account is debited with the cost of the machinery as at the beginning of the year (i.e., balance in the machinery account at the beginning) and with purchases during the year. It is credited with the cost price of the machinery sold and with cost of the machinery as at the close of the year (i.e., balance in the machinery account at the end). In the problems either the total value of purchases during the year may be missing or the cost of the machinery sold may be missing. The missing figure can be found out by feeding the account with the available information and balancing it.

(ii) Depreciation account: Depreciation is not a source of funds. Source of funds is constituted by those transactions, where one account belongs to current category and the other

belongs to non-current category. In case of depreciation both items belong to non-current category, as such it does not make any change in the funds and is not a source of funds. In support of the answer journal entry regarding depreciation is presented herewith.

Date	Particulars		L.F.	Debit	Credit
i.	Depreciation a/c	Dr.		xxx	
	To Fixed Assets a/c				xxx
ii.	Profit and Loss a/c	Dr.		xxx	
	To Depreciation a/c				xxx
	(OR)				
	Profit and Loss a/c	Dr.		xxx	
	To Fixed Assets a/c				xxx

Profit and Loss a/c is a non-current liability and fixed assets are non-current assets. As both of them belong to non-current category, so depreciation is not a source of funds.

(iii) Asset sold account: The purpose of preparing this account is to ascertain the profit/loss made on sale of the asset. The account is debited with the cost of the assets sold (transferred from the Asset account). It is credited with the accumulated depreciation on the asset sold (transferred from depreciation account). It is also credited with the money received on sale on the machinery. The difference between the two sides would be profit (if credit balance) or loss (if debit balance).

Machinery Account

	Rs.		Rs.
To Opening Balance	2,00,000	By Machinery sold a/c	50,000
To Bank (Purchases)	1,00,000	By Closing Balance	2,50,000
	3,00,000		3,00,000

Depreciation Account

	Rs.		Rs.
To Machinery sold a/c	12,000	By Opening Balance	40,000
To Closing Balance	60,000	By P & L Account (provision)	32,000
	72,000		72,000

Machinery sold Account

	Rs.		Rs.
To Machinery a/c	50,000	By Depreciation	12,000
		By Bank (Sales)	30,000
		By P & L a/c (Loss)	8,000
	50,000		50,000

Working Notes:

    i. Depreciation charged during the year is Rs.32,000 (to be added back to profit to arrive at funds from operations)

    ii. Loss on sale machinery is Rs.8,000 (to be added back to profit to arrive at funds from operations).

    iii. Sale of machinery Rs.30,000 a source of funds.

    iv. Purchase of machinery Rs.1,00,000 use of funds.

Illu.1: From the following balance sheets of Gudivada Ltd., you are required to prepare Funds (working capital) flow statement for the year ending 31ˢᵗ Dec. 2002:

Liabilities	31.12.01 Rs.	31.12.02 Rs.	Assets	31.12.01 Rs.	31.12.02 Rs.
Share capital	70,000	74,000	Cash	9,000	7,800
Debentures	12,000	6,000	Debtors	14,900	17,700
Provision for bad debts	700	800	Stock	49,200	42,700
Creditors	10,360	11,840	Land	20,000	30,000
Profit & Loss A/c	10,040	10,560	Goodwill	10,000	5,000
	1,03,100	1,03,200		1,03,100	1,03,200

Additional information:

(a) **Dividends paid Rs.3,500**

(b) **Land is purchased during the year Rs.10,000.**

Solution:

<p align="center">Schedule of changes in the Working Capital</p>

Particulars		2001 Rs.	2002 Rs.	Changes in the Working Capital Increase Rs.	Decrease Rs.
Current Assets:					
Cash		9,000	7,800		1,200
Debtors		14,900	17,700	2,800	
Stock		49,200	42,700		6,500
Total Current Assets	(A)	73,100	68,200		
Current Liabilities:					
Trade Creditors		10,360	11,840		1,480
Reserve for doubtful debts		700	800		100
Total current liabilities	(B)	11,060	12,640		
Working Capital (A-B)		62,040	55,560		
Net decrease in Working Capital (Source)				6,480	
				9,280	9,280

Dr.   **Land a/c**   Cr.

	Rs.		Rs.
To Balance b/d	20,000	By Balance b/d	20,000
To Bank (application)	10,000		
	30,000		30,000

Dr.   **Goodwill a/c**   Cr.

	Rs.		Rs.
To Balance b/d	10,000	By Profit & Loss adjustment a/c	
		(Balancing Figure)	5,000
		By Balance c/d	5,000
	10,000		10,000

Dr.   **Share Capital a/c**   Cr.

	Rs.		Rs.
To Balance b/d	74,000	By Balance b/d	70,000
		By Bank (Source)	4,000
		(Balancing Figure)	
	74,000		74,000

Dr.   **Debentures a/c**   Cr.

	Rs.		Rs.
To Bank (application)	6,000	By Balance b/d	12,000
(Balancing Figure)			
To Balance c/d	6,000		
	12,000		12,000

Dr.   **Profit & Loss Adjustment a/c**   Cr.

	Rs.		Rs.
To Goodwill	5,000	By Balance b/d	10,040
To Bank (application)	3,500	By Funds from Operation (Source)	9,020
To Balance c/d	10,560	(Balancing Figure)	
	19,060		19,060

Funds flow statement for the year ended 31.12.2002

Sources	Rs.	Applications	Rs.
Decrease in Working Capital	6,480	Purchase of land	10,000
Issue of share capital	4,000	Redemption of debentures	6,000
Funds from operation	9,020	Payment of Dividends	3,500
	19,500		19,500

Illu.2: Prepare Funds Flow Statement from the following data:-

Comparative Balance Sheets

(Rs.in '000)

Assets	2001	2002
Land	960	800
Plant	600	680
Patents	40	36
Closing stock	600	688
Debtors	400	740
Cash	1600	1776
	4200	4720
Liabilities & Capital		
Share Capital	1400	1740
Reserves & Surplus	600	780
Debentures	880	880
Discount on Debentures	(80)	(72)
S. Creditors	1200	1280
Provision for Depre.	200	112
	4200	4720

Other information:

(1) Net profit for the year Rs.4,00,000

(2) Dividend paid Rs.80,000

(3) Shares issued for cash Rs.2,00,000 and for Bonus Rs.1,40,000.

(4) Depreciation charged for the year Rs.32,000.

(5) A building was sold for Rs.56,000 its cost and book value being Rs.1,60,000 and Rs.40,000.

Solution:

Schedule of changes in Working Capital

(Rs.in '000)

Particulars	2001 Rs.	2002 Rs.	Changes in the Working Capital Increase Rs.	Changes in the Working Capital Decrease Rs.
Current Assets:				
Stock	600	688	88	
Debtors	400	740	340	
Cash	1,600	1,776	176	
Total Current Assets (A)	2,600	3,204		
Current Liabilities:				
Creditors (B)	1,200	1,280		80
Working Capital (A-B)	1,400	1,924		
Net increase in Working Capital (application)				524
			604	604

Dr.   **Land a/c**   Cr.

	Rs.		Rs.
To Balance b/d	960	By Bank (Source)	56
To Profit & Loss adjustment		By Provision for depreciation	
a/c (56,000-40,000)	16	(1,60,000-40,000)	120
		By Balance c/d	800
	976		976

Dr.   **Goodwill a/c**   Cr.

	Rs.		Rs.
To Balance b/d	600	By Balance c/d	680
To Bank (application) (Balancing Figure)	80		
	680		680

Dr.   **Patents a/c**   Cr.

	Rs.		Rs.
To Balance b/d	40	By Profit & Loss adj. a/c (Balancing Figure)	4
		By Balance c/d	36
	40		40

Dr.   **Share Capital a/c**   Cr.

	Rs.		Rs.
To Balance c/d	1,740	By Balance b/d	1,400
		By Bank (Source)	200
		By Profit & Loss adj. a/c (Stock dividend) (Bonus Shares)	140
	1,740		1,740

Dr.   **Discount on debentures a/c**   Cr.

	Rs.		Rs.
To Balance b/d	80	By Profit & Loss adj. a/c (Balancing Figure)	8
		By Balance c/d	72
	80		80

Dr.   **Provision for depreciation a/c**   Cr.

	Rs.		Rs.
To Land	120	By Balance b/d	200
To Balance c/d	112	By Profit & Loss adj. a/c (Balancing Figure)	32
	232		232

Dr.	Reserves & Surplus a/c (P.L.A. a/c)		Cr.
	Rs.		Rs.
To Patents written off	4	By Balance b/d	600
To Share capital (div.)	140	By Profit on sale of buildings	16
To Discount on debentures	8	By funds from operation (Source) (Balancing Figure)	428
To Provision for depreciation	32		
To Dividend (application)	80		
To Balance c/d	780		
	1,044		1,044

Funds flow statement for the year ended 31.12.2002

Sources	Rs.	Applications	Rs.
Sale of building	56	Increase in working capital	524
Issue of share capital	200	Purchase of plant	80
Funds from operation	428	Payment of Dividend	80
	684		684

Illu.3: Statement of retained earnings is as follows:

		Rs.
Balance of retained earnings-January, 1996		**4,17,280**
Add: NP after tax for 1996		**8,32,660**
IT refund		**28,430**
		12,78,370
Less: Dividends	**5,85,210**	
Write off investments	**1,22,300**	
Loss on sale of plant	**13,340**	
		7,20,850
Balance of retained earnings – Dec. 1996		**5,57,520**

Depreciation charged for current year was Rs.79,520. Plant with a book value of Rs.43,210 was sold in February, 1996. Plant properties were increased during the year 1996 at a cost of Rs.2,31,900. This was financed by bonds. Preference shares were redeemed for Rs.76,400. Prepare Funds Flow Statement.

Solution:

Dr.		**Memorandum Plant a/c**	Cr.
	Rs.		Rs.
To Bonds	2,31,900	By Profit & Loss adjustment a/c (Loss on sale)	13,340
		By Profit & Loss adj. a/c (depreciation)	79,520
		By Bank (Source) (Sale) (43,210 – 13,340)	29,870
		By Balance c/d (Balancing Figure)	1,09,170
	2,31,900		2,31,900

Dr.		**Bonds a/c**	Cr.
	Rs.		Rs.
To Balance c/d	2,31,900	By Plant & Machinery	2,31,900
	2,31,900		2,31,900

Redemption of Preference share capital (application) Rs.76,400.

Dr.		**Retained Earnings a/c**	Cr.
	Rs.		Rs.
To Plant & Machinery (loss)	13,340	By Balance b/d	4,17,280
To Plant & Machinery (depreciation)	79,520	By Income tax refund (Source)	28,430
To Dividend (application)	5,85,210	By Funds from operation (Source) (Balancing Figure)	9,12,180
To Investment written off	1,22,300		
To Balance c/d	5,57,520		
	13,57,890		13,57,890

Funds flow statement for the year ended 31.12.96

Sources	Rs.	Applications	Rs.
Sale of Plant & Machinery	29,870	Redemption of Pref. Share capital	76,400
Refund of income tax	28,430	Payment of dividend	5,85,210
Funds from operation	9,12,180	Increase in working capital (Balance in Figure)	3,08,870
	9,70,480		9,70,480

Illu.3: Following are the summarised Balance Sheets of Vijaya Ltd., as on 31ˢᵗ December 2001 and 31ˢᵗ December 2002:

Liabilities	2001 Rs.	2002 Rs.	Assets	2001 Rs.	2002 Rs.
Share capital	2,00,000	2,50,000	Land and Buildings	2,00,000	2,40,000
General Reserve	40,000	70,000	Machinery	1,80,000	1,30,000
Profit and Loss a/c	32,000	39,000	Stock	1,00,000	1,26,000
Bank loan (long-term)	1,60,000	40,000	Sundry Debtors	80,000	64,000
Sundry Creditors	1,50,000	1,30,000	Cash at Bank	52,000	9,000
Provision for Taxation	30,000	40,000			
	6,12,000	5,69,000		6,12,000	5,69,000

Additional information is an under:

(a) During the year ended 31ˢᵗ December 2002, Dividend of Rs.42,000 was paid.

(b) Assets of another company were purchased for a consideration of Rs.50,000 payable in the issue of shares. There were Land and Buildings of Rs.25,000 and Stock Rs.25,000.

(c) Depreciation written off on Machinery is Rs.12,000 and Land and Buildings is Rs.22,500. Loss on sale of Machinery amounting to Rs.12,000 was written off to General Reserve.

(d) Income tax paid during the year was Rs.35,000.

(e) New additions to Buildings were for Rs.37,500.

You are required to prepare a statement showing sources and application of funds from the above mentioned date.

Solution:

Schedule of changes in Working Capital

Particulars	2001 Rs.	2002 Rs.	Changes in the Working Capital Increase Rs.	Decrease Rs.
Current Assets:				
Stock	1,00,000	1,26,000	26,000	
Debtors	80,000	64,000		16,000
Cash at bank	52,000	9,000		43,000
Total Current Assets (A)	2,32,000	1,99,000		

Current Liabilities:	Rs.	Rs.	Rs.	Rs.
Creditors	1,50,000	1,30,000	20,000	
Provision for taxation	30,000	40,000		10,000
Total Current Liabilities (B)	1,80,000	1,70,000		
Working Capital (A-B)	52,000	29,000		
Decrease in Working Capital (Source)			23,000	
			69,000	69,000

Dr.   **Business Purchase a/c**   **Cr.**

	Rs.		Rs.
To Share Capital	50,000	By Land & Buildings	25,000
		By Stock	25,000
	50,000		50,000

Dr.   **Machinery a/c**   **Cr.**

	Rs.		Rs.
To Balance b/d	1,80,000	By Profit & Loss adjustment a/c (depreciation)	12,000
		By General Reserve (Loss)	12,000
		By Bank (Source) (Balance in Figure)	26,000
		By Balance c/d	1,30,000
	1,80,000		1,80,000

Dr.   **Land & Buildings a/c**   **Cr.**

	Rs.		Rs.
To Balance b/d	2,00,000	By Profit & Loss adjustment a/c (depreciation)	22,500
To Business Purchase	25,000		
To Bank	37,500	By Balance c/d	2,40,000
	2,62,500		2,62,500

Dr.   **Share Capital a/c**   **Cr.**

	Rs.		Rs.
To Balance c/d	2,50,000	By Balance b/d	2,00,000
		By Business Purchase	50,000
	2,50,000		2,50,000

Dr. **General Reserve a/c** Cr.

	Rs.		Rs.
To Machinery	12,000	By Balance b/d	40,000
To Balance c/d	70,000	By Profit & Loss adjustment	
		a/c (Balance in Figure)	42,000
	82,000		82,000

Dr. **Bank Loan a/c** Cr.

	Rs.		Rs.
To Bank (application)	1,20,000	By Balance b/d	1,60,000
(Balance in Figure)			
To Balance c/d	40,000		
	1,60,000		1,60,000

Dr. **Profit & Loss Adjustment a/c** Cr.

	Rs.		Rs.
To Machinery (depreciation)	12,000	By Balance b/d	32,000
To Land & Buildings		By Funds from operation	
(depreciation)	22,500	(source) (Balancing Figure)	1,25,000
To General Reserve	42,000		
To Dividend (application)	42,000		
To Balance c/d	39,000		
	1,57,000		1,57,000

Funds flow statement for the year ended 31.12.2002

Sources	Rs.	Applications	Rs.
Decrease in Working Capital	23,000	Purchase of Land & Buildings	37,500
Sale of Machinery	26,000	Repayment of bank loan	1,20,000
Funds from operation	1,25,500	Payment of dividend	42,000
Issue of Capital (Stock)	25,000		
	1,99,500		1,99,500

Illu.4: The following are the summarised balance sheets of Akila Ltd. on 31st December, 2000 and 31st December, 2001:

Liabilities	2000	2001
	Rs.	Rs.
Share Capital	12,00,000	16,00,000
Debentures	4,00,000	6,00,000
Profit and Loss Account	2,50,000	5,00,000
Creditors	2,30,000	1,80,000

Provision for:	Rs.	Rs.
Bad and doubtful debts	12,000	6,000
Depreciation on land and buildings	40,000	48,000
Depreciation on plant and machinery	60,000	70,000
	21,92,000	30,04,000
Assets		
Plant and Machinery (at cost)	8,00,000	12,90,000
Land and Buildings (at cost)	6,00,000	8,00,000
Stock	6,00,000	7,00,000
Preliminary expenses	14,000	12,000
Bank	40,000	80,000
Debtors	1,38,000	1,22,000
	21,92,000	30,04,000

Additional information:

(a) During the year, a part of the machinery, costing Rs.1,40,000 (accumulated depreciation thereon Rs.4,000) was sold for Rs.12,000.

(b) Dividend for Rs.1,00,000 was paid during the year.

Ascertain:

(i) Change in working capital for 2001.

(ii) Funds Flow Statement for 2001.

Solution:

Schedule of changes in Working Capital

Particulars	2000 Rs.	2001 Rs.	Changes in the Working Capital Increase Rs.	Changes in the Working Capital Decrease Rs.
Current Assets:				
Stock	6,00,000	7,00,000	1,00,000	
Bank	40,000	80,000	40,000	
Debtors	1,38,000	1,22,000		16,000
Total Current Assets (A)	7,78,000	9,02,000		
Current Liabilities:				
Creditors	2,30,000	1,80,000	50,000	
Provision for doubtful debts	12,000	6,000	6,000	
Total Current Liabilities (B)	2,42,000	1,86,000		
Working Capital (A-B)	5,36,000	7,16,000		
Net Increase in Working Capital (Application)				1,80,000
			1,96,000	1,96,000

Dr.   **Plant &Machinery a/c**   Cr.

	Rs.		Rs.
To Balance b/d	8,00,000	By Provision for depreciation	4,000
To Bank (application)	6,30,000	By Bank (Source)	12,000
(Balancing Figure)			
		By Profit & Loss adjustment	
		a/c (loss)	1,24,000
		By Balance c/d	12,90,000
	14,30,000		14,30,000

Dr.   **Land & Buildings a/c**   Cr.

	Rs.		Rs.
To Balance b/d	6,00,000	By Balance c/d	8,00,000
To Bank (application)	2,00,000		
(Balancing Figure)			
	8,00,000		8,00,000

Dr.   **Preliminary Expenses a/c**   Cr.

	Rs.		Rs.
To Balance b/d	14,000	By Profit & Loss adjustment	
		a/c	2,000
		(Balance in Figure)	
		By Balance c/d	12,000
	14,000		14,000

Dr.   **Share Capital a/c**   Cr.

	Rs.		Rs.
To Balance c/d	16,00,000	By Balance b/d	12,00,000
		By Bank (Source)	4,00,000
		(Balance in Figure)	
	16,00,000		16,00,000

Dr.   **Debentures a/c**   Cr.

	Rs.		Rs.
To Balance c/d	6,00,000	By Balance b/d	4,00,000
		By Bank (Source)	2,00,000
		(Balance in Figure)	
	6,00,000		6,00,000

Dr.   **Depreciation on Buildings a/c**   Cr.

	Rs.		Rs.
To Balance c/d	48,000	By Balance b/d	40,000
		By Profit & Loss adjustment a/c	8,000
		(Current year provision)	
		(Balance in Figure)	
	48,000		48,000

Provision for depreciation on

Dr.   **Plant & Machinery a/c**   Cr.

	Rs.		Rs.
To Plant & Machinery	4,000	By Balance b/d	60,000
To Balance c/d	70,000	By Profit & Loss adjustment a/c	14,000
		(Balance in Figure)	
		(Current year Provision)	
	74,000		74,000

Dr.   **Profit & Loss Adjustment a/c**   Cr.

	Rs.		Rs.
To Plant & Machinery	1,24,000	By Balance b/d	2,50,000
To Preliminary Expenses	2,000	By Funds from operation (source)	4,98,000
To Depreciation on			
Land & Buildings	8,000		
To Depreciation on			
Plant & Machinery	14,000		
To Dividend (application)	1,00,000		
To Balance c/d	5,00,000		
	7,48,000		7,48,000

Funds flow statement for the year ended 31.12.2001

Sources	Rs.	Applications	Rs.
Sale of Machinery	12,000	Increase in working capital	1,80,000
Issue of share capital	4,00,000	Purchase of machinery	6,30,000
Issue of debentures	2,00,000	Purchase of land & Buildings	2,00,000
Funds from operation	4,98,000	Payment of dividend	1,00,000
	11,10,000		11,10,000

11.3 SELF ASSESSMENT QUESTIONS

1. Explain the procedure of preparing a funds flow statement.
2. Revenue expenditure reduces working capital where as the charging of depreciation does not reduce, explain?
3. ``Retained earnings and the allowance for depreciation are the two primary sources of funds"" comment?
4. Suggest some items which may be added back to net profit to get the total funds provided by profitable operations for fund flow statement? Illustrate your answer.
5. How would you treat the following items for funds flow statement.
   - (a) Provision for tax
   - (b) Proposed dividend
   - (c) Interim dividend
   - (d) Investments.
6. Explain the terms Funds and Flow of fund. Examine the impact of the following transactions on flow of fund.
   - (a) Cash collected from debtors
   - (b) Purchase of buildings by issue of debentures
   - (c) Old furniture value which is Rs.4,500 discarded and written off to profit and loss account.

12.4 EXERCISES

1. The following are the Balance Sheets of Singh Company from which you are asked to prepare Funds Flow Statement:

Assets	31-12-2006 Rs.	31-12-2007 Rs.
Cash	35,000	75,000
Debtors	98,000	90,000
Stock	87,000	1,20,000
Investments	15,000	10,000
Land	20,000	30,000
	2,55,000	3,25,000
Liabilities		
Creditors	50,000	45,000
Bills payable	20,000	35,000
Promissory Notes	---	20,000
Share Capital	1,25,000	1,50,000
Retained Earnings	60,000	75,000
	2,55,000	3,25,000

[Ans.: Increase in working capital Rs.55,000; Funds from operations Rs.15,000; Funds Flow Statement Rs.65,000]

2. From the following Balance Sheet of a firm, prepare funds flow statement:

Liabilities	31-12-2006 Rs.	31-12-2007 Rs.	Assets	31-12-2006 Rs.	31-12-2007 Rs.
Equity Share Capital	2,40,000	3,60,000	Buildings	1,66,200	3,39,600
Share premium	24,000	36,000	Machinery	1,06,800	1,53,900
			Furniture	7,200	4,500
General Reserve	18,000	27,000	Stock	66,300	78,000
P & L a/c	58,500	62,400	Debtors	1,09,500	1,17,300
8% Debentures	---	78,000	Bank	14,400	12,000
Provision for taxes	29,400	32,700			
Creditors	1,00,500	1,09,200			
	4,70,400	7,05,300		4,70,400	7,05,300

Provide depreciation on Machinery Rs.38,400; on Furniture Rs.1,200.

[Ans.: Increase in Working Capital Rs.5,100; Funds from operations Rs.52,500; Funds flow Statement Rs.2,64,000]

3. The following are the summarised balance sheet of Aravinda Stores on 31st December, 2006 and 31st December, 2007.

Liabilities	2006 Rs.	2007 Rs.	Assets	2006 Rs.	2007 Rs.
Creditors	18,000	20,500	Cash	2,000	1,800
Bank Loan (long term)	15,000	22,500	Debtors	17,500	19,200
			Stock	12,500	11,000
Capital	74,000	74,500	Land	10,000	15,000
			Buildings	25,000	27,500
			Machinery	40,000	43,000
	1,07,000	1,17,500		1,07,000	1,17,500

During 2010, the proprietor withdrew for personal use Rs.13,000. Provision for depreciation on machinery stood at Rs.13,500 on 31st December, 2009 and at Rs.18,000 on 31st December, 2010. Prepare Funds Flow Statement.

[Ans.: Decrease in working capital Rs.2,500; Funds from operations Rs.18,000; Funds Flow Statement Rs.28,000]

4. Balance Sheet of Mrs.Ram and Shyam as on 1-1-2007 and 31-12-2007 were as follows.

Liabilities	1-1-2007 (Rs.)	31-12-2007 (Rs.)
Creditors	40,000	40,000
Mr.Ram's Loan	25,000	---
Loan from Bank	40,000	50,000
Capital	1,25,000	1,57,000
	2,30,000	2,47,000
Assets	1-1-2007 (Rs.)	31-12-2007 (Rs.)
Cash	10,000	7,000
Debtors	30,000	50,000
Stock	35,000	25,000
Machinery	80,000	55,000
Land	40,000	50,000
Buildings	35,000	60,000
	2,30,000	2,47,000

During the year a machine costing Rs.10,000 (accumulated depreciation Rs.3,000) was sold for Rs.5,000. The provision for depreciation against machinery as on 1-1-2010 Rs.25,000 and on 31-12-2010 Rs.40,000. Net Profit for they year 2010 amounted Rs.45,000.
You are required to prepare a funds flow statement.

[Ans.: Net increase in working capital Rs.7,000; Funds from operations Rs.65,000; Funds flow statement Rs.80,000]

5. From the following Balance Sheets of XL Ltd., prepare a statement of sources and application of funds.

Liabilities	2006 Rs.	2007 Rs.	Assets	2006 Rs.	2007 Rs.
Share Capital	1,00,000	1,25,000	Land	1,00,000	95,000
General Reserve	25,000	30,000	Plant	75,000	84,500

Liabilities	2006 Rs.	2007 Rs.	Assets	2006 Rs.	2007 Rs.
Profit & Loss A/c	15,250	15,300	Stock	50,000	37,000
Bank loan	35,000	20,000	Debtors	40,000	32,100
Creditors	75,000	47,600	Cash	250	300
Provision for			Goodwill	---	6,500
taxation	15,000	17,500			
	2,65,250	2,55,400		2,65,250	2,55,400

Additional Information:
a. Dividend of Rs.11,500 was paid.
b. Depreciation written off on plant Rs.9,000
c. Income tax paid Rs.16,500
   [Ans.: Increase in working capital Rs.19,050; Funds from operation Rs.30,550; Funds Flow Statement Rs.55,550]

6. From the following balance sheets of a company as on 31st December, 2005 and 2006, prepare
   a. Statement showing charges in the working capital; and
   ii. funds flow statement.

Liabilities	2005 Rs.	2006 Rs.	Assets	2005 Rs.	2006 Rs.
Share Capital	20,000	25,000	Land & Buildings	20,000	19,000
General reserve	5,000	6,000	Plant	15,000	17,400
Profit & Loss a/c	3,050	3,060	Stock	10,000	7,400
Loan from bank (short term)	7,000	---	Sundry debtors	8,000	6,420
			Cash in hand	50	60
Sundry creditors	15,000	13,520	Cash at bank	---	800
Provision for taxes	3,000	3,500			
	53,050	51,080		53,050	51,080

Additional Information:
a. Depreciation on plant written off in 2010 – Rs.1,400
b. Dividends paid in 2010 – Rs.2,000
c. Provision for taxes during this year – Rs.2,500
   [Ans.: Increase in working capital Rs.4,610; Funds from operations Rs.5,410; Funds Flow Statement Rs.10,410]

7. The following are the summarised Balance Sheets of X Ltd., on 31st December, 2006 and 2007.

Liabilities	2006 Rs.	2007 Rs.	Assets	2006 Rs.	2007 Rs.
Share Capital	6,00,000	8,00,000	Plant &	4,00,000	6,45,000
Debentures	2,00,000	3,00,000	Machinery (at cost)		
Profit & Loss a/c	1,25,000	2,50,000	Land &	3,00,000	4,00,000
Creditors	1,15,000	90,000	buildings (at cost)		
Provision for bad and doubtful debts	6,000	3,000	Stock	3,00,000	3,50,000
			Bank	20,000	40,000
Provision for Depreciation On			Preliminary expenses	7,000	6,000
land & buildings	20,000	24,000	Debtors	69,000	61,000
On Plant and Machinery	30,000	35,000			
	10,96,000	15,02,000		10,96,000	15,02,000

Additional Information:

a. During the year, a part of machinery costing Rs.70,000 (accumulated depreciation there on Rs.2,000) was sold for Rs.6,000

b. Dividends of Rs.50,000 were paid during the year.

You are required to ascertain:

i. Changes in working capital for 2010.

ii. Funds flow statement.

[Ans.: Increase in working capital Rs.90,000; Funds from operations Rs.2,49,000; Funds Flow Statement Rs.5,55,000]

8. From the following balance sheets as on 31st March, 2006 and 2007, prepare funds flow statements of Arogya Ltd.

9.

	2006 Rs.	2007 Rs.		2006 Rs.	2007 Rs.
Share capital	55,000	87,000	Machinery (Cost)	42,000	60,000
Profit & Loss a/c	11,250	25,000	Stock	2,500	3,000
Debentures	12,500	18,000	Bank	2,220	3,330
Creditors	2,000	9,200	Debtors	2,000	1,000
Depreciation on			Investments	20,000	50,500
Buildings	2,000	3,000	Buildings	15,000	28,000
Machinery	3,000	4,000	Goodwill	2,030	370
	85,750	1,46,200		85,750	1,46,200

Additional Information:

a. Dividend Rs.15,000 declared and paid during the year.

b. A part of the machinery costing Rs.11,000 (depreciation provided on this was Rs.2,500) was sold for Rs.6,000

[Ans.: Decrease in Working Capital Rs.6,950; Funds from operations Rs.37,410; Funds Flow Statement Rs.87,500]

10. Following are the Balance Sheets of a company:

Liabilities	2005 Rs.	2006 Rs.	Assets	2006 Rs.	2007 Rs.
Equity Capital	50,000	53,000	Cash	20,000	25,000
Long-term debt	14,000	13,000	Accounts Receivable	24,000	27,000
Retained Earnings	28,000	37,000	Inventories	31,000	32,000
Accumulated Depreciation	21,000	25,000	Other Current Assets	8,000	7,000
			Fixed Assets	50,000	58,000
Sundry Creditors	20,000	21,000			
	1,33,000	1,49,000		1,33,000	1,49,000

Additional Information:

a. Fixed assets costing Rs.12,000 were purchased during 2006 for cash.

b. Fixed assets (original cost Rs.4,000, accumulated depreciation Rs.1,500) were sold at book value.

c. Depreciation for the year 2006 amounted to Rs.5,500 which has been debited to Profit and Loss Account.

d. During 2006, dividends paid Rs.3,000

 [Ans.: Increase in working capital Rs.7,000; Funds from operations Rs.17,500; Funds Flow Statement Rs.23,000]

11. The following are the Balance Sheet of XY Ltd. Company for the years ended on 31-12-2006 and 2007.

Balance Sheet

Liabilities	2006 Rs.	2007 Rs.
Share Capital	4,50,000	4,50,000
General Reserve	3,00,000	3,10,000
Profit & Loss a/c	56,000	68,000
Creditors	1,68,000	1,34,000

Liabilities	2006 Rs.	2007 Rs.
Provision for taxation	75,000	10,000
Long term loan	---	2,70,000
	10,49,000	12,42,000
Assets		
Fixed Assets	4,00,000	3,20,000
Investments	50,000	60,000
Stock	2,40,000	2,10,000
Debtors	2,10,000	4,55,000
Bank	1,49,000	1,97,000
	10,49,000	12,42,000

Additional Information:

1. Investments (Cost Rs.8,000) were sold in the year 2007 for Rs.8,500 and further investments were purchased during the year for Rs.18,000
2. The net part for the year was Rs.62,000 after charging depreciation on fixed assets Rs.70,000 and provision for taxation Rs.10,000.
3. During the year part of fixed assets costing Rs.10,000 was disposed for Rs.12,000 and the profit is included in the profit and loss account.
4. Dividend paid in the year Rs.40,000.

From the above particulars prepare:
1. Statement of Changes in Working Capital
2. Funds Flow Statement.

[Ans.: Increase in Working capital Rs.2,97,000; Funds from operations Rs.1,39,500; Funds Flow Statement Rs.4,30,000]
Note: Provision for taxation is taken as appropriation of profit.

12. The following are the summarised Balance Sheet of Y Ltd. on 31st December, 2006 and 31st December, 2007.

Liabilities	2006 Rs.	2007 Rs.	Assets	2006 Rs.	2007 Rs.
Share Capital	3,00,000	4,00,000	Plant and Machinery (Cost)	2,00,000	3,22,500
Debentures	1,00,000	1,50,000			
P & L a/c	62,500	1,25,000	Land and Buildings (Cost)	1,50,000	2,00,000
Creditors	57,500	45,000			
Provision for			Stock	1,50,000	1,75,000
Doubtful debts	3,000	1,500	Preliminary expenses	3,500	3,000

Liabilities	2006 Rs.	2007 Rs.	Assets	2006 Rs.	2007 Rs.
Provision for Depreciation on Land & Buildings	10,000	12,000	Bank Debtors	10,000 34,500	20,000 30,500
Plant & Machinery	15,000	17,500			
	5,48,000	7,51,000		5,48,000	7,51,000

Additional Information:

a. During the year, a part of the machinery costing Rs.35,000 (accumulated depreciation thereon Rs.1,000) was sold for Rs.3,000.

b. Dividend of Rs.25,000 was paid during the year.

Prepare (i) Statement of changes in working capital and (ii) Funds flow statement

[Ans.: Increase in Working Capital Rs.45,000; Funds from operations Rs.1,24,500; Funds Flow Statement Rs.2,77,500]

13. From the following Balance Sheet of XYZ & Co. Ltd., as on 31st December, 2006 and 2007, you are required to prepare a funds flow statement.

	2006 Rs.	2007 Rs.		2006 Rs.	2007 Rs.
Share Capital	1,00,000	1,25,000	Land, Buildings	1,00,000	95,000
General reserve	25,000	30,000	Plant	75,000	84,500
Profit & Loss a/c	15,250	15,300	Stock	50,000	37,000
Bank Loan	35,000	---	Debtors	40,000	32,100
Creditors	75,000	67,600	Cash	250	300
Provision for taxation	15,000	17,500	Bank	---	4,000
			Goodwill	---	2,500
	2,65,250	2,55,400		2,65,250	2,55,400

The following information is also provided.

i. Dividends paid during 2007 is Rs.11,500

ii. Depreciation written off plant Rs.7,000

iii. Income Tax provision made during the year Rs.16,500

[Ans.: Increase in Working Capital Rs.23,050; Funds from operations Rs.26,050; Funds Flow Statement Rs.51,050]

Note: Bank loan is treated as Short term liability.

14. From the following Balance Sheet of X Ltd. You are required to prepare:
   (a) A schedule of changes in working capital.
   (b) A Funds Flow Statement

Liabilities	2001 Rs.	2002 Rs.	Assets	2001 Rs.	2002 Rs.
Share Capital	1,00,000	1,00,000	Goodwill	12,000	12,000
General Reserve	14,000	18,000	Buildings	40,000	36,000
Profit & Loss a/c	16,000	13,000	Plant	37,000	36,000
Sundry Creditors	8,000	5,400	Investments	10,000	11,000
Bills payable	1,200	800	Stock	30,000	23,400
Provision for taxation	16,000	18,000	Bills Receivable	2,000	3,200
Provision for doubtful debts	400	600	Debtors	18,000	19,000
			Cash at bank	6,600	15,200
	1,55,600	1,55,800		1,55,600	1,55,800

The following additional information has also given:
   (i) Depreciation charged on Plant was Rs.4,000 and on Building 4,000.
  (ii) Provision for taxation of Rs.19,000 was made during the year 2002.
 (iii) Interim dividend of Rs.8,000 was paid during the year 2002.
   [Ans.: Increase in Working Capital Rs.5,000; Funds from operations Rs.17,000; Funds flow statement Rs.17,000]

15. The following is the Balance Sheet of X Ltd., on 31st December 2006 & 2007.

Liabilities	2006 Rs.	2007 Rs.
Capital (Equity)	3,00,000	4,00,000
Cum. Preference Shares	1,50,000	1,00,000
General Reserve	40,000	70,000
Profit & Loss a/c	30,000	48,000
Proposed dividend	42,000	52,000
Sundry Creditors	55,000	83,000
Bills payable	20,000	16,000
Provision for taxation	40,000	50,000
	6,77,000	8,17,000
Assets		
Goodwill	1,15,000	90,000
Buildings	2,00,000	1,70,000
Machinery	80,000	2,00,000

Liabilities	2006 Rs.	2007 Rs.
Sundry debtors	1,60,000	2,00,000
Stock	77,000	1,09,000
Bills receivable	20,000	30,000
Cash in hand and at Bank	25,000	18,000
	6,77,000	8,17,000

Additional Information:

1. Depreciation written off on machinery and building in 2007 were Rs.10,000 and Rs.20,000 respectively.
2. During the year 2007, dividends Rs.20,000 were paid.
3. The income tax paid during the year was Rs.35,000. Prepare the fund flow statement.

   [Ans.: Increase in Working capital Rs.51,000; Funds flow operations Rs.2,18,000; Funds Flow Statement Rs.3,28,000]

16. Following are the summarised Balance Sheets of a Limited Co. As at 31st March, 2006, and March 31, 2007:

Liabilities	2006 Rs.	2007 Rs.	Assets	2006 Rs.	2007 Rs.
Sundry Creditors	39,010	41,135	Cash at Bank	3,000	2,700
Bills payable	37,780	11,525	Sundry Debtors	85,175	72,625
Bank Overdraft	60,000	Nil	Sundry Advances	2,315	735
Provision for Income tax	40,000	49,000	Stock	1,09,040	97,370
Reserves	44,000	50,000	Land & Buildings	1,48,000	1,54,250
Profit & Loss a/c	39,690	41,220	Plant & Machinery	1,12,950	1,16,200
Share Capital	2,00,000	2,60,000	Goodwill	Nil	9,000
	4,60,480	4,52,880		4,60,480	4,52,880

Additional Information:

(a) An interim dividend of Rs.26,000 and a final dividends of Rs.54,000 were paid during 2006-07.
(b) The assets of another company were purchased for Rs.60,000 payable in fully paid shares of the company. The assets purchased comprised of stock: Rs.22,000; and Machinery Rs.29,000.
(c) Additional plant purchased worth Rs.6,000

(d) Depreciation provided during the current year: Land and Buildings – Rs.3,750; Plant and Machinery – Rs.12,000

(e) Income tax paid during the year Rs.30,000

You are required to prepare the Funds Flow Statement and a statement of change in working capital for the year ending on March 31, 2007.

[Ans.: Increase in Working Capital Rs.49,030; Funds from operations Rs.1,03,280; Funds Flow Statement Rs.1,45,030]

12.5 REFERENCE BOOKS

1. R.S.N. Pillai, & Bagavathi, Management Accounting, S. Chand & Company Ltd., New Delhi

2. M.A. Sahaf, Management Accounting – Principles & Practice, Vikas Publishing House Pvt. Ltd., New Delhi.

3. Shashi K. Gupta & R.K. Sharma, Management Accounting, Kalyani Publishers,

4. Charles thorn Gaxy Sundem, Introduction to Management Accounting –

5. N. Vinayakam, Tools & Techniques of Management Accounting

6. SP Gupta, Management Accounting

7. Manmohan & Goyal, Management Accounting

8. V. Krishna Kumar, Management Accounting

9. Dr.Kulsreshtha and Gupta, Practical Problems in Management Accounting

10. SP. Jain & KL Narang, Advanced Cost and Management Accounting

Chapter – 13

CASH FLOW ANALYSIS

Objectives :

After going to this lesson you should be able to
- understand the meaning of cash flow analysis
- distinguish between funds flow and cash flow of an organization
- find out the uses of cash flow statement
- analyse the classification of cash flows
- go through the steps in the presentation of cash flow statement

Structure :

13.1 INTRODUCTION

An analysis of cash flow of a concern during a specified period, presented in the form of a statement is known as cash flow analysis. The cash flow statement can be for the past or can be projection for the future. The cash flow of the concern in the near future, say for a period of six months or one year, can be prepared based on the past trends and expectations of the concern regarding factors that would affect its cash receipts and cash payments. Such an estimate of future cash flows is better termed 'cash budget'. Cash flow statement generally refers to the statement showing the receipts (inflows) and payments (outflows) of cash during the period covered by two consecutive balance sheets.

George Phillipatos is of the view that, in its generic sense, a cash flow is the receipt and the payment of amount of money and that it implies more than our accrual or a financial obligation, hence cash flow is a movement of cash which is real one. Leon Simons observes that a cash flow is frequently and erroneously assumed to include only current operations.

Cash flow analysis enables the management to plan and co-ordinate the financial operations of the enterprise, and furnish the basis for evaluating financing policies. It provides a barometer for ensuring the profitability of the business, and makes financing problems of the business much more manageable.

13.2. DISTINCTION BETWEEN FUNDS FLOW AND CASH FLOW STATEMENT

A cash flow statement is similar in design to a funds flow statement. Both the statements are prepared from the same data, viz., the balance sheets of the concern and additional information made available. Both the statements focus on the financial position of the concern. A cash flow statement differs from a funds flow statement in that the former confines only to cash flows and does not include non-cash flow of funds. For instance, if assets are acquired by the concern by issue of share capital, the transaction should not enter into cash flow statement as there is neither cash payment nor receipt.

Distinction between Funds Flow Statement and Cash Flow Statement

Basis for Difference	Funds Flow	Cash Flow
1. Basis of accounting	It is based on accrued basis of accounting.	It is based on cash basis of accounting.
2. Subject matter	Funds flow statement is concerned with changes in Working Capital position between two Balance Sheet dates.	Cash Flow statement is concerned only with the changes in cash position.
3. Concept of Fund	Funds Flow statement is based on a wider concept of funds i.e., working capital	Cash Flow statement is based on the narrow concept of funds i.e., cash only which is only one component of working capital.
4. Schedule of Working Capital Changes	A schedule of Working capital changes is prepared in the case of Funds Flow Statement.	No such schedule is prepared in the case of Cash Flow Statement.
5. Showing of Balance	It shows the changes of not only cash but also of other current assets like debtors, stock etc.	It shows the change of the opening cash balance into the closing cash balance.

Basis for Difference	Funds Flow	Cash Flow
6. Opening and Closing Balance	The statement does not start with any opening of balance of any account and does not even and with any such closing balance of any account.	The statement starts with the opening cash and bank balances and ends with the closing cash and bank balances in most of the cases.
7. Current Liabilities	It shows the change in the current liabilities like sundry creditors, bills payable etc.	It does not show the changes in the current liabilities of the enterprise.
8. Source	In this case, the profit from operation or the net profit is considered as a principal sources of fund.	In this case, the main source of cash inflow is considered to be the sales and not the net profit of the business.
9. Utility	Funds Flow statement is useful for long-term financial analysis and solvency of the firm.	Cash Flow Statement as a tool of financial analysis is more useful to the management in cash planning and short-term analysis.

13.3. USES OF CASH FLOW ANALYSIS

A Cash Flow Statement is an important financial tool for management in efficient short-term financial planning. It enable the management to plan and co-ordinate the financial operation of the concern, and furnish the basis for evaluating financing policies. It help the management in making the financing problems of the business much more manageable. The following are the uses of cash flow analysis.

1. **Helpful in efficient cash management:** It is very helpful in understanding the cash position of a firm. Since cash is the basis for carrying on business operations, the cash flow statement is very useful in evaluating the current cash position.

2. **Planning of Programmes:** The repayment of loans, replacement of assets and other such programmes can be planned on its basis.

3. **Helpful in Short-term financial decisions:** The cash flow statement is helpful in making short-term financial decisions relating to liquidity, and the ways and means position of the firm.

4. **Useful in Capital budgeting:** Cash flow statement is also useful for making appraisal of different capital investment projects in order to determine their viability and profitability.

5. **Useful as a control device:** It helps the management to understand the past behaviour of the cash cycle, and to control the uses of cash in future. A comparison of the projected cash flow statement helps the management in appraising the inflows and outflows of cash according to the plan and taking the necessary remedial measures.

6. **Useful to Outsiders:** Cash flow statement is also very useful to external analysis like bankers, creditors etc., for assessing the short-term solvency of a business concern as well as its capacity to meet its short-term obligations.

13.4. PREPARATION OF CASH FLOW STATEMENT

The Cash Flow Statement is to be presented as per the AS-3 of the Institute of Chartered Accountants of India (ICAI). The ICAI issued AS-3 in June, 1981 for the first time. Later in March, 1997 it revised the standard. The model stipulated in AS-3 is the widely accepted model for presentation of Cash Flow Statements.

All the listed companies/entities whose financial year ends on March, 1996 and thereafter will be required to give Cash Flow Statement along with Balance Sheet and Profit and Loss Account. The above amendment comes into effect immediately i.e., w.e.f. 15-2-1996.

13.4.1 Accounting Standard – 3

The standard prescribes two alternative formats for presentation of Cash Flow. The first one is known as Direct Method and the second one is the Indirect Method. The key difference in these two methods lies in their presentation of 'Cash flows from operating activities'. In the direct method, operating cash receipts and payments are reported directly. In the indirect method, cash flows from operating activities are reported by way of adjustments of the reporting period's net profit reported in the profit and loss account. Users prefer the indirect method because it establishes linkage between the cash flow statement, the balance sheet and the profit and loss account. SEBI requires listed companies to use the indirect method to present the cash flow statement.

13.4.2 Definitions:

The following are used in this statement with the meaning specified:

i.   Cash comprises cash on hand and demand deposits with banks
ii. Cash equivalents are short-term highly liquid investments, that are readily convertible into known amounts of cash and which are subject to an insignificant risk of changes in value.

iii. Cash flows are inflows and outflows of cash and cash equivalents.

iv. Operating activities are the principal revenue-producing activities of the enterprise and other activities and are not investing or financing activities.

v. Investing activities are the acquisition and disposal of long-term assets and other investments not included in cash equivalents.

vi. Financing activities are activities that result in changes in the size and composition of the owner's capital (including preference share capital in the case of a company) and borrowings of the enterprise.

13.4.3 Cash and Cash Equivalents:

Cash equivalents are held for the purpose of meeting short-term cash commitments rather than for investment or other purposes. For an investment to qualify as a cash equivalent, it must be readily convertible to a known amount of cash and be subject to an insignificant risk of changes in value. Therefore, an investment normally qualifies as a cash equivalent only when it has a short maturity of, say, three months or less from the date of acquisition. Investments in shares are excluded from cash equivalents unless they are, in substance, cash equivalents, for example, preference shares of a company acquired shortly before their specified redemption date (provided there is only an insignificant risk of failure of the company to repay the amount at maturity).

Cash flows exclude movements between items that constitute cash or cash equivalents because these components are part of the cash management of an enterprise rather than part of its operating, investing and financing activities. Cash management includes the investment of excess cash in cash equivalents.

13.5. CLASSIFICATION OF CASH FLOWS

The model prescribed in AS-3, 'Cash Flow Statement, classifies cash flows into three categories: Cash flow from operating activities, cash flow from investing activities, and cash flow from financing activities.

13.5.1 Operating Activities:

Operating activities are those transactions which are considered in the determination of net income. Examples of cash inflows in this category are cash received from debtors for goods and services, interest and dividend received on loan and investment. Examples of cash outflows in this category are cash payments for goods and services; merchandise; wages; interest; taxes; supplies and others.

13.5.2 Investing Activities:

Investing activities include acquisition of long-term or fixed assets; disposal debentures and other securities; lending of money and its subsequent collection. Cash inflows from investing activities generally include cash sales of property, plant, equipment and intangible assets, cash sales of investments in shares, debentures and other securities, cash collection (loan repayments) from borrowers. Cash outflows are purchase of shares, debentures and securities other enterprises, purchase of property, plant, equipment and other long-term assets, loan given to other firms.

13.5.3 Financing Activities:

Financing activities relate to long-term liability and equity capital. A firm engages in financing activities when it obtains resources from owners, returns resources to owners, borrows resources from creditors and repays amounts borrowed. Cash inflows include proceeds from issue of shares and short-term and long-term borrowings. Cash outflows include repayment of loan and payments to owners, including cash dividends. Repayments of accounts payable or accrued liabilities are not considered repayment of loans under financing activities but are classified as cash outflows under operating activities.

13.6. PRESENTATION OF CASH FLOW STATEMENT

While preparing the cash flow statement, cash flows from operating activities are presented first, followed by investing activities and then financing activities. The individual inflows and outflows relating to investing and financing activities are presented separately in their respective categories. The operating activities section can be presented using the direct method or indirect method. In the direct method cash flow statement is presented primarily on a cash receipts and cash payments basis, instead of on accrual basis. In the indirect method, net income is adjusted for items that affected net income but did not affect cash.

13.6.1 Direct Method:

Cash Flow Statement (Direct Method)
XYZ Company for the year ended 31st March, 2011

		Rs.	Rs.
A.	**Cash Flow from Operating Activities**		
	Cash Receipts from:		
	Sales	x x x	
	Interest Received	x x x	
	Cash payments for	x x x	
	Purchases	x x x	

		Rs.	Rs.
	Operating Expenses	x x x	
	Interest taxes	x x x	
	Income taxes	x x x	x x x
	Net Cash Flow from Operating Activities		x x x
B.	**Cash Flows form Investing Activities**		
	Sale of Plant Assets	x x x	
	Sale of Investments	x x x	
	Purchase of Plant Assets	x x x	
	Purchase of Investments	x x x	
	Net Cash Flow used by Investing Activities		x x x
C.	**Cash Flows from Financing Activities**		
	Repayment of Bonds and Debentures	x x x	
	Issue of Common Shares	x x x	
	Dividend paid	x x x	
	Net cash flows from Financing Activities	x x x	x x x
	Net Increase/Decrease in Cash		x x x

13.6.2 Indirect Method

Cash Flow Statement (Indirect Method)
XYZ Company for the year ended 31st March, 2011

		Rs.	Rs.
A.	**Cash Flow from Operating Activities**		
	Net Income	x x x	
	Adjustments to Reconcile Net income to Net cash provided by Operating Activities		
	Depreciation	x x x	
	Gain on sale of Investments	x x x	
	Loss on Sale of Plant Asset	x x x	
	Decrease in Account receivable	x x x	
	Decrease in Inventory	x x x	
	Decrease in prepaid Expenses	x x x	
	Increase in Accounts payable	x x x	
	Increase in Accrued Liabilities	x x x	
	Decrease in Income Taxes payable	x x x	
	Net Cash Flows from operating Activities		x x x
B.	**Cash Flow from Investing Activities**		
	Sale of Fixed Assets	x x x	
	Sale of Investments	x x x	
	Purchase of Fixed Assets	x x x	
	Purchase of Investments	x x x	
	Net Cash Flows used by Investing Activities		x x x

C.	**Cash Flows from Financing Activities**	Rs.	Rs.
	Repayment of Bonds and Debentures	x x x	
	Issue of common shares	x x x	
	Dividends paid	x x x	
	Net Cash flows from Financing Activities		x x x
	Net Increase/Decrease in Cash		x x x

13.7 SELF ASSESSMENT QUESTIONS

1. Explain the meaning of cash flow statement.
2. Distinguish between Funds Flow Statement and Cash Flow Statement.
3. Explain the significance of Cash Flow Statement.
4. How do you classify the cash flows? Explain briefly.
5. What are Operating Activities?
6. What are Investing Activities?
7. What are Financing Activities?
8. State the salient features of the Revised Accounting Standard 3

13.8 REFERENCE BOOKS :

1. R.S.N. Pillai, & Bagavathi, Management Accounting, S. Chand & Company Ltd., New Delhi
2. M.A. Sahaf, Management Accounting – Principles & Practice, Vikas Publishing House Pvt. Ltd., New Delhi.
3. Shashi K. Gupta & R.K. Sharma, Management Accounting, Kalyani Publishers,
4. Charles thorn Gaxy Sundem, Introduction to Management Accounting –
5. N. Vinayakam, Tools & Techniques of Management Accounting
6. SP Gupta, Management Accounting
7. Manmohan & Goyal, Management Accounting
8. V. Krishna Kumar, Management Accounting
9. Dr.Kulsreshtha and Gupta, Practical Problems in Management Accounting
10. SP. Jain & KL Narang, Advanced Cost and Management Accounting

APPENDIX
AS 3 : CASH FLOW STATEMENTS*

The following is the text of the revised Accounting Standard (AS) 3, 'Cash Flow Statements' issues by the Council of the Institute of Chartered Accountants of India. This standard supersedes Accounting Standard (AS) 3, 'Changes in Financial Position', issued in June, 1981.

In the initial years, this accounting standard will be recommendatory in character. During this period this standard is recommended for use by companies listed on a recognised stock exchange and other commercial, industrial and business enterprises in the public and private sectors.

Objectives:

Information about the cash flows of an enterprise is useful in providing users of financial statements with a basis to assess the ability of the enterprise to generate cash and cash equivalents and the needs of the enterprise to utilise those cash flows. The economic decisions that are taken by users require an evaluation of the ability of an enterprise to generate cash and cash equivalents and the timing and certain of their generation.

The Statement deals with the provisions of information about the historical changes in cash and cash equivalents of an enterprise by means of a cash flow statement which classifies cash flows during the period from operating, investing and financing activities.

Scope:

1. An enterprise should prepare a cash flow statement and should present it for each period for which financial statements are presented.

2. Users of an enterprise's financial statements are interested in how the enterprise generates and users cash and cash equivalents. This is the case regardless of the nature of the enterprise's activities and irrespective of whether cash can be viewed as the product of the enterprise, as may be the case with a financial enterprise. Enterprise need cash for essentially the same reasons, however different their principal revenue producing activities might be. They need cash to conduct their operations, to pay their obligations and to provide returns to their investors.

Benefits of Cash Flow Information:
3. A cash flow statement, when used in conjunction with the other financial statements, provides information that enables users to evaluate the changes in net assets of an enterprise,

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* **The Council of the Institute of Chartered Accounts of India issued this Standard originally in 1991 and it was revised in March, 1997.**

its financial structure (including its liquidity and solvency) and its ability to affect the amounts and timing of cash flows in order to adapt to changing circumstances and opportunities. Cash flow information is useful in assessing the ability of the enterprise to generate cash and cash equivalent and enables user to develop models to assess and compare the present value of the future cash flows of different enterprises. It also enhances the comparability of the reporting of operating performance by different enterprises because it eliminates the effects of using different accounting treatments for the same transactions and events.

4. Historical cash flow information is often used as an indicator of the amount, timing and certainty of future cash flows. It is also useful in checking the accuracy of past assessments of future cash flows and in examining the relationship between profitability and net cash flow and the impact of changing prices.

Definitions:

5. The following are used in this statement with the meaning specified:
   i.   Cash comprises cash on hand and demand deposits with banks
   ii. Cash equivalents are short-term highly liquid investments, that are readily convertible into known amounts of cash and which are subject to an insignificant risk of changes in value.
   iii. Cash flows are inflows and outflows of cash and cash equivalents.
   iv. Operating activities are the principal revenue producing activities of the enterprise and other activities and are not investing or financing activities.
   v.   Investing activities are the acquisition and disposal of long-term assets and other investments not included in cash equivalents.
   vi. Financing activities are activities that result in changes in the size and composition of the owners' capital (including preference share capital in the case of company) and borrowings of the enterprise.

Cash and Cash Equivalents:

6. Cash equivalents are held for the purpose of meeting short-term cash commitments rather than for investment or other purposes. For an investment to quality as a cash equivalent, it must be readily convertible to a known amount of cash and be subject to an insignificant risk of changes in value. Therefore, an investment normally qualifies as a cash equivalent only when it has a short maturity of, say, three months or less from the date of acquisition. Investments in shares are excluded from cash equivalents unless they are, in substance, cash equivalents; for example, preference shares of a company acquired shortly before their specified redemption date (provided there is only an insignificant risk of failure of the company to repay the amount at maturity).

7. Cash flows exclude movements between items that constitute cash or cash or cash equivalents because these components are part of the cash management of an enterprise

rather than part of its operating, investing and financing activities. Cash management includes the investment of excess cash in cash equivalents.

Presentation of a Cash Flow Statement:

8. The cash flow statement should report cash flows during the period classified by operating, investing and financing activities.

9. An enterprise presents its cash flows from operating, investing and financing activities in a manner which is most appropriate to its business. Classification by activity provides information that allows users to assess the impact of those activities on the financial position of the enterprise and the amount of its cash and cash equivalents. This information may also be used to evaluate the relationships among these activities.

10. A single transaction may include cash flows that are classified differently. For example, when the installment aid in respect of a fixed asset acquired on different payment basis includes both interest and loan, the interest element is classified under financing activities and the loan element is classified under investing activities.

Operating Activities:

11. The amount of cash flows arising from operating activities is a key indicator of the extent to which the operations of the enterprise have generated sufficient cash flows to maintain the operating capability of the enterprise, pay dividends, repay loans and make new investments without recourse to external sources of financing. Information about the specific components of historical operating cash flows is useful, conjunction with other information, in forecasting future operating cash flows.

12. Cash flows from operating activities are primarily derived from the principal revenue-producing activities of the enterprise. Therefore, they generally result from the transactions and other events that enter into the determination of net profit or loss. Examples of cash flows from operating activities are:
   a.   Cash receipts form the sale of goods and the rendering of services;
   b.   Cash receipts from royalties, fees, commission and other revenue;
   c.   Cash payments to suppliers for goods and services;
   d.   Cash payments to and on behalf of employees
   e.   Cash receipts and cash payments of an insurance enterprise for premiums and claims, annuities and other policy benefits;
   f.   Cash payment of refunds of income taxes, unless they can be specifically identified with financing and investing activities; and
   g.   Cash receipts and payments relating to future contracts, forward contracts, option contracts and swap contracts when the contracts are held for dealing or trading purposes.

13. Some transactions, such as the sale of an item of plant, may give to rise to gain or loss which is included in the determination of net profit or loss. However, the cash flows relating to such transactions are cash flows from investing activities.

14. An enterprise may hold securities and loans for dealing or trading purposes, in which case they are similarly to inventory acquired specifically for resale. Therefore, cash flows arising from the purchase and sale of dealing or trading securities are classified as operating activities. Similarly cash advances and loans made by financial enterprises are usually classified as operating activities since they relate to the main revenue producing activity of that enterprise.

Investing Activities:

15. The separate disclosure of cash flows arising from investing activities is important because the cash flows represent the extent to which expenditure have been made for resources intended to generate future income and cash flows. Example of cash flows arising from investing are:

a. Cash payments to acquire fixed assets (including intangible). These payments include those relating to capitalised research and development costs and self-constructed fixed assets;
b. Cash receipts from disposal of fixed assets (including intangible);
c. Cash payments to acquire share, warrants or debt instruments of other enterprises and interests in joint ventures (other than payments for those instruments considered to be cash equivalents and those held for dealing for trading purposes);
d. Cash receipts from disposal of shares, warrants or debt instruments of other enterprises and interests in joint ventures (other than receipt from those instruments considered to be cash equivalents and those held for dealing or trading purposes);
e. Cash advances and loans made to third parties (other than advances and loans made by a finance enterprise);
f. Cash receipts from the repayment to advances and loans made to third parties (other than advances and loans of a financial enterprise);
g. Cash payments for future contracts, forward contracts, option contracts and swap contracts excepts when the contracts are held for dealing or trading purposes; or the payments are classified as financing activities; and
h. Cash receipts from futures contracts, forward contracts, option contracts and swap contracts except when the contracts are held for dealing or trading purposes, or the receipts are classified as financing activities.

16. When a contract is accounted for as a hedge of an identifiable position, the cash flows of the contract are classified in the same manner as the cash flows of the position being hedged.

Financing Activities:

17. The separate disclosure of cash flows arising from financing activities is important because it is useful in predicting claims on figure cash flows by providers of funds (both capital and borrowings) to enterprise. Examples of cash flows arising from financing activities are:

a. Cash proceeds from issuing shares or other similarly instruments;
b. Cash proceeds from issuing debentures, loans, notes, bonds, and other short or long-term borrowings, and
c. Cash repayments of amounts borrowed

Reporting Cash Flows from Operating Activities:

18. An enterprise should report cash flows from operating activities using either:

1. **Direct method:** the direct method, whereby major classes of gross cash receipts and gross cash payments are disclosed; or

2. **Indirect Method:** The indirect method, whereby net profit or loss is adjusted for the effects of transactions of a non-cash nature, any deferrals or accruals of past or future operating cash receipts or payments and item of income or expenses associated with investing or financing cash flows.

19. The direct method provides information which may be useful in estimating future cash flows and which is not available under the indirect method and is, therefore, considered more appropriate than the indirect method. Under the direct method, information about major classes of gross cash receipts and gross cash payments may be obtained either:

a. from the accounting records of the enterprise; or
b. by adjusting sales, cost of sales (interest and similar income and interest expenses and similar charges for a financial enterprise) and other items in the statement of profit and loss for:
    i. changes during the period in inventories and operating receivable and payable.
    ii. other non-cash items; and
    iii. other items for which the cash effects are investing or financing cash flows.

20. Under the indirect method, the net cash flow from operating activities is determiend by adjusting net profit or loss for the effects of:

a. changes during the period in inventories and operating receivables and payables;
b. non-cash items such as depreciation, provisions, deferred taxes, and unrealised foreign exchanges gains and losses; and
c. all other items for which the cash effects are investing or financing cash flows.

Alternatively, the net cash flow from operating activities may be presented under the indirect method by showing the operating revenues and expenses, excluding non-cash items disclosed in the statement of profit and loss and changes during the period in inventories and operating receivables and payables.

Reporting Cash Flows from Investing and Financing Activities:

21. An enterprise should report separately major classes of gross cash receipts and gross cash payments arising from investing and financing activities, except to the extent that cash flows described in paragraphs 22 and 24 are reported on a net basis.

Reporting Cash Flows on a Net Basis:

22. Cash flows arising from the following operating, investing or financing activtiies may be reported on a net basis.

a. Cash receipts and payments on behalf of customers when the cash flows reflect the activities of the customer rather than those of the enterprises; and

b. Cash receipts and payments for items in which the turnover is quick, the amounts are large, and the maturities are short.

23. Example of cash receipts and payments referred to in paragraph 22 (a) are:

a. the acceptance and repayment of demand deposits by a bank.

b. Funds held for a customers by an investment enterprise; and

c. Rents collected on behalf of, and paid over to, the owners of properties.

Examples of cash receipts and payments referred to in paragraph 22(b) are advances made for and the repayment of

a. principle amounts relating to credit card customers;

b. the purchase and sale of investments; and

c. other short-term borrowings, for example, those which have a maturity period of three months or less.

24. Cash flow arising form each of the following activities of a financial enterprise may be reported on a net basis.

a. cash receipts and payments for the acceptance and repayment of deposits with a fixed maturity date;

b. the placement of deposits with and withdrawal of deposits from other financial enterprises and;

c. cash advances and loans made to customers and the repayment of those advances and loans.

Foreign Currency Cash Flows:

25. Cash flows arising from transactions in a foreign currency should be recorded in an enterprise's reporting currency by applying to the foreign currency amount the exchange rate between the reporting currency and the foreign currency at the date of the cash flow. A rate that approximate the actual rate may be used if the result is substantially the same as would arise if the rates at the dates of the cash flows were used. The effect of changes in exchanges rates on cash and cash equivalents held in a foreign currency should be reported as a separate part of the reconciliation of the changes in cash and cash equipment during the period.

26. Cash flows denominated in foreign currency are reported in a manner consistent with Accounting Standard (AS) II. Accounting for the Effects of changes in Foreign Exchange Rates. This permits the use a period may be used for recording foreign currency transactions.

27. Unrealised gain and losses arising from changes in foreign exchange rates are not cash flows. However, the effect of exchange rate changes on cash and cash equivalents held or the in a foreign currency is reported in the cash flow statement in order to reconcile cash and cash equivalents at the beginning and the end of the period. This amount is presented separately from cash flows from operating, investing and financing activities and includes the differences, if any, had those cash flows been reported at the end of period exchange rates.

Extraordinary Items:

28. The cash flows associated with extraordinary items should be classified as arising from operating investing or financing activities as appropriate and separately disclosed.

29. The cash flows associated with extraordinary items are disclosed separately as arising from operating, investing or financing activities in the cash flow statement, to enable users to understand their nature and effect on the present and future cash flows of the enterprise. These disclosures are in addition to the separate disclosures of the nature and amount of extraordinary items required by Accounting Standard (AS) 5. Net Profit or loss for the period, prior period items and changes in Accounting Policies.

Interest and Dividends:

30. Cash flows from interest and paid should each be disclosed separately. Cash flows arising from interest paid and interest and dividends received in the case of a financial enterprise should be classified as cash flow arising from operating activities. In the case of other enterprises, cash flows arising from interest paid should be classified as cash flows from investing activities. Dividends paid should be classified as cash flows from financing activities.

31. The total amount of interest paid during the period is disclosed in the cash flow statement whether it has been recognised as an expense in the statement of profit and loss or capitalised in accordance with Accounting Standard (AS) 10, Accounting for Fixed Assets.

32. Interest paid and Interest and dividends received, are usually classified as operating cash flows for a financial enterprise. However, there is no consensus on the classification of these cash flows for other enterprises. Some argue that interest paid and interest and dividends received may be classified as operating cash flows because they enter into the determination of net profit or loss. However, it is more appropriate that interest paid and interest and dividends received are classified as financing cash flows and investing cash flows respectively, because they are cost of obtaining financial resources or returns on investments.

33. Some argue that dividends paid may be classified as a component of cash flows from operating activities in order to assist users to determine the ability of an enterprise to pay dividends out of operating cash flows. However, it is considered more appropriate that dividends paid should be classified as cash flows from financing activities because they are cost of obtaining financial resources.

Taxes on Income:

34. Cash flows arising from taxes on income should be separately disclosed and should be classified as cash flows from operating activities unless they can be specifically identified with financing and investing activities.

35. Taxes on income arise on transactions that give rise to cash flows that are classified as operating investing or financing activities in a cash flow statement. While tax expenses may be readily identifiable with investing or financing activities, the related tax cash flows are often impracticable to identify and may arise in different period from the cash flows of the underlying transactions. Therefore, taxes paid are usually classified as cash flows from operating activities. However, when it is practicable to identify the tax cash flow with an individual transaction that gives rise to cash flows that are classified as investing or financing activities the tax cash flow is classified as an investing or financing activity as appropriate. When tax cash flows are allocated over more than one class of activity, the total amount of taxes paid is disclosed.

Investments in Subsidiaries, Associated and Joint Ventures:

36. When accounting for an investment in an associate or a subsidiary or a joint venture, an investor restricts its reporting in the cash flow statement to the cash flows between itself and the investee/joint venture, for example cash flows relating to dividends and advances.

Acquisition and Disposals of Subsidiaries and Other Business Units:

37. The aggregrate cash flows arising from acquisitions and from disposals of subsidiaries or other business units should be presented separately and classified as investing activities.

38. An enterprise should disclose, in aggregate, in respect of both acquisition and disposal of subsidiaries or other business units during the period each of the following.

    a.   the total purchase a disposal consideration; and
    b.   the portion of the purchase or disposal consideration discharged by mean of cash and cash equivalents.

39. The separate presentation of the cash flow effects of acquisitions and disposals of subsidiaries and other business units as single line items helps to distinguish those cash flows from other cash flows. The cash flow effects of disposals are not deducted from those of acquisition.

Non-Cash Transactions:

40. Investing and financing transactions that do not require the use of cash or cash equivalents should be excluded from a cash flow statement. Such transactions should be disclose elsewhere in the financial statements in the way that provides all the relevant information about these investing and financing activities.

41. Many investing and financing activities do not have a impact on current cash flow although they do effect the capital and asset structure of an enterprise. The exclusion of non-cash transactions from the cash flow statement is consistent with the objective of a cash flow statement as these items do not involve cash flows in the current period. Examples of non-cash transactions are:

    a.   the acquisition of assets by assuming directly related liabilities;
    b.   the acquisition of an enterprise by means of issue of shares;
    c.   the conversion of debt to equity.

Components of Cash and Cash equivalents:

42. An enterprise should disclose the components of cash and cash equivalents and should present a reconciliation of the amounts in its cash flow statements with the equivalent items reported in the balance sheet.

43. In view of the variety of cash management practices, an enterprise discloses the policy which it adopts in determining the composition of cash and cash equivalents.

44. The effect of any change in the policy for determining components of cash and cash equivalents is reported in accordance with Accounting Standard (AS) 5. Net Profit or loss for the period, Prior Period Items and Changes in Accounting Policies.

Other Disclosures:

45. An enterprise should disclose, together with a commentary by management the amount of significant cash and cash equivalent balances held by the enterprise that are not available for use by it.

46. There are various circumstances in which cash and cash equivalent balance held by an enterprise are not available for use by it. Examples include cash and cash equivalent balances held by a branch of the enterprise that operates in a country where exchange controls or other legal restrictions apply as a result of which the balance are not available for use by the enterprise.

47. Additional information may be relevant to users in understanding the financial position and liquidity of an enterprise. Disclosure of this information, together with a commentary by management is encouraged and may include.
   a. the amount of undrawn borrowing facilitates that may be available for future operating activities and to settle capital commitments, indicating any restrictions on the use of these facilitates; and
   b. the aggregate amount of cash flows that represent increase in operating capacity separately from those cash flows that are required to maintain operating capacity.

48. The separate disclosure of cash flows that represent increases in operating capacity and cash flows that are required to maintain operating capacity is useful in enabling user to determine whether the enterprise is investing adequately in the maintenance of its operating capacity. An enterprise that does not invest adequately in the maintenance of its operating capacity may be prejudicing future profitability for the sake of current liquidity and distribution to owners.

CASH FLOW STATEMENT FOR AN ENTERPRISE OTHER THAN A FINANCIAL ENTERPRISE

The appendix is illustrative only and does not form part of the accounting standard. The purpose of this appendix is to illustrate application of the accounting standard.
1. The example shows only current period amounts.
2. Information from the statement of profit and loss and balance sheet is provided to show how the statements of cash flow under the direct method the indirect method have been derived. Neither the statements of profit and loss nor the balance sheet is presented in conformity with the disclosure and presentation requirements of applicable laws and accounting standards. The working notes given towards the end of this appendix in the

cash flow statement have been derived. These working notes do not form part of the cash flow statement and, accordingly, need not be published.

3.   The following additional information is also relevant for the preparation of the statement of cash flows (figure are in Rs.'000)

a.   An amount of 250 was raised from the issue of share capital and a further 250 was raised from long term borrowings.

b.   Interest expenses was 400 of which 170 was paid during the period. 100 relating to interest expenses of the prior period was also paid during the period.

c.   Dividends paid were Rs.1,200

d.   Tax deducted at source on dividends received (included in the tax expenses of 300 for the year mounted to Rs.40)

e.   During the period the enterprise acquired fixed assets for 350. The payment was made in cash.

f.   Plant with original cost of Rs.80 and accumulated depreciation of Rs.60 was sold for Rs.20

g.   Foreign exchange loss of 40 represents the reduction in the carrying amount of a short-term investment in foreign currency designated bonds arising out of a change in exchange rate between the date of acquisition of the investment and the balance sheet date.

h.   Sundry debtors and sundry creditors include amounts relating to credit sales and credit purchases only.

Balance sheet as on 31-12-2011

	Rs.	1996 Rs.	Rs.	1995 Rs.
Assets				
Cash on hand and balance with banks		200		25
Short-term investments		670		135
Sundry debtors		1,700		1,200
Interest receivable		100		--
Inventories		900	1,950	
Long-term investments	2,500		2,500	
Fixed asset at cost	2,180		1,910	
Accumulated depreciation	(1,450)		(1,060)	
Fixed assets (net)		730		850
Total Assets		6,800		6,660
Liabilities:				
Sundry creditors		150		1,890
Interest payable		230		100
Income taxes payable		400		1,000
Long-term debt		1,110		1,040
Total Liabilities		1,890		4,030

		1996		1995
	Rs.	Rs.	Rs.	Rs.
Shareholders' funds				
Share capital		1,500		1,250
Reserves		3,410		1,380
Total Shareholders Funds		4,910		2,630
Total liabilities and Shareholders Funds		6,800		6,660

Statement of Profit and Loss for the period ended 31-12-2011

	(Rs.'000)
	1996
Sales	30,650
Cost of Sales	(26,000)
Gross Profit	4,650
Depreciation	(450)
Administrative and selling expenses	(910)
Interest expenses	(400)
Interest income	300
Dividend income	200
Foreign exchange loss	(40)
Net profit before taxation and extraordinary item	3,350
Extraordinary item- Insurance proceeds from earthquake disaster settlement	180
Net profit after extraordinary item	3,530
Income tax	(300)
Net Profit	3,230

Direct Method Cash Flow Statement [Paragraph 18 (a)]

		(Rs.'000)
		1996
Cash Flows from operating Activities:		
Cash receipts from customers	30,150	
Cash paid to suppliers and employees	(27,600)	
Cash generated from operations	2,550	
Income taxes paid	(860)	
Cash flow before extraordinary item	1,690	
Proceeds from earthquake disaster settlement	180	
Net cash from operating activities		1,870
Cash flows from Investing activities		
Purchase of fixed assets	(350)	

		(Rs.'000)
Proceeds from sale of equipment	20	
Interest received	200	
Dividends received	160	
Net cash from investing activities		30
Cash flow from financing activities		
Proceeds from issuance of share capital	250	
Proceeds from long-term borrowings	250	
Repayment of long-term borrowings	(180)	
Interest paid	(270)	
Dividends paid	(1,200)	
Net cash used in financing activities		(1,150)
Net increase in cash and cash equivalents		750
Cash and Cash equivalents at beginning of period (See Note 1)		
Cash and Cash equivalents at end of period (See Note 1)		160
		910

Indirect Method Cash Flow Statement [Paragraph 18 (b)]

		(Rs.'000)
	Rs.	Rs.
Cash Flow from operating Activities		
Net profit before taxation, and extraordinary item	3,350	
Adjustment for:		
Depreciation	450	
Foreign exchange loss	40	
Interest income	(300)	
Dividend income	(200)	
Interest expenses	400	
Operating profit before working capital changes	3,740	
Interest in Sundry debtors	(500)	
Decrease in inventories	1,050	
Decrease in sundry creditors	(1,740)	
Cash generated from operations	2,550	
Income taxes paid	(860)	
Cash flow before extraordinary item	1,690	
Proceeds form earthquake disaster settlement	180	
Net cash from operating activities		1,870
Cash flows from investing activities		
Purchase of fixed assets	(350)	
Proceeds from sale of equipment	20	
Interest received	200	
Dividends received	160	

	Rs.	Rs.
Net cash from investing activities		30
Cash flows from financing activities		
Proceeds from issuance of share capital	250	
Proceeds from long-term borrowings	250	
Repayment of long-term borrowings	(180)	
Interest paid	(270)	
Dividends paid	(1,200)	
Net cash used in financing activities		(1,150)
Net increase in cash and cash equivalents		750
Cash and cash equivalents at beginning of period (See Note 1)		160
Cash and Cash equivalents at end of period (See Note I)		910

Notes to the Cash Flow Statement
(Direct method and indirect method)

1. **Cash and Cash Equivalents:**

Cash and cash equivalents consists of cash and hand and balances with bank and investments in money-market instruments. Cash and cash equivalents included in the cash flow statement comprise the following balance sheet amounts.

	1996	1995
Cash on hand and balances with banks	200	25
Short-term investments	670	135
Cash and cash equivalents	870	160
Effect of exchange rate changes	40	--
Cash and cash equivalents as restated	910	160

Cash and cash equivalents at the end of the period include deposits with banks of 100 held by a branch which are not freely remissible to the company because of currency exchange restrictions.

The company has undrawn borrowing facilities of 2,000 of which 700 may be used only for future expansion.

2. **Total tax paid during the year** (including tax deducted at source on dividends received) amounted to Rs.900.

Alternative Presentation (indirect method)

As an alternative, in an indirect method cash flow statement, operating profit before working capital changes is sometimes presented as follows:

	1996	1995
Revenue excluding investment income	30,650	
Operating expenses excluding depreciation	(26,910)	
Operating profit before working capital changes		3,740

Working Notes:

The working notes given below do not form part of the cash flow statement and, accordingly, need not be published. The purpose of these working notes is merely to assist in understanding the manner in which various figures in the cash flow statement have been derived (Figures are in Rs.'000)

		Rs.	Rs.
1.	**Cash receipts from Customers**		
	Sales		30,650
	Add: Sundry debtors at the end of the year		1,200
			31,850
	Less: Sundry debtors at the end of the year		1,700
			30,150
2.	**Cash paid to suppliers and employees:**		
	Cost of Sales		26,000
	Administrative and selling expenses		910
			26,910
	Add: Sundry creditors at the beginning of the year	1,890	
	Inventories at the end of the year	900	2,790
			29,700
	Less: Sundry creditors at the end of the year	150	
	Inventories at the beginning of the year	1,950	2,100
			27,600
3.	**Income taxes paid (including tax deducted at sources from dividends received)**		
	Income tax expenses for the year (including tad deducted at sources from dividends received)		300
	Add: Income tax liability at the beginning of the year		1,000
			1,300
	Less: Income tax liability at the end of the year		400
			900

Out of Rs.900, tax deducted at source on dividends received (amount to Rs.40) is included in cash flows from investing activities and the balance of Rs.860 is included in cash flow from operation activities (see paragraph 34).

		Rs.	.
4.	**Repayment of long-term borrowings:**		
	Long-term debt at the beginning of the year		1,040
	Add: Long-term borrowings made during the year		250
			1,290
	Less: Long-term borrowings at the end of the year		1,110
			180
5.	**Interest paid**		
	Interest expenses for the year		400
	Add: Interest payable at the beginning of the year		100
			500
	Less: Interest paid at the end of the year		230
			270

Cash flow statement for a Financial Enterprise

The appendix is illustrative only and does not form part of the accounting standard. The purpose of this appendix is to illustrate the application of the accounting standard.

	Rs.	(Rs.'000) 1996
Cash Flow from operating activities		
Interest and commission receipts	28,447	
Interest payments	(23,463)	
Recoveries on loans previously written off	237	
Cash payments to employees and suppliers	(997)	
Operating profit before changes in operating assets	4,224	
(Increase) Decrease in operating assets:		
Short-term funds	(650)	
Deposits held for regulatory or monetary control purposes	234	
Funds advanced to customer	(288)	
Net increase in credit card receivables	(360)	
Other short-term securities)	(120)	
Increase (Decrease) in operating liabilities		
Deposits from customers	600	
Certificates of deposit	(200)	
Net cash from operating activities before income tax	3,440	
Income taxes paid	(100)	
Net cash from operating activities		3,340

	Rs.	(Rs.'000) 1996
Cash flows from investing activities		
Dividends received	250	
Interest received	300	
Proceeds from sale of permanent investments	1,200	
Purchase of permanent investments	(600)	
Purchase of fixed assets	(500)	
Net cash from investing activities		650
Cash flow from financing activities		
Issue of shares	1,800	
Repayment of long-term borrowings	(200)	
Net Decrease in other borrowings	(1,000)	
Dividends paid	(400)	
Net cash from Financing activities		200
Net increase in cash and cash equivalents		4,190
Cash and cash equivalents at beginning of period		4,650
Cash and cash equivalents at the end of period		8,840

Chapter – 14

PREPARATION OF CASH FLOW STATEMENT

Objectives :

After studying this unit you should be able to
- know the steps in the preparation of cash flow statement
- determine cash from operations, investing activities and financing activities

Structure :

14.1   **Steps in the preparation of Cash Flow Statement**
14.2   **Reporting Cash flows from Operating Activities**
14.3   **Investing Activities**
14.4   **Financing Activities**
14.5   **Self Assessment Questions**
14.6   **Exercises**
14.7   **Reference books**

14.1 STEPS IN PREPARATION OF CASH FLOW STATEMENT

Before preparing cash flow statement, first of all, the following three steps have to be completed.
1.   Determining cash flows from operations or operating activities;
2.   Determining cash flows from investing activities;
3.   Determining cash flows from financing activities.

14.1.1   Cash from Operations:

The profit and loss account focuses on net income determination from operating activities. However, it does not show cash inflow and outflow relating to operating activities because the profit and loss account is prepared on accrual basis. In preparing profit and loss account, revenues are recorded even though cash for them has not been received. Similarly, expenses are recorded even though may not been paid. Therefore, to find cash flows operations, one need to convert accrual basis income statement figures to cash basis by making adjustments. By way of adjustments, earned revenues will be converted into cash received from sales or customers and incurred expenses will be converted into cash expended, i.e., expenses actually paid in cash.

14.2 REPORTING CASH FLOWS FROM OPERATING ACTIVITIES:

An enterprise should report cash flows from operating activities using either:

1. **Direct method:** the direct method, whereby major classes of gross cash receipts and gross cash payments are disclosed; or

2. **Indirect Method:** This indirect method, whereby net profit and loss is adjusted for the effects of transactions of a non-cash nature, and deferrals or accruals of past or future operating cash receipts or payments and item of income or expenses associated with investing or financing cash flows.

The direct method provides information which may be useful in estimating future cash flows and which is not available under the indirect method and is, therefore, considered more appropriate than the indirect method. Under the direct method, information about major classes of gross cash receipts and gross cash payments may be obtained either:

a. from the accounting records of the enterprise; or
b. by adjusting sales, cost of sales (interest and similar income and interest expenses and similar charges for a financial enterprise) and other items in the statement of profit and loss for:
    i.   changes during the period in inventories and operating receivable and payable.
    ii. other non-cash items; and
    iii. other items for which the cash effects are investing or financing cash flows.

Under the indirect method, the net cash flow from operating activities is determined by adjusting net profit or loss for the effects of:

a. changes during the period in inventories and operating receivables and payables;
b. non-cash items such as depreciation, provisions, deferred taxes, and unrealised foreign exchanges gains and losses; and
c. all other items for which the cash effects are investing or financing cash flows.

Alternatively, the net cash flow from operating activities may be presented under the indirect method by showing the operating revenues and expenses, excluding non-cash items disclosed in the statement of profit and loss and changes during the period in inventories and operating receivables and payables.

14.3 INVESTING ACTIVITIES:

The separate disclosure of cash flows arising from investing activities is important because the cash flows represent the extent to which expenditures have been made for resources intended to generate future income and cash flows. Example of cash flows arising from investing are:

a. Cash payments to acquire fixed assets (including intangible). These payments include those relating to capitalised research and development costs and self-constructed fixed assets;

b. cash receipts from disposal of fixed assets (including intangible);

c. cash payments to acquire share, warrants or debt instruments of other enterprises and interests in joint ventures (other than payments for those instruments considered to be cash equivalents and those held for dealing for trading purpose);

d. cash receipts from disposal of shares, warrants or debt instruments of other enterprises and interests in joint ventures (other than receipt from those instruments considered to be cash equivalents and those held for dealing or trading purposes);

e. cash advances and loans made to third parties (other than advances and loans made by a finance enterprise);

f. cash receipts from the repayment to advances and loans made to third parties (other than advances and loans of a financial enterprise);

g. cash payments for futures contracts, forward contracts, option contracts and swap contracts excepts when the contracts are held for dealing or trading purposes; or the payments are classified as financing activities; and

h. cash receipts from futures contracts, forward contracts, option contracts and swap contracts except when the contracts are held for dealing or trading purposes, or the receipts are classified as financing activities.

When a contract is accounted for as a hedge of an identifiable position, the cash flows of the contract are classified in the same manner as the cash flows of the position being hedged.

14.4 FINANCING ACTIVITIES:

The separate disclosure of cash flows arising from financing activities is important because it is useful in predicting claims on future cash flows by providers of funds (both capital and borrowings) to enterprise. Examples of cash flows arising from financing activities are:

a. cash proceeds from issuing shares or other similarly instruments.
b. cash proceeds from issuing debentures, loans, notes, bonds, and other short or long-term borrowings, and
c. cash repayments of amounts borrowed.

Illu.1: From the following comparative balance sheet of Sankalp Ltd. for the year 2000 and 2001 prepare Cash Flow Statements:

Balance Sheets

Liabilities	2000 Rs.	2001 Rs.	Assets	2000 Rs.	2001 Rs.
Equity Share Capital	7,00,000	7,40,000	Cash	90,000	78,000
10% Debentures	1,20,000	60,000	Debtors	1,42,000	1,69,000
Creditors	1,03,600	1,18,400	Stock	4,92,000	4,27,000
Profit & Loss a/c	1,00,400	1,05,600	Land	2,00,000	3,00,000
			Goodwill	1,00,000	50,000
	10,24,000	10,24,000		10,24,000	10,24,000

Solution:

Cash Flow Statement for the year ending 31-12-2001

		Rs.	Rs.
I. Cash Flow from Operating Activities:			
Net Profit (Rs.1,05,600 – 1,00,400)	(A)	5,200	
Add: Non Operating Expenses and Losses:	(B)		
Goodwill written off		50,000	
		55,200	
Less: Non-Operating Incomes and Gains	(C)	Nil	
Operating profit before working capital changes (A+B-C)	D	55,200	
Add: Decrease in Current assets and increase in Current liabilities:			
Stock (Rs.4,92,000 – 4,27,000)		65,000	
Creditors (Rs.1,18,400 – 1,03,600)		14,800	
	(E)	1,35,000	
Less: Increase in Current assets and decrease in Current liabilities:			
Debtors (Rs.1,69,000 – 1,42,000)	(F)	27,000	
Cash from operating activities (D+E-F)	(G)		1,08,000

		Rs.	Rs.
II. Cash from Investing Activities:			
Add: Cash Inflows		Nil	
Less: Cash outflows			
Purchases of land	(H)	1,00,000	
Net cash from Investing Activities	(I)		(-) 1,00,000
III. Cash from financing Activities			
Add: Cash inflows:			
Issues of share capital	(J)	40,000	
Less: Cash outflows:			
Redemption of Debentures	(K)	60,000	
Net cash from Financing Activities (J-K)	(L)		(-) 20,000
Net Decrease in Cash equivalent (Rs.78,000 – 90,000)			(-) 12,000
Cash and cash equivalents at the beginning of the period			90,000
Cash and cash equivalents at the end of the period			78,000

Working Notes:

Dr.   **Land a/c**   Cr.

	Rs.		Rs.
To Balance b/d	2,00,000	By Balance c/d	3,00,000
To Bank (outflow)	1,00,000		
(Balancing Figure)			
	3,00,000		3,00,000

Dr.   **Goodwill a/c**   Cr.

	Rs.		Rs.
To Balance b/d	1,00,000	By Profit & Loss adjustment a/c (Balancing Figure)	50,000
		By Balance c/d	50,000
	1,00,000		1,00,000

Dr.   **Equity Share Capital a/c**   Cr.

	Rs.		Rs.
To Balance c/d	7,40,000	By Balance b/d	7,00,000
		By Bank (inflow) (Balance Figure)	40,000
	7,40,000		7,40,000

Dr.		10% debentures a/c	Cr.
	Rs.		Rs.
To Bank (outflow) (Balancing Figure)	60,000	By Balance b/d	1,20,000
To Balance c/d	60,000		
	1,20,000		1,20,000

Dr.		Profit & Loss adjustment a/c	Cr.
	Rs.		Rs.
To Goodwill	50,000	By Balance b/d	1,00,400
To Balance c/d	1,05,600	By Operating Profit (Balancing Figure)	55,200
	1,55,600		1,55,600

Illu.2: Prepare Cash flow statements from the following:

Liabilities	2001 Rs.	2002 Rs.
Equity Share Capital	3,00,000	4,00,000
6% Redeemable Preference Share Capital	1,50,000	1,00,000
Capital Reserve	---	20,000
General Reserve	40,000	50,000
Profit & Loss a/c	30,000	48,000
Proposed dividend	42,000	50,000
Creditors	25,000	47,000
Bills Payable	20,000	16,000
Preliminary for expenses	30,000	36,000
Provision for taxation	40,000	50,000
	6,77,000	8,17,000

Assets	2001 Rs.	2002 Rs.
Goodwill	1,00,000	80,000
Land & Buildings	2,00,000	1,70,000
Plant	80,000	2,00,000
Investments	20,000	30,000
Debtors	1,40,000	1,70,000
Stock	77,000	1,09,000
Bills Receivable	20,000	30,000
Cash in hand	15,000	10,000
Cash at bank	10,000	8,000
Preliminary Expenses	15,000	10,000
	6,77,000	8,17,000

1. A piece of land had been sold in 2002 and profit on sale has been credited to capital reserve a/c.

2. **A machine has been sold for Rs.10,000, W.D.12,000 Depreciation of Rs.10,000 is charged on plant a/c in 2002.**

3. **Investments are trade investments Rs.3,000 by way of dividend is received including 1,000 from preacquisition profit which has been credited to investments a/c.**

4. **Interim dividend of 20,000 has been paid in 2002.**

Solution:

Cash Flow Statement for the year ending 31-3-2002

		Rs.	Rs.
I. Cash Flow from Operating Activities:			
Net Profit (Rs.48,000 – 30,000) (A)		18,000	
Add: Non Operating Expenses and Losses:			
Goodwill written off		20,000	
Depreciation on plant		10,000	
Loss on sale of plant		2,000	
Preliminary expenses written off		5,000	
Transfer to General reserve		10,000	
Proposed Dividends		50,000	
Payment of Dividends		20,000	
Total Non-Operating Expenses and Losses (B)		1,17,000	
Less: Non-Operating Incomes and Gains		Nil	
Dividends on Investments (C)		2,000	
Operating profit before working capital changes D		1,33,000	
(A+B-C)			
Add: Decrease in Current assets and			
increase in Current liabilities:			
Creditors (Rs.47,000 – 25,000)		22,000	
Liabilities for Expenses (Rs.36,000 – 30,000)		6,000	
Provision for Taxation (Rs.50,000 – 40,000)		10,000	
Total decrease in Current assets and			
Increase in Current Liabilities (E)		38,000	
Less: Increase in Current assets and			
decrease in Current Liabilities:			
Debtors (1,70,000 – 1,40,000)		30,000	
Stock (1,09,000 – 77,000)		32,000	
Bills Receivable (30,000 – 20,000)		10,000	
Bills Payable (20,000 – 16,000)		4,000	
Total Increase in Current Assets and			
Decrease in Current Liabilities (F)		76,000	
Cash from operating activities (D+E-F) (G)			95,000

II. Cash Flow from Investing Activities:		Rs.	Rs.
Add: Cash Inflows			
Sale of lands and Buildings		50,000	
Sale of Machinery		10,000	
Dividends from Investments		2,000	
Preacquisition profit on Investments		1,000	
Total Cash Inflows	(H)	63,000	
Less: Cash outflows			
Purchase of land		1,42,000	
Purchase of Investments		11,000	
Total Cash outflows	(I)	1,53,000	
Net cash from Investing Activities (H-I)	(J)		(-) 90,000
III. Cash from financing Activities			
Add: Cash inflows:			
Issues of Equity share capital	(K)	1,00,000	
Less: Cash outflows:			
Redumption of pref. Share capital		50,000	
Payment of proposed dividend		42,000	
Payment of Dividend		20,000	
Total Cash outflows	(L)	1,12,000	
Net cash from Financing Activities (K-L)			(-) 12,000
Net Decrease in Cash equivalent			(-) 7,000
Cash and Cash equivalents at the beginning of the period			25,000
Cash and Cash equivalents at the end of the period			18,000

Working Notes:

Dr.		**Goodwill a/c**		Cr.
	Rs.			Rs.
To Balance b/d	1,00,000	By Profit & Loss adjustment a/c (Balancing Figure)		20,000
		By Balance c/d		80,000
	1,00,000			1,00,000

Dr.		**Land & Buildings a/c**		Cr.
	Rs.			Rs.
To Balance b/d	2,00,000	By Bank (inflow) (Balancing Figure)		50,000
To Capital Reserve (Profit)	20,000	By Balance c/d		1,70,000
	2,20,000			2,20,000

Dr.   **Capital Reserve a/c**   Cr.

	Rs.		Rs.
To Balance c/d	20,000	By Land a/c	20,000
	20,000		20,000

Dr.   **Plant a/c**   Cr.

	Rs.		Rs.
To Balance b/d	80,000	By Bank (inflow)	10,000
To Bank (outflow) (Balancing Figure)	1,42,000	By Profit & Loss adjustment a/c (depreciation)	10,000
		By Profit & Loss a/c (loss)	2,000
		By Balance c/d	2,00,000
	2,22,000		2,22,000

Dr.   **Preliminary Expenses a/c**   Cr.

	Rs.		Rs.
To Balance b/d	15,000	By Profit & Loss adjustment a/c (Balancing Figure)	5,000
		By Balance c/d	10,000
	15,000		15,000

Dr.   **Equity Share Capital a/c**   Cr.

	Rs.		Rs.
To Balance c/d	4,00,000	By Balance b/d	3,00,000
		By Bank (inflow) (Balancing Figure)	1,00,000
	4,00,000		4,00,000

Dr.   **Investments a/c**   Cr.

	Rs.		Rs.
To Balance b/d	20,000	By Bank (inflow) (Pre-acquisition profit)	1,000
To Bank (outflow) (Balancing Figure)	11,000	By Balance c/d	30,000
	31,000		31,000

Dr.   **6% Preference Share Capital a/c**   Cr.

	Rs.		Rs.
To Bank (outflow) (Balancing Figure)	50,000	By Balance b/d	1,50,000
To Balance c/d	1,00,000		
	1,50,000		1,50,000

Dr.   **General Reserve a/c**   Cr.

	Rs.		Rs.
To Balance c/d	50,000	By Balance b/d	40,000
		By Profit & Loss adjustment a/c (Balancing Figure)	10,000
	50,000		50,000

Dr.   **Proposed Dividend a/c**   Cr.

	Rs.		Rs.
To Bank (outflow)	42,000	By Balance b/d	42,000
To Balance c/d	50,000	By Profit & Loss adjustment a/c (Balancing Figure)	50,000
	92,000		92,000

Dr.   **Profit & Loss adjustment a/c**   Cr.

	Rs.		Rs.
To Goodwill	20,000	By Balance b/d	30,000
To Plant (depreciation)	10,000	By Dividend on investments (inflow)	2,000
To Plant (loss)	2,000	By Operating Profit (Balancing Figure)	1,33,000
To Preliminary expenses	5,000		
To General Reserve	10,000		
To Proposed dividend	50,000		
To Dividend (outflow)	20,000		
To Balance c/d	48,000		
	1,65,000		1,65,000

    Illu.3: The financial position of M/s Jayco Traders on January 1 and December 31, 2001 was as follows:

Liabilities	1st Jan. Rs.	31st Dec. Rs.	Assets	1st Jan. Rs.	31st Dec. Rs.
Current Liabilities	36,000	40,600	Cash	4,000	3,600
Loans from Individuals	---	40,000	Debtors	35,000	38,000
Loan from Bank	30,000	25,000	Stock	25,000	22,000
Capital	1,48,000	1,54,000	Land	20,000	30,000
			Buildings	50,000	55,000
			Machinery	80,000	86,000
			Van	---	25,000
	2,14,000	2,59,600		2,14,000	2,59,600

The Van was purchased in December in 2001; a payment of Rs.5,000 was made immediately and the balance of the amount is to be paid in 20 monthly installments of Rs.1,000 each together with interest @ 12% p.a. During the year the partners withdrew Rs.26,000 for their use. The provision for depreciation against machinery on 31-12-2000 was Rs.27,000 and on 31-12-2001 Rs.36,000. You are required to prepare the cash flow statement.

Solution:

Cash Flow Statement for the year ending 31-12-2001

		Rs.	Rs.
I. Cash Flow from Operating Activities:			
Net Profit	(A)	32,000	
Add: Non Operating Expenses and Losses:			
Provision for Depreciation	(B)	9,000	
Less: Non-Operating Incomes and Gains	(C)	Nil	
Operating profit before working capital changes (A+B-C)	(D)	41,000	
Add: Decrease in Current assets and increase in Current liabilities:			
Stock (Rs.25,000 – 22,000)		3,000	
Current Liabilities (Rs.40,600 – 36,000)		4,600	
Total decreases in Current assets and Increase in Current Liabilities	(E)	7,600	
Less: Increase in Current assets and decrease in Current liabilities:			
Debtors (Rs.38,000 – 35,000)	(F)	3,000	
Cash from operating activities (D+E-F)	(G)		45,600
II. Cash Flow from Investing Activities:			
Add: Cash Inflows		Nil	
Less: Cash Outflows			

		Rs.	Rs.
Purchase of Land		10,000	
Purchase of Building		5,000	
Purchase of Machinery		15,000	
Down payment for Delivery van		5,000	
Total of Cash outflows	(H)	35,000	
Net cash from Investing Activities (H-I)	(I)		(-) 35,000
III. Cash from financing Activities			
Add: Cash inflows			
Loans taken from Individuals	(J)	20,000	
Less: Cash outflows:			
Bank loan Repayment		5,000	
Drawings		26,000	
Total Cash outflows	(K)	31,000	
Net cash used in Financing Activities (J-K)	(L)		(-) 11,000
Net increase in Cash and cash equivalent (I+II+III)			(-) 400
Cash and Cash equivalents at the beginning of the period			4,000
Cash and Cash equivalents at the end of the period			3,600

Working Notes:

Dr. **Land a/c** Cr.

	Rs.		Rs.
To Balance b/d	20,000	By Balance c/d	30,000
To Bank (outflow)	10,000		
(Balancing Figure)			
	30,000		30,000

Dr. **Building a/c** Cr.

	Rs.		Rs.
To Balance b/d	50,000	By Balance c/d	55,000
To Bank (outflow)	5,000		
(Balancing Figure)			
	55,000		55,000

Dr. **Machinery a/c** Cr.

	Rs.		Rs.
To Balance b/d	1,07,000	By Balance c/d	1,22,000
(80,000+27,000)		(86,000+36,000)	
To Bank (outflow)	15,000		
(Balancing figure)			
	1,22,000		1,22,000

Dr.   **Provision for depreciation a/c**   Cr.

	Rs.		Rs.
To Balance c/d	36,000	By Balance b/d	27,000
		By Profit & Loss adjustment a/c (Balancing Figure)	9,000
	36,000		36,000

Dr.   **Van a/c**   Cr.

	Rs.		Rs.
To Hire Vendor (loan from individuals)	25,000	By Balance c/d	25,000
	25,000		25,000

Dr.   **Loan from individual a/c**   Cr.

	Rs.		Rs.
To Bank (outflow) (down payment)	5,000	By Van	25,000
To Balance c/d	40,000	By Bank (inflow) (Balancing Figure)	20,000
	45,000		45,000

Dr.   **Loan from bank a/c**   Cr.

	Rs.		Rs.
To Bank (outflow) (Balancing Figure)	5,000	By Balance b/d	30,000
To Balance c/d	25,000		
	30,000		30,000

Dr.   **Capital a/c**   Cr.

	Rs.		Rs.
To Bank (drawings) (Outflow)	26,000	By Balance b/d	1,48,000
To Balance c/d	1,54,000	By Profit & Loss a/c (Profit)	32,000
	1,80,000		1,80,000

Dr.	**Profit & Loss adjustment a/c**		Cr.
	Rs.		Rs.
To Provision for Depreciation	9,000	By Operating profit (Balancing Figure)	41,000
To Capital	32,000		
	41,000		41,000

Illu.4: ANLEX Ltd. has presented the following Balance Sheet as at 31st December, 2000 and 2001.

	2000 Rs.	2001 Rs.		2000 Rs.	2001 Rs.
Share Capital	6,00,000	6,00,000	**Building less Depreciation**	5,00,000	4,80,000
General Reserve	26,500	12,000	**Plant less Depreciation**	90,000	85,000
Creditors	8,500	4,000	**Stock**	5,000	1,000
			Debtors	15,000	10,000
			Cash	25,000	40,000
	6,35,000	6,16,000		6,35,000	6,16,000

Sales made by the company amounted to Rs.21,85,000 during the year 2001. No dividend has been paid. The changes in Building and Plant values are fully due to depreciation charges for 2000. Prepare a Cash Flow Statement.

Solution:

Cash Flow Statement for the year ending 31-12-2001

			Rs.	Rs.
I	**Cash Flow from Operating Activities:**			
	Net Profit	(A)	Nil	
	Add: Non Operating Expenses and Losses:			
	Depreciation on Buildings		20,000	
	Depreciation on Plant		5,000	
	Total Non-Operating Expenses and Losses	(B)	25,000	
	Less: Non-Operating Incomes and Gains			
	General Reserve		14,500	
	Cost of Sales		21,85,000	
	Total Non-Operating Incomes and Gains	(C)	21,99,500	
	Gross Operating Loss before changes in the Working Capital (B-C)	D	21,74,500	

			Rs.	Rs.
	Less: Sales	(E)	21,85,000	
	Net Operating Profit Before changes in the Working Capital (D-E)	(F)	10,500	
	Add: Decrease in Current assets and increase in Current liabilities:			
	Stock (Rs.5,000 – 1,000)		4,000	
	Debtors (Rs.15,000 – 10,000)		5,000	
	Total Decrease in Current Assets and Increase in Current Liabilities	(G)	9,000	
	Less: Increase in Current assets and decrease in Current liabilities:			
	Creditors (Rs.8,500 – 4,000)	(H)	4,500	
	Cash from operating activities (F+G-H)	(I)		15,000
II	**Cash from Investing Activities:**			**Nil**
III	**Cash from Financing Activities:**			**Nil**
	Net Increase in Cash equivalent (I+II+III)			15,000
	Cash and Cash equivalents at the beginning of the period			25,000
	Cash and Cash equivalents at the end of period			40,000

Working Notes:

Dr.   **Buildings a/c**   Cr.

	Rs.		Rs.
To Balance b/d	5,00,000	By Profit & Loss adjustment a/c (depreciation) (Balancing Figure)	20,000
		By Balance c/d	4,80,000
	5,00,000		5,00,000

Dr.   **Plant a/c**   Cr.

	Rs.		Rs.
To Balance b/d	90,000	By Profit & Loss adjustment a/c (depreciation) (Balancing Figure)	5,000
		By Balance c/d	85,000
	90,000		90,000

Dr. **General Reserve a/c** Cr.

	Rs.		Rs.
To Profit & Loss adjustment a/c (Balancing Figure)	14,500	By Balance b/d	26,500
To Balance c/d	12,000		
	26,500		26,500

Dr. **Profit & Loss adjustment a/c** Cr.

	Rs.		Rs.
To Depreciation on Buildings	20,000	By General Reserve	14,500
To Depreciation on Plant	5,000	By Cost of Sales	21,85,000
To Operating loss (Balancing Figure)	21,74,500		
	21,99,500		21,99,500

Illu.5: The directors of Durex Tools Ltd. are very much worried at the deteriorating financial position of the concern. The concern has availed full overdraft facility from SBI of India and still it is not able to pay off its creditors on due dates not withstanding satisfactory profits earned by it. The following are the Balance Sheets as at 31st December, 2000 and 2001.

	2000 Rs.	2001 Rs.		2000 Rs.	2001 Rs.
Share Capital in Share of Rs.10 fully paid	**1,00,000**	**1,00,000**	**Land & Buildings** **Plant & Machinery (cost)**	**30,000** **50,000**	**50,000** **60,000**
Profit & Loss a/c	**6,000**	**8,000**	**Vehicles (cost)**	**11,600**	**12,400**
Bank Overdraft	**16,000**	**60,000**	**Stock**	**22,000**	**72,000**
Creditors	**20,000**	**60,000**	**Debtors**	**46,000**	**60,000**
Provision for Depreciation:					
Plant & Machinery	**12,000**	**18,000**			
Vehicles	**5,600**	**8,400**			
	1,59,600	**2,54,400**		**1,59,600**	**2,54,400**

During the year a dividend of 10% was paid to share holders. On 1st January, 2001 a motor car which was originally purchased for Rs.2,000 and showing a book value of Rs.1,000 was sold for Rs.1,600. You are required to prepare a statement which should indicate as what has happened to the money which has come into the business during the year 2001.

Solution:

Cash Flow Statement for the year ending 31-12-2001

			Rs.	Rs.
I	**Cash Flow from Operating Activities:**			
	Net Profit (Rs.8,000 – 6,000)	(A)	2,000	
	Add: Non Operating Expenses and Losses:			
	Provision for Depreciation on Plant & Machinery		6,000	
	Provision for Depreciation on Vehicles		3,800	
	Payment of Dividend		10,000	
	Total Non-operating Expenses and Losses	(B)	19,800	
	Less: Non-Operating Incomes and Gains			
	Profit on sale of Motor car	(C)	600	
	Operating Profit Before changes in Working Capital (A+B-C)	(D)	21,200	
	Add: Decrease in Current asset and increase in Current Liabilities:			
	Creditors (Rs.60,000 – 20,000)		40,000	
	Less: Increase in Current assets and decrease in Current Liabilities:			
	Stock (Rs.72,000 – 22,000)		50,000	
	Debtors (Rs.60,000 – 46,000)		14,000	
	Total Increase in Current assets and decrease in Current Liabilities	(F)	64,000	
	Cash from operating activities (D+E-F)	(G)		(-) 2,800
II	**Cash from Investing Activities:**			
	Add: Cash Inflows		Nil	
	Less: Cash outflows			
	Purchases of land		1,00,000	
	Net cash from Investing Activities			(-) 1,00,000
III	**Cash from Financing Activities**			
	Add: Cash inflows:			
	Sale of motor car	(H)	1,600	
	Less: Cash outflows:			
	Purchase of land and buildings		20,000	
	Purchase of Plant and Machinery		10,000	
	Purchase of Vehicles		2,800	
	Total Cash outflows	(I)	32,800	
	Net cash from Investing Activities (H-I)	(J)		(-) 31,200
	Net cash from Financing Activities			
	Add: Cash Inflows:			
	Bank Overdraft (16,000 – 60,000)	(K)	44,000	

Less: Cash Outflows:		**Rs.**	**Rs.**
Payment of Dividend	(L)	10,000	
Net Cash from financing activities (K-L)	(M)		34,000
Net Increase/Decrease in Cash			Nil
Cash and Cash equivalents at the beginning of the period			Nil
Cash and Cash equivalents at the end of the period			Nil

Working Notes:

Dr.		**Land & Buildings a/c**		Cr.
	Rs.			Rs.
To Balance b/d	30,000	By Balance c/d		50,000
To Bank (outflow) (Balancing Figure)	20,000			
	50,000			50,000

Dr.		**Plant & Machinery a/c**		Cr.
	Rs.			Rs.
To Balance b/d	50,000	By Balance c/d		60,000
To Bank (outflow (Balancing Figure)	10,000			
	60,000			60,000

Dr.		**Vehicles a/c**		Cr.
	Rs.			Rs.
To Balance b/d	11,600	By Bank (inflow)		1,600
To Profit & Loss adjustment a/c		By Depreciation on Vehicles		1,000
(Profit)	600	By Balance c/d		12,400
To Bank (outflow) (Balancing Figure)	2,800			
	15,000			15,000

Dr.		**Profit & Loss adjustment a/c**		Cr.
	Rs.			Rs.
To Provision for depreciation on Plant & Machinery	6,000	By Balance b/d		6,000
To Provision for depreciation on Vehicles	3,800	By Profit on sale of motor car		600
To Dividend (outflow)	10,000	By Operating profit (Balancing Figure)		21,200
$(1,00,000 \times \frac{10}{100})$				
To Balance c/d	8,000			
	27,800			27,800

Provision for depreciation on Plant & Machinery

	Rs.		Rs.
To Balance c/d	18,000	By Balance b/d	12,000
		By Profit and Loss adjustment a/c (Balancing Figure)	6,000
	18,000		18,000

Provision for depreciation on Vehicles

	Rs.		Rs.
To Vehicles	1,000	By Balance b/d	5,600
To Balance c/d	8,400	By Profit and Loss adjustment a/c (Balancing Figure)	3,800
	9,400		9,400

Illu.6: The following is the summary of annual accounts Mythreyee Company Ltd. for the two years 2001 and 2002.

Liabilities	2000 Rs.	2001 Rs.	Assets	2000 Rs.	2001 Rs.
Capital Notes Payable	20,000		Cash	5,000	3,000
Notes payable	5,000	8,000	Marketable Securities	5,000	7,000
Accounts payable	3,000	5,000	Accounts Receivable	10,000	15,000
Accrued Taxes	3,000	5,000	Inventory	12,000	15,000
Accrued Wages	2,000	2,000	Fixed Assets (Net)	50,000	55,000
Long term loan		15,000	Other Assets	8,000	5,000
Shareholders Fund	60,000	70,000			
	90,000	1,00,000		90,000	1,00,000

Profit and Loss Account
(for the year ending December 31, 2002)

	Rs.	Rs.
Net Sales		50,000
Less: Expenses		
Cost of Goods sold	25,000	
Selling & Administration	5,000	
Depreciation	5,000	
Interest	1,000	36,000

	Rs.	Rs.
Net profit before Tax		**14,000**
Less: Income Tax (50%)		**7,000**
Net profit before Tax		**7,000**
Add: P & L a/c balance on 1-1-2002		**40,000**
		47,000
Less: Dividends		**3,000**
P & L a/c balance on 31-12-2002		**4,000**

Solution:

Cash flow Statement for the year ended 31-12-2002

		Rs.	Rs.
I.	**Cash Flow from Operating Activities:**		
	Net Profit (Rs.44,000-40,000) (A)	4,000	
	Add: Non Operating Expenses and Losses:		
	Depreciation on Fixed Assets	5,000	
	Depreciation on Other Assets	3,000	
	Payment of Dividend	3,000	
	Total Non-Operating Expenses and Losses (B)	11,000	
	Less: Non-Operating Incomes and Gains (C)	Nil	
	Operating Profit Before changes in Working Capital (A+B-C) (D)	15,000	
	Add: Decrease in Current assets and increase in Current liabilities		
	Accounts Payable (Rs.8,000-5,000)	3,000	
	Accrued Taxes (Rs.5,000-3,000)	2,000	
	Total of Decrease in Current Assets and increase in Current liabilities (E)	5,000	
	Less: Increase in Current assets and decrease in Current liabilities:		
	Marketable Securities (Rs.7,000-5,000)	2,000	
	Accounts Receivable (Rs.15,000-10,000)	5,000	
	Inventory (Rs.15,000-12,000)	3,000	
	Bills payable (Rs.20,000-0)	20,000	
	Total of Increase in Current Assets and decrease in Current liabilities (F)	30,000	
	Cash from operating activities (D+E-F) (G)		(-) 10,000
II.	**Cash from Investing Activities:**		
	Add: Cash Inflows H	Nil	
	Less: Cash outflows		
	Purchases of fixed assets (I)	10,000	
	Net cash from Investing Activities (H-I) J		(-) 10,000

			Rs.	Rs.
III.	**Cash from financing Activities**			
	Add: Cash inflows:			
	Long term loan taken	(J)	15,000	
	Less: Cash outflows:			
	Payment of Dividends	(K)	3,000	
	Net cash from Investing Activities (J-K)	(L)		12,000
	Net cash from Financing Activities			
	Net Increase/Decrease in Cash equivalent			(-) 8,000
	Cash and Cash equivalents at the beginning of the period			5,000
	Cash and Cash equivalents at the end of the period			3,000

Working Notes:

Shareholders fund means : Share capital + Reserves.

Dr.		Fixed assets a/c			Cr.
		Rs.			Rs.
To Balance b/d		50,000	By Profit & Loss adjustment a/c (depreciation)		5,000
To Bank (outflow) (Balancing Figure)		10,000	By Balance c/d		55,000
		60,000			60,000

Dr.		Other Assets a/c			Cr.
		Rs.			Rs.
To Balance b/d		8,000	By P & L adjustment a/c (depreciation) (Balancing Figure)		5,000
			By Balance c/d		5,000
		8,000			8,000

Dr.		Long term loan a/c			Cr.
		Rs.			Rs.
To Balance c/d		15,000	By Bank (inflow) (Balancing Figure)		15,000
		15,000			15,000

Dr.		Shareholder's Fund a/c			Cr.
		Rs.			Rs.
To P & L adjustment a/c (Opening balance of Profit)		40,000	By Balance b/d		60,000
To Balance c/d		70,000	By P & L adjustment a/c (Closing balance of Profit)		44,000
			By Bank (inflow) (Balancing Figure)		6,000
		1,10,000			1,10,000

Dr.		Profit & Loss Adjustment a/c	Cr.
	Rs.		Rs.
To Depreciation on fixed assets	5,000	By Shareholder's fund	40,000
To Depreciation on other assets (written off)	3,000	By Operating profit (Balancing Figure)	15,000
To Shareholders fund	44,000		
To Dividend (outflow)	3,000		
	55,000		55,000

Note: Shareholder's fund = share capital + reserves. Reserves include Profit & Loss a/c opening and closing balances. To find out the actual capital issues, we have to open the shareholders find account.

Illu.7: The Balance Sheets of EPL Limited as at 31-12-2001 were as under:

Liabilities	2000 Rs.	2001 Rs.	Assets	2000 Rs.	2001 Rs.
Share Capital	30,000	30,000	Freehold property at cost	22,500	24,000
Reserves	22,500	24,000	Plant and Machinery (at cost Less: Depreciation	13,500	16,500
6% Debentures (Unsecured)	7,500	7,500	Investment in shares of companies under the same management (unquoted)	15,000	15,000
Mortgage on Freehold property	2,700	1,425	Investments in share of other companies (quoted)	11,250	11,250
Creditors	4,500	4,500	Stock	5,250	7,500
Proposed Dividend	2,250	2,325	Debtors	4,500	7,500
Provision for tax	2,100	3,750	Bank	1,050	--
Secured Overdraft (by floating charge on assets)	1,500	8,250			
	73,050	81,750		73,050	81,750

The following additional information for the year 2001 are relevant:

		Rs.
1.	**Sales**	**67,500**
2.	**Purchases**	**52,000**
3.	**Overheads**	**8,375**
4.	**Depreciation on Plant & Machinery**	**1,750**
5.	**Dividend for the year 2001 was paid in full**	
6.	**Amount paid towards tax for 2001**	**2,150**

In view of the credit squeeze, the Company has been asked by the bank to reduce the overdraft substantially within 6 months, if possible by 50%.

Solution:

Cash Flow Statement for the year ending 31-12-2001

			Rs.	Rs.
I.	**Cash Flow from Operating Activities:**			
	Net Profit	(A)	Nil	
	Add: Non Operating Expenses and Losses:			
	Depreciation on Plant and Machinery		1,750	
	Proposed Dividend		2,325	
	Provision for Tax		3,800	
	Transfers to Reserves		1,500	
	Total of Non-operating Expenses and Losses	(B)	9,375	
	Less: Non-Operating Incomes and Gains	(C)	Nil	
	Operating profit before changes in working capital changes	(D)	9,375	
	Add: Decrease in Current assets and increase in Current Liabilities:		Nil	
	Less: Increase in Current assets and decrease in Current liabilities:			
	Stock (Rs.7,500-5,250)		2,250	
	Debtors (Rs.7,500-4,500)		3,000	
	Total Increase in Current Assets and Decreased in Current Liabilities	(F)	5,250	
	Cash from operating activities (D+E-F)	(G)		4,125
II.	**Cash from Investing Activities:**			
	Add: Cash Inflows		Nil	
	Less: Cash outflows			
	Purchases of freehold property		1,500	
	Purchase of Plant and Machinery		4,750	
	Total Cash outflows	(I)	6,250	
	Net cash from Investing Activities			(-) 6,250

III.	Cash from financing Activities		Rs.	Rs.
	Add: Cash inflows:			
	Bank Overdraft (8,250-1,500)	(K)	6,750	
	Less: Cash outflows:			
	Payment of Mortgage		1,275	
	Payment of proposed dividend		2,250	
	Payment of tax		2,150	
	Total Cash outflows	(L)	5,675	
	Net cash from Financing Activities			1,075
	Net Decrease in Cash equivalent			(-) 1,050
	Cash and Cash equivalent at the beginning of the period			1,050
	Cash and Cash equivalent at the end of the period			Nil

Working Notes:

Dr.   **Freehold Property a/c**   Cr.

	Rs.		Rs.
To Balance b/d	22,500	By Balance c/d	24,000
To Bank (outflow) (Balancing Figure)	1,500		
	24,000		24,000

Dr.   **Plant and Machinery a/c**   Cr.

	Rs.		Rs.
To Balance b/d	13,500	By P & L adjustment a/c (depreciation)	1,750
To Bank (outflow) (Balancing Figure)	4,750	By Balance c/d	16,500
	18,250		18,250

Dr.   **Mortgage on freehold property a/c**   Cr.

	Rs.		Rs.
To Bank (outflow) (Balancing Figure)	1,275	By Balance b/d	2,700
To Balance c/d	1,425		
	2,700		2,700

Dr.   **Proposed dividend a/c**   Cr.

	Rs.		Rs.
To Bank (outflow)	2,250	By Balance b/d	2,250
To Balance c/d	2,325	By P & L adjustment a/c (Balancing Figure)	2,325
	4,575		4,575

Dr.   **Provision for tax a/c**   **Cr.**

	Rs.		Rs.
To Bank (outflow)	2,150	By Balance b/d	2,100
To Balance c/d	3,750	By Profit & Loss adjustment a/c (Balancing Figure)	3,800
	5,900		5,900

Dr.   **Reserve a/c**   **Cr.**

	Rs.		Rs.
To Balance c/d	24,000	By Balance b/d	22,500
		By P & L adjustment a/c (Balancing Figure)	1,500
	24,000		24,000

Dr.   **Profit & Loss adjustment a/c**   **Cr.**

	Rs.		Rs.
To Depreciation on Plant and Machinery	1,750	By Operating profit (Balancing figure)	9,375
To Proposed dividend	2,325		
To Provision for tax	3,800		
To Reserve	1,500		
	9,375		9,375

Illu.8: Ravindra Ltd., had the following figures on 1st January 2002:

	Rs.
Fixed Assets	3,00,000
Less: Depreciation	1,05,000
	1,95,000
Bank balance	17,500
Other Current Assets	1,25,000
Capital (Shares of Rs.10 each)	1,50,000
Current liabilities	50,000

The company has prepared the following estimates for 2002

(a) Profit would be Rs.27,500 after depreciation of Rs.30,000

(b) The company will acquire Fixed Assets costing Rs.5,00,000 after selling one machine for Rs.10,000 costing Rs.25,000 and on which depreciation provided amounted to Rs.17,500.

(c) Current Assets and Current Liabilities other than Bank balance at the end of 2002 are expected to be Rs.1,47,500 and Rs.1,15,000 respectively.

(d) The company will pay Dividend at 10%.

Prepare estimated Cash Flow Statement.

Solution:

Estimated Cash Flow Statement for the year ending 31-12-2002

			Rs.	Rs.
I.	**Cash Flow from Operating Activities:**			
	Net Profit	(A)	27,500	
	Add: Non Operating Expenses and Losses:			
	Depreciation	(B)	30,000	
	Less: Non-Operating Incomes and Gains			
	Profit on Sale of machinery	(C)	2,500	
	Operating profit before working capital changes (A+B-C)	(D)	55,000	
	Add: Decrease in Current assets and increase in Current liabilities:			
	Current Liabilities (1,15,000 – 50,000)	(E)	65,000	
	Less: Increase in Current assets and decrease in Current liabilities:			
	Current assets (1,47,500 – 1,25,000)	(F)	22,500	
	Cash from operating activities (D+E-F)	(G)		97,500
II.	**Cash from Investing Activities:**			
	Add: Cash Inflows			
	Sale of Machinery	(H)	10,000	
	Less: Cash outflows			
	Purchases of fixed assets	(I)	5,00,000	
	Net cash from Investing Activities (H-J)	(J)		(-) 4,90,000
III.	**Cash from financing Activities**			
	Add: Cash inflows:			
	Bank Overdraft	(K)	3,90,000	
	Less: Cash outflows:			
	Payment of dividend	(L)	15,000	
	Net cash from financing activities (K-L)	(M)	3,75,000	
	Net Decrease in Cash equivalent			(-) 17,500
	Cash and Cash equivalent at the beginning of the period			17,500
	Cash and Cash equivalent at the end of the period			Nil

Working Notes:

Purchase of fixed assets (outflow) = 5,00,000
Sale of machine (inflow) = 10,000

Calculation of profit or loss on sale of machine:	Rs.
Cost of the machine	25,000
Less: Depreciation	17,500
Book value	7,500
Less: Selling price	10,000
Profit on sale	2,500

Calculation of dividend: (Current year (1,50,000 $\times \dfrac{10}{100}$ = 15,000 (outflow)

Dr.   **Profit & Loss adjustment a/c**   Cr.

	Rs.		Rs.
To Depreciation	30,000	By Profit on sale of machinery	2,500
To Balance c/d	27,500	By Operating profit (Balancing Figure)	55,000
	57,500		57,500

Illu.9: The Balance Sheet of XYZ Limited is as follows:

Liabilities	1998 Rs.	1999 Rs.	Assets	1998 Rs.	1999 Rs.
Equity	800	900	**Fixed Assets**	600	800
General Reserve	300	400	**Additions**	200	100
Profit & Loss A/c	200	300		800	900
Provision for taxation	300	400	**Depreciation**	300	350
Overdraft	300	464		500	550
Sundry Creditors	1,200	1,000	**Investments**	200	--
Proposed Dividend	80	90	**Stock**	1,400	1,230
			Debtors	1,080	1,774
	3,180	3,554		3,180	3,554

Profit and Loss Account (for the year ending ……..)

Liabilities	1998 Rs.	1999 Rs.	Assets	1998 Rs.	1999 Rs.
To Taxation	250	450	**By Trading profit**	430	660
To Proposed Dividend	80	90	**By Profit on sale of investment**	--	30
To Transfer to General Reserve	100	100	**By Income tax excess provided in the previous year**	--	50
To Balance c/d	200	300	**By Balance from last year**	200	200
	630	940		630	940

Additional Information:

1. For the year ending 31-12-99 purchases were Rs.60 lakhs and sales Rs.70 lakhs.
2. Trading profit of the year ended 31-12-99 was arrived at after charging depreciation Rs.50,000 and directors remuneration Rs.1,20,000.

Prepare the Cash Flow Statement.

Solution:

Cash Flow Statement for the year ending 31-12-1999

			Rs.	Rs.
I.	**Cash Flow from Operating Activities:**			
	Net Profit (Rs.300-200)	(A)	100	
	Add: Non Operating Expenses and Losses:			
	Provision for Depreciation		50	
	Transfers to General Reserve		100	
	Proposed Dividend		90	
	Provision for tax		450	
	Total Non-Operating Expenses and Losses	(B)	690	
	Less: Non-Operating Incomes and Gains			
	Profit on Investments		30	
	Provision for tax		50	
	Total Non-Operating Incomes and gains	(C)	80	
	Operating profit before working capital changes (A+B-C)	D	710	
	Add: Decrease in Current assets and increase in Current Liabilities:			
	Stock (1,400-1,230)	(E)	170	
	Less: Increase in Current assets and decrease in Current Liabilities			
	Debtors (1,774 – 1,080)		694	
	Creditors (1,200 – 1,000)		200	
	Total Increase in Current assets and Decrease in Current Liabilities	(F)	894	
	Cash from operating activities (D+E-F)	(G)		-(14)
II.	**Cash from Investing Activities:**			
	Add: Cash Inflows			
	Sale of Investments	(H)	230	
	Less: Cash outflows			
	Purchases of fixed assets	(I)	100	
	Net cash from Investing Activities (H-I)	(J)		130

III.	**Cash from financing Activities**		**Rs.**	**Rs.**
	Add: Cash inflows:			
	Issues of capital	(K)	100	
	Less: Cash outflows:			
	Payment of Tax		300	
	Payment of Proposed Dividend		80	
		(L)	380	
	Net cash from Financing Activities (K-L)	(M)		(-) 280
	Net Decrease in Cash equivalent			(-) 164
	Cash and Cash equivalent at the beginning of the period			(-) 300
	Cash and Cash equivalent at the end of the period			(-) 464

Working Notes:

Dr.   **Fixed Assets a/c**   Cr.

	Rs.		Rs.
To Balance b/d (600+200)	800	By Balance c/d (800+100)	900
To Bank (outflow) (Balancing Figure)	100		
	900		900

Dr.   **Provision for depreciation a/c**   Cr.

	Rs.		Rs.
To Balance b/d	350	By Balance c/d	300
		By Profit & Loss adjustment a/c	50
	350		350

Dr.   **Investments a/c**   Cr.

	Rs.		Rs.
To Balance b/d	200	By Bank (inflow) (Balancing Figure)	230
To P & L adjustment a/c (Profit on sale)	30		
	230		230

Dr.   **Equity Share Capital a/c**   Cr.

	Rs.		Rs.
To Balance c/d	900	By Balance b/d	800
		By Bank (inflow) (Balancing Figure)	100
	900		900

Dr.		**General Reserve a/c**		Cr.
	Rs.			Rs.
To Balance c/d	400	By Balance c/d		300
		By Profit & Loss adjustment a/c		100
		(Balancing Figure)		
	400			400

Dr.		**Provision for taxation a/c**		Cr.
	Rs.			Rs.
To Profit & Loss adjustment a/c		By Balance b/d		300
(excess provision cancelled)	50			
To Bank (outflow) (Balancing		By Profit and Loss adjustment a/c		450
figure)	300	(current year provision)		
To Balance c/d	400			
	750			750

Dr.		**Proposed dividend a/c**		Cr.
	Rs.			Rs.
To Bank (outflow)	80	By Balance b/d		80
To Balance c/d	90	By Profit & Loss adjustment a/c		90
		(Balancing Figure)		
	170			170

Dr.		**Profit & Loss adjustment a/c**		Cr.
	Rs.			Rs.
To Provision for depreciation	50	By Balance b/d		200
To General Reserve	100	By Investments (Profit)		30
To Proposed dividend	90	By Provision for tax		50
To Provision for tax	450	By Operating profit (Balancing Figure)		710
To Balance c/d	300			
	990			990

Illu.10: From the following particulars prepare cash flow statement.

1. **Net profit for 2009 after giving effect to the following was Rs.67,000**
2. **Plant sold during the year for Rs.1,23,000 cost being Rs.2,00,000, provision for depreciation Rs.50,000.**
3. **A part of old premises was disposed off far Rs.49,000 its cost was Rs.13,000 and depreciation was Rs.8,000.**
4. **Remaining part of old premises was renovated at a cost of Rs.52,000, its cost earlier being Rs.98,000 and depreciation provided Rs.16,000.**
5. **No depreciation was provided during the year on 2,3 and 4**

6. **12% preference shares 3,00,000 were redeemed at a premium of 10%.**
7. **15% debentures 2,00,000 were issued at a discount of 5%.**
8. **10,000 equity shares of 100 each were converted into 1,00,000 equity shares of 10 each.**
9. **A plant costing 10,000 was exchanged for furniture of the same value.**
10. **Cash at bank as at the beginning was Rs.40,000 and at the end Rs.1,10,000.**

Solution:

Cash Flow Statement for the year ending 31-12-2009

			Rs.	Rs.
I	**Cash Flow from Operating Activities:**			
	Net Profit	(A)	67,000	
	Add: Non Operating Expenses and Losses:			
	Loss on sale of plant		27,000	
	Premium on Preference shares		30,000	
	Discount on issue of Debentures		10,000	
	Total Non-Operating Expenses and losses	(B)	67,000	
	Less: Non-Operating Incomes and Gains			
	Profit on sale of premises	(C)	44,000	
	Operating profit before changes in working capital (A+B-C)	(D)	90,000	
	Add: Decrease in Current assets and increase in Current Liabilities	E	Nil	
	Less: Increase in Current assets and decrease in Current liabilities	F	Nil	
	Cash from operating activities (D+E-F)	(G)		90,000
II	**Cash from Investing Activities:**			
	Add: Cash Inflows			
	Sale of Plant		1,23,000	
	Sale of premises		49,000	
	Total Cash inflows	(H)	1,72,000	
	Less: Cash outflows			
	Renovation of premises	I	52,000	
	Net cash from Investing Activities (H-I)	(J)		1,20,000
III	**Cash from financing Activities**			
	Add: Cash inflows:			
	Issues of Debentures (2,00,000-10,000)	(K)	1,90,000	
	Less: Cash outflows:			
	Redemption of Pref. shares (3,00,000+30,000)	L	3,30,000	
	Net cash from Financing Activities (K-L)	M		(-) 1,40,000

	Rs.	Rs.
Net Increase in Cash equivalent		70,000
Cash and cash equivalents at the beginning of the period		40,000
Cash and cash equivalents at the end of the period		1,10,000

Working Notes:

Dr. **Profit & Loss adjustment a/c** Cr.

	Rs.		Rs.
To Loss on sale of plant	27,000	By Profit on sale of premises	44,000
To Premium on preference shares $3,00,000 \times \frac{10}{100}$)	30,000	By Operating profit (Balancing Figure)	90,000
To Discount on issue of debentures ($2,00,000 \times \frac{5}{100}$)	10,000	(or) Cash flow operations (inflow)	
To Balance c/d	67,000		
	1,34,000		1,34,000

	Rs.	
Plant cost	2,00,000	
Less: Depreciation	50,000	
	1,50,000	
Less: Sales	1,23,000	(inflow)
Loss	27,000	
Cost of Old premises	13,000	
Less: Depreciation	8,000	
	5,000	
Less: Sales	49,000	(inflow)
Profit	44,000	

Note: It was mentioned in 5th point that no depreciation was provided on 2nd, 3rd and 4th points. Hence depreciation was not recorded in Profit & Loss account. Those amounts were taken only at the time of ascertaining the profit or loss.

14.5 QUESTIONS

1. Explain the role of non-current assets and non-current liabilities in the generation of cash.
2. Explain the various items regarding inflow and outflow of cash.

14.6 EXERCISES

1. The following details are available from a company Balance Sheet as on 31st December:

Liabilities	2001	2002	Assets	2001	2002
	Rs.	Rs.		Rs.	Rs.
Share capital	70,000	74,000	Cash	9,000	7,800
Debentures	12,000	6,000	Debtors	14,900	17,700
Provision for			Stock	49,200	42,700
doubtful debts	700	800	Land	20,000	30,000
Trade creditors	10,360	11,840	Goodwill	10,000	5,000
Profit & Loss a/c	10,040	10,560			
	1,03,100	1,03,200		1,03,100	1,03,200
Profit & Loss a/c	10,000	10,600			

In addition, you are given:
- (a) Dividend paid during the year 2002 Rs.3,500
- (b) Land was purchased for Rs.10,000. Amount provided for amortization of goodwill Rs.5,000.
- (c) Paid for debentures redemption Rs.6,000
    Prepare Cash Flow Statement.

    [Ans.: Net Cash from operating Activities Rs.14,300; Net Cash used in Investing Activities Rs.(-) 10,000; Net Cash from financing activities Rs.(-) 5,500; Net decrease in cash Rs.(-) 1,200]

2. The following are the balance sheets of Sarat Ltd. at the end of the year 1997:

Assets	1-1-1997	31-12-1997
	Rs.	Rs.
Cash and bank balances	45,000	45,000
Sundry Debtors	33,500	21,500
Temporary Investments	55,000	37,000
Pre-paid expenses	500	1,000
Stock-in-trade	41,000	53,000
Land and Buildings	75,000	75,000
Machinery	26,000	35,000
	2,76,000	2,67,500
Liabilities and Capital		
Sundry Creditors	51,500	48,000
Outstanding expenses	6,500	6,000

Assets	1-1-1997	31-12-1997
	Rs.	Rs.
8% Debentures	45,000	35,000
Depreciation fund	20,000	22,000
Reserve for contingencies	30,000	30,000
Profit and Loss Account	8,000	11,500
Capital	1,15,000	1,15,000
	2,76,000	2,67,500

The following information is also available:
a.   10% dividend was paid in cash.
b.   New machinery for Rs.15,000 was purchased but old machinery costing Rs.6,000 was sold for Rs.2,000; accumulated depreciation was Rs.3,000.
c.   Rs.10,000 8% Debentures were redeemed by purchase from open market @ 96 per debenture of Rs.100.
d.   Rs.18,000 investments were sold at book value.
     You are required to prepare Cash Flow Statement.

[Ans.: Net Cash from operating Activities Rs.16,100; Net Cash used in Investing Activities Rs.(-) 13,000; Net Cash from Financing activities Rs.(-) 21,100; Net decrease in cash Rs.(-) 18,000]

3.   From the following prepare a cash flow statement for XYZ Ltd. for the year 2006.

XYZ Ltd.,
Balance Sheet as at 1ˢᵗ January, 2006

Liabilities and Equity	Rs.('000)	Assets	Rs.	Rs.('000)
Paid up capital	50	Gross Fixed Assets	1,000	
Retained earnings	350	Less: Accum.Dep.	100	
Long-term debt	500			900
Notes payable	80	Inventory		100
Accounts payable	80	Accounts receivables		50
		Cash		10
	1,060			1,060

Balance Sheet as at 31ˢᵗ December, 2006

Liabilities and Equity	Rs.('000)	Assets	Rs.	Rs.('000)
Paid up capital	50	Gross Fixed Assets	1,125	
Retained earnings	415	Less: Accum.Dep.	175	950
Long-term debt	550	Inventory		110
Notes payable	100	Accounts receivables		60
Accounts payable	90	Cash		85
	1,205			1,205

Income Statement 31ˢᵗ December, 2006 (Rs.'000)

Sales	1,200
Less: Cost of goods sold	(-) 800
Gross Profit	400
Less: Selling, General, administration expenses	(-) 150
EBIT	250
Less: Interest expenses	(-) 50
EBT	200
Less: Taxes (50%)	(-) 100
Net Income	100
Additional Information:	
(i) Dividend paid	35
(ii) Additions to retained earnings	65
(iii) Depreciation	75

[Ans.: Net Cash from operating Activities Rs.1,85,000; Net Cash used in Investing Activities Rs.(-) 1,25,000; Net Cash from financing activities Rs.15,000; Net increase in cash Rs.75,000]

4. The following are the Balance Sheet of PQR Ltd., for the years 2001and 2002. Prepare a cash flow statement and comment.

Balance Sheet as at 31ˢᵗ March (Rs. in lakhs)

Liabilities	2001 Rs.	2002 Rs.	Assets	2001 Rs.	2002 Rs.
Share capital	300	460	Fixed Assets	630	690
General reserves	150	180	Investments	130	180
P & L a/c	30	65	Current assets, loans and advances		
Term loans	210	150	Inventories	180	220
Bank overdraft	250	300	Debtors	135	220
Sundry Creditors	80	100	Cash and Bank balances	5	15
Other Liabilities	85	100	Other advances	25	30
	1,105	1,355		1,105	1,355

Additional Information:

a. Dividend was declared @ 25% of the share capital. Additional capital of Rs.160 lakhs was brought in during the beginning of January, 2002 and is eligible for dividend on prorata.

b. Depreciation on fixed assets provides in Rs.75 lakhs for 2001and Rs.90 laksh for 2002 respectively.

[Ans.: Net Cash from operating Activities Rs.60,00,000; Net Cash used in Investing Activities Rs.(-) 200,00,000; Net Cash from financing activities Rs.150,00,000; Net increase in cash Rs.10,00,000]

14.7 REFERENCE BOOKS

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Chapter – 15

MARGINAL COSTING

Objectives :

After studying this unit you should be able to :

- know the meaning and importance of marginal costing
- distinguish between absorption costing and marginal costing
- determine the margin of safety
- understand the benefits and limitations of marginal costing

Structure :

15.1 INTRODUCTION

Marginal Costing is a useful technique which guides management in pricing, decision making and assessment of profitability. It classifies costs into fixed and variable ones. The expenses which vary directly in proportion to the volume of production are termed as 'variable expenses'. The expenses which remain constant or unaffected by the change in output are called 'fixed expenses'. This distinction forms the basis of marginal costing.

Profit is influenced by the changes infixed expenses and these expenses will remain static and do not affect decision – making. More over they are largely uncontrollable. The theory of marginal costing, therefore, argues that only variable expenses should be taken into account for purposes of product pricing, inventory valuation and other important management decisions.

15.1.1 Marginal Cost:

The Institute of Cost and Works Accountants, London, defined marginal costs as "the amount at any given volume of output by which aggregate costs are changed, if the volume of

output is increased or decreased by one unit of output". It is the additional cost of producing one additional unit. It arises from the production of additional increments of output.

Illu.1: A factory produces plastic cans. The variable cost of the can is Rs.5. The fixed costs are Rs.5,000 per annum. Presently 200 cans are produced annually. The cost sheet of 200 cans would be:

	Rs.
Variable cost (200 × Rs.5)	1,000
Fixed cost	5,000
Total cost	6,000

If production is increased by one plastic can, the cost sheet of 201 can would be:

	Rs.
Variable Cost (201 × 5)	1,005
Fixed Cost	5,000
Total Cost	6,005

Marginal cost per unit is Rs.5 (i.e., the cost of producing one additional unit). Marginal cost, thus consists of prime cost plus total variable overheads. It should also be remembered that marginal cost takes into account only variable cost and excludes the fixed cost. With in the capacity of an organisation, an increase of one unit in production, obviously, will cause an increase in variable costs only. The following illustration will make this clear.

Illu.2: Following information relates to a factory, manufacturing good quality fountain pens:

Total cost Rs.	Production (units)	Direct material Rs.	Labour Rs.	Other variable costs Rs.	Fixed costs Rs.
3,250	500	1,000	750	500	1,000
5,500	1,000	2,000	1,500	1,000	1,000
7,750	1,500	3,000	2,250	1,500	1,000
10,000	2,000	4,000	3,000	2,000	1,000
12,250	2,500	5,000	3,750	2,500	1,000

Calculate marginal cost of production.

Solution:

Marginal Cost of Production

Production Units	Total Costs (a)		Fixed Costs (b)		Marginal Cost (c) = (a) – (b)	
	Total Rs.	Per Unit Rs.	Total Rs.	Per Unit Rs.	Total Rs.	Per Unit Rs.
500	3,250	6.50	1,000	2.00	2,250	4.50
1,000	5,500	5.50	1,000	1.00	4,450	4.50
1,500	7,750	5.17	1,000	0.67	6,750	4.50
2,000	10,000	5.00	1,000	0.50	9,000	4.50
2,500	12,250	4.90	1,000	0.40	11,250	4.50

The above table shows that with an increase in production the total cost per unit is decreasing. This happens because the fixed overheads which are constant at all levels of output are apportioned over larger outputs. Hence, cost of output per unit goes on declining with every increase in volume of output. It will be seen that while the marginal cost of production per unit remains constant (at Rs.4.50), the fixed cost per unit decreases from Rs.2 to Rs.0.40. Marginal cost has been calculated thus:

Marginal Cost = Direct Material Cost + Direct Labour Cost +
Direct expenses + Variable overheads

OR

Marginal Cost = Total Cost – Fixed Cost

15.2. MARGINAL COSTING

Marginal Costing is a technique where only the variable costs are taken into account while calculating the cost of product. The fixed costs are met against the total fund arising out of excess of selling price over total variable cost. This fund is called **Contribution.** Let us know go through various definitions given for Marginal Costing.

1. **ICMA London:** According to ICMA London, Marginal Costing is a technique where only the variable costs are charged to cost units, the fixed cost attributable being written off in full against the contribution for the period.

2. **D. Joseph:** Marginal Costing is a technique of determining the amount of change in the aggregate cost due to an increase of one unit over the existing level of production.

3. **Horold J. Wheldon:** Other things being equal, the fixed overhead will, in total remain fixed during changes in production achieved and the rate per unit will

consequently vary, where as that variable overhead will remain constant per unit of production and vary in total.

15.2.1 Characteristics of Marginal Costing:

1. It is a technique of analysis and presentation of cost rather than an independent method of costing. It can be applied with any method of costing.
2. Basically it involves differentiation of variable costs from fixed costs. It considers only variable costs in its analysis.
3. It guides pricing and other managerial decisions on the basis of contribution.
4. The stock of finished goods and work-in-progress are valued at marginal cost.
5. Fixed costs are charged against the contribution earned during a period. No portion of fixed cost is carried forward to next period.
6. The difference between the contribution and fixed cost represents either profit or loss, excess of contribution and fixed cost is the profit and the deficiency of contribution to fixed cost is the loss.

15.3 ABSORPTION COSTING AND MARGINAL COSTING

Absorption Costing technique is also known as Traditional or Full Cost Method. In this method, both fixed and variable costs are recovered from production. The variable costs, such as those of direct materials, direct labour etc., are directly charged to the products, while fixed costs are apportioned on a suitable basis over various products manufactured during a period. All costs are, thus, identified with manufactured products.

Illu.3: A Company is manufacturing 3 products A, B and C. The costs of their manufacture are as follows:

	A	B	C
	Rs.	Rs.	Rs.
Direct material pre Unit	3	4	5
Direct labour	2	3	4
Selling price	10	15	20
Output (Units)	1,000	1,000	1,000

The total overheads are Rs.12,000 out of which Rs.9,000 are fixed and rest are variable. It is decided to apportion these costs over different products in the ratio of output. You are required to prepare:

(a) A statement showing cost of each product and profit according to absorption costing and
(b) A statement of cost and profit according to the Marginal costing technique.

Solution: (A)

Statement Showing Cost and Profit
(According to Absorption Costing Technique)

Particulars	A = 1,000		B = 1,000		C = 1,000	
	Per Unit	Total Rs.	Per Unit	Total Rs.	Per Unit	Total Rs.
Direct Material	3	3,000	4	4,000	5	5,000
Direct labour	2	2,000	3	3,000	4	4,000
Prime Cost	5	5,000	7	7,000	9	9,000
Add: Overheads:						
Fixed	3	3,000	3	3,000	3	3,000
Variable	1	1,000	1	1,000	1	1,000
Total Cost	9	9,000	11	11,000	13	13,000
Profit	1	1,000	4	4,000	7	7,000
Sales	10	10,000	15	15,000	20	20,000

Total Profit = Rs.1,000 + Rs.4,000 + Rs.7,000 = Rs.12,000

The system of absorption costing has a number of limitations. It assumes that prices are simply a function of costs. The demand side of the product is throughly discounted. Only past costs are considered which arriving at pricing decisions. Further, it does not offer information which helps decision making in a changing environment.

More importantly charging of fixed costs to different products on a suitable basis poses innumerable problems. These costs have to be incurred whether there is production or not. In other words, the cost of a product not only depends on expenses which have been incurred directly but also on the volume of output. For example, if the cost of direct material and direct labour for a product is Rs.2 and Rs.4 respectively and the volume of output is 500 units the total cost of production will be as under:

	Rs.
Costs of Direct material and labour	3,000
Fixed Overheads	1,000
Total Cost	4,000

The cost per unit comes to Rs.8. In case the output is only 400 units the cost of production (400 × 6 + 10,000) would be Rs.3,400 and cost per unit would increases not because prices of materials or labour have gone up, but because lower level of production. Obviously, the whole exercise seems to be illogical. The technique of marginal costing is employed to overcome this deficiency, by charging, fixed costs against the total fund arising out of excess of selling price over variable cost.

(b) Marginal Cost Statement

Particulars		A = 1,000		B = 1,000		C = 1,000	
		Per Unit	Total Rs.	Per Unit	Total Rs.	Per Unit	Total Rs.
Sales	(S)	10	10,000	15	15,000	20	20,000
Less: Marginal Cost:							
Direct Material		3	3,000	4	4,000	5	5,000
Direct Labour		2	2,000	3	3,000	4	4,000
Prime Cost		5	5,000	7	7,000	9	9,000
Variable Overheads		1	1,000	1	1,000	1	1,000
Total Marginal Cost	(V)	6	6,000	8	8,000	10	10,000
Contribution (S-V)	(C)	4	4,000	7	7,000	10	10,000
Selling Price		10	10,000	15	15,000	20	20,000

Thus, the total contribution from the three products, A, B and C is Rs.21,000. The profit will now be computed as follows:

	Rs.
Total Contribution	21,000
Fixed costs	9,000
Profit	12,000

15.3.3 Differences between Marginal Costing and Absorption Costing:

The difference between absorption costing and marginal costing, as the above illustrations show, is based on the recovery to fixed overheads. In absorption costing both fixed and variable overheads are charged to production. As a result, work in progress and finished goods are valued at 'works cost' and 'total cost of production' respectively, giving effect to fixed overheads. In marginal costing only variable overheads are charged to production, thereby leading to under-recovery of overheads. This obviously leads to undervaluation of closing stock. But this does not result in carrying over of fixed overheads of one period to another, as it happens in absorption costing. The main points of difference between absorption costing and marginal costing are given below:

Differences between Marginal and Absorption Costing

Basis of Difference	Absorption Costing	Marginal Costing
1. Fixed Costs	Fixed overheads are charged to the product to be subsequently released as a part of cost of goods sold i.e., it is included in cost per unit.	Fixed costs are not included while computing cost per unit.

Basis of Difference	Absorption Costing	Marginal Costing
2. Profit	Profit is the difference between sales and cost of goods sold.	Profit in marginal costing is ascertained by establishing the total contribution and then deducting therefrom the total fixed expenses. Contribution is the excess of sales over variable cost.
3. Classification of Costs	Costs are rarely classified into variable and fixed. Although such a classification is possible, it fails to establish a cost – volume profit relationship.	Cost – Volume – Profit relationship is an essential part of marginal costing. Costs have to be classified into fixed costs and variable costs.
4. Valuation of Inventories	If inventories increase during a period, this method will reveal more profit than marginal costing. When inventories decrease, less profits are reported because in this method closing stock is valued at higher figures.	If inventories increase during a period, this method generally reports less income than absorption costing, but when inventories decrease this method reports more net income.
5. Recovery of Overheads	Apportionment of fixed costs is arbitrary and this may result in under recovery of overheads.	There is no arbitrary apportionment of fixed overheads, as fixed costs are excluded.

15.3.4 Contribution:

Contribution represents the difference between sales and variable costs. It may be considered as some sort of fund from out of which all fixed costs are to be met. The difference between contribution and fixed costs represents either profit or loss, as the case may be. Contribution is also called 'Gross Margin'. Contribution can be expressed thus:

Contribution	=	Selling Price – Variable cost
		Or
		Fixed Cost + Profit or Loss
Profit/Los	=	Contribution – Fixed Cost

15.3.5 Marginal Cost Equation:

The algebraic expression of contribution is known as Marginal Cost Equation. It can be expressed as follows:

$$S - V = F + P$$

Where

    S = Selling Price
    V = Variable Cost
    F = Fixed Cost
    P = Profit

Illu.4: From the following information find out the amount of profit earned during the year using marginal cost technique.
    Fixed cost Rs.5,00,000
    Variable cost Rs.10 per unit
    Selling price Rs.15 per unit
    Output level 1,50,000 units.

Solution:
    Sales = 1,50,000 units $\times$ 15 = Rs.22, 50,000
    Variable cost = Rs.1,50,000 $\times$ 10 = Rs.15,00,000
    Fixed cost = Rs.5,00,000
    S – V = F + P
    Rs.22,50,000 – Rs.15,00,000 = 5,00,000 + P
    Rs.7,50,000 – 5,00,000 = P
    Rs.2, 50,000 = P
    P = Rs.2, 50,000

15.4. BENEFITS OF MARGINAL COSTING

The technique of marginal costing is of immense use to the management in taking various decisions. It helps the management in taking the following decisions:

1.   **Helps in determining level of output:** Marginal costing helps in finding out the output which is most profitable for running a concern. This, in turn, helps in utilising plant capacity in full, and realise maximum profits. By determining the most profitable relationships between cost, price and volume, marginal costing helps a business to determine most competitive prices for its product.

2.   **Help in selection of most suitable product mix:** By applying marginal costing techniques, the most suitable production line could be determined. The profitability

of various products can be compared and the most products which languish behind and which do not seem to be feasible (in view of their inability to recover marginal cost) may be eliminated from the production line by keeping the capacity and resources constrains in mind. It will also serve as a guide in arriving at the price for new products.

3. **Helps in determining Make or Buy decisions:** The marginal cost of producing an article inside the factory serves as a useful guide while arriving at make or buy decisions. The costs of manufacturing can be compared with the costs of buying outside and a suitable decision can be arrived at easily.

4. **Helps in the selection of method of production – Manual or Machine Based:** In case a particular product can be produced by two or more methods, ascertaining the marginal cost of producing the product by each method will help in deciding as to which method should be followed. The same is true in case of decisions to use machine power in place of manual labour.

5. **Helps in decision making during Recessionary period:** In periods of trade depression, marginal costing helps in deciding whether production in the plant should be suspended temporarily or continued in spite of low demand for the firm's product.

6. **Help in product planning:** Marginal costing helps in determining the no-profit no-loss point. The efficiency and economy of various products, plants, departments can also be determined. This helps in profit planning as well as cost control.

15.5 LIMITATIONS OF MARGINAL COSTING

Marginal costing has the following limitations:

1. **Difficulty in Classifications:** In marginal costing, costs are segregated into fixed and variable. In actual practice, this classification scheme proves to be superfluous in that certain costs may be partly fixed and partly variable and certain other costs may have no relation to volume of output or even with the time. In short, the categorization of costs into fixed and variable elements is a difficult and tedious job.

2. **Difficulty in Application:** The marginal costing technique cannot be applied in industries where large stocks in the form of work in progress (job and contracting firms)

3. **Defective Inventory Valuation:** Under marginal costing, fixed costs are not included in the value of stock of finished goods and work in progress. As fixed costs are also incurred, these should form part of the cost of the product. By eliminating fixed costs from

finished stock and work in progress, marginal cost is objectionable because of other reasons also:

   i. In case of loss by fire, full loss cannot be recovered from the insurance company.
   ii. Profits   will be lower, than that shown under absorption costing and hence may be objected by taxation authorities.
   iii. Circulating assets will be estimated in the balance sheet.

4.   Objectionable basis of Pricing: In marginal costing, sale prices are arrived at on the basis of contribution alone. This is an objectionable practice. For example, in the long run, the selling price should not be fixed on the basis of contribution alone as it may result in losses or low profits. Other important factors such as fixed costs, capital employed should also be taken into account while fixing selling prices. Further, it is also not correct to lay more stress in selling function, as is done in marginal costing and relegate production function to the background.

5.   Limited scope: The utility of marginal costing is limited to short run profit planning and decision making. For decisions of far reaching importance, one is interested in special purpose cost rather than variable cost. Important decisions on several occasions, depend on non-cost considerations also, which are thoroughly discounted in marginal costing.

In view of these limitations marginal costing needs to be applied with necessary care and caution. Fruitful results will emerge only when management tries to apply the technique in combination with other useful techniques such as budgetary control and standard costing.

15.6 QUESTIONS

I. Short Questions:

1.   Defined the term 'marginal costing'.
2.   How can the cost be classified on the basis of variability?
3.   What is contribution?

II. Essay type questions:

1.   Explain the advantages and disadvantages of marginal costing.
2.   Discuss the applications of the marginal costing technique.
3.   Define Marginal Costing. Explain the advantages and limitations of Marginal Costing.
4.   Define Marginal Costing. Explain the differences between Marginal Costing and absorption costing.
5.   What is marginal costing? Explain the advantages and disadvantages of marginal costing.

15.7 EXERCISES

1. What is the amount of Fixed Costs when sales in Rs.2,40,000; Direct Material is Rs.80,000; Direct Labour is Rs.50,000, Variable overheads are Rs.20,000 and profit is Rs.50,000?

      [Ans.: Fixed Costs: Rs.40,000]

2. From the following information, calculate margin of safety.

	Rs.
Sales (4,000 units @ Rs.25 each)	1,00,000
Variable cost	72,000
Fixed expenses	16,800

      [Ans.: Margin of Safety Rs.40,000]

3. Given, fixed cost of Rs.5,00,000; variable cost as Rs.10 per unit; selling price of Rs.15 per unit and output as 1,50,000 units, find the profit earned.

      [Ans.: Profit Rs.2,50,000]

4. Using the information given below, prepare operating statements for the months of June and July, 2007 using.

    (i)   Marginal costing technique and (ii) Absorption costing

	Per unit Rs.
Selling price	50
Direct material cost	18
Direct labour cost	4
Variable production overhead	3

    Monthly costs:

Fixed production overheads	99,000
Fixed selling expenses	15,000
Fixed administration expenses	25,000

Variable selling costs are 10% of sales revenue and normal production capacity is 11,000 units per month. The other details are:

	Sales (units)	Production (units)
June	10,000	12,000
July	12,000	10,000

[Ans.: Profits: (i) Rs.61,000; Rs.1,01,000; (ii) Rs.81,670; 80,330]

5. The following data are obtained from the records of a factory:

	Rs.	Rs.
Sales 4,000 units at Rs.25 each		1,00,000
Materials consumed	40,000	
Labour charges	20,000	
Variable overheads	12,000	
	72,000	
Fixed overheads	18,000	90,000
Profit		10,000

It is proposed to reduce the selling price by 20%. What extra units should be sold to obtain the same amount of profit as above?

[Ans.: Units sold: (a) 14,000 units; Extra units to be sold: 14,000 4,000 = 10,000 units]

6. On the basis of the following data prepare a Marginal cost statement:

Variable Cost	Rs.	Rs.
Direct Material	4,500	
Direct Wages	2,500	
Factory overhead	1,050	
Administration, selling and distribution overhead	1,600	9,650
Fixed Cost		
Factory overhead	400	
Administration, selling and distribution overhead	670	1,070
Total Cost		10,720
Profit		4,280
Sales		15,000

[Ans.: Profit Rs.4,280]

7. Takur Ltd., produces 1 standard type of article. The results of last 4 months of 2007 are as follows.

	September	October	November	December
Output in Units	200	300	400	600

Prime Cost is Rs.10 per unit

Variable expenses are Rs.2 per unit

Fixed expenses are Rs.36,000 p.a.

Find out cost per unit of each month.

[Ans.: Cost per unit: Oct. Rs.10; Nov. Rs.7.50; Dec. Rs.5]

8. Calculate the fixed cost from the following information:

	2006	2007
Sales (Rs.)	4,00,000	6,00,000
Profit (Rs.)	80,000	2,00,000

[Ans.: Rs.1,60,000]

15.8 REFERENCE BOOKS

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Chapter – 16

MARGINAL COSTING – CVP ANALYSIS

Objectives :

After reading this lesson you should be able to :
*   understand the break even analysis and profit/volume ratio
*   know the meaning and importance of margin of safety
*   prepare break even chart of an organization

Structure :

16.1   Break Even Analysis
16.2   Profit/Volume Ratio
16.3   Margin of Safety
16.4   Break Even chart
16.5   Advantages of Break-Even Analysis
16.6   Limitations of Break-Even Analysis
16.7   Self Assessment Questions
16.8   Exercises
16.9   Reference Books

16.1. BREAK-EVEN ANALYSIS

Break even analysis is a specific method of presenting and studying the inter relationship between costs, volume and profits. (Hence, it also known as Cost – volume – Profit Analysis – C.V.P Analysis). It is an important tool of financial analysis whereby the impact on profit of the changes in volume, price, costs and mix can be found out with a certain amount of accuracy. A business is said to break even when its total sales are equal to its total costs. Break even point is a point of no profit or no loss. At this point contribution is just sufficient to recover the fixed costs. Break even point can be calculated in units or sales. It can be calculated with the help of any of the following formulae.

1.   B.E.P. (in Units) $= \dfrac{\text{Fixed cost}}{\text{Contribution per unit}}$

$= \dfrac{\text{Fixed cost}}{\text{Selling price per unit - Variable cost per unit}}$

2.   B.E.P. (Sales) $= \dfrac{\text{Fixed cost}}{\text{Contribution per unit}} \times \text{Selling price per unit}$

3. $\dfrac{\text{Fixed cost}}{\text{Total contribution}} \times \text{Total sales (Or)} \dfrac{F \times S}{S - V}$

4. $\dfrac{\text{Fixed cost}}{1 - \dfrac{\text{Variable Cost per unit}}{\text{Selling Price per unit}}} = \dfrac{\text{Fixed cost}}{\text{P/V Ratio}}$

5. B.E.P. = $\dfrac{\text{Fixed cost}}{\text{Fixed costs} + \text{net profit}} \times$ Sales

At break-even point the desired profit will be zero. Where the volume of output sales is to be calculated so as to earn a desired amount of profit, the amount of desired profit has to be added to the fixed cost.

Units to earn a desired profit: = $\dfrac{\text{Fixed cost} + \text{Desired Profit}}{\text{Contribution Per Unit}}$

Sales to earn a desired profit: = $\dfrac{\text{Fixed cost} + \text{Desired Profit}}{\text{P/V Ratio}}$

Illu.1: From the following particulars calculate the Break-even point in terms of both quantity and value:

Production in units	10,000
Sales price	Rs.5.00 per unit
Variable costs	Rs.20,000
Fixed costs	Rs.12,000

Solution: Calculation of Break-even Point

Break-even Point (in terms of quantity):

$= \dfrac{\text{Fixed Expenses}}{\text{Selling Price pr unit - Variable Cost Per Unit}} = \dfrac{Rs.12,000}{5.00 - 2.00} = 4,000$ Units.

Break-even Point in quantity = 4,000 Units

Break-even Point in Value = Break-even Point in Quantity $\times$ Selling price per unit

= 4,000 Units $\times$ Rs.5.00 = Rs.20,000.

Note: Variable Cost per unit = $\dfrac{Rs.20,000}{10,000 \text{ units}}$ = Rs.2.00

16.2. PROFIT/VOLUME RATIO

The profitability of business operations could be found out by calculating the profit – volume ratio (P/V Ratio). It is the ratio of contribution to sales. It is also known as **marginal – income ratio, contribution – Sales ratio or variable – profit ratio**. The ratio can be shown in the form of a percentage also.

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \ \text{or} \ \frac{\text{Sales - Variable Costs}}{\text{Sales}}$$

$$= \frac{C}{S} \ \text{or} \ \frac{S - V}{S} \ \text{or} \ \frac{F + P}{S}$$

$$= 1 - \frac{\text{Variable Costs}}{\text{Sales}}$$

The ratio can also be shown by comparing the change in contribution to change in sales, or change in profit to change in sales. Any increase in contribution, obviously, would mean increase in profit, as fixed expenses are assumed to be constant at all levels of production.

$$\textbf{P/V Ratio =} \ \frac{\text{Change in Contribution}}{\text{Change in Sales}} = \frac{\text{Change in Profit}}{\text{Change in Sales}}$$

The importance of P/V Ratio lies in its use for evaluating the profitability of alternative products or proposals. A higher ratio shows grater profitability. Management should, therefore, try to increase P/V Ratio by widening the gap between the selling price and the variable costs. This can be achieved by increasing sale price, reducing variable costs or switching over to more profitable products.

Illu.2: A Company producing a single article sells at Rs.20 each. The marginal costs of production is Rs.12 each and fixed cost is Rs.8,000 p.a. calculate I) the P/V ratio, ii) sales required to break – even.

Solution:

(i)   Calculation of P/V. Ratio:

	Rs.
Fixed Cost	8,000
Selling price per unit	20
Margin cost per unit	12

P/V. Ratio	$= \dfrac{\text{Sales - Margin Cost}}{\text{Sales}} \times 100$
	$= \dfrac{20 - 12}{20} \times 100 = 40\%$
P/V. Ratio	$= \ 40\%$

(ii)   Sales Required to Break-even: $\dfrac{\text{Fixed Cost}}{\text{P.V. Ratio}} = \dfrac{8,000}{40\%} = 8,000 \times \dfrac{100}{40} = \text{Rs.20,000}$

Sales Required to Break-even = Rs.20,000.

Illu.3: Calculate margin of safety and the amount of actual sales from the following:

		Rs.
(i)	**Profit**	**10,000**
(ii)	**PV Ratio**	**50%**
(iii)	**BEP Sales**	**20,000**

Solution:

(i) Calculation of Margin of safety and the amount of actual Sales:

$$\text{Margin of Safety} = \frac{\text{Profit}}{\text{P.V. Ratio}} = \frac{10,000}{50\%} = 10,000 \times \frac{100}{50} = Rs.20,000$$

Margin of Safety = Rs.20,000

(ii) The amount of actual sales:

Margin of Safety	=	Actual Sales – Break-even-Point sales
Rs.20,000	=	Actual Sales – Rs.20,000
Actual Sales	=	Rs.20,000 + 20,000
Actual Sales	=	Rs.40,000

Illu.4: The following figures relating to Sales and profits of a company are of two periods.

	Sales (Rs.)	Profit(Rs.)
Year ending 31-12-2001	**1,00,000**	**15,000**
Year ending 31-12-2002	**1,20,000**	**23,000**

Calculate (a) P.V. ratio (b) Fixed cost, (c) Break-even point.

Solution:

i.   P.V. Ratio = $\dfrac{\text{Change in profit}}{\text{Change in Sales}} \times 100$

       = $\dfrac{8,000}{20,000} \times 40\%$

ii.   S(P.V.Ratio) = F+P; 1,00,000 ($\frac{40}{100}$) = F + 15,000;

      40,000 = F + 15,000; 40,000 – 15,000 = F; 25,000 = F, F = Rs.25,000

iii.   BEP Sales = $\dfrac{F}{P.V.Ratio}$ = $\dfrac{25,000}{40\%}$ = $\dfrac{25,000 \times 100}{40}$ = Rs.62,500

iv.   S (P.V. Ratio) = F + P; 1,25,000 ($\frac{40}{100}$) = 25,000 + P;

50,000 = 25,000 + P = 50,000 – 25,000 = P; 25,000 = P

    P = Rs.25,000

S(P.V Ratio) = F + P, S $(\frac{40}{100})$ = 25,000 + 20,000

S $(\frac{40}{100})$ = 45,000; S = 45,000 × $\frac{100}{40}$ = Rs.1,12,500

16.3 MARGIN OF SAFETY

Total sales minus the sales at break even point is known as the margin of safety. Lower break – even point means a higher margin of safety. Margin of safety can also be expressed as a percentage of total sales. The formula is:

Margin of Safety = Total Sales – Sales at BEP

<div align="center">Or</div>

$$\frac{Profit}{P/V \; ratio}$$

Margin of Safety (as a percentage) = $\frac{Margin \; of \; safety}{Total \; sales} \times 100$

Higher margin on safety shows that the business is sound. Even when sales substantially come down the business may earn profit. Lower margin of safety, means that when sales come down slightly profit position may affect adversely. Thus, margin of safety can be used to test the soundness of a business. In order to improve the margin of safety, a business can increase selling prices (without affecting demand, of course) reducing fixed or variable costs and replacing unprofitable products with profitable ones.

Illu.5: From the following information calculate:
(a) P/V Ratio.
(b) Break Even Point
(c) Margin of Safety.

	Rs.
Total Sales	**3,60,000**
Selling price per unit	**100**
Variable Cost per unit	**50**
Fixed Costs	**1,00,000**

(d) If selling prices is reduced to Rs.90, by how much is the margin of safety is reduced?

Solution:

(a) Calculation of Break-even-point:

$$\text{Break-even point} = \frac{\text{Fixed Costs}}{\text{Selling price per unit - Variable cost per unit}}$$

Break-even-Point $= \dfrac{1,00,000}{100 - 50} = \dfrac{1,00,000}{50} = 2,000$ units

Break even Sales   =   2,000 units @ Rs.100 per unit

                                =   Rs.2,00,000

(b) P.V. Ratio $= \dfrac{S - V}{S} \times 100$

                                $= \dfrac{3,60,000 - (3,600 \times 50)}{3,60,000} \times 100$

                                $= \dfrac{1,80,000}{3,60,000} \times 100$

P.V. Ratio   =   50%

(c) Margin of Safety   =   Actual Sales – Break even sales

                                =   Rs.3,60,000 – 2,00,000 = Rs.1,60,000

(d) If Selling price is reduced to Rs.90, the Margin of safety is reduced by:

Margin of Safety   =   Actual Sales – Break even sales

                                =   Rs.3,60,000 – (2,500 Units $\times$ 90)

                                =   Rs.3,60,000 – 2,25,000 = Rs.1,35,000

Illu.6: A manufacture has supplied the following information relating to one of his product.

Total variable costs	**Rs.30,000**
Total sales	**Rs.60,000**
Units sold	**20,000**
Total Fixed Costs	**Rs.18,000**

Calculate:

    a. **Contribution per unit**
    b. **Break-even point**
    c. **Margin of Safety**
    d. **Profit**
    e. **Volume of sales to earn a profit of Rs.24,000**

Solution:

a.   **Contribution = S-V; C = 60,000 – 30,000 = Rs.30,000**

Contribution per unit = $\dfrac{30,000}{20,000\ units}$ = 1.50 p.

b.   **BEP Sales =** $\dfrac{F \times S}{S - V}$; $\dfrac{18,000 \times 60,000}{60,000\text{ - }30,000}$ = **Rs.36,000**

c.   **Margin of Safety =** Actual Sales – BEP Sales.

= 60,000 – 36,000 = Rs.24,000

d.   **Profit = S-V = F+P; 60,000 – 30,000 = 18,000+P;**

= 30,000 = 18,000 + P; 30,000 – 18,000 =P.

= 12,000 = P; P = Rs.12,000

e.   **Volume of Sales to earn a profit of Rs.24,000**

P.V. Ratio = $\dfrac{C}{S} \times 100$; $\dfrac{30,000}{60,000} \times 100 = 50\%$.

S $\left(\dfrac{50}{100}\right)$ = 18,000 + 24,000

S $\left(\dfrac{50}{100}\right)$ = 42,000; S = 42,000 $\times \dfrac{100}{50}$ = Rs.84,000

Units = $\dfrac{\text{Sales Amount}}{\text{Selling Price}}$ = $\dfrac{84,000}{Rs.3}$ = 28,000 units.

Illu.7: In 2006, Srikanth Ltd., sold its products worth Rs.40 lakhs and made a profit of Rs.4 lakhs. But in 2002, the sales dipped to Rs.30 lakhs due to competition in the market and the profit is reduced to 3 lakhs. Calculate Break – even points and profit volume rations in 2006 and 2007.

Solution:

Profit/Volume Ratio = $\dfrac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$

Change in Profit = Rs.1,00,000

Change in Sales = Rs.10,00,000

P.V. Ratio = $\dfrac{1,00,000}{10,00,000} \times 100 = 10\%$

Fixed Expenses: Sales (P/V ratio) = F + P

2001: When profit and sales of 2001 are taken:

40,00,000 $\times \dfrac{10}{100}$ = F + 4,00,000

4,00,000 = F + 4,00,000

4,00,000 – 4,00,000 = F

F = 0

$$\text{Break-even Point} = \frac{F}{\text{P.V. Ratio}} = \frac{0}{\frac{10}{100}} = \frac{0}{10} = 0$$

2002: When Profit and sale of 2002 are taken.

S(P/V Ratio) = F + P

$$30,00,000 \times \frac{10}{100} = F + 3,00,000$$

3,00,000 = F + 3,00,000

3,00,000 − 3,00,000 = F

F = 0

$$\text{B.E. Point} = \frac{F}{\text{P.V. Ratio}} = \frac{0}{10\%} = 0 \times \frac{100}{10} = 0$$

Illu.8: The sales and profits during two periods are as under:

Period I : Sales Rs.20 lakhs; profit Rs.2 lakhs

Period II: Sales Rs.30 lakhs; Profit Rs.4 lakhs.

Calculate: (a) P/V Ratio (b) Break even point (c) Sales required to earn a profit of Rs.5 lakhs (d) Profit when sales are Rs.50 lakhs, and (e) Margin of safety at a profit of Rs.2.5 lakhs.

Solution:

a. P/V Ratio = $\dfrac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$

$$= \frac{2,00,000}{10,00,000} \times 100 = 20\%$$

Fixed Expenses = S × P.V. Ratio = F + P

Rs.20,00,000 × 20% = F + Rs.2,00,000

Rs.4,00,000 = F + Rs.2,00,000

Rs.4,00,000 − Rs.2,00,000 = F

F = Rs.2,00,000

b. Break-even Point = $\dfrac{F}{\text{P.V. Ratio}}$

$$= \frac{2,00,000}{20\%} = \text{Rs.10,00,000}$$

c. Sales (P/V Ratio) = F + P

$$S \times \frac{20}{100} = \text{Rs.2,00,000} + \text{Rs.5,00,000}$$

$$S \times \frac{20}{100} = \text{Rs.7,00,000}$$

$$S = \text{Rs.7,00,000} \times \frac{100}{20} = \text{Rs.35,00,000}$$

d.   Sales × P.V. Ratio = F + P

$$S \times \frac{20}{100} = Rs.2,00,000 + P$$

$$Rs.50,00,000 \times \frac{20}{100} = Rs.2,00,000 + P$$

Rs.10,00,000 = Rs.2,00,000 + P
Rs.10,00,000 – Rs.2,00,000 = P
P = Rs.8,00,000

e.   Margin of Safety = $\dfrac{Profit}{P.V.\,Ratio}$

$$= \frac{2,50,000}{20\%} = Rs.2,50,000 \times \frac{100}{20} = Rs.12,50,000$$

Illu.9: The following information was extracted from the books of Giridhar Mft. Co. Ltd.

	Rs.
Sales	1,80,000
Less: Variable Costs	1,44,000
Contribution	36,000
Less: Fixed costs	24,000
Net Profit	12,000

Calculate the following (a) P/V ratio (b) Break-even point (c) Net profit earned at sales of Rs.2,70,000 (d) Sales required to earn a profit of Rs.24,000.

Solution:

(a)   P.V. Ratio = $\dfrac{C}{S} \times 100 = \dfrac{36,000}{1,80,000} \times 100 =$ **20%**

(b)   B.E.P = $\dfrac{F}{P.V.\,Ratio} = \dfrac{24,000}{20\%} = \dfrac{24,000}{20} \times 100 =$ 1,20,000

(c)   S × P/V Ratio = F + P

$$Rs.2,70,000 \times \frac{20}{100} = Rs.24,000 + P$$

Rs.54,000 = Rs.24,000 + P
Rs.54,000 = Rs.24,000 + P
P = Rs.30,000

(d)   S × P/V. Ratio = F + P

$$S \times \frac{20}{100} = Rs.24,000 + Rs.24,000$$

$$S \times \frac{20}{100} = Rs.48,000$$

$$S = Rs.48,000 \times \frac{100}{20} = Rs.2,40,000$$

Illu.10: The price structure of a cycle made by the Cycle Company Ltd., is as follows.

	Per Cycle Rs.
Materials	60
Labour	20
Variable Overhead	20
	100
Fixed Overheads	50
Profit	50
Selling Price	200

This is based on the manufacture of one lakh cycles per annum.

The company excepts that due to competition they will have to reduce selling prices, but they want to keep the total profits intact. What level of production will have to be reduced i.e., how many cycles will have to be made to get the same amount of profit if:

    a.   **The Selling price is reduced by 10%**
    b.   **The selling price is reduced by 20%**

Solution:

(a)	**If Selling price is reduced by 10%**	**Rs.**
	Selling Price	200
	Less: Price	20
	Present Selling Price	180

V = 100 (60+20+20); P = 50;

P.V. Ratio = $\frac{C}{S} \times 100 = \frac{80}{180} \times 100 = 44.44\%$

Sales to get the same level of profit Rs.50,00,000.

S (P.V. Ratio) = E + P

$S(\frac{44.44}{100}) = 50,00,000 + 50,00,000$

$S(\frac{44.44}{100}) = 1,00,00,000$

$$S = 1,00,00,000 \times \frac{100}{44.44} = 22502250$$

$$\text{Selling Units} = \frac{\text{Sales Amount}}{\text{Selling Price Per unit}} = \frac{22502250}{180} = 1,25,013 \text{ units}$$

If Selling Price is reduced by 20%	Rs.
Selling Price	200
Less: 20% reduction	40
Present Selling Price	160

V = Rs.100; P = Rs.50;

$$\text{P.V. Ratio} = \frac{C}{S} \times 100 = \frac{60}{160} \times 100 = 37.5\%$$

Sales to get the same level of profit Rs.50,00,000.

S(P.V.Ratio) = E + P

$$S(\frac{37.5}{100}) = \text{Rs.50,00,000} + 50,00,000$$

$$S(\frac{37.5}{100}) = \text{Rs.1,00,00,000}$$

$$S = 1,00,00,000 \times \frac{100}{37.5} = 26666666$$

$$\text{Selling Units} = \frac{\text{Sales Amount}}{\text{Selling Price Per unit}} = \frac{26666666}{160} = 1,66,667 \text{ units.}$$

Ilu.11: Find P/V Ratio and Margin of Safety – when sales, variable cost, fixed costs are Rs.Ten lakhs, Four lakhs, Four lakhs respectively.

Solution:

(i)	P.V. Ratio	=	$\frac{S - V}{S} \times 100$
		=	$\frac{10 \text{ lakhs - 4 lakhs}}{10 \text{ lakhs}} \times 100$
		=	$\frac{10 - 4}{10} \times 100 = \frac{6}{10} \times 100 = 60\%$
	P.V. Ratio	=	60%
(ii)	Margin of Safety	=	$\frac{\text{Profit}}{\text{P.V. Ration}} = \frac{?}{60\%}$
	Profit	=	Contribution – Fixed cost
	Profit	=	(Sales – Variable Cost) – Fixed Cost
		=	(Rs.10 lakhs – Rs.4. lakhs) – Rs.4 lakhs
		=	Rs.2 lakhs
	Margin of Safety	=	$\frac{2 \text{ Lakhs}}{60\%}$ = **Rs.3,33,333.33**

Illu.12: Fixed expenses Rs.1,50,000 percentage of variable expenses on sales is $66\frac{2}{3}$%. Normal sales at 100% capacity is Rs.9,00,000.

Calculate,

 a. **P/V Ratio**
 b. **Break even point at what percentage of sales**
 c. **Profit at 80% of sales capacity.**

Solution:

 a. P/V Ratio $= \dfrac{S - V}{S} \times 100 = \dfrac{Rs.9,00,000 - Rs.6,00,000}{Rs.9,00,000} \times 100 = 33\frac{1}{3}$ or $\frac{1}{3}$

 b. B.E. Point $= \dfrac{Fixed\ Expenses}{Sales\ -\ Variable\ Costs} = \dfrac{1,50,000}{9,00,000 - 6,00,000} = 50\%$

 c. Profit at 80% sales capacity:

Profit   =   Contribution – Fixed Expenses

                 =   (Sales – Variable cost) – Fixed Expenses

                 =   (Rs.7,20,000 – Rs.4,80,000) – Rs.1,50,000 = Rs.90,000

Note: Sales $= 9,00,000 \times \dfrac{80}{100} =$ Rs.7,20,000; Variable Costs $= 7,20,000 \times \dfrac{2}{3} =$ Rs.4,80,000

Illu.13: Sri Sai Ram Limited furnishes you the following information relating to the half year ended 30th June 1996:

	Rs.
Fixed expenses	**45,000**
Sales value	**1,50,000**
Profit	**30,000**

During the second half of the year, the company has projected a loss of Rs.10,000.

Calculate:

 (a) **The Break-even point and Margin of safety for six months ending 30th June 1996.**
 (b) **Expected sales volume for second half of the year assuming that P/V ratio and fixed expenses remain constant in the second half year also.**
 (c) **The Break-even point and Margin of safety for the whole year 1996.**

Solution:

(a)   P.V. Ratio $=$ $\dfrac{\text{Fixed Expenses} + \text{Profit}}{\text{Sales}} \times 100$

$=$ $\dfrac{Rs.45,000 + Rs.30,000}{1,50,000} \times 100 = 50\%$

Break-Even Point $=$ $\dfrac{\text{Fixed Cost}}{\text{P.V. Ratio}} = \dfrac{Rs.45,000}{50\%} = Rs.90,000$

Margin of Safety $=$ Actual Sales – Break-Even sales
Rs.1,50,000 – Rs.90,000 = Rs.60,000

Alternatively

Margin of Safety $=$ $\dfrac{\text{Profit}}{\text{P.V. Ratio}}$

$=$ $\dfrac{Rs.30,000}{50\%} = Rs.60,000$

(b) Expected Sales volume for second half year:

Expected Sales Volume $=$ $\dfrac{\text{Contribution}}{\text{P.V. Ratio}} = \dfrac{\text{Fixed Cost} + \text{Profit}}{\text{P.V. Ratio}}$ or

$=$ $\dfrac{\text{Fixed Cost - Loss}}{\text{P.V. Ratio}} = \dfrac{Rs.45,000 - 10,000}{50\%}$

$=$ Rs.70,000

(c) Break-even Point and Margin of Safety for the whole year 1996:

Break-even Point $= \dfrac{\text{Fixed Expenses}}{\text{P.V. Ratio}} = \dfrac{Rs.45,000 + Rs.45,000}{50\%} = $ Rs.1,80,000

Margin of Safety $= \dfrac{\text{Profit}}{\text{P.V. Ratio}} = \dfrac{Rs.30,000 - 10,000}{50\%} = $ Rs.40,000

Alternatively:

Margin of Safety $=$ Actual Sales – Break Even Sales
$=$ (Rs.1,50,000 + 70,000) Rs.1,80,000 = Rs.40,000

Illu.14: The following figures relate to a company manufacturing a varied range of products.

	Total Sales Rs.	Total Cost Rs.
Year ended 31st March, 2001	22,23,000	19,83,600
Year ended 31st March, 2002	24,51,000	21,43,200

Assuming stability in prices, with variable costs carefully controlled to reflect predetermined relationships, and an unvarying figure for fixed costs, calculate:

    a.   **the profit/volume ratio, to reflect the rates of growth for profit and sales; and**
    b.   **any other cost figures to be deduced from the data.**

Solution:

	Sales Rs.	Cost Rs.
2001	22,23,000	19,83,600
2002	24,51,000	21,43,200
Difference	2,28,000	1,59,600

Variable cost (% of sales) = $\dfrac{1,59,600}{2,28,000} \times 100 = 70\%$

(or in other words, variable cost is 70 paise per Re.1.00 of sales

Variable cost for the year 2001 = $22,23,000 \times \dfrac{70}{100}$ = Rs.15,56,100

Variable cost for the year 2002 = $24,51,000 \times \dfrac{70}{100}$ = Rs.17,15,700

a.   **P/V ratio = $\left(\dfrac{S-V}{S}\right) \times$ 100**

        2001 = $\dfrac{6,66,900}{22,23,000} \times 100 = 30\%$

        2002 = $\dfrac{7,35,300}{24,51,000} \times 100 = 30\%$

b.   **Other cost figures:**
    i)   Fixed Cost (Total Cost – Variable cost):
        2001 = Rs.19,83,600 – 15,56,100 = Rs.4,27,500
        2002 = Rs.21,43,200 – 17,15,700 = Rs.4,27,500
    ii)   Fixed cost % of sales:

        2001 = $\dfrac{4,27,500}{22,23,000} \times 100 = 19\%$ (approx.)

        2002 = $\dfrac{4,27,500}{24,51,000} \times 100 = 17\%$ (approx.)

    iii)   Break-even point = $\dfrac{F}{P.V.\,Ratio}$ = Rs. $\dfrac{4,27,500}{30\%}$ = Rs.14,25,000

    iv)   Margin of safety:
        2001 = 22,23,000 – 14,25,000 = Rs.7,98,000
        2002 = 24,51,000 – 14,25,000 = Rs.10,26,000

Illu.15: From the following data calcualte:

i) **P/V ratio**
ii) **Profit when sale are Rs.20,000**
iii) **New Break-even point if selling price is reduced by 20%.**
     Fixed expenses   Rs.4,000
     Break-even point   Rs.10,000

Solution:

i. Break-even sales = $\dfrac{\text{Fixed expenses}}{\text{P/V Ratio}}$

   P/V Ratio = $\dfrac{\text{Fixed expenses}}{\text{Break - even sales}} = \dfrac{4,000}{10,000} = 40\%$

ii. Profit when sales are Rs.20,000
    Profit = Sales $\times$ P/V ratio – Fixed expenses
         = Rs.20,000 $\times$ 40% - Rs.4,000
         = Rs.8,000 – Rs.4,000 = Rs.4,000

iii. New break-even point if selling price is reduced by 20%. If the selling price Rs.100, now it will be Rs.80. Variable cost per unit Rs.60 (i.e., 100 – 40% old P/V ratio)

    New P/V Ratio = $\dfrac{80 \text{-} 60}{80}$ = 25%

    Break-even point will be = $\dfrac{4,000}{25\%}$ = Rs.16,000

16.4 . BREAK-EVEN CHART

The break even point can also be shown graphically through the break even chart. The break even chart shows the profitability or otherwise of an undertaking at various levels of activity and as a result indicate the point at which neither profit nor loss is made. It shows the relation ship, through a graph between cost, volume and profit. The break even point lies at the point of intersection between the total cost line and the total sales line in the chart.

In a nut shell break – even charts are often used to depict the following.

1. Cost volume profit relationships and break-even point.
2. Profit volume ratio and margin of safety
3. The impact of change in the level of sales on likely costs and profit.
4. Profit appropriations and expense analysis.
5. For controlling profits and level of activity by comparing the budgeted with actual sales and profit.
6. For deriving the figures of optimum output.

16.4.1 Preparation of break – even Charts:

These charts are shown on the graph paper by drawing lines at the point which are to be plotted. The sales in units are depicted on the horizontal line i.e., X-X' and costs and revenue on the vertical line i.e., Y-Y'. Both are expressed in monetary values.

First of all a line is drawn parallel to X-axis showing the fixed costs. Then the total cost line is drawn and inserted upon the fixe cost line. Thereafter the sales line is drawn diagonally touching the zero at the orgin point and the highest point on the vertical scale. The point at which this sales line interests the total cost line, is the break even point. The right sector of this point shows the profits and the left sector shows the loss. This is a simple break even chart. Suitable description regarding variable costs, fixed costs, profit or loss and break-even point are usually written on this chart.

16.4.2 Angle of Incidence:

It is an angle at which sales line cuts the total costs line. A high angle denotes high rate of profit while a low angle reflects poor rate of return. Obviously management must plan for high angle of incidence which can only be when variable costs bear a low proportion of cost of sales.

Break Even chart
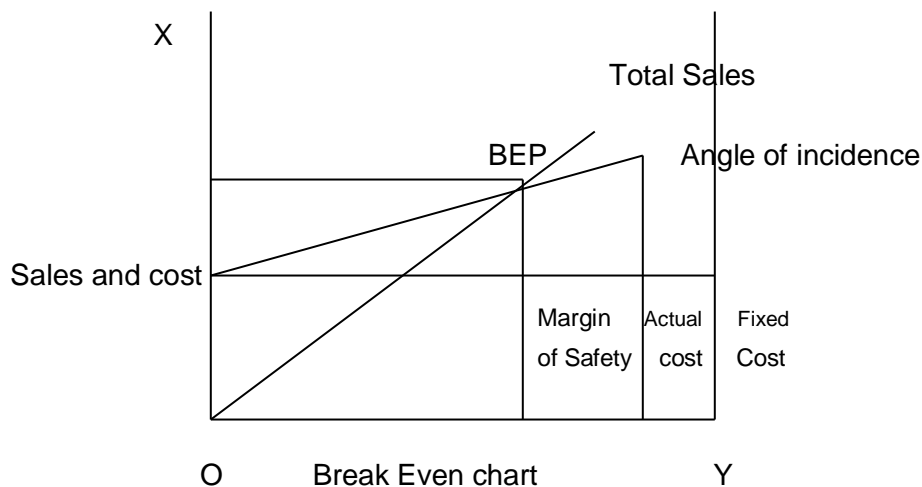
If the angle is large, the firm is said to be making profits at a high rate or vice versa. A large angle of incidence together with a high margin of safety indicate sound business conditions. Therefore, the management's aim will be to have as large an angle as possible; because this shows a high rate of profit once the fixed costs are met. A narrow angle, on the other hand would show that even after absorbing the fixed costs the rate of profit is comparatively low. In other words, it indicates that the variable costs form a large part of the total costs.

Illu.16 : From the following information draw up a chart to show break-even points.

	Rs.
Fixed costs (Total)	**40,000**
Variable costs (per unit)	**2**
Selling price (per unit)	**3**

Solution:

Contribution = Selling price – Variable cost per unit

Rs.3 – 2 = Rs.1

$$BEP = \frac{\text{Fixed costs}}{\text{Contribution}} = \frac{40,000}{1} = 40,000 \text{ units.}$$

40,000 units × selling price per unit i.e., Rs.3 = Rs.1,20,000 when output is 40,000 units. Total cost and Total sales will be Rs.1,20,000.

In the graph given below the horizontal scale OX shows volume of production expressed in units. The vertical scale OY shows sales and cost in Rs.10,000. In the chart three lines are drawn. The first line shows fixed cost which is parallel to the base scale and has not relation with the output.

Output in Units
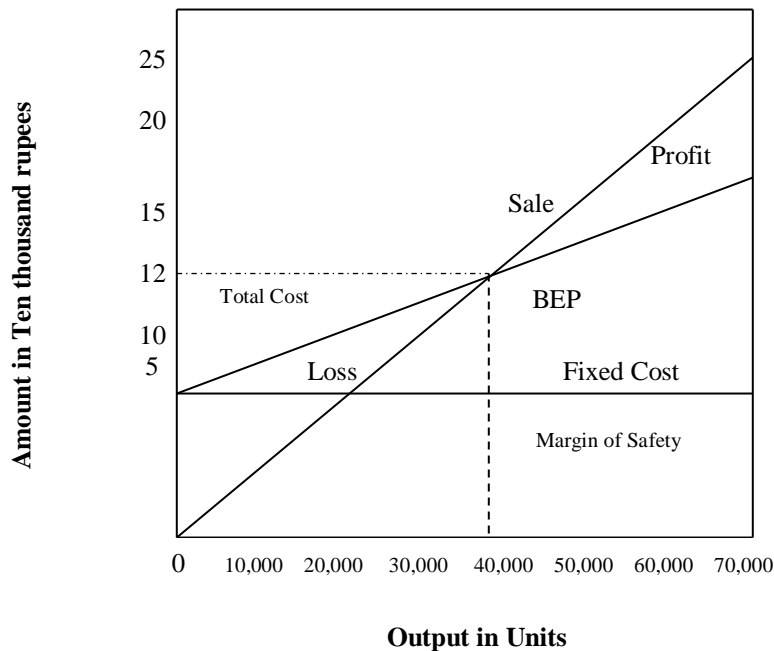
The sales line (total sales) is drawn from the point where there are no sales (zero intersection of horizontal and vertical scales).

The total cost line (variable costs + fixed costs) is drawn from the point of fixed costs. The total costs and total sales lines intersect each other at point "P" which is a B.E.P. from this point perpendicular is drawn which touches out put at R (40,000 units) and Revenue at Q (Rs.1,20,000). If the output is below 40,000 units there will be a loss. If output exceeds 40,000 units there will be a profit. Output in excess of 40,000 units i.e., RX shows margin of safety.

Illu.17: The following figures relate to one year's working at 100% capacity level in a manufacturing business.

	Rs.
Fixed Overheads	**30,000**
Variable Overheads	**50,000**
Direct Wages	**40,000**
Direct Materials	**1,00,000**
Sales	**2,50,000**

Represent that above figures on a break-even chart and determine from the chart the break-even point. Verify your result by calculations.

Solution:
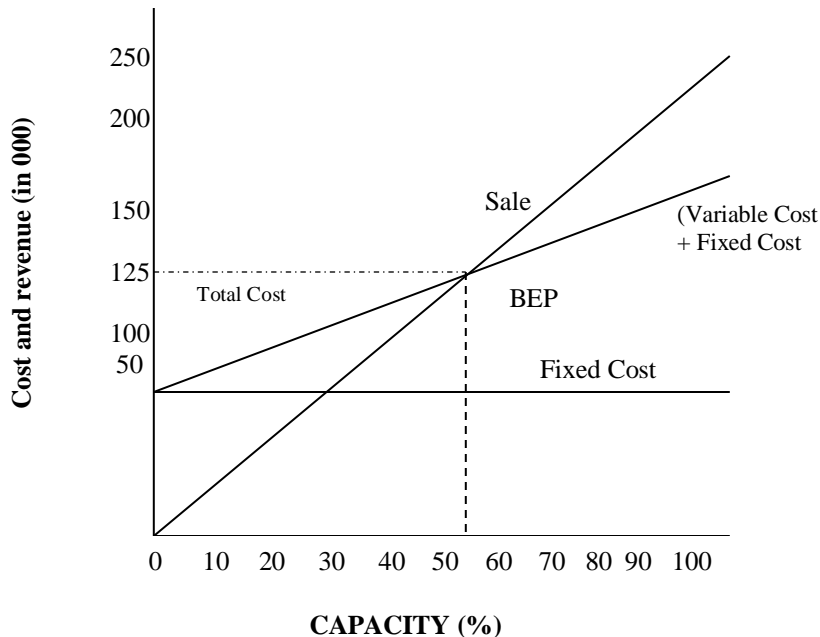
Verification:

$$BEP = \frac{F}{P/V \text{ Ratio}}$$

F = Rs.30,000

$$P/V \text{ Ratio} = \frac{C}{S} = \frac{S-V}{S} = \frac{2,50,000 - 1,90,000}{2,50,000}$$

$$= \frac{60,000}{2,50,000} = \frac{6}{25}$$

$$BEP\ Sales = \frac{30,000}{6} \times 25 = Rs.1,25,000$$

Cash Break-Even Chart:

This chart is prepared to show the cash needs of a concern. Fixed expenses are to be classified as those involving cash payments and those not involving cash payments like depreciation. As the cash break even chart is designed to include only actual payments and not expenses incurred, any time lag in the payment of items included under variable cost must be taken into account. Equal care must be shown on the period of credit allowed to the debtor for the purpose of calculating the amount of cash to be received from them, during a particular period. Cash break-even point is used to assess the liquidity position of the firm. It can be calculated as under:

$$\textbf{Cash Break-even Point} = \frac{\text{Cash Fixed Costs}}{\text{Cash contribution per unit}}$$

16.4.3 Assumptions of Break even Analysis:

Break even analysis is based on the following assumptions.

  i Fixed cost remains constant at all levels of output.
  ii Variable costs fluctuate in direct proportion to volume of output.
  iii Selling prices do not change as volume changes.
  iv There is only one product and in the case of multiple products, the sales mix remains constant.
  v There will be no change in general price level.
  vi Productivity per worker will remain unchanged.
  vii There is synchronization between productions and sales, i.e., whatever is produced is sold out.

16.5. ADVANTAGES OF BREAK EVEN ANALYSIS

The break even analysis is a simple tool employed to graphically represent accounting data. The data revealed by financial statements and reports are difficult to understand and intepret. But when the same are presented through break even charts, it becomes easy to understand them. Break even charts help in:

1. Determining total cost, variable cost and fixed cost at a given level of activity;
2. Finding out break even output or sales;

3. Understanding the cost, volume, profit relationship;
4. Making inter-firm comparisons;
5. Forecasting profits;
6. Selecting the best product mix; and
7. Enforcing cost control.

Thus, the break even analysis can be used to find out the effect of all these changes which influence total revenue and total cost and thereby the profitability of a business. The marginal cost approach, which is better termed as relevant cost approach, is vital for making a choice out of various alternatives. But to make all decision on the basis of marginal cost would be wrong. Normal prices for example are based on full costs and not marginal cost.

16.6. LIMITATIONS OF BREAK EVEN ANALYSIS

On the negative side, break even analysis suffers from the following limitations.

1. **Difficulty in segregation of Costs:** It is very difficult, if not impossible, to segregate costs into fixed and variable components. Further, fixed costs to not always remain constant. They have a tendency to rise to some extent after production reaches certain level. Like wise, variable costs do not always vary proportionately.

2. **Complicated Calculations:** The application of break even analysis to a multi-product firm is very difficult. A lot of complications are involved.

3. **Limited Importance:** The break even point has limited importance. At best it would help management to indulge in cost reduction in times of dull business. Normally, it is not the objective of business to break even, because no business is carried on in order to break even. Thus, the BEP 'Provides neither a standard of performance nor a guide for executive decisions.

4. **Limitations application in long-range planning:** Break even analysis is a short run concept, and it has a limited application in the long range planning.

Despite these limitations, break even analysis has some practical utility in that it helps management in profit planning. According to Wheldon, "if the limitations are accepted, and the chart is considered as being an instantaneous photograph of the present position and possible trends, there are some very importance conclusions to be drawn from such a chart".

Illu.18: A factory engaged in manufacturing plastic buckets is working at 40% capacity and produces 10,000 buckets for annum.

The present cost break-up for one bucket is as under:

	Rs.
Material	10
Labour Cost	3
Overheads	5(60% fixed)
The selling price is Rs.20 per bucket.	

If it is decided to work the factory at 50% capacity, the selling price falls by 3%. At 90% capacity the selling price falls by 5% accompanied by a similar fall in the prices of material.

You are required to calculate the profit at 50% and 90% capacities and also the break-even points for the same capacity productions.

Solution:

Statement showing profit and break-even point at different capacity levels

		50%		90%	
	Capacity level Production (Units)	12,500		22,500	
		Per Unit Rs.	Total Rs.	Per Unit Rs.	Total Rs.
a)	Sales	19.40	2,42,500	19.00	4,27,500
	Variable cost material	10.00	1,25,000	9.50	2,13,750
	Wages	3.00	37,500	3.00	67,500
	Variable overhead	2.00	25,000	2.00	45,000
b)	Total varibale cost	15.00	1,87,500	14.50	3,26,250
c)	Contribution (S-V)				
	Or (a-b)	4.40	55,000	4.50	1,01,250
	Less: Fixed cost		30,000		30,000
	Net profit		25,000		71,250
	Break-even point at		50%		90%

$$\text{Units} = \frac{\text{Fixed cost}}{\text{Contribution per unit}}$$

$\dfrac{30,000}{4.40} = 6,818$ units $\dfrac{30,000}{4.50} = 6,667$ units

Sales value   Rs.1,32,269   Rs.1,26,673

Illu.19 : From the following data calculate:

i)   P/V ratio

ii)   Profit when sales are Rs.20,000

iii)   New Break-even point if selling price is reduced by 20%.

Fixed expenses   **Rs.4,000**
Break-even point   **Rs.10,000**

Solution:

i.   **Break-even sales =** $\dfrac{\text{Fixed expenses}}{\text{P/V Ratio}}$

P/V Ratio = $\dfrac{\text{Fixed expenses}}{\text{Break - even sales}} = \dfrac{4{,}000}{10{,}000} \times 100 = 40\%$

ii.   Profit when sales are Rs.20,000

Profit = Sales × P/V ratio – Fixed expenses.

       = Rs.20,000 × 40% - Rs.4,000

       = Rs.8,000 – Rs.4,000 = Rs.4,000

iii.   New break-even point if selling price is reduced by 20%. If the selling price Rs.100, now it will be Rs.80. Variable cost per unit Rs.60 (i.e. 100-40% old P/V ratio)

New P/V Ratio = $\dfrac{80 - 60}{80} = 25\%$

Break-even point will be = $\dfrac{4{,}000}{25\%} = $ Rs.16,000

Illu.20: The sales and profit during the years were as follows.

	Sales Rs.	Profit Rs.
2001	1,50,000	20,000
2002	1,70,000	25,000

You are required to calculate
a.   **P/V Ratio**
b.   **Break even level**
c.   **Sales required to earn a profit of Rs.40,000**
d.   **Margin of Safety at a profit of Rs.2,50,000**
e.   **Profit made when sales are Rs.50,000**
f.   **Variable Cost in the two periods.**

Solution:

a)   P.V. Ratio = $\dfrac{\text{Change in Profit in 2 periods}}{\text{Change in Sales in 2 periods}} \times 100$

       = $\dfrac{\text{Rs.25,000- 20,000}}{\text{Rs.1,70,000 -1,50,000}} \times 100 = \dfrac{5{,}000}{20{,}000} \times 100 = 25\%$

b)   **Break Even Level**   = $\dfrac{\text{Fixed Cost}}{\text{P.V. Ratio}}$

Fixed Cost = Contribution – Profit

Fixed Cost = (Sales × P.V. Ratio) – Profit

$$= (1,50,000 \times \frac{25}{100})\text{-}20,000 = Rs.17,500$$

Break Even Level $= \dfrac{Rs.17,500}{25\%} = Rs.70,000$

c) **Sales required to earn a profit of Rs.40,000**

$$= \frac{Fixed\ expenses + Required\ Profit}{P.V.\ Ratio} = \frac{Rs.17,500 + 40,000}{25\%}$$

$$= Rs.57,500 \times \frac{100}{25} = Rs.2,30,000$$

d) **Margin of Safety at a profit of Rs.2,50,000**

$$Margin\ of\ Safety = \frac{Profit}{P.V.\ Ratio} = \frac{2,50,000}{25\%} = Rs.10,00,000$$

e) **Profit when sales are Rs.2,50,000**

Profit = Contribution – Fixed Cost

= (Sales × P.V. Ratio) – Fixed Cost

$$= (Rs.2,50,000 \times \frac{25}{100}) - Rs.17,500 = Rs.45,000$$

f) **Variable Cost in the two periods:**

Variable Cost = Sales – Profit – Fixed Cost

2001 = Rs.1,50,000 – 20,000 – 17,500 = Rs.1,12,500

2002 = Rs.1,70,000 – 25,000 – 17,500 = Rs.1,27,500

Illu.21: Assuming that the cost structure and selling prices remain the same in periods I and II find out:

(a) Profit volume ratio, (b) Profit when sales are Rs.1,00,000.

Periods	Sales Rs.	Profit Rs.
I	1,20,000	9,000
II	1,40,000	13,000

Solution:

a.   P/V Ratio = $\dfrac{\text{Change in Profit}}{\text{Change in sales}} \times 100$; $\dfrac{4,000}{20,000} \times 100 = 20\%$

Calculation of Fixed Expenses:

S (P/V Ratio) = F + P; 1,20,000 ($\dfrac{20}{100}$) = F + 9,000; 24,000 = F + 9,000; 24,000 − 9,000 = F; 15,000 = F; F = Rs.15,000

b.   S (P/V Ratio) = F + P; 1,00,000 ($\dfrac{20}{100}$) = 15,000 + P; 20,000 = 15,000 + P; 20,000 − 15,000 = P; 5,000 = P; P = Rs.5,000

16.7 SELF ASSESSMENT QUESTIONS

I. Short Questions:

1.   What is break-even point?
2.   What is margin of safety?
3.   What is profit-volume ratio?
4.   What is contribution?
5.   What is angle of incidence?
6.   What is Cash break-even point?

II. Essay type questions:

1.   Explain cost-volume profit analysis.
2.   Explain the ways by which profit-volume ratio can be improved.
3.   Explain the uses of break-even analysis in profit planning.
4.   What assumption are made to construct a simple Break-even Chart?
5.   Explain the utility of Break-even Analysis in Managerial Decisions
6.   What do you meant by Break-even level of output?
7.   What are the limitations of the break-even charts?
8.   What are the managerial uses of break-even analysis?
9.   What is Profit volume ratio and Profit Volume graph? How is Profit-volume graph technique helpful to management.
10.   What is C.V.P.? Analyse and state its uses and applications.
11.   Explain 'Break-Even Analysis'. Discuss the assumptions that underline the technique and the practical usefulness of Break-even analysis.
12.   Define Break-even-Point and explain its advantage and limitations.
13.   What do you mean by P/V Ratio? What are its uses?
14.   What are the assumptions of Break-even-Analysis?
15.   Explain the concepts of marginal costing and Break-even analysis.
16.   Explain about Break-even Analysis. What are its applications?

16.8 EXERCISES

1. From the following particulars calculate the Break-even point interms of both quantity and value:

Production in units	10,000
Sales price	Rs.5,00 per unit
Variable costs	Rs.20,000
Fixed costs	Rs.12,000

   [Ans.: (a) 4,000 units; (b) Rs.20,000]

3. What is the break-even-point when sales is Rs.6.0 lakhs; Fixed expenses are Rs.1.5 lakhs and Variable costs are Rs.4.0 lakhs?

   [Ans.: Rs.4.5 lakhs]

4. Find P/V Ratio and Margin of Safety – when sales, variable cost, fixed costs are Rs. Ten lakhs, Four lakhs, Four lakhs respectively.

   [Ans.: P.V. Ratio = 60%; MOS = Rs.3,33,333]

5. The following information is extracted from the books of Harish Ltd.

Year	Sales Rs.	Cost Rs.
2006	2,00,000	1,40,000
2007	2,40,000	1,60,000
Calculate B.E.P.		

   [Ans.: BEP Rs.80,000; P.V. Ratio = 50%; Fixed Cost Rs.40,000]

6. A company estimates that next year it will earn a profit of Rs.50,000. The budgeted fixed costs and sales are Rs.2,50,000 and Rs.9,93,000 respectively. Find out Break-Even point.

   [Ans.: Rs.8,27,500]

7. From the following information, calculate margin of safety.

	Rs.
Sales (4,000 units @ Rs.25 each)	1,00,000
Variable cost	72,000
Fixed expenses	16,800

    [Ans.: Margin of Safety Rs.40,000]

8. From the following details calculate BEP, Margin of safety:

	Rs.
Sales	4,20,000
Fixed cost	90,000
Variable cost ratio	55% of sales

    [Ans.: BEP Rs.2,00,000; Margin of Safety Rs.2,20,000]

9. From the following particulars calculate the margin of safety Sales units: 15,000; Fixed costs Rs.34,000; Selling price per unit Rs.10; Variable cost per unit Rs.6.

    [Ans.: Margin of Safety Rs.65,000]

10. From the following information calculate:
    (a) Break-even point
    (b) Turnover required to earn a profit of Rs.36,000.
    (c) Margin of safety for Rs.36,000 profit. Fixed overhead Rs.1,80,000 Variable cost per unit Rs.2 Selling price per unit Rs.20.

    [Ans.: (a) Rs.10,000 units; Value Rs.2,00,000; (b) 12,000 units; Value Rs.2,40,000; (c) Rs.40,000]

11. Sri Sai Ram Limited furnishes you the following information relating to the half year ended 30th June 2007:

	Rs.
Fixed expenses	45,000
Sales value	1,50,000
Profit	30,000

    During the second half of the year, the company has projected a loss of Rs.10,000.
    Calculate:

(a)   The Break-even point and Margin of safety for six months ending 30th June 2007.

(b)   Expected sales volume for second half of the year assuming that P/V ratio and fixed expenses remain constant in the second half year also.

(c)   The Break-even point and Margin of safety for the whole year 2007.

[Ans.: (a) BEP Rs.90,000; MOS Rs.60,000; (c) BEP Rs.1,80,000; MOS Rs.40,000]

12.   You are given the following data for the year of a company.

	Rs.	%
Variable costs	6,00,000	60
Fixed costs	3,00,000	30
Net profit	1,00,000	10
	10,00,000	100

Find out
(a)   Break even point
(b)   P/V Ratio.
(c)   Margin of safety.

[Ans.: (a) Rs.7,50,000; (b) 40%; (c) Rs.2,50,000]

13.   The following information relates to an article produced by EM EM Ltd:

	Rs.
Total fixed costs	18,000
Total variable costs	30,000
Total sales	60,000
Units sold	20,000

From the above information find out (a) Per unit contribution (b) Break-even-point (c) Safety margin and (d) Sales required to earn a profit of Rs.24,000.

[Ans.: (a) Rs.1.50 (b) 12,000 units Rs.36,000; (c) 8,000 units – Rs.24,000; (d) 28,000 units value Rs.84,000]

14.   From the following figures, calculate P/V ratio, BEP, profit on estimated sales of Rs.1,25,000 and sales required to earn a profit of Rs.20,000:

	Sales Rs.	Profit Rs.
Period I	1,00,000	15,000
Period II	1,20,000	23,000

[Ans.: P.V. Ratio = 40%; BEP Rs.62,500; Profit Rs.25,000; Sales required Rs.1,12,500]

15. The following data are obtained from the records of a factory:

	Rs.	Rs.
Sales 4,000 units at Rs.25 each		1,00,000
Materials consumed	40,000	
Labour charges	20,000	
Variable overheads	12,000	
	72,000	
Fixed overheads	18,000	90,000
Profit		10,000

It is proposed to reduce the selling price by 20%. What extra units should be sold to obtain the same amount of profit as above?

[Ans.: Units sold: (a) 14,000 units; Extra units to be sold: 14,000 4,000 = 10,000 units]

16. From the following particulars calculate:
    (a) Contribution
    (b) P/V Ratio
    (c) Break-even in units and in Rupees
    (d) What will be the selling price per unit if the break-even is brought down to 25,000 units?

	Rs.
Fixed Expenses:	1,50,000
Variable cost per unit	10
Selling price per unit	15

[Ans.: (a) Rs.5; (b) $33\frac{1}{3}$ or $\frac{1}{3}$ (c) 30,000 units; Rs.4,50,000; and (d) Rs.16]

17. Bhargavi Ltd. incurred a total cost of Rs.40,000 on a sales of Rs.45,000 in the 1st half year and Rs.43,000 cost on sales of Rs.50,000 in the 2nd half year.
    Assuming that costs and prices remained the same, calculate for the entire year:

(i)   P.V. Ratio (ii) Fixed Expenses
(iii)   Break-even sales (iv) % of margin of safety.

[Ans.: (i) 40%; (ii) Rs.26,000; (iii) Rs.65,000; (iv) Rs.30,000 and 31.58%]

18.   The sales and profit during two years are as follows:

Year	Sales Rs.	Profit Rs.
2006	3,00,000	30,000
2007	4,00,000	50,000

You are required to calculate (i) p/v ratio (ii) Break even sales (iii) Margin of Safety at a Profits of Rs.40,000.

[Ans.: (i) 20% or $\frac{1}{5}$; (ii) Rs.1,50,000 (iii) Rs.2,00,000]

19.   From the following data, determine the net profits, if actual sales are 10% and 15% above the Break-Even volume:

Selling Price per unit	:	Rs.10
Trade discount	:	5%
Fixed overheads	:	Rs.10,000
Variable cost per unit	:	Rs.7

[Ans.: B.E.P = 4,000 Units; Net Profit = Rs.1,000; Rs.1,500]

20.   The following figures are available from the records of Sindhu enterprises as at 31st December:

	2006 Rs. in lakhs	2007 Rs. in lakhs
Sales	150	200
Profit	30	50

Calculate:
(a)   The p/v ratio and total fixed expenses.
(b)   The break-even level of sales.
(c)   Sales required to earn a profit of Rs.90 lakhs.
(d)   Profit or loss that would arise if the sales were Rs.280 lakhs.

[Ans.: (a) 40% & Rs.30,00,000; (b) Rs.75,00,000 (c) Rs.3,00,00,000 (d) 82,00,000]

21. Calculate the Break-even point from the following particulars:
    Budgeted output 70,000 units
    Fixed cost (Rs.) 4,00,000
    Variable cost per unit (Rs.) 12
    Selling price per unit (Rs.) 22
    If the selling price is reduced to (Rs.) 20 per unit what will be the revised Break-even point?

    [Ans.: BEP = 40,000 units Value Rs.8,80,000; Revised BEP = 50,000 units Value Rs.10,00,000]

22. From the following data, determine the net profits, if actual sales are 10% and 15% above the Break-Even Volume:-

Selling price per unit:	Rs.10
Trade discount:	5%
Fixed overheads:	Rs.10,000
Variable cost per unit	Rs.7

    [Ans.: BEP = 400 Units: Profits Rs.(i) Rs.1,000; (ii) Rs.1,500]

23. Sales of a product amount to 200 units per month at Rs.10 per unit. Fixed overhead is Rs.400 per month and variable cost Rs.6 per unit. There is a proposal to reduce prices by 10%. Calculate present and future P/V ratio, how many units must be sold to maintain total profit.

    [Ans.: Present and future P/V ratios 40% and $33\frac{1}{3}$%, Units to maintain total Profit = 267]

24. From the following particulars calculate the P/V ratio Break-even sales and Fixed Costs. Profit Rs.2,000 which represents 10% of sales Margin of safety = Rs.10,000.

    [Ans.: P/V ratio = $\frac{1}{5}$; Break-even sales Rs.10,000; Fixed cost Rs.2,000]

25. From the following particulars calculate (a) Fixed costs (b) Break Eve Sales (c) Total Sales and (d) Profit.
    Margin of Safety = Rs.10,000 (which represents 40% of sales) P/V Ratio = 50%.

    [Ans.: (a) Rs.7,500; (b) 15,000; (c) Rs.25,000; (d) Rs.5,000.]

26. Given:

     Sales 10,000 units
     Variable cost Rs.1,00,000
     Sales value Rs.2,00,000
     Fixed cost Rs.40,000
     Selling Price per unit Rs.20

     You are required to calculate:
     (a) P/V Ratio (b) Break-even point (c) Margin of safety (d) Sales to earn a profit of Rs.30,000.

     [Ans.: (a) 50% (b) Rs.80,000 (c) Rs.1,20,000 (d) Rs.1,40,000]

27. Assuming that the cost structure and selling prices remain the same in Periods I and II, find out:
     (a) Profit Volume Ratio;
     (b) Fixed Cost;
     (c) Break Even Point for Sales;
     (d) Profit when Sales are of Rs.1,00,000;
     (e) Sales required to earn a Profit of Rs.20,000; and
     (f) Margin of Safety at a profit of Rs.15,000;
     (g) Variable cost in Period II

Period	Sales Rs.	Profit Rs.
I	1,20,000	9,000
II	1,40,000	13,000

     [Ans.: (a) 20% (b) Rs.15,000 (c) Rs.75,000 (d) Rs.5,000 (e) Rs.1,75,000 (f) Rs.75,000 (g) Rs.1,12,000]

28. The sales turnover and profit of M/s Sreenivasa & Co. Ltd. during the two years 2006 and 2007 were as follows:

	Sales (Rs.)	Profit (Rs.)
2006	4,50,000	60,000
2007	5,10,000	75,000

     You are required to calculate:
     1. Profit-volume ratio.
     2. Break-even point.
     3. The sales required to earn a profit of Rs.1,20,000.

4. The profit made when sales are Rs.7,50,000.
5. Margin of safety at a profit of Rs.1,50,000.
6. Variable costs of the two periods.

[Ans.: (1) 25% (2) Rs.2,10,000 (3) Rs.6,90,000 (4) Rs.1,35,000 (5) Rs.6,00,000 (6) 1989 = Rs.3,37,500; 1990 = Rs.3,82,500]

29. Following are the particulars of Pennar Tubes Ltd:
Sales Rs.30,00,000; Fixed costs Rs.9,00,000; Variable costs Rs.15,00,000. Calculate (a) P/V ratio, (b) Break-even point (c) Margins of safety and (d) Margin of safety ratio.

[Ans.: (a) 50% (b) Rs.18,00,000 (c) Rs.12,00,000 (d) 40%]

30. M Ltd., manufacturing and selling industrial boxes. It is proposed to decrease the prices due to heavy competition. By decreasing the selling prices by 10% and 15%, how many units to be sold to maintain the current level of profit. The additional information is given:

Current sales 30,000 units		Rs.3,00,000
Variable cost 30,000 units	1,80,000	
Fixed cost	70,000	2,50,000
Net profit		50,000

[Ans.: Sale of Units at 10% reduction in selling price 40,000; Sale of Units at 15% reduction in selling price 48,000]

31. From the following details calculate:
    (a) P/V Ratio
    (b) BE Point
    (c) Margin of safety
    (d) Effect of 10% increase in SP on BEP.
    (e) Effect of 10% decrease in SP on BEP.

	Rs.
Sales	60,000
Variable Cost	30,000
Fixed Cost	15,000

[Ans.: (a) 50, (b) Rs.30,000; (c) Rs.30,000; (d) BEP Rs.27,500; (e) Rs.33,750

32. From the following particulars find

(i) Contribution, (ii) P/V Ratio:

Variable cost per unit Rs.20; Selling price per unit Rs.40; Fixed expenses Rs.1,00,000; Output 5,000 units.

[Ans.: Contribution per unit Rs.20; P.V. Ratio: 50%]

33. Ramachandra sells a line of Men's footwears for Rs.18 a pair. Each pair that is sold contributes Rs.6 to the recovery of fixed costs and to profits. His fixed costs amounts to Rs.84,000 a year.

You are asked to (a) show   how many pairs must be sold in a year to Break Even. (b) Break Even sales revenue at the Break Even Point. (c) Desired sales to earn a profit of Rs.54,000.

[Ans.: (a) 14,000 units (b) Rs.2,52,000 (c) Rs.4,14,000]

34. From the following details, compute: (i) P.V. Ratio (ii) Profit

Fixed Costs Rs.50,000

Sales Rs.3,00,000

Variable costs $66\frac{2}{3}$ % of sales.

[Ans.: (i) $33\frac{1}{3}$ % (ii) Rs.50,000]

35. From the following details compute: (a) Variable Costs; (b) P/V Ratio.

	Rs.
Sales	3,00,000
Fixed Costs	70,000
Profit	80,000

[Ans.: (a) Rs.1,50,000 (b) Rs.50%]

36. From the following data, you are required to calculate
   a.   P/V Ratio
   b.   Break even sales with the help of P/V ratio
   c.   Sales required to earn a profit of Rs.4,50,000
        Fixed expenses Rs.90,000
        Variable cost per unit:
        Direct material = Rs.5
        Direct Labour = Rs.2
        Direct overheads = 100 per cent of direct labour
        Selling price per unit = Rs.12
   [Ans.: (a) 25% (b) 3,60,000 (c) Rs.21,60,000]

37. From the following information pertaining to the years, calculate:
   a. P/V ratio
   b. Amount of sales to earn profit of Rs.40,000
   c. Profit on sales Rs.1,20,000

Years	Sales Rs.	Profit Rs.
2006	1,40,000	15,000
2007	1,60,000	20,000

   [Ans.: (a) 25% (b) Rs.2,40,000 (c) Rs.10,000]

38. From the following data relating to a company, calculate:
   i. The break-even sales; and
   ii. Sales required to earn a profit of Rs.6,000 per period.

Period Rs.	Total Sales Rs.	Total Cost
1.	42,500	38,700
2.	39,200	36,852

   [Ans.: (i) Rs.33,863.64 (ii) Rs.47,500]

39. The following information was extracted from the books of Giridhar Mft. Co. Ltd.

	Rs.
Sales	1,80,000
Less: Variable Costs	1,44,000
Contribution	36,000
Less: Fixed costs	24,000
Net Profit	12,000

   Calculate the following (a) P/V ratio (b) Break-even point (c) Net profit earned at sales of Rs.2,70,000 (d) Sales required to earn a profit of Rs.24,000.

   [Ans.: (a) 20% (b) Rs.1,20,000 (c) Rs.30,000 (d) Rs.2,40,000]

40. By making and selling 7,000 units of its product, a company would lose Rs.10,000; whereas in the case of 9,000 units it would make a profit of Rs.10,000 instead. Calculate:

   (a) The amount of fixed expenses.

(b) Number of units of Break-Even.
(c) Profit or Loss for 10,000 units.
(d) Number of units to earn a profit of Rs.40,000.

[Ans.: P.V. Ratio = 10%; (a) 80,000 (b) 8,000 units (c) Rs.20,000 (d) 12,000 units]

41. M/s Haripriya Ltd., sold its products worth Rs.180 lakhs and made a profit of rS.18 lakhs in 2006. But in 2007, the sales cam down to Rs.140 lakhs due to serve competition in the market. The fall in profit was Rs.4 lakhs. Calculate break-even points and profit volume ratios in 2006 and 2007.

)

[Ans.: BEP = 0; P.V. Ratio : 2001 – 10%; 2002 – 10%]

42. Two competing companies P Ltd. and Q Ltd. produce and sell the same type of product in the same market. For the year ended March 2008, their forecasted profit and loss accounts are as follows:

		P. Ltd.		Q. Ltd.
	Rs.	Rs.	Rs.	Rs.
Sales		3,00,000		3,00,000
Selling Price Expenses	2,00,000		2,25,000	
Fixed Cost	50,000	2,50,000	25,000	2,50,000
		50,000		50,000

You are required to calculate the following:
(a) Profit volume ratio, Break-even Point and Margin of Safety of each business.
(b) Sales volume at which each business will earn a profit of Rs.30,000.
(c) Explain, giving reasons which business is likely to earn greater profits in conditions of (i) heavy demand for the product, (ii) low demand for the product.
[Ans.: (a) P.V. Ratio : P Ltd. 33.33%; Q Ltd. 25%; BEP Sales : P Ltd., Rs.1,50,015; Q Ltd., Rs.1,00,000; Margin of safety : P Ltd. Rs.1,50,015; Q Ltd., Rs.2,00,000; (b) P Ltd. Rs.2,40, 024; Q Ltd. Rs.3,00,000 (c) (i) In case of heavy demand the product of P Ltd., is more profitable, because P.V. ratio of P Ltd., is greater than Q Ltd. (ii) In case of low demand, the product Q Ltd., is more preferable since it provides more profit. It is because BEP of Q Ltd., is lower than the BEP of P Ltd.]

43. Following information has been obtained from the revenue account of Balaji Ltd. for the year ended 31st December, 2007:

	Rs.	Rs.

Sales		6,00,000
Direct materials	1,80,000	
Direct wages	1,20,000	
Variable overheads	48,000	
Fixed overheads	1,72,000	5,20,000
Profit		80,000

It is proposed to reduce the selling price by 5%. What would be the sales volume if the present level of Profit is to be maintained. Assume no change in cost structure.

[Ans.: Old P.V. Ratio : 42%; New P.V. Ratio : 38.95%; Sales Volume at present level of profit Rs.6,46,938]

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Chapter – 17

MARGINAL COSTING - MANAGERIAL DECISIONS

Objectives

After studying this chapter you should be able to
- understand the uses of marginal costing and taking various managerial decisions
- explain the problems relating to profit planning, introduction of new product, planning the level of activity. Key factor, suitable product mix, pricing decisions etc.

Structure :

17.1. MARGINAL COSTING AND DECISION MAKING

Marginal costing techniques may be applied in various fields to aid management in arriving at many important policy decisions. These include:

1. Profit planning
2. Introduction of new product
3. Planning of level of activity
4. Key factor
5. Determination of suitable product – mix
6. Pricing Decisions
7. Foreign Market offer
8. Make or buy decisions

17.1.1 Profit Planning:

Profit planning is the planning of future operations so as to attain maximum profit. The contribution ratio shows the relative profitability of various sectors of the business whenever there is a change in selling price, variable costs or product mix. There are four important ways to improve the profit performance of a business.

(i) By increasing volume
(ii) By increasing selling price
(iii) By reducing variable costs, and
(iv) By reducing fixed costs.

Illu.1: The following are the budgeted data relating to AB Ltd., and CD Ltd., producing identical products.

	Rs.	Rs.	Rs.	Rs.
Sales		**1,50,000**		**1,50,000**
Less: Variable cost	**1,20,000**		**1,00,000**	
Fixed Cost	**15,000**	**1,35,000**	**35,000**	**1,35,000**
Net Profit		**15,000**		**15,000**

a. **Calculate break-even points, P/V ratio and margin of safety of each company:**
b. **State which company is likely to earn greater profits in conditions of (i) heavy demand and (ii) low demand of the product.**

Solution:

a.(i) **B.E.P. Sales** $= \dfrac{F \times S}{S - V}$

AB Ltd. $= \dfrac{15,000 \times 1,50,000}{1,50,000 - 1,20,000} =$ Rs.75,000

CD Ltd. $= \dfrac{35,000 \times 1,50,000}{1,50,000 - 1,00,000} =$ Rs.1,05,000

ii. **P.V. Ratio** $= \dfrac{S - V}{S} \times 100$

AB Ltd. $= \dfrac{1,50,000 - 1,20,000}{1,50,000} \times 100 =$ 20%

CD Ltd. $= \dfrac{1,50,000 - 1,00,000}{1,50,000} \times 100 =$ 33.33%

iii. **Margin of Safety** = Actual Sales - BEP Sales

AB Ltd. = Rs.1,50,000 - 75,000 = Rs.75,000

CD Ltd. = Rs.1,50,00 - 1,05,000 = Rs.45,000

(b) In case of heavy demand, CD Ltd., will earn higher profit since the P/V Ratio is higher for the company. In case of low demand, AB Ltd., may earn higher profit since its break even point is low and margin of safety is higher.

17.1.2 Introduction of New Product:

Sometime, a product may be added to the existing lines of products with a view to utilise idle facilities to capture new market or for any other purpose. The profitability of this new product has to be found out initially. Usually, the new product will be manufactured if it is capable of contributing something towards fixed costs and profit after meeting its variable costs.

Illu.2: A firm manufacturing Product X has provided the following information.

	Rs.
Sales	**75,000**
Direct materials	**30,000**
Direct labour	**10,000**
Variable overhead	**10,000**
Fixed overhead	**15,000**

In order to increase its sales by Rs.25,000, the firm wants to introduce the Product Y, and estimates the costs in connection therewith as under:

	Rs.
Direct materials	**10,000**
Direct labour	**8,000**
Variable overhead	**5,000**
Fixed overhead	**Nil**

Advise whether the Product Y will be profitable or not.

Solution:

Marginal Cost Statement

	X Rs.	Y Rs.	Total Rs.
Sales	75,000	25,000	1,00,000
Less: Material cost:			
Direct materials	30,000	10,000	40,000
Direct labour	10,000	8,000	18,000
Variable overhead	10,000	5,000	15,000
	50,000	23,000	73,000
Contribution	25,000	2,000	27,000
Fixed Costs			15,000
Profit			12,000

Commentary: If product Y is introduced, the profitability of product X is not affected in any manner. On the other hand, product Y provides a contribution of Rs.2,000 towards fixed cost and profit. Therefore, Product Y should be introduced.

17.1.3 Planning the Level of Activity:

Marginal costing is of great help while planning the level of activity. Maximum contribution at a particular the level of activity will show the position of maximum profitability.

Illu.3: Excellent company is currently working at 50% capacity and produces 10,000 units.
 At 60% capacity, raw material cost increases by 2% and selling price falls by 2%. At 80% working, raw material cost increase by 5% and selling price falls by 5%. At 50% capacity working, the product costs Rs.180 per unit and is sold at Rs.2.00 per unit.
 The unit cost of Rs.180 is made up as follows.

Materials	Rs.100
Wages	Rs.30
Factory overheads	Rs.30(40% fixed)
Administrative overheads	Rs.20 (50% fixed)

You are required to work out the material cost, fixed cost, total cost and profit for three capacity levels.

Solution:

Statement Showing Material Cost, Fixed Cost, Total cost and Profit at three Capacity Levels

		50%	60%	70%
Output Capacity				
Sales	(A)	20,00,000	23,52,000	30,40,000
Marginal Cost:				
Material Cost		10,00,000	12,24,000	16,80,000
Wages		3,00,000	3,60,000	4,80,000
Factory Overheads		1,80,000	2,16,000	2,88,000
Administrative Overheads		1,00,000	1,20,000	1,60,000
Total Marginal Cost	(B)	15,80,000	19,20,000	26,08,000
Contribution (A-B)	(C)	4,20,000	4,32,000	4,32,000
Less: Fixed Expenses:				
Factory Overheads		1,20,000	1,20,000	1,20,000
Administrative Overheads		1,00,000	1,00,000	1,00,000
Total Fixed Expenses	(D)	2,20,000	2,20,000	2,20,000
Total Cost (B+D)	(E)	18,00,000	21,40,000	28,28,000
Profit/Loss (C-D)	(F)	2,00,000	2,12,000	2,12,000

Note: Statement showing material cost, fixed cost, total cost; and profit per unit at three capacity levels.

Output Capacity		50%	60%	70%
Selling Price	(A)	200	196	190
Marginal Cost:				
Materials		100	102	105
Wages		30	30	30
Factory Overheads		18	18	18
Administrative Overheads		10	10	10
Total Marginal Cost	(B)	158	160	163
Contribution (A-B)	(C)	42	36	27
Less: Fixed Expenses:				
Factory Overheads		12	10	7.50
Administrative Overheads		10	8.33	6.25
Total Fixed Expenses	(D)	22	18.33	13.75
Profit/Loss (C-D)	(E)	20	17.67	13.25

Illu.4: Two companies which have the following operating details decide to merge:

	Company I	Company II
Capacity utilisation	90%	60%
Sales (Rs.Lakhs)	540	300
Variables cost (Rs.Lakhs)	396	225
Fixed cost (Rs.Lakhs)	80	50

Assuming proposal is implemented, calculate:
(a) Break-even sales of the merged plant and the capacity utilisation at that stage.
(b) Profitability of the merged plant at 80% capacity utilisation.
(c) Sales turnover of the merged plant to earn a profit of Rs.75 lakhs.

Solution:

Statement of the merged company at 100% and 80% Capacity

Capacity	Company A		Company B		Merged Company	
	90%	100%	90%	100%	100%	80%
Sales	540	600	300	500	1,100	880
Variable Cost	396	440	225	375	815	652
Contribution (S-V)	144	160	75	125	285	228
Fixed Cost	80	80	50	50	130	130
Profit	64	80	25	75	155	98

a. **BEP of merged Plant:**

P.V. Ratio = $\dfrac{C}{S} \times 100; \dfrac{285}{1,100} \times 100 = 25.91\%$

BEP Sales = $\dfrac{F}{\text{P.V.Ratio}} = \dfrac{130}{25.91\%}$ = Rs.501.75 lakhs.

Capacity Utilisation = $\dfrac{100}{1,100} \times$ Rs.501.75 lakhs = 45.6%

b. **Profitability of the merged company at 80% capacity utilisation.**

= $\dfrac{\text{Profit}}{\text{Sales}} \times 100; = \dfrac{98}{880} \times 100 = 11.14\%$

c. **Sales required to earn a profit of Rs.75 lakhs.**

Desired Profit = Rs.75 lakhs. Fixed Cost of merged Co. = Rs.130 lakhs

Desired Contribution = 75 + 130 = Rs.205 lakhs.

Sales to earn Rs.205 lakhs contribution = $\dfrac{205}{25.91\%}$ = Rs.791.23 lakhs.

17.1.4 Key Factor:

A concern would produce and sell only those products which offer maximum profit. This is based on the assumption that it is possible to produce any quantity without any difficulty and sell like wise. However, in actual practice, this seems to be unrealistic as several constraints come in the way of manufacturing as well as selling. Such constraints that come in the way of management's efforts to produce and sell in unlimited quantities are called 'Key factors' or 'limiting factors'.

The limiting factors may be materials, labour, plant capacity, or demand. Management must as certain the extent of influence of the key factor for ensuring maximisation of profit. Normally, when contribution and key factors are known, the relative profitability of different products or processes can be measured with the help of the following formula.

$$\text{Profitability} = \dfrac{\text{Contribution}}{\text{Key factor}}$$

Illu.5: From the following data, which product would you recommend to be manufactured in a factory, time being the key factor?

	Per unit of product X Rs.	Per unit of product Y Rs.
Direct material	24	14
Direct labour at Re.1 per hour	2	3
Variable overhead at Rs.2 per hour	4	6
Selling price	100	110
Standard time to produce	2 hours	3 hours

Solution:

	Rs.	Product X Per unit Rs.	Rs.	Product Y Per unit Rs.
Selling price		100		110
Less: Marginal cost:				
Direct materials	24		14	
Direct labour	2		3	
Variable overhead	4	30	6	23
Contribution		70		87
Standard time to produce		2 hours		3 hours
Contribution per hour		$\frac{70}{2} =$ **Rs.35**		$\frac{87}{3} =$ **Rs.29**

Contribution per hour of product X is more than that of product Y by Rs.6. Therefore, product X is more profitable and is recommended for manufacturing.

17.1.5 Suitable Product Mix:

Normally, a business concern will select the product mix which gives maximum profit. Product mix is the ratio in which various products are produced and sold. The marginal costing technique helps management in taking appropriate decisions regarding the produce mix, i.e., in changing the ratio of product mix so as to maximise profits. The technique not only helps in dropping unprofitable products from the mix but also helps in dropping unprofitable departments, activities etc.,

Illu.6: Present the following information to show to the management: a) the marginal product cost and the contribution per unit; b) the total contribution and profits resulting from each of the following sales mixtures:

	Product	Per Unit
		Rs.
Direct materials	**A**	**10**
	B	**9**
Direct wages	**A**	**3**
	B	**2**
Fixed expenses Rs.800		

Variable expenses are allocated to products as 100% of direct wages.

		Rs.
Sales Price	**A**	**20**
	B	**15**

Sales mixtures:
  i)   **1000 units of product A and 2000 units of B**
  ii) **1500 units of product A and 1500 units of B**
  iii) **2000 units of product A and 1000 units of B**

Solution:

a) Marginal Cost Statement	A	B
	Rs.	Rs.
Direct materials	10	9
Direct wages	3	2
Variable overheads (100%)	3	2
Marginal Cost	16	13
Sales Price	20	15
Contribution	4	2

(b) Product mix choice	1000 A + 2000 B (i)	1500 A + 1500 B (ii)	2000 A + 1000 B (iii)
	Rs.	Rs.	Rs.
Total Sales	(1000 × 20 + 2000 × 15) = 50,000	(1500 × 20 + 1500 × 15) = 52,500	(2000 × 20 + 1000 × 15) = 55,000
Less: Marginal Cost	(1000 × 16 + 2000 × 13) = 42,000	(1500 × 16 + 1500 × 13) = 43,500	(2000 × 16 + 1000 × 13) = 45,000
Contribution	8,000	9,000	10,000
Less: Fixed Costs	800	800	800
Profit	7,200	8,200	9,200

Therefore, sales mixture (iii) will give the highest profit; and as such mixture (iii) can be adopted.

17.1.6 Pricing Decisions:

Marginal costing techniques helps a firm to decide about the prices of various products in a fairly easy manner. Let's examine the following cases.

(i) Fixation of Selling Price.

Illu.7: P/V ratio is 60% and the marginal cost of the product is Rs.50. What will be the selling price?

Solution: P/V Ratio = $\dfrac{S-V}{S} = 1 - \dfrac{V}{S} = \dfrac{C}{S}$

$\dfrac{\text{Variable cost}}{\text{Sales}} = 40\%$ or $\dfrac{40}{100}$

Selling price = $\dfrac{50}{40\%} = \dfrac{50 \times 100}{40} =$ Rs.125

ii. Pricing during Recession:

Illu.8: Hindustan Engineering Company is working well below normal capacity due to recession. The directors of the company have been approached with an enquiry for special job. The costing department estimated the following in respect of the job.

Direct materials – Rs.10,000
Direct labour – 500 Hours @ Rs.2 per hour.
Overhead costs : Normal recovery rates.
Variable – Re. 0.50 per hour
Fixed – Rs.1.00 per hour.
The directors ask you to adise them on the minimum price to be charged. Assume that there are no production difficulties regarding the job.

Solution:
Calculation of Marginal Cost:

	Rs.
Direct materials	10,000
Direct labour	1,000
Variable overhead @ Re.0.50 per hour	250
Marginal cost	Rs.11,250

Commentary: Here the minimum price to be quoted is Rs.11,250, which is the marginal cost. By quoting so, the company is sacrificing the recovery of the profit and the fixed costs. The fixed costs will continue to be incurred even if the company does not accept the offer. So any price above Rs.11,250 is welcome.

(iii) Selling below marginal cost:

Selling below marginal cost, normally, is not feasible. However, under the following circumstances this can be practised.

1. when a new product is introduced.
2. when competitors have to be edged out of the market.
3. when company deals with perishable products.,
4. when the product is used as a loss leader.
5. when labour engaged cannot be retrenched.
6. when foreign market is to be explored to earn foreign exchange.
7. when there is cut-throat competition.
8. when the plant has to be kept in a running condition.

17.1.7 Foreign Market Offer:

The acceptance or rejection of an offer from a foreign market depends upon the incremental cost and incremental revenue.

Illu.9: Chola Pen Co. Ltd. produces and markets Micro tipped pens. The selling price per pen is Rs.5.50 made up as follows:

	Rs.
Direct materials	2.00
Direct labour	1.50
Variable overheads	0.50
Fixed overheads (Rs.90,000 ÷1,20,000)	0.75
Total cost	4.75
Profit	0.75
Selling price	5.50

The installed capacity is 1,50,000 pens per month. At present, it is producing and selling, on an average, 1,20,000 pens per month. The company has received an export order for 30,000 pens per month for two years but at a price of Rs.4.50. the management is hesitant to accept this order because it does not cover the total cost. There are no government subsidies to meet the deficit. It is unlikely that the domestic market will expand in the next two years. Advise them with necessary supporting data.

Solution:

Marginal Cost per unit:

	Rs.
Direct material	2.00
Direct labour	1.50
Variable overheads	0.50
Total Variable Cost	4.00

Selling price of the export order Rs.4.50

If the foreign order is accepted for each unit the firm gets a profit. of Rs.0.50 (Rs.4.50 – 4.00). The total profit if the foreign order is accepted = Rs.15,000 (30,000 × 0.50). So it is better to accept foreign order.

17.2 MAKE OR BUY DECISIONS

A company might be having unused capacity which may be utilised for making component parts or similar items instead of buying them from the market. In arriving at such a 'make or buy' decision, the cost of manufacturing component parts should be compared with price quoted in the market. If the variable costs are lower than the purchase price, the component parts should be manufactured in the factory itself.

Fixed costs are excluded on the assumption that they have been already incurred, and the manufacturing of components involves only variable cost. However, I there is an increase in fixed costs and any limiting factor is operating they should also be taken into account. Consider the following illustration, throwing light on these aspects.

Illu.10: A manufacturing company finds that while the cost of making a component part is Rs.10, the same is available in the market at Rs.9 with an assurance of continuous supply. Give your suggestion whether to make or buy this part. Give also your views in case the supplier reduces price from Rs.9 to Rs.8.

The cost information is as follows:

Particulars	Rs.
1. Material	3.50
2. Direct Labour	4.00
3. Other Variable expenses	1.00
4. Fixed expenses	1.50
	10.00

Solution:

Make or Buy Decision Statement

Purchasing Price	(A)	9
Manufacturing Cost:		
Material		3.50
Direct Labour		4.00
Variable Expenses		1.00
Total Manufacturing Cost	(B)	8.50
Saving in Manufacturing (A-B)	(C)	0.50

Advise:

1. It is better to manufacture rather than buying from outside Market.
2. If the component is supplied at Rs.8 it is better to purchase it rather than manufacturing it. By purchasing, the profit will increase by Rs.0.50 (Rs.8.50 – 8.00) per unit.

Illu.11: A company engaged in the manufacturing radios incurs Rs.6.25 per piece for producing part A. But the same part is available for at Rs.5.75 only per piece in the market. Its supply will also be alright. Particulars of expenses are as follows:

	Rs.
Material per piece	**2.75**
Labour per piece	**1.75**
Other variable expenses per piece	**0.50**
Depreciation and fixed overheads per piece	**1.25**
	6.25

(a) **Do you manufacture that part or purchase it in the market?**
(b) **In case the supplier offers the same at Rs.4.85 only per piece, what is your decision?**

Solution:

Make or Buy Statement for Part A

		Rs.
Buying Price	(A)	5.75
Manufacturing Cost:		
Material		2.75
Labour		1.75
Variable Expenses		0.50
Total Manufacturing Cost	(B)	5.00
Saving in Manufacture (A-B)	(C)	0.75

Advise:

a.   It is better to manufacture rather than buying this. It is because the buying price per unit is Rs.5.75 and manufacturing price is Rs.5.00. In manufacturing the product the firm has a saving of Rs.0.75 per product.

b.   If the computer supply price is Rs.4.85 then it is better to purchase it rather than manufacturing it due to a saving of Rs.0.15 per unit.

Illu.12: ABC company has just been formed. A company has a special process which will enable it to produce a unique product, the demand for which is uncertain. Their estimated costs are:

Material per unit Rs.2
Labour per unit Rs.6
Variable manufacturing expenses per unit Rs.3
Variable selling expenses per unit Re.1
Fixed manufacturing expenses Rs.24,000
Fixed Administrative and selling expenses Rs.72,000.

(a)   If the selling price is Rs.20, how many units they have to sell to (i) break even (ii) make a profit of Rs.32,000 (iii) make a profit of 20 per cent of sale?

(b) If the demand for the product is 10,000 units, what price must they charge in order to (i) break-even (ii) make a profit of Rs.24,000 (iii) make a profit of 20 per cent of sales?

Solution:

Total variable Expenses = 2 + 3 + 6 + 1 = Rs.12
Total Fixed Expenses = Rs.24,000 + Rs.72,000 = Rs.96,000
Sales Price Rs.20

(a) (i) B.E.P. $= \dfrac{F}{S-V} = \dfrac{96,000}{20\text{-}12} = \dfrac{96,000}{8}$ = 12,000 units.

(ii)   Sales required to get a profit of Rs.32,000

$\dfrac{F+P}{S-V} = \dfrac{96,000+32,000}{20\text{-}12} = \dfrac{1,28,000}{8}$ = 16,000 units

(iii)   Required sales amount to get a profit of 20% on Sales. Sales units is assumed as S.

Total Sales = 20S; Estimated profit 20% S; $20\,S \times \dfrac{20}{100} = 4S$

$S = \dfrac{F+P}{S-V} = \dfrac{96,000+4S}{20\text{-}12}$ = 8S = 96,000 + 4S = 8S-4S = 96,000

$$4S = 96,000S = \frac{96,000}{4} = 24,000 \text{ Units}$$

(b) (i) B.E.P. 10,000 units. Selling Price is assumed as S.

$$10,000 = \frac{96,000}{S-12} = 10,000 \, S - 1,20,000 = 96,000;$$

$$10,000S = 96,000 + 1,20,000 ; 10,000S = 2,16,000;$$

$$S = \frac{2,16,000}{10,000} = 21.60; \, S = \text{Rs.}21.60.$$

(ii) Selling price to get a profit of Rs.24,000

$$10,000 = \frac{96,000 + 24,000}{S-12} = 10,000S - 1,20,000 = 1,20,000$$

$$10,000S = 1,20,000 + 1,20,000 = 10,000S = 2,40,000; \, S = \frac{2,40,000}{10,000} = S = \text{Rs.}24$$

(iii) Selling Price to get profit of 20% on Sales.

Total Sales amount for 10,000 Units = 10,000S

On 10,000S; 20% Profit = $10,000S \times \frac{20}{100} = 2,000S$

$$10,000 = \frac{96,000 + 2,000S}{S-12} = 10,000S - 1,20,000 = 96,000 + 2,000S \text{ or}$$

$$8,000S = 2,16,000; \, S = \text{Rs.}27.$$

Illu.13: A firm is selling X product, whose variable cost per unit is Rs.10 and fixed cost is Rs.6,000. It has sold 1,000 articles during one month at Rs.20 per unit. Market research shows that there is a great demand for the product if the price can be reduced. If the price can be reduced to Rs.12.50 per unit, it is expected that 5,000 articles can be sold in the expanded market. The firm has to take a decision whether to produce and sell 1,000 units at the rate of Rs.20 or to produce and sell for the growing demand of 5,000 units at the rate of Rs.12.50. Give your advice to the management in taking the decision.

Solution:

		1,000 units	5,000 units
Selling Price	(A)	20	12.50
Less: Variable cost	(B)	10	10.00
Contribution per unit (A-B)	(C)	10	2.50
Total Contribution		10,000	12,500
Less: Fixed Cost		6,000	6,000
Profit		4,000	6,500

The management may be advised to reduce the selling price to Rs.12.50. It is also advised

to produce and sell, 5,000 units because it gives an additional profit of Rs.2,500 (Rs.6,500 - 4,000)

Illu.14: A Toy manufacturer earns an average net profit of Rs.3 per piece in a selling price of Rs.15 by producing and selling 60,000 pieces at 60% of the potential capacity. Composition of cost of sales is as follows:

	Rs.
Direct Materials	**4.00**
Direct Wages	**1.00**
Factory overhead	**6.00**
	(50% Fixed)
Sales overhead	**1.00**
	(25% varying)

During the current year, he intends to produce the same number of toys but anticipates that:

(a) His fixed charges will go up by 10%.
(b) Rates of Direct labour will increase by 20%
(c) Rates of Direct Material will increase by 5%
(d) Selling price cannot be increased.

Under these circumstances, he obtains an order for a further 20% of his capacity. What minimum price will you recommend for accepting the order to ensure the manufacturer an overall profit of Rs.1,80,500.

Solution:
Calculation of Current year Marginal Cost Statement:

		Rs.
Selling Price	(A)	15.00
Less: Marginal Cost:		
Direct Material [4 + (4× $\frac{5}{100}$)]		4.20
Direct Wages [1 + (1× $\frac{20}{100}$)]		1.20
Factory Overheads (6× $\frac{50}{100}$)		3.00
Sales Overheads (1× $\frac{25}{100}$)		0.25
Total Marginal Cost	(B)	8.65
Contribution per unit (A-B)	(C)	6.35

Total Contribution for 60,000 units = 60,000 × 6.35 = Rs.3,81,000

Calculation of Total Fixed Cost:

	Rs.
Fixed factory overheads per unit	3.00
Fixed sales overheads per unit	0.75
Total fixed cost per unit	3.75

Total fixed cost for 60,000 units = 60,000 units × 3.75 = Rs.2,25,000

Current year total fixed cost = $2,25,000 \times \frac{10}{100} + 2,25,000 = $ Rs.2,47,500

Current year profit for 60,000 units = Total contribution – Fixed expenses
$$= 3,81,000 - 2,47,500 = Rs.1,33,500$$

Calculation of New Selling Price for 20% Capacity:

	Rs.
Given required Profit	1,80,500
Less: Profit earned for 60,000 units	1,33,500
Profit to be acquired for 20% capacity	47,000

When the firm is at 60% capacity the output is 60,000 units.

For additional 20% capacity the required units 20,000

New Selling Price is assumed at 'S' per unit.

For 20,000 units sales amount = 20,000 units × S = 20,000 S

Variable Cost per unit = 8 – 65

Total Variable Cost = 20,000 units × Rs.8-65 = Rs.1,73,000

$$S - V = F + P$$

20,000S – 1,73,000 = Nil + 47,000

20,000S – 1,73,000 + 47,000

20,000S = 2,20,000

$$S = \frac{2,20,000}{20,000} = Rs.11$$

The minimum recommended Selling Price to the company to accept the order is Rs.11.

Illu.15: Budgeted Results to X Ltd. include the following.

Sales	Amount (Rs. Lakhs)	Variable cost as % of sales value
A	5.0	60%
B	4.0	50%
C	8.0	65%
D	3.0	80%
E	6.0	75%
	26.0	65.17%

Fixed cost for the period are Rs.9.1 lakhs. You are required to (a) Produce a statement showing the amount of loss expected and (b) Recommend a change in sales volume of each product which will eliminate the expected loss that sales of only one product can be increased at a time.

Solution:

(a)   **Statement of Profit/Loss Expected**

(Amount in lakhs)

Product	Sales	Variable Cost Ratio	Variable Cost	P.V. Ratio (or) C%	Contribution
A	5	60	3.0	40	2.0
B	4	50	2.0	50	2.0
C	8	65	5.2	35	2.8
D	3	80	2.4	20	0.6
E	6	75	4.5	25	1.5
			17.1		8.9

Calculation of Expected loss:

Total Contribution	8.9
Less: Fixed Expenses	9.1
Expected loss	0.2

b.   Assume only one product can be increased at a time. The amount of sales of each product to be increased as follows.

$$\text{Sales required} = \frac{\text{Under recovery of fixed costs}}{\text{P.V. Ratio}}$$

			Rs.
Product A	$\dfrac{20{,}000}{40\%}$	$20{,}000 \times \dfrac{100}{40}$	50,000
Product B	$\dfrac{20{,}000}{50\%}$	$20{,}000 \times \dfrac{100}{50}$	40,000
Product C	$\dfrac{20{,}000}{35\%}$	$20{,}000 \times \dfrac{100}{35}$	57,143
Product D	$\dfrac{20{,}000}{20\%}$	$20{,}000 \times \dfrac{100}{20}$	1,00,000
Product E	$\dfrac{20{,}000}{25\%}$	$20{,}000 \times \dfrac{100}{25}$	80,000

Note: For (a)

i.   Variable cost = Sales $\times \dfrac{\text{Variable Cost Ratio}}{100} = 5 \times \dfrac{60}{100} = $ Rs.3

ii.   P.V. ratio = 100 – Variable Cost Ratio = 100 – 60 = 40

iii.   Contribution = Sales $\times$ P.V. Ratio = $5 \times \dfrac{40}{100} = 2$

Note: For (b)

Under recovery of fixed expenses = Expected loss = Rs.20,000

Illu.16: The following figures are extracted from the records of a company.

	Departments				
	A	B	C	D	Total
	Rs.	Rs.	Rs.	Rs.	Rs.
Sales	200	400	600	800	2,000
Costs:					
Direct Material	80	200	360	580	1,220
Direct Labour	40	150	180	140	510
Direct Expenses	4	6	8	10	28
Prime Cost	124	356	548	730	1,758
Overheads:					
Variable	20	30	24	20	94
Fixed	10	20	10	8	48
	30	50	34	28	142
Total cost	154	406	582	758	1,900
Profit/Loss	46	(-) 6	18	42	100

       On the basis of the above information, the management is inclined to discontinue department B. What will be your advice to management?

Solution:

Comparative Statement of Profitability

	With Dept. B Total Rs.	Without Dept. B Total Rs.
Sales	2,000	1,600
Less: Variable cost	1,852	1,466
Contribution	148	134
Less: Fixed expenses	48	48
Profit	100	86

Advise: It Department B is discontinued we have a total profit of Rs.86. If it is continued the total profit is Rs.100. Hence it is better to continue will be Department B.

Note: It is assumed that the total fixed costs remains the same.

       Illu.17: Hindustan Limited is engaged in manufacturing and selling industrial boxes. It is proposed to reduce the prices due to heavy competition. By decreasing the selling

price by 10% and 15%, how many units are to be sold to maintain the current level of profit?

	Rs.	Rs.
Current Sales (15,000 units)		1,50,000
Variable Cost (15,000 units)	90,000	
Fixed Costs	35,000	1,25,000
Net Profit		25,000

Solution:

Calculation of Selling Price per unit, Variable Cost per unit and Contribution Per unit

	Total	Per unit
Current Sales (15,000 units)	1,50,000	Rs.10
Variable Cost (15,000 units)	90,000	Rs.6
Contribution per unit	60,000	Rs.4

Calculation of required sales in units to earn a profit of Rs.25,000 when selling price is reduced by 10% and 15%.

		10% Decrease		15% Decrease
New Selling Price per unit	$(10 \times \frac{9}{100})$	Rs.9	$(10 \times \frac{15}{100})$	8.50
Variable Cost Per unit		6		6
Contribution per unit		3		2.50
Required sales to earn profit of Rs.25,000 $\frac{(F + \text{Desired Profit}}{\text{Contribution per unit}}$	$(\frac{35,000 + 25,000}{3})$	20,000 Units	$(\frac{25,000 + 30,000}{2.50})$	24,000 Units

Illu.18: Assume you are the Management Consultant of XYZ Co. Ltd. The Managing Director of the company seeks your advice on the following problem:

The XYZ Ltd., produces a variety of products each having a number of component parts. Product "B" takes 5 hours to produce on machine No.99 working at full capacity. "B" has a selling price of Rs.50 and a marginal costs of Rs.30 per unit. "A-10" a component part could be made on the same machine in 2 hrs. for marginal cost of Rs.5 per unit. The supplier's price is Rs.12.50 per unit. Should the company make or buy "A-10"?

Assume that machine hour is the limiting factor.

Solution:

In this problem the cost of new product plus contribution lost during the time for manufacturing "A-10" should be compared with the supplier's price to arrive at a decision.

	Rs.
B- Selling Price	50.00
Less: Marginal Cost	30.00
Contribution	20.00

It takes 5 hours to produce one unit of "B"

Contribution earned per hour on Machine No.99 is Rs. $\frac{20}{5}$ = Rs.4

"A-10" takes two hours to be manufactured on machine which is producing "B".

If "A-10" is produced, contribution lost will be = 2 hours × Rs.4 = Rs.8

Real cost of "A-10" to the company = Marginal cost of "A-10" plus contribution lost for using the machine for "A-10".

$$Rs.5 + Rs.8 = Rs.13$$

This is more than the seller's price of Rs.12.50 and so it is advisable for the company to buy the product from outside.

17.3 SELF ASSESSMENT QUESTIONS

1. Explain the specific decision-making areas where the principles of marginal costing could be applied.
2. What is the signification of Contribution of marginal costing? State its uses in managerial decision making.
3. What is Marginal Costing? How is it useful to the manufacturing organization?
4. Bring out the significance of imputed costs and out pocket costs for managerial decision making.

17.4 EXERCISES

1. A company is considering expansion. Fixed costs amount to Rs.4,20,000 and are expected to increase by Rs.1,25,000 when plant expansion is completed. The present plant capacity is 80,000 units a year. Capacity will increase by 50 per cent with the expansion. Variable costs are currently Rs.6.80 per unit and are expected to go down by Rs.0.40 per unit with the expansion. The current selling price is Rs.16 per unit and is expected to remain same under either alternative. What are the break-even points under either alternative? Which alternative is better and why?

[Ans.: It is better to go for expansion because the profit will double]

2. Arjun Electronic decided to effect a 10% reduction in the price of its product because it is felt that such a step may lead to a greater volume of sales.   It is anticipated that there are no prospects of a change in total fixed costs and variable cost per unit. The director wish to maintain net profits at the present level.

    The following information has been obtained from its books.
    Sales : 10,000 units Rs.2,00,000
    Variable Costs: Rs.15 per unit
    Fixed Costs Rs.40,000
    How would management proceed to implement this decision?

    [Ans.: Sales Rs.3,00,000]

3. Vimala Company produced and sold 10,000 units under the following Cost structure during the year 2006:

    (a) Prime Cost Rs.80 per unit.
    (b) Variable Overheads Rs.10 per unit.
    (c) Fixed expenses Rs.1,50,000.
    (d) Advertising Rs.25,000.
    (e) Selling Price Rs.150 per unit.

    For the year 2007 the following changes are proposed to be made:
    (i)   Advertising to be discontinued.
    (ii)   Reduction in direct labour cost by Rs.3 per unit.
    (iii)   Reduction in variable administration expenses by Rs.3 per unit.
    (iv)   New selling price: Rs.120 per unit.
    (v)   Increase in production and sales by 100%.

        You are required to find out (1) The P/V ratio (2) The Break-even point and (3) The amount of profit for the year 2007, taking into account the proposed changes.

    [Ans.: (1) 30% (2) Rs.5,00,000 (3) Rs.5,70,000]

4. The cost of manufacturing of 8,000 units of 'X' product is given below:
    Direct materials Rs.8,000; labour Rs.64,000; Variable overheads Rs.32,000; Fixed overheads Rs.40,000; Fixed overhead is included Rs.24,000, that continues regardless of the decision. The same product is available in the market for Rs.16 per unit. Should the company make or buy the product?
    [Ans.: Manufacturing is more profitable than purchase because due to manufacture the profit is more by Rs.32,000]

5.. The management of Pioneer Products Corporation Limited requests assistance from you in arriving at a decision whether to continue manufacturing a certain part of an assembly or to buy it from an outside supplier who had been quoting a price of Rs.8 per unit.

The Corporation's annual requirements is 5,000 units and the costs accumulated for their special manufacture are:

	Rs.
Direct Materials	17,500
Direct labour	28,000
Indirect Labour	6,000
Power (Electricity)	300
Others	640

If the parts are purchased from outside, the present machinery used to make the parts could be sold and its value would be realised. This step would reduce the total machinery depreciation by Rs.2,000 and property taxes and insurance by Rs.1,000.

If the parts are purchased from the outside supplier, the following additional costs would be incurred:

Freight Rs.0.50 per unit and material received charges @ Rs.1 per unit.

From the above information you are required to prepare a statement comparing the costs of manufacturing the parts, with the costs of purchasing them from the outside supplier and guide management for a make or buy decision.

[Ans.: It is better to purchase 5,000 units instead of manufacturing it due to the saving of Rs.7,440]

6. A company produces variety of products and components. Following components with relevant manufacturing costs are under consideration for purchase outside:

Component	Direct Material Rs.	Direct Labour Rs.	Variable overheads Rs.	Fixed Costs Rs.	Bought out price Rs.
XY	600	200	100	300	800
PR	200	800	200	1,000	2,300
MN	100	300	200	500	1,200

Select the components which should be bought from outside, indicating the reasons for choice.

[Ans.: (a) It is better to purchase XY Product (b) It is better to manufacture PR product (c) It is better to manufacture MN Product.]

7.   A manufacturer has planned his level of operation at 50% of his plant capacity of 30,000 units. His expenses are estimated as follows, if 50% of the plant capacity is utilised.

	Rs.
(i) Director materials	8,280
(ii) Direct wages	11,160
(iii) Variable and other manufacturing expenses	3,960
(iv) Total fixed expenses irrespective of capacity utilisation	6,000

The expected selling price in the domestic market is Rs.2 per unit. Recently the manufacturer has received a trade enquiry from an overseas organisation interested in purchasing 6,000 units at a price of Rs.1.45 per unit.

As a professional management accountant, what would be your suggestion regarding acceptance or rejection of the offer? Support your suggestion with suitable quantitative information.

[Ans.: 15,000 units: Profit Rs.600; 6,000 units : Loss Rs.660; Total 21,000 units : Loss Rs.60; It is not profitable to accept the foreign offer.]

8.   A company currently operating at 80% capacity has the following particulars.

	Rs.
Sales	32,00,000
Direct materials	10,00,000
Direct labour	4,00,000
Variable overheads	2,00,000
Fixed overheads	13,00,000

An export order has received that would utilise half the capacity of the factory. The order cannot be split, i.e., it has either to be taken in full and executed at 10% below the normal domestic prices are rejected totally.

The alternative available to the management are:

1.   Reject the order and continue with the domestic sales only; (at as present); or
2.   Accept the order, split capacity between overseas and domestic sales and turn away excess domestic demand; or
3.   Increase capacity to accept the export order and maintain the present domestic sales by:

(a) buying an equipment that will increase capacity by 10%. This will result in an crease of Rs.1,00,000 in fixed costs; and

(b) Work overtime to met balance of required capacity. In that case, labour will be paid at one and half times the normal wage rate.

Prepare a comparative statement of profitability and suggest the best alternative.
[Ans.: Profit I Rs.3,00,000; II Rs.5,00,000; III Rs.9,50,000. Alternative III is the best because it results in the highest amount of profit.]

9. Prestige company private limited, manufacturing pressure cookers has drawn up the following budget for the year 2006-07.

	Rs.
Raw materials	20,00,000
Labour, stores, power and other variable costs	6,00,000
Manufacturing overheads	7,00,000
Variable distribution costs	4,00,000
General overheads including selling	3,00,000
Total	40,00,000
Income from sales	50,00,000
Budgeted profits	10,00,000

The General Manager suggests to reduce selling price by 5% and expects to achieve an additional volume of 50%. There is sufficient manufacturing capacity. More intensive manufacturing programme will involve additional costs of Rs.50,000 for production planning. It will also be necessary to open an additional sales office at the cost of Rs.1,00,000 per annum.

The Sales Manager, on the other hand, suggests to increase selling price by 10%, which it is estimated will reduce sales volume by 10%. At the same time saving in manufacturing overheads and general overheads at Rs.50,000 and Rs.1,00,000 per annum respectively is expected on this reduced volume.
Which of these two proposals would you accept and why?

[Ans.: Proposal I : Profit Rs.14,75,000; Proposal II Rs.14,00,000; Proposal I is acceptable as it gives higher profit.]

10. The following production/sales mix are capable of achievement in a factory.

i. 2,000 units of Product A and 2,000 units of product C.
ii. 4,000 units of product B.
iii. 1,000 units of product A, 2,000 units of product B and 1,600 units of product C.

Cost per unit is as follows.

	A Rs.	B Rs.	C Rs.
Direct material	20	16	40
Direct wages	8	10	20

Fixed cost is Rs.20,000 and variable overheads per unit of A, B and C are Rs.2, Rs.4 and Rs.4 and Rs.8 respectively. Selling prices of A, B and C are Rs.36, Rs.40 and Rs.100 per unit respectively. Determine the marginal contribution per unit of A, B and C and the profits resulting from product mixed (i), (ii) and (iii).

[Ans.: Marginal Contribution per unit; A Rs.6; B Rs.10; C Rs.32; Sales mix (iii) is profitable as it is yields the highest amount of contribution and profit.]

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LESSON - 18

FINANCIAL LEVERAGE AND COMBINED LEVERAGE

Objectives

The main objectives of this lesson are to explain

* the concept of finanacial leverage, its measurement and importance

* the EBIT-EPS analysis

* the point of indifference

* the meaning and measurement of composite leverage

STRUCTURE :

18.1 Meaning of Financial Leverage :

The composition of different sources of long-term funds mobilised by a firm is known as capital structure of that firm. These sources include debt, preference capital, equity and retained earnings. The use of fixed income bearing debt and preference share capital along with equity for the benefit of owners of the firm (equity shareholders) is called financial leverage or trading on equity. Since the cost of these funds is fixed and cheaper when compared to cost of equity, their use magnifies the earnings to the equity shareholders.

Favourable and Unfavourable Financial Leverage : Financial leverage can be favourable or unfavourable. Debt capital involves payment of interest at a fixed rate irrespective of the fact that the firm makes profit or not. The preference dividend, however, is payable out of after-tax income. If there is no profit during any particular year, the preference dividend is not payable. The equity shareholders are entitled to the residual income. A firm is said to have a favourable financial leverage, if its earnings are more than the cost of debt and preference capital. On the contrary, if it does not earn as much as these costs, the leverage is unfavourable.

Financial Leverage and Trading on Equity : Finanacial leverage and trading on equity are generally synonymously used. However, there is a slight difference to be shown in their use. Trading on equity refers to the employment of fixed income - bearing sources of funds for the benefit of equity shareholders. Hence, the term trading on equity should be used for financial leverage only when it is favourable. The firm resorts to trading on equity with the objective of giving the equity shareholders a higher rate of return than the general rate of return on the capital employed in the firm, so that it may compensate the risk they bear.

For example, if a firm borrows debt capital at 15% and earns 20% on its capital, the difference of 5% after payment of interest belongs to equity shareholders making their total return 25% (20+5). On the other hand, if the firm earns only 12% on its capital, there will be a loss of 3% after payment of interest, which makes the rate of return available to equity shareholders lower at 9% (12-3). Thus, financial leverage is a duoble-edged sowrd, which has the potentiality of increased return as well as increased risk to equity shareholders.

18.2 Measurement of Financial Leverage

Degree of Financial Leverage can be calculated with the following formula :

$$\text{Degree of Financial Leverage} = \frac{EBIT}{EBT} = \frac{EBIT}{EBIT-I}$$

Where,

EBIT = Operating profit or Earnings before interest and tax

EBT = Earnings before tax

I = Annual Interest on debt capital

Illustration 1

Calculate the financial leverage for the following financial plan

Equity capital	= Rs. 2,00,000
Debt	= Rs. 2,00,000
Operating profit (EBIT)	= Rs. 40,000

Interest at 10% on debt capital.

Solution :

EBIT	= Rs. 40,000
Less Interest @10% on debt	= Rs. 20,000
EBT	= Rs, 20,000

$$\text{Degree of Financial Leverage} = \frac{EBIT}{EBT} = \frac{Rs.40000}{Rs.40000-20000}$$

$$= \frac{40,000}{20,000} = 2$$

Alternative Definition of Financial Leverage : One of the objectives of planning an appropriate capital structure is to maximise the return on equity shareholders' funds or maximise the earnings per share (EPS). Some authorities have used the term, "Financial Leverage" in the context that it defines the relationship between EBIT and EPS. According to Gitman, financial leverage is the ability of a firm to use fixed financial charges to magnify the effects of changes in EBIT on the firm's earnings per share. Therefore, financial leverage indicates the percentage change in EPS in relation to a percentage change in EBIT.

As per the above definition the degree of financial leverage can be calculated as below :

$$\text{Degree of Financial Leverage} = \frac{Percentage\ Change\ in\ EPS}{Percentage\ change\ in\ EBIT}$$

It is implied that there will be no financial leverage, if the quotient according to the above formula does not exceed one.

Illustration 2

A company has the following capital structure :

10,000 Equity shares of Rs. 10 each	:	Rs. 1,00,000
2,000 10% Preference shares of Rs. 100 each :		Rs. 2,00,000
2,000 10% Debentures of Rs. 100 each :		Rs. 2,00,000

Calculate the EPS for each of the levels of EBIT as : i) Rs. 1,00,000 and ii) Rs. 1,40,000.

Also calculate the financial leverage taking EBIT level under base (i). Tax rate is 50%.

Solution : Computation of Earnings per share

	(i)	(ii)
EBIT	Rs. 1,00,000	Rs. 1,40,000
Less : Interest on debentures	20,000	20,000
EBT	80,000	1,20,000
Less Tax @50%	40,000	60,000
EAT	40,000	60,000
Less : Preference dividend	20,000	20,000
Earnings available to equity shareholders	20,000	40,000
Earnings per share	Rs. 2	Rs. 4

$$\text{EPS} = \frac{\text{Earnings available to equity shareholders}}{\text{No. of equity shares}}$$

$$\text{Degree of financial leverage} = \frac{Percentage\ Change\ in\ EPS}{Percentage\ change\ in\ EBIT} = \frac{100\%}{40\%} = 2.5$$

18.3 Financial Leverage and EBIT - EPS Analysis

Finanacial leverage is used to magnify the shareholder's earnings. It is based on the assumption that cost of fixed charge funds is lower than the firm's rate of return on its assets. An analysis of EBIT - EPS relationships helps in designing the capital structure of a firm. It is a widely used technique to design an appropriate capital structure which will be determined on the basis of EPS. It will help to determine the appropriate financial plan from among various alternative financial plans, when EBIT is constant and is varying. This EBIT - EPS can be explained with the following illustrations :

7.3.1 Analysing Alternative Financial Plans - Constant EBIT : The effect of financial leverage on EPS under various alternative financial plans can be illustrated as below.

Illustration 3

ABC Ltd. has an equity share capital of Rs. 10,00,000 divided into shares of Rs. 100 each. The company plans to raise further Rs. 5,00,000 for expansion-cum-modernisation. The company has the following financial plans :

Plan I :	All common stock
Plan II :	Rs. two lakh in equity and Rs. 3 lakh in 8% debt.
Plan III :	All debt financed at 8% p.a.
Plan IV :	Rs 2 lakh in equity and Rs. 3 lakh in 8% preference share capital.

The Company's present earnings before interest and tax (EBIT) are Rs. 3,00,000. The corporate tax rate is 50%.

You are required to calculate the earnings per share in each plan and comment on the implications of financial leverage.

Solution :

	Different PLANS			
	I	II	III	IV
	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Earnings before interest and taxes (EBIT)	3,00,000	3,00,000	3,00,000	3,00,000
Less : Interest @ 8%	-	24,000	40,000	-
EBT	3,00,000	2,76,000	2,60,000	3,00,000
Less : Tax @ 50%	1,50,000	1,38,000	1,30,000	1,50,000
EAT	1,50,000	1,38,000	1,30,000	1,50,000
Less : Preference dividend @ 8%	-	-	-	24,000
Earnings available to equity shareholders	1,50,000	1,38,000	1,30,000	1,26,000
No. of equity shares	15,000	12,000	10,000	12,000
Earnings per share (EPS)	Rs. 10	Rs. 11.50	Rs. 13	Rs. 10.50

Comments :

Of all the above financial plans, plan III, the most leveraged is the best plan as its EPS is the highest at Rs. 13. Plan II is the next best plan where the EPS is Rs. 11.50. In this case, Rs. 3 Lakh are mobilised in the form of debt capital. Even plan IV, where preference Capital is mobilised, is better than plan I which is all-equity financed.

Thus, through EBIT-EPS analysis, alternative financial plans can be assessed.

18.3.2 Analysing Alternative Financial Plans - Varying EBIT

In practice, EBIT for any firm is subject to various influences. As a result, EBIT varies. In the given period, the actual EBIT of the firm may be more or less than the expected. It is therefore useful to analyse the impact of financial leverage on EPS for possible fluctuations in EBIT. It is illustrated below :

Illustration 4

A firm is considering two financial plans for an investment of Rs. 5,00,000

	Plan I	*Plan II*
Debt (at 10% interest)	Rs. 4,00,000	Rs. 1,00,000
Equity share capital (Rs. 10 each)	Rs. 1,00,000	Rs. 4,00,000
Total Capital	Rs. 5,00,000	Rs. 5,00,000
No. of equity shares	10,000	40,000

Find out the effect of financial leverage on EPS, if EBIT expected is i) Rs. 50,000, ii) Rs. 75,000, and iii) Rs. 1,25,000. The corporate tax rate is 50%.

Solution :

Effect on EPS under Plan I

	Rs.	*Rs.*	*Rs.*
EBIT	50,000	75,000	1,25,000
Less : Interest on debt	40,000	40,000	40,000
Earnings before tax :	10,000	35,000	85,000
Less : tax @ 50%	5,000	17,500	42,500
Earnings after tax :	5,000	17,500	42,500
No. of equity shares	10,000	10,000	10,000
Earnings per share :	0.50	1.75	4.25

Effect on EPS under Plan II	Rs.	Rs.	Rs.
EBIT	50,000	75,000	1,25,000
Less : Interest	10,000	10,000	10,000
EBT	40,000	65,000	1,15,000
Less Tax @ 50%	20,000	32,500	57,500
EAT	20,000	32,500	57,500
No. of equity shares :	40,000	40,000	40,000
Earnings per share (EPS)	0.50	0.81	1.44

Comment :

1)   Plan I more leveraged than plan II. Plan I has 80% of debt while plan II has only 20% of debt capital.

2)   Under plan I, the effect of change in EBIT on EPS is more when campared to plan II, because financial leverage is higher in plan I.

18.4 Calculation of Indifference point

The point of indifference refers to that level of earnings before interest and taxes (EBIT), at which earnings per share (EPS) remains the same irrespective of different alternatives of debt-equity mix. At this level of EBIT, the rate of return on capital employed is equal to the cost of debt. This is also known as break--even level of EBIT for alternative financial plans.

At the level of indifference EBIT (EBIT*) alternative financial plans with result in the same EPS. For example

a) Under all equity (100%) plan, EPS is equal to

$$EPS_a = \frac{EBIT(1-T)}{N_a}$$ Where EBIT = Earning Before Interest and Taxes.

                                T = corporate tax rate

                                N = Number of shares

b) Under Debt - Equity plan, EPS is equal to

$$EPS_b = \frac{(EBIT - I)(1-T)}{N_b}$$ Where I = annual interest

c) Under Debt - Equity - preference capital plan EPS is equal to

$$EPS_c = \frac{(EBIT - I)(I-T) - Dp}{N} \quad \text{Where Dp = Preference Dividend}$$

If we wish to find the indifference level of EBIT between plan a (all equity) and plan b (Debt - Equity), since EPS under both plans would to equal at Indifference level of EBIT, EBIT * can be worked out by the following procedure

Since $EPS_a = EPS_b$

$$\text{then} = \frac{EBIT(1-T)}{N} = \frac{(EBIT - I)(1-T)}{N}$$

Given   i) number of shares under both the plans (H)

               ii) interest on debt (I)

               iii) carporate tax rate (T)

We can solve EBIT which is the indifference level of EBIT (EBIT *)

Similarly between financial plan d and c the following equation can be used.

Given   i) Interest under both plans (I)

               ii) Tax rate (T)

               iii) Number of shares under both plans

               iv) Preference dividend under plan c (DP)

we can solve EBIT by using the following equation.

$$\frac{EBIT - Ib)(1-T)}{Nb} = \frac{(EBIT - Ie)(1-T)-Dp}{Nc}$$

18.4.1. EBIT - EPS Analysis - Graphical Presentation :

We know that

$$EPS = \frac{(EBIT - I)(1-T) - Dp}{N}$$

if the equation is rearranged

$$EPS = \frac{(1-T)EBIT}{N} - \frac{(1-T)I}{N} - \frac{DP}{N}$$

$$EPS = \frac{-(1-T)I}{N} - \frac{DP}{N} + \frac{(1-T)}{N} EBIT$$

When the level of leverage, corporate the rate and dividend on preference Capital are coustant.

$$\left\lfloor \frac{(1-T)I}{N} + \frac{DP}{N} \right\rfloor \text{ is a constant}$$

Then EBIT is a changing variable and is represanted by 'x'

$$EPS = - \left\lfloor \frac{(1-T)I}{N} + \frac{DP}{N} \right\rfloor + \left\lfloor \frac{1-T}{N} \right\rfloor EBIT$$

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if EPS is represented by y

then   y = a+bx

Therefore EPS is a linear function of EBIT.

If H_O EBIT - EPS relationship is platted on a graph the line takes the shape of a straight line

Financial plan IV (25% Equity 75% Debt)

Financial plan II (50% Equity 50% Debt)

Financial plan II (75% Equity 25% Debt)

Financial plan I (100% Equity)

⟶ Indifference point

E

EBIT*

EBIT

EPS
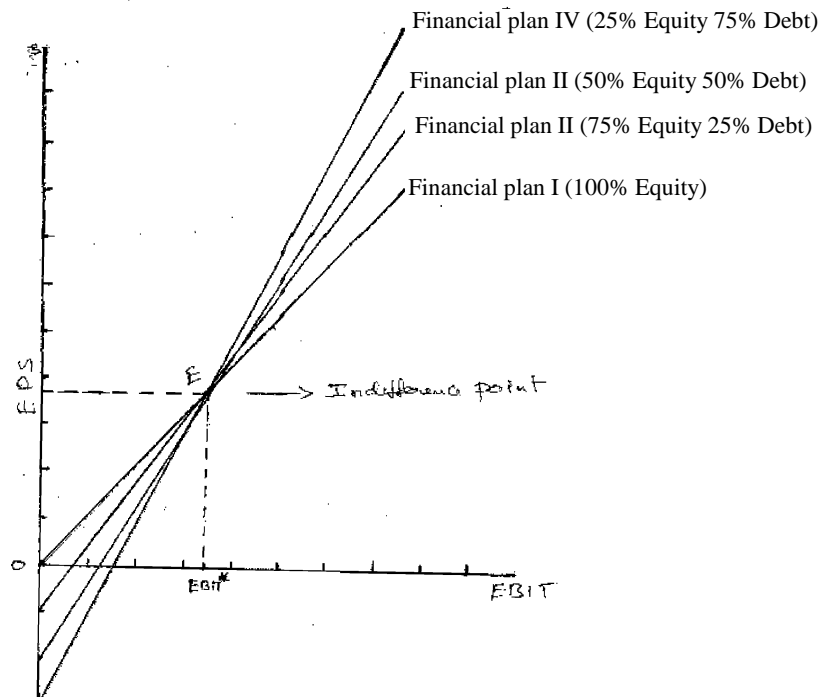
from the graphical view of EBIT - EPS analysis the following observations can be made.

*   The line be come steeper and steeper with more and more debt in the capital structure

*   Steeper the line, the more the profit potential to the sharehders

*   Point of intersection (E) is the indifference point. It is the level of EBIT at which EPS under various alternative financil plans is equal. It is the point where rate of

*   Below the indifference point, the line shifts more and more towerds the righ when the level of leverage increases, indicating Unfavourable effect of leverage.

*   The line beyond point E Shifts towards left as the leverage increases indicating favourable effect of leverage.

If the actual EBIT of the campany is

        * Lower than EBIT*   -   Equite financing is preferable

        * equal to EBIT *   -   all plans are equally preferable

        * Morethan EBIT*   -   Debt financing is preferable

    These situations arise because of the differance between rate of refurn on assets (r) and rate of interest an debt (i)

r is less than i -	EPS decreases with every increase in debt
r is equal to i -	EPS remains the same with any level of debt
r is more than i -	EPS increases with increasing debt

Illustration 5 :

A new project under consideration of a company requires an investment of capital of Rs. 150 lakhs. Interest on term loan is 12% and the tax rate is 50%. If the debt equity ratio insisted by the financing agencies is 2:1, calculate the point of indifference for the project.

Solution :

In case of this project, the financing agencies insisted on debt - equity ratio of 2:1. Hence, there are two alternative plans they are :

1)   Raising the entire amount of Rs. 150 lakhs by the issue of equity shares, so that there is no debt.

2)   Raising debt capital of Rs. 100 lakhs and equity capital of Rs. 50 lakhs.

Calculation of point of indifference :

$$\frac{(X - I_1)\ (I - T) - D_p}{N_1} = \frac{(X - I_2)\ (I - T) - D_p}{N_2}$$

$$\frac{(X - 0)\ (1 - .5) - 0}{150\ lakhs} = \frac{(X - 12\ lakhs)\ (1 - .5) - 0}{50\ lakhs}$$

or $\qquad \dfrac{.5x}{150} = \dfrac{.5x - 6}{50}$

or 25x = 75 x - 900

or 50x = -900

or 50 x = 900

or $x = \dfrac{900}{50} = Rs\,18\ lakhs$

Thus, EBIT at point of indifference is Rs. 18 lakhs. At this level of EBIT, the earnings per share (EPS) will be the same under both the plans.

Illustration 6 :

ABC Co. Ltd is considering three plans for which the key information is as below :

a) Total investment to be raised Rs. 4,00,000.

b) Plans of financing proportion :

Plans	Equity	Debt	Preference capital
A	100%	-	-
B	50%	50%	-
C	50%	-	50%

c) Cost of debt is 8% and rate of preference dividend is 8%.

d) Equity shares of Rs 10 each will be issued at a premium of Rs. 10 per share

e) The expected EBIT is Rs. 1,60,000 and the tax rate is 50%.

Determine for each plan :

i) Earnings per share (EPS)

ii) the EBIT range among the plans for point of indifference.

Sollution :

i) computation of EPS for each plan

	Plan A (Rs.)	Plan B (Rs.)	Plan C (Rs.)
EBIT	1,60,000	1,60,000	1,60,000
Less : Interest@8%	-	16,000	-
EBT	1,60, 000	1,44,000	1,60,000
Less Tax @ 50%	80,000	72,000	80,000
Earnings after tax	80,000	72,000	80,000
Less : Preference dividend 8%	-	-	16,000
Earnings available to equity shareholders	80,000	72,000	64,000
No. of equity shares	20,000	10,000	10,000
Earnings per share	Rs. 4.00	Rs. 7.20	Rs. 6.40

ii)   Computation of EBIT range among the plans for point of indifference.

a) Point of indifference between plan A and B :

$$\frac{(X - I_1)\ (1 - T)\ - D_p}{N_1} = \frac{(X - I_2)\ (1 - T)\ - PD}{N_2}$$

Where, X = EBIT at point of indifference

I_1 = Interest under plan 1

I_2 = Interest under plan 2

T = Tax rate

D_p = Preference dividend

N_1 = Number of equity shares under plan 1

N_2 - Number of equity shares under Plan 2

$$\frac{(X - 0)\ (1-.5)\ - 0}{20,000} = \frac{(X - 16,000)\ (1-.5)\ - O}{10,000}$$

or $\dfrac{.5x}{20,000} = \dfrac{.5x - 8000}{10,000}$

or $10,000\ (.5x) = 20,000\ (.5x\text{ - }8000)$

or $.5x = 2\ (.5x\text{ - }8000)$

or $.5x = x\text{ - }16,000$

or $.5\ x = 16,000$

$\therefore\ x = \dfrac{16,000}{.5} = Rs.32,000$

Thus, point of difference between plan A and Plan B is Rs. 32,000.

b) Between plan A and C

$$\frac{(X - 0)\ (1-.5) - 0}{20,000} = \frac{(X - 0)\ (1-.5) - 16,000}{10,000}$$

or

$$\frac{.5x}{20,000} = \frac{.5x - 16,000}{10,000}$$

or
.5x = 2 (.5x - 16,000)

or
.5x = x - 32,000

or
.5x = 32,000

$$\therefore \ x = \frac{32,000}{.5} = Rs.\ 64,000$$

c) Between plan B and C

$$\frac{(x - 16,000)\ (1-.5) - 0}{10,000} = \frac{(x - 0)\ (1-.5) - 16000}{10,000}$$

.5x - 8000 = .5x - 16,000

Thus, there is no point of indifference between plan B and C

18.5 Combined Leverage - Meaning and measurement

As discussed earlier, operating leveage measures the effect of a change in sales on EBIT. It explains the degree of operating risk. Financial leverge measures the effect of a change in operating EBIT or EPS. Thus, it explains the degree of financial risk. When these two leverages are combined it indicates the effect of change in sales on EPS. This combined leverage or composite leverage can be computed as follows :

Degree of Composite leverage = Operating Leverage x Financial Leverage

Degree of Operating leverage   =- $\dfrac{\text{Sales - VC}}{\text{EBIT}}$ = $\dfrac{\text{Contribution}}{\text{EBIT}}$

Degree of Financial leverage   = $\dfrac{\text{EBIT}}{\text{EBT}}$ = $\dfrac{\text{EBIT}}{\text{EBIT - Interest ondehi}}$

Degree of Composite leverage = $\dfrac{\text{Contribution}}{\text{EBIT}}$ x $\dfrac{\text{EBIT}}{\text{EBT}}$

= $\dfrac{\text{Contribution}}{\text{EBT}}$sales - $\dfrac{\text{Variable operating Cost}}{\text{EBIT - Interest an debt}}$

The degree of combined or composite leverage can also be calculated as follows :

Degree of combined leverage = $\dfrac{\text{Percentage change in EPS}}{\text{Percentage change in sales}}$

10

Illustration 7

ABC Ltd, has sales of Rs. 10,00,000; Variable cost of Rs. 4,00,000 and fixed costs of Rs. 2,00,000. It has a long term debt of Rs. 20,00,000 at 10% rate of interest. Calculate the operating, financial and combined leverages.

Solution :

Sales :	Rs. 10,00,000
Less Variable Cost :	Rs. 4,00,000
Contribution :	6,00,000
Less : Fixed Cost	2,00,000
EBIT	4,00,000
Less Interest@10%	2,00,000
EBT	2,00,000

i)   Operating Leverage $= \dfrac{Contribution}{EBIT} = \dfrac{6,00,000}{4,00,000} = 1.5$

ii)   Financial Leverage $= \dfrac{EBIT}{EBT} = \dfrac{4,00,000}{2,00,000} = 2$

iii) Composite Leverage = DOL x DFL = 1.5 x 2 = 3

  or $= \dfrac{Contribution}{EBT} = \dfrac{6,00,000}{2,00,000} = 3$

Illustration 8

A firm has sales of Rs. 20,00,000; variable cost of Rs. 14,00,000 and fixed costs of Rs. 4,00,000 and debt of Rs. 10,00,000 at 10% rate of interest. What are operating, financial and composite leverages? If the firm wants to double its EBIT, how much of a percentage rise would be needed?

Solution :

	Rs.
Sales :	20,00,000
Less : Varibale Cost :	14,00,000
Contribution :	6,00,000
Less : Fixed Cost :	4,00,000
EBIT	2,00,000
Less : Interest@10% on Rs. 10,00,000	1,00,000
EBT :	1,00,000

a) Operating Leverage $= \dfrac{Contribution}{EBIT} = \dfrac{6,00,000}{2,00,000} = 3$

b) Financial Leverage $= \dfrac{EBIT}{EBT} = \dfrac{2,00,000}{1,00,000} = 2$

c) Combined leverage = Operating leverage x Financial leverage = 3 x 2 = 6

Percentage rise in sales needed to double the EBIT :

As the operating leverage is 3, if sales increase by 100% EBIT will increase by 300%. So, if sales increase by 33 1/3%, EBIT will increase by 100%, i.e. EBIT will double.

Verification :

Sales (after 33 1/3 increase) (20,00,000+6,66,667)	26,66,667
Less : vairable cost (at 70% of sales)	18,66,667
Contribution :	8,00,000
Less : Fixed Cost	4,00,000
EBIT	4,00,000

18.6 Importance of Financial and Operating Leverages

The two important quantitative tools used by the financial experts to measure the return to equity shareholders and the market pirce of equity shares are the operating and financial leverages. Of these two tools, the financial leverage is considered to be superior, because it focusses the attention on the earnings of the shareholders and the market price of the shares.

A firm resorts to financial leverage or trading on equity to magnify the earnings of equity shareholders. Financial leverage is significant in the following two ways :

i) Planning of capital structure : The capital structure is concerned with the debt - equity ratio. It helps in selecting the optimum capital structure which gives the highest EPS.

ii) Profit planning : The earnings per share is affected by the degree of financial leverage. In case the profitablity of the firm is increasing, the fixed cost funds will help in increasing the availability of profits for equity shareholders. Thus, financial leverage is important for profit planning.

However, a firm cannot continue to increase debt capital to magnify shareholders' earnings because financial leverage has the risk of adversely affecting the earnings which is known as financial risk. If a firm employs more and more debt capital, it increases the financial risk. Moreover, a firm with widely fluctuating earnings cannot afford to employ more debt capital.

A company should try to have a balance of the two leverages because they got tremendous acceleration or deceleration effect on EBIT and EPS. A proper cambination of both operating and financial leverages is of great advantage to the firm's growth, while on inappropriate combination may prove to be a curse as explained below :

i) A very high degree of operating as well as financial leverages will make the position of a firm very risky. When both the leverages are high, it implies that the firm has high fixed operating cost and fixed interest charges. As a result, the carnings of shareholders widely fluctuate.

ii) If a firm has a high operating leverage, it should not have a high financial leverage. It should have a low financial leverage.

iii) In the same way, firm with a low operating leverage will get the benefit by having a high financial leverage, provided it has enough profitable opportunities for the borrowed funds.

iv) If both the leverages are low, it means that the management of the firm is adopting a very cautious attitude. It results in losing a good no. of investment opportunities.

Of all the above cases, low operating leverage and high financial leverage is the ideal situation for making maximum profits with minimum of risk. So the management of the firm should properly combine both the leverages to get the maximum advantage.

18.7. Summary

The use of fixed income - bearing debt and preference shares along with equity, for the benefit of owners of the firm is called financial leverage or trading on equity. Financial leverage has both favourable and adverse effect on shareholders' earnings. The degree of financial leverage is computed with the following formulae :

$$\text{Financial leverage} = \frac{EBIT}{EBT}$$

$$\text{or } DFL = \frac{\text{Percentage change in EPS}}{\text{Percentage change in Sales}}$$

The EBIT - EPS analysis helps in identifying the most appropriate financial plan from among various alternative financial plans. It helps in designing proper capital structure for a firm. The point of indifference refers to that level of earnings before interest and tax (EBIT) at which EPS remains the same, irrespective of different alternatives of debt - equity mix. This point is also known as break -even level of EBIT for alternative financial plans.

A company should try to have a balance of both operating and financial leverages, because they got tremendous acceleration or decelaration effect on EBIT and EPS. A proper combination of these leverages is of great advantage to the firm's growth.

18.8 Key words

Financial Leverage : It refers to the employment of fixed - income bearing securities in capital structure.

Trading on Equity : Employment of debt capital for the benefit of equity shareholders.

Indifference point : It refers to that level of EBIT at which the EPS is the same for two Financial plans.

Composite Leverage : It is the combined effect of both financial and operating leverages.

EBIT-EPS analysis : It is an important tool which shows the effect of financial leverage on earnings per share.

18.9 Self - Assessment Questions

1. What is meant by financial leverage? Explain how it magnifies the revenue available to equity shareholders.

2. What is leverage? Distinguish between operating and financial leverages.

3. Explain the significance of operating and financial leverages.

4. Explain the following :
   i) Financial leverage   ii) Trading on equity
   iii) Composite leverage

18.10 Suggested Readings

1. James C. Van Horne : Financial Management

2. Khan and Jain : Financial Management

3. Pandey I.M. : Financial Management

CAPITAL STRUCTURE - DETERMINANTS AND THEORIES

OBJECTIVES

After studying this lesson you will be able to learn :

the meaning of capital structure and optimum capital structure

the major determinants of capital structure of a firm

the various theories of capital structure

STRUCTURE

19.1 Introduction

A firm needs funds for long - term requirements and working capital. These funds are raised through different sources both short - term and long - term. The long - term funds required by a firm are mobilised through owners' funds (equity share, preference shares and retained earnings) and long – term debt (debentures and bonds). A mix of various long - term sources of funds employed by a firm is called capital structure. In this lesson, we discuss the meaning of capital structure, determinants of capital structure and various theories that explain the relationship between capital structure and cost of capital and capital structure and value of the firm. Capital structure refers to the long - term sources of funds employed by firm, viz, equity shares, preference shares, reserves and debt capital.

According to Gerestenberg, "Capital structure of a company refers to the composition or make - up of its capitalisation and it includes all long - term capital resources, viz, loans, bonds, shares and reserves Thus capital structure is made - up of debt and equity securities and refers to permanent financing of a firm.

19.1.1 Capital structure and Financial Structure

Some authors use capital structure and financial structure interchangeably. But, both are different concepts. Financial structure refers to the way in which the total assets of a firm are financed. In other words, financial structure refers to the entire liabilities side of the balance sheet. But, capital structure represents only long - term sources of funds and excludes all short - term debt and current liabilities Thus, financial structure is a broader one and capital structure is only a part of it.

19.2 Features of an appropriate capital structure

It is the duty of the financial manager to develop an appropriate capital structure which is most advantageous to the company. The capital structure should be planned carefully keeping in view, the interests of the equity shareholders as they are the ultimate owners of the company.

The planning and designing of an appropriate capital structure is not an easy task. However, it must be seen while designing the capital structure that a sound or appropriate capital structure should have
the following features :

i) Profitability : The capital structure of the should be most advantageous. It should maximise the earnings per share while minimising cost of financing.

ii) Solvency : Excessive use of debt threatens the solvency of the company. Therefore, the debt capital should be employed upto such a level that the financial risk is within manageable limits.

iii) Flexibility : The capital structure should be flexible enough to meet the changing conditions. It must be possible for the company to provide funds whenever needed to finance any profitable activities.

iv) Conservatism : The capital structure of the company should be conservative in the sense that the debt component of the firm should not exceed debt capacity of the firm. The debt capacity of the firm depends on its ability to generate enough future cash flows for meeting interest obligation and repayment of principal when it becomes due.

v) Control : The capital structure should be designed in such a way that it involves a minimum loss of control of the company by the existing shareholders/directors.

The above mentioned are the general features of an appropriate capital structure. The relative importance of these features may differ from one company to another. For example, one company may give more importance to flexibility to conservatism, and another company may go for solvency rather than profitability. But it may be said that the company's capital structure should be easily adaptable.

19.3 Determinants of capital structure

The capital structure of a firm depends on a number of factors and these factors are of different importance. Moreover, the influence of individual factors of a firm changes over a period of time. Generally, the following factors should be considered while determining the capital structure of a company.

i) **Trading on equity and EBIT - EPS analysis.**

The use of long - term debt and preference share capital, which are fixed income - bearing securities, along with equity share capital is called financial leverage or trading on equity. The use of long - term debt capital increases the earnings per share (EPS) as long as the return on investment (ROI) is greater than the cost of debt. Preference share capital will also result in increasing EPS. But the leverage effect is more pronounced in case of debt because of two reasons : i) cost of debt is usually lower than the cost of preference share capital, and ii) the interest paid on debt is tax deductible.

Because of its effects on the earnings per share, financial leverage is one of the important considerations in planning the capital structure of a company. The companies with high level of Earnings Before Interest and Taxes (EBIT) can make profitable use of the high degree of leverage to increase the return on the shareholders' equity. The EBIT - EPS analysis is one important tool in the hands of the financial manager to get an insight into the firm's capital structure planning. He can analyse the possible fluctuations in EBIT and their impact on EPS under different financing plans.

Under favourable conditions, financial leverage increases EPS, however it can also increase financial risk to shareholders. Therefore, the firm should employ debt to such an extent that financial risk does not spoil the leverage effect.

ii) Growth and stability of sales

This is another important factor which influences the capital structure of a firm. Stability of sales ensures stable earnings, so that the firm will not face any difficulty in meeting its fixed commitments of interest payment and repayment of debt. So the firm can raise a higher level of debt. In the same way, the rate of growth in sales also affects the capital structure decision. Usually, greater the rate of growth of sales, greater can be the use of debt in the financing of a firm. On the other hand, the firm should be very careful in employing debt capital if its sales are highly fluctuating and declining.

iii) Cost of capital

Cost of capital is another important factor that should be kept in mind while designing the capital structure of a firm. The capital structure should be designed in such a way that the firm's overall cost of capital is the minimum. Cost of capital is the minimum return expected by its suppliers. Of all the sources of capital, equity capital is the costliest as the equity shareholders bear the highest risk. On the other hand, debt capital is the cheapest source because the interest is paid on it by the firm whether it makes profits or not. Moreover, interest on debt capital is tax deductible, which makes it further cheaper. Preference share capital is also cheaper than equity capital as the dividends are paid at a fixed rate on preference shares. So, the overall cost of capital depends on the proportion in which the capital is mobilised from different sources of finance. Hence; capital structure should be designed carefully so that overall cost of capital is minimized.

iv) Cash flow ability

A firm which has the ability of generating larger and stable cash inflows will be able to employ more debt capital. The firm has to meet fixed charges in the form of interest on debt capital, fixed preference dividend and the principal amount, when it becomes due. The firm can meet these fixed obligations only when it has adequate cash inflows. Whenever a firm wants to raise additional funds, it should estimate the future cash inflows to ensure the coverage of fixed charges. Fixed charges coverage ratio and interest coverage ratio are relevant for this purpose.

Here, one important point to be considered is that it is the cash flow ability of the firm and not the earning capacity alone (as indicated by EBIT) that should be taken into view while designing the capital structure. A firm may have adequate profits (EBIT) but it may not have adequate cash inflows to meet its fixed charges obligation. Sometimes, inadequacy of cash inflows may lead the firm to the point of insolvency,

when it fails to meet its payment obligations in time. Therefore debt capacity of the firm is determined by its cash flow ability.

v) Control

Some times, the designing of capital structure of a firm is influenced by the desire of the existing management to retain the control over the firm. Whenever additional funds are required, the management of the firm wants to raise the funds without any loss of control over the firm. If equity shares are issued for raising funds, the control of the existing shareholders is diluted. Because of this, they may raise the funds by issuing fixed charge bearing debt and preference share capital, as preference shareholders and debt holders do not have any voting right. The Debt financing is advisable from the point of view of control. But overdependence on debt capital may result in heavy burden of interest and fixed changes and may lead to liquidation of the company.

vi) Flexibility

Flexibility means the firm's ability to adapt its capital structure to the needs of the changing conditions. Capital structure should be flexible enough to raise additional funds whenever required, without much delay and cost. The capital structure of the firm must be designed in such a way that it is possible to substitute one form of financing for another to economize the use of funds. Preference shares and debentures offer the highest flexibility in the capital structure, as they can be redeemed at the discretion of the firm.

vii) Size of the firm

The size of the firm influences the capital structure design of a firm. Small companies find it very difficult to mobilize long - term debt, as they have to face higher rate of interest and inconvenient terms. Hence, small firms make their capital structure very inflexible and depend on share capital and retained earnings for their long - term funds. Since their capital structure is small, small firms cannot go to the capital market frequently for the issue of equity shares, as it carries a greater danger of loss of control over the firm to others. Hence, the small firms sometimes limit the growth of their business and any additional fond requirements met through retained earnings only. However, a large firm has relative flexibility in capital structure designing. It has the facility of obtaining long - term debt at relatively lower rate of interest and convenient terms. Moreover, the large firms have relatively an easy access to the capital market.

viii) Marketability and timing

Capital market conditions may change from time to time. Sometimes there may be depression and at other times there may be boom condition in the market. The firm should decide whether to go for equity issue or debt capital by taking market sentiments into consideration. In the case of depressed conditions in the share market, the firm should not issue equity shares but go for debt capital. On the other hand, under boom conditions, it becomes easy for the firm to mobilize funds by issuing equity shares.

The internal conditions of a firm may also determine the marketability of securities. For example, a highly levered firm may find it difficult to raise additional debt. In the same way, a firm may find it very difficult to mobilize funds by issuing any kind of security in the market merely because of its small size.

ix) Floatation costs

Floatation costs are not a very significant factor in the determination of capital structure. **These** costs are incurred when the funds are raised externally. They include cost of the issue of prospectus, brokerage, commissions, etc. Generally, the cost of floatation for debt **is** less than for equity. So, there may be a temptation for debt capital There will be no floatation cost for retained earnings. As is said earlier, floatation costs are not a significant factor except for small companies.

Floatation costs can be an important consideration in deciding the size of the issue of securities, because these costs as a percentage of funds raised will decline with the size of the issue. Hence, greater the size of the issue, more will be the savings in terms of floatation costs. However, a large issue affects the firms's financial flexibility.

x) Purpose of financing

The purpose for which funds are raised should also be considered while determining the sources of capital structure. If funds are raised for productive purpose, debt capital is appropriate as the interest can be paid out of profits generated from the investment. But, if it is for unproductive purpose, equity should be preferred.

xi) Legal requirements

The various guidelines issued by the Government from time to time regarding the issue of shares and debentures should be kept in mind while determining the capital structure of a firm. These legal restrictions are very significant as they give a framework within which capital structure decisions should be made.

19.4 Optimum capital structure

The capital structure of a firm influences its cost of capital and the value of the firm. So, the financial manager of the firm should aim at achieving the optimum capital structure and then to maintain it. An optimum capital structure may be defined as that combination of debt and equity that maximize the total value of the firm or minimizes the weighted average cost of capital. According to Ezra Solomon, the optimum capital structure refers to that degree of financial leverage at which the market value of the firm's securities will be higher or the cost of capital will be lower than at other degrees of leverage.

19.5 Theories of capital structure

But, the existence of an optimum capital structure is not accepted by all. There are two extreme views or schools of thought regarding the existence of an optimum capital structure. As per one view, capital structure influences the value of the firm and cost of capital and hence there exists an optimum capital structure. On the other hand, The other school of thought advocates that capital structure has no relevance and it does not influence the value of the firm and cost of capital. Reflecting these views, different theories of capital structure have been developed. The main contributors to the theories are David Durand, Ezra Solomon, Modigliani and Miller.

The important theories of capital structure are :
Net Income Approach
Net Operating Income Approach
The Traditional view
Modigliani and Miller hypothesis

Assumptions Underlying the Theories :
In order to have a clear understanding of these theories and the relationship between capital structure and value of the firm or cost of capital, the following assumptions are made :
i) Firms employ only debt and equity. ii)
ii) The total assets of the firm are given.
iii) The firm's total financing remains constant. The degree of leverage can be changed by selling debt to repurchase shares or selling shares to retire debt.
iv) The firm has 100% payout ratio, i.e., it pays 100% of its earnings as dividends.
v) The operating earnings (EBIT) of the firm are not expected to grow.
vi) The business risk is assumed to be constant and independent of capital structure and financial risk.
vii) Investors have the same subjective probability distribution of expected future operating earnings for a given firm .
viii) There are no corporate and personal taxes. This assumption it relaxed later.

In analysing the capital structure theories the following basic definitions are used :

S = market value of common shares
D = market value of debt

$V = S + D$ = market value of the firm

$NOI = X$ = expected net operating income, i.e., Earnings before interest and taxes (**EBIT**)
NI = NOI - Interest = Net Income or shareholders earnings.

19.5.1. Net Income Approach

This approach was identified by David Durand. According to this approach, capital structure has relevance, and a firm can increase the value of the firm and minimise the overall cost of capital by employing debt capital in its capital structure. According to this theory, greater the debt capital employed, lower shall be the overall cost of capital and more shall be the value of the firm.
This theory is subject to the following assumptions :
i) The cost of debt is less than cost of equity.
ii) The risk perception of investors is not affected by the use of debt. As a result, the equity capitalization rate (ke) and the debt - capitalization rate (kd) don't change with leverage.
iii) There are no corporate taxes.

According to the above assumptions, cost of debt is cheaper than cost of equity and they remain constant irrespective of the degree of leverage. If more debt' capital is used because of its relative cheapness, the overall cost of capital declines and the value of the firm increases.

According to this approach
$V = S + D$
S = market value of equity = NI/Ke
K_0 = overal cost of capital = $EDIT/V$

NI Approach : Figure 8 : 1
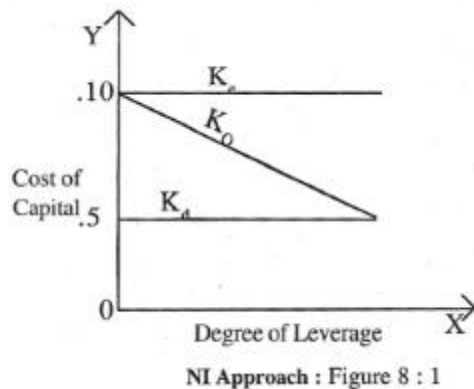
It is evident from the above diagram that when degree of leverage is zero (i.e. no debt capital employed), overall cost of capital is equal to cost of equity (k, = k_). If debt capital is employed further and further which is relatively cheap when compared to cost of equity, the overall cost of capital declines, and it becomes equal to cost of debt (k,) when leverage is one (i.e. the firm is fully debt financed). Thus, according to this theory, the firm's capital structure will be optimum, when degree of leverage is one.

19.5.2. Net operating Income Approach

This net operating income (NO I) approach is also suggested by David Durand. This represents another extreme view that capital structure and value of the firm are irrelevant. The capital structure of the firm does not influence cost of capital and value of the firm. The value of the firm (V) is determined as follows:

$V = S + D = NOI/K_0$

K_0, is the overall cost of capital and depends on the business risk of the firm. It is not affected by financing mix.

The critical assumptions of this theory are :

1. The market capitalizes the value of the firm as a whole. Thus, the split between debt and equity is not important.
2. The business risk remains constant at every level of debt - equity mix.
3. There are no corporate taxes.
4. The debt capitalisation rate $(K,)$ is constant.

According to this theory, the use of less costly debt increases the risk to equity shareholders. This causes the equity capitalization rate (K) to increase. As a result, the low cost advantage of debt is exactly offset by the increase in the equity capitalization rate. Thus, the overall capitalisation rate (K,) remains constant and consequently the value of the firm does not change.
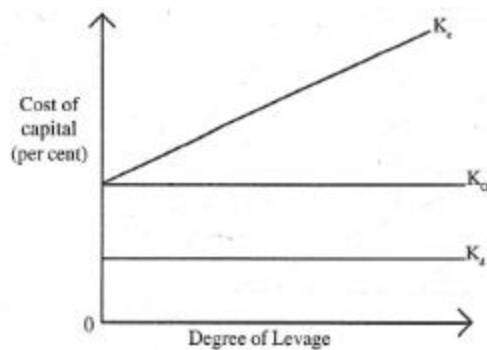
Chart 8.2 NoI Approach :

The above diagram shows that K_0, and K_d, are constant and Kc increases with leverage continuously. The increase in cost of equity *(Ke) exactly* offsets the advantage of low cost debt, so that overall cost of capital **(K_0)** remains constant, at every degree of leverage. It implies that every capital structure is optimum and there is no unique optimum capital structure.

19.5.3. The traditional view

This approach, which is also known as intermediate approach, has been popularized by Ezra Solomon. It is a compromise between the two extremes of net income approach and net operating income approach According to this approach, cost of capital can be reduced or the value of the firm can be increased with a judicious mix of debt and equity. This theory says that cost of capital declines with increase in debt capital upto a reasonable level, and later it increases with a further rise in debt capital.

The way in which the overall cost of capital reacts to changes in capital structure can be divided
into three stages under traditional position.

Stage-I

In this stage, the cost of equity (K_c) and the cost of debt (K_d) are constant and cost of debt is less than cost of equity. The employment of debt capital upto a reasonable level will cause the overall cost of capital to decline due to the low cost advantage of debt.

Stage II:

Once the firm has reached a reasonable level of leverage, a further increase in debt will have no effect on the value of the firm and the cost of capital. This is because of the fact that a further rise in debt capital increases the risk to equity shareholders which leads to a rise in equity capitalisation rate (K_e) This rise in cost of equity exactly offsets the low - cost advantage of debt capital so that the overall cost of capital remains constant.

Stage III

If the firm increases debt capital further and further beyond reasonable level, it will cause an increase in risk to both equity shareholders and debt - holders, because of which both cost of equity and cost of debt start rising in this stage. This will in turn will cause an increase in overall cost of capital.

If the overall effect of all the three stages is taken. it is evident that cost of capital declines and the value of the firm increases with a rise in debt capital

upto a certain reasonable level. If debt capital is further increased beyond this level, the overall cost of capital (K_0) tends to rise and as a result the value of the firm will decline.
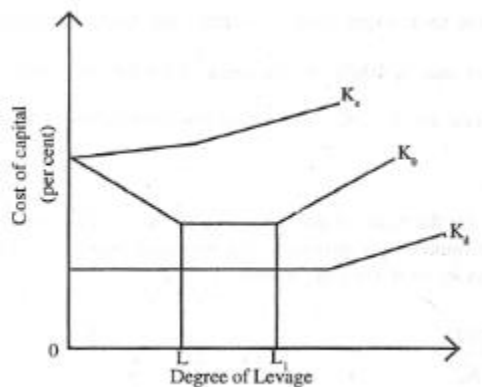

Figure 8.2 Traditional view:

It is evident from Figure 8.2 that the overall cost of capital declines with an increase in leverage upto point L and it increases with rise in the leverage after point L,. Hence, the optimum capital structure lies in between L and L1.

19.5.4. Modigliani - Miller (MM) Hypothesis - Without Taxes \The Modigliani - Miller hypothesis is identical with the net operating Income approach. Modigliani and Miller argued that, in the absence of taxes the cost of capital and the value of the firm are not affected by the changes in capital structure. In other words, capital structure decisions are irrelevant and value of the firm is independent of debt - equity mix.

Basic Propositions :
M - Hypothesis can be explained in terms of two propositions of Modigliani and Miller. They are :

(i) The overall cost of capital (K,) and the value of the firm are independent of the capital structure. The total market value of the firm is given by capitalizing the expected net operating income by the rate appropriate for that risk class.

(ii) The financial risk increases with more debt content in the capital structure. As a result cost of equity (**Ke**) increases in a manner to offset exactly the low - cost advantage of debt. Hence, overall cost of capital remains the same.

Assumptions of the MM Approach :
There is a perfect capital market. Capital markets are perfect when i) investors are free to buy and sell securities, ii) they can borrow funds without restriction at the same terms as the firms do, iii) they behave rationally, iv) they are well informed, and v) there are no transaction costs

2 Firms can be classified into homogeneous risk classes. All the firms in the same risk class will have the same degree of financial risk.

3. All investors have the same expectation of a firm's net operating income (EBIT).

4. The dividend payout ratio is 100%, which means there are no retained earnings.

5. There are no corporate taxes. this assumption has been removed later.

Proposition I

According to **M- M,** for the firms in the same risk class, the total market value is independent of capital structure and is determined by capitalising net operating income by the rate appropriate to that risk class. Proposition I can be expressed as follows :

$$X \qquad NOi$$
$$V=S+D$$
$$K, \qquad K,$$

Where V= the market value of firm
S= the market value of equity
D= the market value of debt

x = the expected net operating income (EBIT)

K, = the capitalization rate appropriate to the risk class of the firm.

According to proposition I the average cost of capital is not affected by degree of leverage and is determined as follows :

$K_0 = x/V$

According to **M-M,** the average cost of capital is constant as shown **in** the following Figure 8.3 :
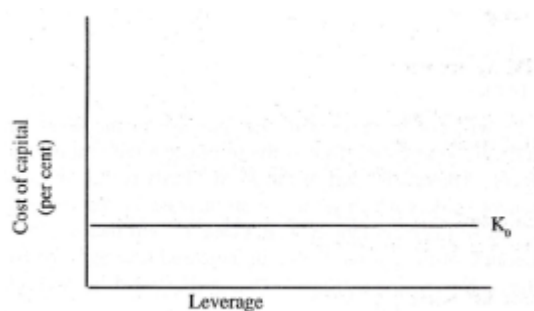
Figure 8.3 Avage cost of capital

Arbitrage process :

According to M-M, two firms identical in all respects except their capital structure, cannot have different market values or different cost of capital. In case, these firms have different market values, the arbitrage will take place and equilibrium in market values is restored in no time. Arbitrage process refers to switching of investment from one firm to a n o t h e r. When market values are different, the investors will try to take advantage of it by selling their securities with high market price and buying the securities with low market price. The use of debt by the investors is known as personal leverage or homemad e leverage.

Because of this arbitrage process, the market price of securities in higher valued market will come down and the market price of securities in the lower valued market will go up, and this switching process is continued until the equilibrium is established in the market values. So, M M argue that there is no possibility of different market values for identical firms.

Reverse working of Arbitrage process :
Arbitrage process also works in the reverse direction. Leverage has neither advantage nor disadvantage. If an unlevered firm (with no debt capital) has higher market value than a levered firm (with debt capital) arbitrage process works in reverse direction. Investors will try to switch their investments from unlevered firm to levered firm so that equilibrium is established in no time.

Thus, M-M proved in terms of their proposition I that the value of the firm is not affected by debt
equity mix.

Proposition II
M-M's proposition II defines cost of equity. According to them, for any firm in a given risk class, the cost of equity is equal to the constant average cost of capital (K,) plus a premium for the financial risk, which is equal to debt - equity ratio times the spread between average cost and cost of debt. Thus, cost of equity is :

where, K_{-} = cost of equity

DIS = debt - equity ratio

M-M argue that K, will not increase with the increase in the leverage, because the low - cost advantage of debt capital will be exactly offset by the increase in the cost of equity as caused by increased risk to equity shareholders. The crucial part of the M-M Thesis is that an excessive use of leverage will increase the risk to the debt holders which results in an increase in cost of debt (Kd). However, this will not lead to a rise in K,. M M maintain that in such a case K_{-} will increase at a decreasing rate or even it may decline. This is because of the reason that at an increased leverage, the increased risk will be shared by the debt holders. Hence K, remains constant. This is illustrated in the Figure 8.9 given below :
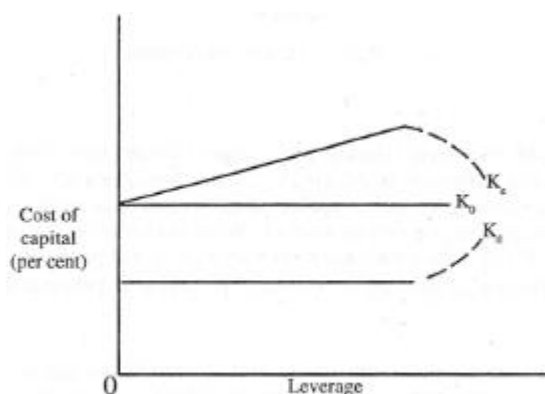

Figure 8.3 M M Hypothesis and cost of capital

Criticism of MM Hypothesis

The arbitrage process is the behavioural and operational foundation for **M M** Hypothesis. But this process fails to bring the desired equilibrium because of the following limitations.

1. Rates of interest are not the same for the individuals and firms. The firms generally have a higher credit standing because of which they can borrow funds at a lower rate of interest as compared to individuals.

2. Home - Made leverage is not a perfect substitute for corporate leverage. If the firm borrows, the risk to the shareholder is limited to his shareholding in that company. But if he borrows personally, the liability will be extended to his personal property also. Hence, the assumption that personal or home - made leverage is a perfect substitute for corporate leverage is not valid.

3. The assumption that transaction costs do not exist is not valid because these costs are necessarily involved in buying and selling securities.

4. The working of arbitrage is affected by institutional restrictions, because the institutional investors are not allowed to practisce home - made leverage.

5. The major limitation of M-M hypothesis is the existence of corporate taxes. Since the interest charges are tax deductible, a levered firm will have a lower cost of debt due to tax advantage when taxes exist.

19.5.4. M-M Hypothesis Corporate Taxes

Modigliani and Miller l a t e r r e c o g n i z e d the importance of the existence of corporate taxes. Accordingly, they agreed that the value of the firm will increase or the cost of capital will decrease with the use of debt due to tax deductibility of interest charges. Thus, the optimum capital structure can be achieved by maximizing debt component in the capital structure.

According to this approach, value of a firm can be calculated as follows :

Value of Unlevered firm (V_u) = EBIT/K_0 (I-t)

Value of Levered firm (V_L)= V_U+Dt
Where, EBIT= Earnings before interest and taxes
K_0 = Overall cost of capital
D= Value of debt capital
t=Tax rate

19.6 Summary
Capital structure refers to the long - term sources of funds employed by a firm. The planning and designing of an appropriate capital structure is not an easy task. It depends upon a number of factors such as EBIT - EPS analysis, growth and stability of sales, cost of capital, cash flow ability of the firm, flexibility, etc.

An optimum capital structure is that combination of debt and equity which maximises the value of the firm or minimises the cost of capital. But, the existence of an optimum capital structure is not accepted by all. Hence, several theories of capital structure have been developed. As per the Net Income approach and the traditional view, capital structure influences the value of the firm and the cost of capital and hence there is an optimum capital structure. On the other hand, according to the Net operating Income approach and M M Hypothesis, capital structure has no relevance, and it does not influence the value of the firm and the cost of capital.

Modigliani and Miller supported their conclusions with the help of arbitrage process. **However,** they later realised the importance of the existence of corporate taxes **and** accepted that capital structure influences the value of the firm and cost of capital.

19.7 Key words

Capital Structure: Capital structure refers to the long - term sources of finance of a firm.

Financial Leverage : Employment of debt capital in the capital structure of a firm for the benefit of equity shareholders. Also known as trading on equity.

Financial Risk : The uncertainty about the future earnings of equity shareholders due to the use of debt capital by a firm.

Arbitrage : The process of switching of investment from higher - valued firm to lower - valued firm that results in equilibrium of the value of the two firms.

Personal or Home - Made Leverage : The use of debt by investors for arbitrage.

19. 8 Self assessment Questions

1. What is meant by capital structure ? Explain the features of an appropriate capital structure.

2. What do you understand by capital structure ? Explain the major determinants of capital structure.

3. Explain Net Income (NI) and Net Operating Income (NO I) approaches.

4. What is the Traditional View on capital structure ?

5. Critically examine the Modigliani Miller Hypothesis of capital structure.

6. What is M M hypothesis ' Capital structure ? Does it make any difference if corporate taxes exist?

7. What is arbitrage ? How does it work ?

19.9 Further Readings

Van Home, James : Financial Management
C Pandey I. M.: Financial Management
Prasanna Chandra : Financial Management

Chapter –20

WORKING CAPITAL MANAGEMENT

Objectives :

After studying this unit you should be able to :
- define the meaning of working capital
- understand the importance of working capital
- find out the determinants of working capital
- analyse the walker's principles on the financing of working capital

Structure :

20.1 INTRODUCTION

Though working capital is of vital significance to an undertaking in several ways, the management of which did not receive adequate attention until recently. The literature of Finance concentrated more on the infrequent episodic events like mergers and liquidation neglecting completely the management of working capital. Even now, the management of fixed assets is getting a precedence over the working capital.

It has been observed by Schall and Haley that "managing current assets requires more attention than managing plant and equipment expenditure. Mismanagement of current assets can be costly. Too large an investment in current assets means tying up capital that can be used productively elsewhere. On the other hand, too little investment can also be expensive." For example, insufficient inventory may result in loss of sales as the goods that a customer wants to buy may not be available. The Finance Manager will be forced to spend a large percentage of his time in managing current assets. It is because these assets vary quickly and a lack of attention paid to them may result in appreciably lower profits for the firm.

20.1.1 Importance of Working Capital:

In fact, working capital forms a major chunk of the total capital employed in many a business enterprise. In case of industries like Tobacco and Trading, it forms more than 70 per cent of the total capital employed. Besides, it is this area of financial management that consumes much of the time of a finance manager. It plays a greater role in earning maximum return on the investment. That is to say, a firm's profitability may be increased as more working capital is added to the fixed capital when the firm does not exceed cent per cent of the capacity.

In managing this asset, the finance manager of a company is constantly engaged in endeavouring to maintain a sound working capital position. He is often times confronted with excess and shortages of working capital. While an excessive working capital leads to unremunerative use of scarce funds; inadequate working capital interrupts the smooth flow of business activity and impairs profitability. History is replete with instances where paucity of working capital has posed to be the major contributing factor for business failures. Nothing can be more frustrating for the operating managers of an enterprise than being compelled to function in a continuing atmosphere of lack of availability of funds to meet their important and urgent operating expenses.

Not only the inadequacy of working capital poses a threat to the finance manager, but also its abundance. Availability of more than required amount of funds causes an unchecked accumulation of inventories. Further, there may be a tendency to grant more and more credit without properly looking into the credentials of the customers. Moreover, idle cash earns nothing and it is unwise to keep large quantities of cash with the firm. Thus, the need to have adequate working capital in a firm need not be overemphasized.

20.1.2 Working Capital Definitions:

The following are the some of the definitions given for working capital by experts in the area of finance.

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

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

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

20.1.3 Concept of Working Capital:

Thus, like most other financial terms, the concept 'Working Capital' is used in different connotations by different experts. On the basis of above definitions we can understand that there are two different concepts of working capital, viz., gross concept and net concept.

1. **Gross Working Capital:** The 'Gross Working Capital' also known as 'Current Capital' or 'Circulating Capital' is represented by the sum total of all current assets of the enterprise. Current assets are the assets which are meant to be converted into cash within a year or an operating cycle. Stock of raw materials, stock of semi-finished goods, stock of finished goods, trade debtors, bills receivable, prepaid expenses, cash at bank and cash in hand are examples of current assets.

2. **Net Working Capital:** On the other hand, the term net working capital refers to the difference between current assets and current liabilities. For example, the total current assets and current liabilities of a firm amount to Rs.6,50,000 and Rs.4,00,000 respectively. Then, the gross working capital of the firm is Rs.6,50,000. The net working capital of the firm is Rs.2,50,000 (Rs.6,50,000 – 4,00,000). It means a some of Rs.2,50,000 long term funds of the firm were used for financing the working capital needs of the firm. Thus, net working capital is that part of the working capital which is financed by long-term funds.

Both the net and the gross concepts of working capital have their own uses. The choice of a particular concept obviously depends upon the purpose in view. If the objective is to measure the size and extent to which current assets are being used to optimise productivity of the concern, the gross concept is more useful. If, on the other hand, the objective lies in evaluating the liquidity position of an undertaking, the concept of net working capital becomes pertinent and preferable.

20.1.4 Structure of Working Capital:

For a proper appreciation of the problems of working capital management, a closer look at the individual items of working capital is essential. The components of current assets and current liabilities, which are constituents of working capital are shown in the following Exhibit 1.

Exhibit – 1 : Constituent Parts of Working Capital

Current Liabilities	Current Assets
Bank Borrowings:	**Inventories:**
Cash Credit and over drafts	Raw materials, components etc.
Trade Creditors Including Sundry Creditors or	Work in Progress
Creditors for purchases	Finished goods,
	Stores and Spares

Current Liabilities	Current Assets
Other Current Liabilities Advances from customers, Accrued expenses viz., Salaries, wages, other trade dues	**Sundry Debtors and trade debtors** Cash in hand, Cash at Bank
Statutory liabilities: like electricity charges, municipal rent and rates, unpaid dividends, income-tax outstanding dues. Others like provisions for taxes and other current provisions.	**Other Current Assets** Advances to Suppliers, loans and advances and other debtors balances. Pre-paid expenses Short-term Investments in Government, and trade deposits of one year or less, advances payment of income-tax and sales tax.

20.1.5 Current Assets:

The finance literature describes the current assets as those assets which can be converted into cash within an accounting year or within the operating cycle whichever is greater. Sometimes these assets may not get converted into cash strictly withing this stipulated period, but are still included in the category of current assets. The current assets include basically inventories of all categories, trade debtors, advances, investments in marketable securities, cash in hand an bank and other current assets including prepaid expenses and advance payment of tax.

20.1.6 Current Liabilities:

Current liabilities are those that are payable within the next accounting year or operating cycle. Normally all those liabilities that are required to be paid within a period on one year are regarded as current liabilities. They include sundry creditors, bank borrowings, advances received from customers, security and other deposits, provisions for taxation, dividends, bonus, etc., and other liabilities including interest accured on loans. Like the current assets, current liabilities also may not strictly satisfy the time criterion, but the dues are still included in the category of current liabilities.

20.2. WORKING CAPITAL MANAGEMENT

Working capital management is concerned with all decisions and acts that influence the size and effectiveness of working capital. According to Gitman, "the goal of working capital management is to manage each of the firm's current assets and current liabilities in such a way that an acceptable level of net working capital is maintained." It is concerned with the determination of appropriate levels of current assets and their efficient use, as well as the choice of the financing mix for raising the current resources.

20.2.1 Adequacy of Working Capital:

Adequacy of working capital implies that it should neither be excessive nor inadequate of the firm's requirements. Excessive working capital means that the firm has funds which earn no profit for the firm. Inadequate working capital means the company does not have sufficient funds for carrying out its operations, which ultimately result in production interruptions and decreasing the profitability.

Working Capital should be adequate for smooth running of the operations and uninterrupted flow of production. It will maintain credit-worthiness in the market and meet all the current obligations including the payment of dividends to shareholders. It enables the firm to avail cash discounts by making prompt payments.

Inadequate Working Capital: Both the inadequate and excessive working capital are dangerous. If the working capital is inadequate, the production will suffer. Credit worthiness in the market will be affected because of lack of liquidity. Low liquidity and low production may lead to low profitability which in turn affects the liquidity.

20.2.2 Dangers of Inadequate Working Capital:

The following are the dangers of inadequate working capital.

1. **Loss of Goodwill and Creditworthiness:** The firm loses its creditworthiness and goodwill as it fails to honour its current liabilities. Consequently, the firm finds it difficult to procure the requisite funds for its business operations on easy terms, which ultimately results in reduced profitability as well as production interruptions.

2. **Firm cannot Avail the Favourable Opportunities:** The firm with inadequate working capital fails to undertake the profitable projects, which not only prevent the firm from availing the benefits of favourable opportunities, but also stagnate its growth.

3. **Adverse Effect on Credit Opportunities:** The firm also fails to avail the attractive credit opportunities due to inadequacy of working capital.

4. **Operational Inefficiency:** Inadequacy of working capital leads to operating inefficiencies as day-to-day commitments can not be met.

5. **Low Rate of Return on Fixed Assets:** Inadequacy or shortage of working capital also results in lowering down the rate of return on fixed assets because fixed assets. It is can not be efficiently utilised or maintained due to inadequacy of working capital.

6. **Increase in Business Risks:** Inadequate working capital increases the risk of the firm. In the absence of ample working capital, the firm cannot discharge its current liabilities

and is liable of being declared as insolvent. Inadequate working capital, therefore, poses a serious threat tot he survival of the firm.

7. **Adverse Effect on the Morale of Business Executive:** Inadequacy of working capital also adversely affects the morale of the firm's executives. They have to face may unhappy situations due to delay in payments.

Excessive Working Capital: If the working capital is excessive, excessive inventory is the main target. It results in the operational inefficiency leading to low profitability. Ralph Kennedy and Mc Muller observed that the availability of excessive working capital may lead to carelessness about costs and, therefore, to inefficiency of operations.

20.2.3 Dangers of Excessive Working Capital:

As mentioned above, it is not only inadequacy of working capital which is dangerous but also excessive working capital leads to many problems. These are given below:

1. **Low Rate of Return on Capital:** Excessive working capital implies the presence of idle funds which earn no profit for the firm. The firm with excessive working capital may not be able to earn a proper rate of return on its total investments, whereas profits are distributed on the whole of its capital. This would ultimately result in bringing down the rate or return to the shareholders.

2. **Decline in Capital and Efficiency:** Due to low rate of return and low dividend to shareholders, companies often adopt some objectionable devices to inflate profits to maintain or increase the rate of dividend. Sometimes, unearned dividends are paid out of the company's capital to keep up the show of prosperity by window dressing of accounts. In order to make up the deficiency of reduced earnings, certain provisions, such a – provision for depreciation, repairs and renewals are not made. This leads to decline in operating efficiency and fall in profits.

3. **Loss of Goodwill and Confidence:** Excessive working capital leads to lower rate of return on the company's total investments. Shareholders also get lower dividend. Lower rate of dividend reduces the market value of the company's shares. The shareholders lose confidence in the company. The goodwill or credit of the company suffers a serious setback leading to loss of confidence.

4. **Misapplication of Funds:** Companies with excessive working capital may not utilise the resources prudently. In case of excessive working capital, it becomes difficult to control the purchases of many things which are not required in the business. Often excessive inventories and fixed assets are purchased by the company, which do not add to the profitability of the company but adds to its maintenance costs and losses due to theft, waste and mishandling.

5. **Evils of Over-Capitalisation:** Excessive working capital is often responsible for overcapitalisation in the company. Over-capitalisation is not only disastrous to the smooth survival of the company but also affects the interests of those associated with the company.

6. **Inefficient Management:** Existence of excessive working capital is an indication of inefficient management of the company. It shows that the management is not interested in expanding the business, otherwise the excessive working capital might have been utilised in expanding the business.

20.2.4 Optimum Level of Working Capital:

Thus, every Finance manager has to work out the optimum level of working capital in order to avoid the dangers of inadequate and excessive working capital. Thus, both the situations of inadequate and redundant working capital are dangerous.

20.2.5 Objectives of Working Capital:

The two important objectives of working capital are 'profitability and liquidity'. Financial management cannot afford to stick to only one of these objectives. There should be a proper balance between the two so that one objective does not suffer at the expense of the other. Effective policies are needed to achieve these two objectives.

20.2.6 Aspects of Working Capital:

The aspects of management of working capital are:
1. determining the requirements of working capital;
2. financing the requirements; and
3. efficient utilisation of working capital.

20.2.7 Determination of the Requirements of Working Capital:

Efficient management of working capital involves careful determination of working capital requirements and formulation of plans for meeting them. A large number of factors influence the working capital needs of firms. The most important of these are: (1) the nature and size of business, (2) manufacturing cycle, (3) business fluctuations, (4) production policy, (5) credit policy, (6) credit availability, (7) growth and expansion activities, (8) profit margin and profit appropriation, (9) price level changes, (10) operating efficiency. It is in consonance with these factors, that the working capital requirements are planned.

20.2.8 Financing of Working Capital:

A working capital forecast is prepared to determine the amount of working capital required to finance particular level of business operations. The exercise involves complicated calculations embracing every aspect of business activity. The items usually taken into consideration while preparing a working capital forecast are: costs to be incurred on material; wages and overhead expenses.

The budgetary approach to determine the working capital requirements involves preparation of cash budget which is an integral part of the overall budgetary process in any firm. The information required for each of the items in the cash budget has to be assembled from various functional budgets and supporting schedules. Cash budget may be prepared for any frequency (quarterly, monthly, fortnightly, weekly or even daily) depending upon the efficiency of the information system used in the firm and the relevance of the frequency.

20.2.9 Efficient utilisation of working capital:

All the components of working capital viz., cash, debtors, inventory and inventories, are to be managed efficiently. There should not be excess or shortage of investment in any of these components.

20.2.10 Organisational set-up:

Normally a separate organisational set-up for management of working capital in business enterprises may not exist. It is generally vested with the top Financial Executive who looks after all the aspects of financial management of the enterprise. He is styled variously as Director Finance / Financial Adviser / Adviser, Finance / Finance Adviser and Chief Accounts Officer as the case may be. He is concerned with the funds forecasting, laying down suitable policies and procedures; monitoring the levels of cash, receivables and inventory; deciding about the financial mix for working capital; expenditure control by fixing limits to expenditure; working capital control, review and replanning; formulation of guidelines for working capital expenditures; and obtaining bank finance and other funds to meet the working capital requirements. Fixation of limits of expenditure and authorisation of such expenditure is essential, in order to recurrent problems involving and adhoc discrimination between the departments.

20.3. IMPORTANCE OF WORKING CAPITAL MANAGEMENT

The management of working capital is one of the key areas of financial decision making. It is significant because the management must see that an excessive investment in current assets should be minimised as it leads to low profitability. At the same time it should protect the company from the problems of stock-outs and risk. The management of fixed assets will be impossible without maintaining proper level of current assets. Current assets will also determine
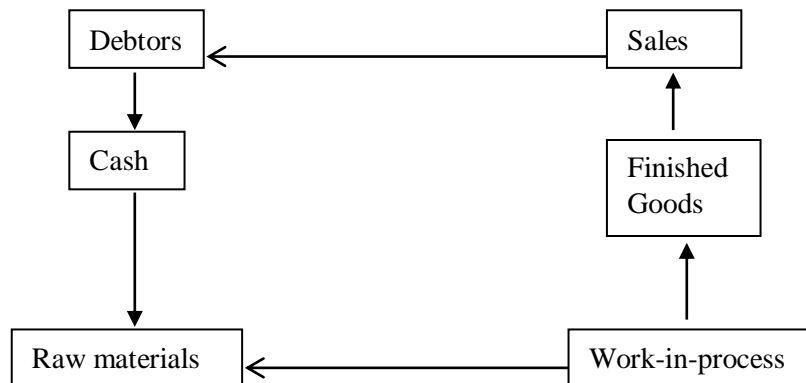
the liquidity position of the company. The importance of working capital can be understood from the following points.

1. **Time devoted to working capital decisions:** The financial manager will devote their largest time for working capital financing, control of current assets, management of liquidity etc. In view of this, it can be said that effective working capital decisions are also significant for successful management of the company's affairs.

2. **Investment in current assets:** Characteristically, current assets present more than 60 per cent of the total assets of many firms, because they represent a large investment in the various components of current assets. Further, the investment trends tend to be relatively volatile. Hence, the financial manager has to show special attention for them.

3. **Importance to small firms:** The management of working capital is particularly important to small firms, because for a small firm it may be possible to minimise its investment in fixed assets but it cannot avoid an investment in cash, receivables and inventories. Therefore, current assets are particularly significant for the financial managers of small firms. Small companies have relatively limited access to long-term capital market. Therefore, they have to depend heavily on trade credit and short-term loans form banks, both of which affect the net working capital.

4. **Relationship between sales growth and current assets:** The relationship between growth in sales and increase in current asset investment are very close and direct. An increase in sales will accompany a similar rate of immediate increase in additional inventories and cash balance. All such needs must be financed.

20.4. DETERMINANTS OF WORKING CAPITAL

There are no set rules or formula to determine the working capital requirements of a firm. A large number of factors influence the size of investment in working capital. These include:

1. **Nature of the business:** The working capital requirement of a firm are basically influenced by the nature of its business. Firms engaged in trading and financing activities make very heavy investment in current assets as compared to the investment in fixed assets, whereas in the case of rail and road transport and other public utility services steel, Aluminum, Automobile Industries, working capital forms a relatively low proportion of total assets.

2. **Operating cycle:** The operating cycle implies the stages or processes through which the raw materials are processed to get the final product. If the process is lengthy and takes long time to get the finished products, the requirements of working capital will be much larger than that of a unit which has a relatively low operating cycle. The shortest manufacturing process will minimise the investment in the form of work-in-progress.

Operating cycle of a manufacturing firm

```
   Debtors  ◄──────────────────  Sales
      │                            ▲
      ▼                            │
    Cash                      Finished
      │                        Goods
      │                            ▲
      ▼                            │
 Raw materials ◄─────────── Work-in-process
```

3. **Seasonal elements:** The requirements of working capital to a company are influenced by the demand for the product. If the firm's product is seasonal demand-oriented, not only the amount of working capital fluctuates from one season to the other, but also the composition of working capital changes over the time. During the season, cash and bank balances are converted into inventory. The working capital level will increase and cash balances may reduce.

4. **Growth and expansion of business:** The working capital requirements of the firm will increase as it grows in terms of sales or fixed assets. Current assets are closely related with that of sales. The requirements of working capital for a growing firm will be more. A growing company has to maintain proper balance between fixed and current assets in order to sustain its growing production and sales. This will in turn increase the investment in current assets to support the increased scale of operations.

5. **Firm's credit policy:** The credit policy of the firm affects working capital by influencing the debtor balances. The credit terms of a company may also depend upon the industry credit norms. If a company follows a liberal credit policy, without following the norms of credit, it will result in more credit sales, increased book debts and increased investment in working capital.

6. **Turnover of current assets:** Turnover of current assets refers to the speed at which the components of current assets can be converted into cash. The greater the turnover is, greater will be the cashflow and lesser will be the level of working capital. If the turnover is low, the company can witness heavy piling up of various components of current assets and increased level of working capital.

7. **Availability of credit:** The level of working capital of a company also depends upon the credit facility available to it. The firm will need less working capital, if liberal credit terms are available. The availability of credit facility from commercial banks also influences

working capital needs of the firm. Generally, if a firm gets credit facility easily, on favourable conditions, it can operate with less working capital than a firm without such facility.

8. **Dividend policy:** Dividends are paid to shareholders of the company out of the profits. The payment of dividends results in cash outflow. Further, a desire to maintain an established dividend policy may affect the company by reducing the cash balances. It will cause changes in the level of working capital. Often, changes in working capital also bring an adjustment in the dividend policy. Shortage of working capital therefore, acts as a powerful reason for reducing or skipping a cash dividend.

9. **Taxation:** Taxation is a short-term liability payable in cash. Advance payment of tax may have to be paid on the basis of anticipated profits. Tax is the first appropriation out of profits. Higher the tax, greater is the strain on the working capital of the company.

10. **Government Regulations and Restrictions:** Regulations and restrictions by the Government and Reserve Bank of India through such controls, as credit control, import regulations, influence the working capital of companies. For instance, the Tandon Committee has prescribed norms for holding inventory and debtors which the company is not expected to exceed.

20.5 WALKER'S PRINCIPLES

With regard to management of working capital, four propositions have been laid down by E.W.Walker and these propositions were further elucidated by James C.Van Horne. These propositions are also termed as the principles involving risk that serve as the basis of working capital theory.

20.5.1 Principle 1: Investment – Risk and Return:

"If working capital is varied relative to fixed asset investment (also sales), the amount of risk that a firm assumes is also varied and the opportunity for gain or loss is increased." This principle assumes that a definite relation exists between the degree of risk that a firm assumes and the rate of return i.e., the more the risk assume, the greater is the opportunity for gain or loss. The opportunity for gain is increased by choosing an appropriate asset liability structure. The firm's return on investment will be greater when there is a low proportion of current assets to total assets and a high proportion of current liabilities to total liabilities.

Profitability Vs. Liquidity: This strategy no doubt will result in low level of working capital and greater profitability. But the firm assumes the risk of technical insolvency, i.e., the inability to meet its cash obligations. Therefore, the risk involved with various levels of currents assets and current liabilities must be evaluated in relation to the profitability associated with those levels. Risk, profitability trade off, is considered by the management again in determining the

appropriate level of liquidity to be maintained for the firm. Such trade off is brought about by holding the fixed assets constant and varying the amount of current assets.

Conservative Vs. Aggressive Policy: The above analysis leads to two policies, viz., conservative policy and aggressive policy. In the case of conservative policy, the ratio of current assets to fixed assets is greatest at every level of output, the firm's liquidity is greatest, and the risk of technical insolvency is lowest. But the profitability of the firm will be lower on account of increased costs of maintaining high liquidity. In the case of aggressive policy, profitability will be higher but the firm has lowest liquidity and correspondingly the greatest risk. Therefore, it should be the goal of management to select the level of current assets that optimises the firm's rate of return.

20.5.2 Principle 2: Contribution to Networth:

"Capital should be invested in each component of working capital as long as the equity position of the firm increases." This principle is based on the concept that each rupee invested in fixed or working capital should contribute to the net worth of the firm.

20.5.3 Principle 3: Financing of working Capital:

"The type of capital used to finance working capital directly affects the amount of risk of the firm assumes as well as the opportunity for gain or loss and cost of capital. There are two approaches to financing which a firm can adopt, viz., the hedging approach and margin of safety approach.

i. **Hedging Approach:** Hedging approach is a financial plan which involves the matching of assets with the expected life of the source of funds raised to finance assets. If the firm follows this policy, long-term funds are used to finance fixed assets and the permanent portion of current assets, while short-term funds are used to finance the temporary or variable portion of current assets. Under the hedging approach, the firm's seasonal fund requirements are financed on short-term basis and repaid during seasonal troughs as and when surplus cash is generated. Thus borrowings are resorted to only when they are needed. Under this policy, while profitability will be higher, the risk in terms of funds availability will be greater.

ii. **Margin of Safety Approach:** The margin of safety approach involves financing a portion of the firm's expected seasonal fund requirements on long-term basis. If the expected net cash flows are realised, the debt is repaid during seasonal troughs when funds are not needed. The firm thus reduces the risk of fund availability by employing long-term funds to finance a portion of its seasonal requirements; but the profitability is also reduced on account of higher costs associated with the existence of idle funds (long-term) in times of seasonal troughs. Therefore, in order to maximise the overall rate of return on investment, firms have to employ an optimal mix of financing policies.

20.5.4 Principle 4: Flow of Funds:

"The greater the disparity between the maturities of a firm's short-term debt instruments and its flow of internally generated funds, it is not possible to closely synchronise the schedule of expected net cash flows and payments on debt (called margin of safety) will depend upon the risk preferences of management. The shorter the maturity schedule of debt in relation to expected net cash flows, the less the risk of inability to pay the debt." However, financing is likely to be costlier under longer maturity schedule thus cutting into profits. Profits can be maximised by making every effort to tie debt maturities with the cash inflows of internally generated funds, since in such a case, there will be no need to hold low yielding liquid assets, nor to have more long-term financing than is absolutely necessary.

20.5.5 Maximisation of shareholders Wealth:

On the whole, management has to determine the liquidity of the firm on the basis of the information about risk and opportunity costs of holding liquidity. The degree of liquidity desirable is a function of the probability of insolvency at various levels of liquidity, the opportunity cost of maintaining those level, and the cost of bankruptcy. The behaviour of the management should be influenced not only by the risk and the opportunity costs associated with various levels of liquidity, but also by the cost of bankruptcy. The management must behave in a manner consistent with maximisation of shareholder's wealth (value of the firm to the owners).

20.5.6 Techniques of Working Capital Management:

There are several techniques of control as regards working capital management. Some of the important techniques are ratio analysis, systems approach as applied in the case of material management, PERT as applied in the case of operating cycle analysis, mathematical models as applied in determining economic order quantities; safety stocks and order points; discriminate analysis and decision tree approaches as applied in credit granting and collection decisions; discriminate analysis and simulation; and linear programming techniques as applied in cash management decisions; cash flow and funds flow analysis.

Concerned as it is with the determination of appropriate levels of current assets and their efficient use, as well as the choice of the financing mix for raising current resources, working capital management deals with decisions, acts and procedures relating to the use and the method of financing each current assets and determining its optimal level. The important components of working capital management, therefore, are inventory management, receivables management and cash management.

20.6 FINANCING OF WORKING CAPITAL

The sources of finance for working capital can be classified as under:

i) Short-term sources.
   a. Sundry creditors.
   b. Bank overdraft.
   c. Advance payments received.

ii) Long-term sources:
   a. Redeemable debentures.
   b. Redeemable preference Shares.
   c. Deposits.

iii) Permanent sources
   a. Share capital.
   b. Irredeemable debentures
   c. Plough back of profits.

20.6.1 Permanent and Variable Working capital:

In the similar way, the working capital requirements (current assets) of the concern can be divided into two portions – (i) permanent portion and (ii) variable portion.

i. Permanent Working Capital: The total fund requirements (both on fixed capital and working capital) increases with increased production over a period of time. A portion of the working capital remains the same throughout. In other words, there is a limit below which the current assets do not fall. This portion is the permanent working capital. This minimum level or lowest level of current assets that a company should hold. It is known as the 'hard core' or 'fixed' working capital. The Dehejia Committee and the Tandon Committee have referred to the permanent working capital as the 'core current assets'.

ii. Fluctuating Working Capital: There is a variable portion of current assets, over and above the permanent assets. It varies with production plans, seasonality etc. This portion, also known as the 'fluctuating' or 'temporary' working capital. It can be estimated in advance. The general principle is that the fixed asset and the permanent portion of the working capital should be financed by capital and reserves, long term debt and permanent portion of the current liabilities. The variable portion of working capital can be financed by short-term funds.

iii. Financing of Working Capital: The Tandon Committee recommended that the core portion of current assets should be financed by the company out of equity or by raising long term debt. But till recently, companies continued to rely on commercial banks as

the major suppliers of working capital. However, due to tightening of bank credit and encouragement given to companies to tap capital market, companies have taken to issuing debentures for financing permanent working capital. Judicious mix of short-term and long-term finances for working capital requirements has several advantages. If variable working capital is financed on a short-term basis, the company pays interest on funds only during the period of time they are needed. This reduces the interest cost. By utilising the long-term funds for permanent working capital the company ensures stability. The loan need not be repaid at frequent intervals. The repayment over a period can be planned depending on the surplus generated. The liquidity of the concern is increased.

2.6.2 Tandon Committee and Permissible Bank Borrowings:

The Reserve Bank of India appointed a study Group (1975) under the Chairmanship of Sri P.L. Tandon to determine the maximum permissible bank borrowings. The study group has visualised that banker's role is to supplement the borrower's resources to carry an acceptable level of current assets. Bank is not expected to meet all working capital requirements of borrowers. Banker is required to finance only a part of the working capital gap.

Working capital gap: It is defined as the total current assets minus current liabilities other than the bank borrowings.

Methods of Lending: The committee has advocated three methods of sanctioning the permissible level of bank finance.

1. **First Method of Lending:** Under the first method, the borrower contributes 25% of the working capital gap and banks finance the rest. This result in the current ratio of 1.17:1 (minimum)

2. **Second Method of Lending:** Under the second method, borrower contributes (25% of the total current assets, the remaining working capital gap (i.e., total working capital gap minus borrower's contribution) is to be financed by banks. This will result in current ratio of 1.13:1 (must be)

3. **Third Method of Lending:** Under the third method, borrower should contribute cent per cent of core assets, and 25% of the balance of current assets. The remaining working capital gap can be bridged by the bank borrowings and there will be an improvement of current ratio, further.

The term 'core assets' refer to the critical minimum level of raw material, stock-in-process, and finished goods, required to ensure continuity of production. This third method would mean further reduction in the bank credit and strengthening of the current ratio of the borrowing firm.

At present the second method is being followed by banks in financing the working capital needs of firms.

20.7 SELF ASSESSMENT QUESTIONS

1. Define Working Capital. What are various concepts of working capital?
2. What are current assets? What are current liabilities?
3. What is Adequacy of working capital? State the dangers of inadequate working capital.
4. Explain the problems of excessive working capital.
5. Explain the importance of working capital.
6. Discuss the concept of working capital? State the dangers of inadequate working capital exclusive? Explain.
7. Enumerate the cardinal principles of working capital management. Discuss the significance of these principles in management of working capital.
8. Discuss the risk-return trade off in current assets financing.
9. Explain the merits of a matching plan in relation of financing extensively using (a) long-term financing (b) short-term financing.

20.8 REFERENCE BOOKS :

1. R.S.N. Pillai, & Bagavathi, Management Accounting, S. Chand & Company Ltd., New Delhi
2. M.A. Sahaf, Management Accounting – Principles & Practice, Vikas Publishing House Pvt. Ltd., New Delhi.
3. Shashi K. Gupta & R.K. Sharma, Management Accounting, Kalyani Publishers,
4. Charles thorn Gaxy Sundem, Introduction to Management Accounting –
5. N. Vinayakam, Tools & Techniques of Management Accounting
6. SP Gupta, Management Accounting
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8. V. Krishna Kumar, Management Accounting
9. Dr.Kulsreshtha and Gupta, Practical Problems in Management Accounting
10. SP. Jain & KL Narang, Advanced Cost and Management Accounting

Chapter –21

ESTIMATION OF WORKING CAPITAL

Objectives :

After reading this unit you should be able to
- estimate the needs of the working capital of an organization
- go through different methods of forecasting working capital

Structure :

21.1 Estimation of Working Capital Requirements
21.2 Methods of Working Capital Forecasting
21.3 Self Assessment Questions
21.4 Exercises
21.5 Reference Books

21.1 ESTIMATION OF WORKING CAPITAL REQUIREMENTS

The success of a business depends to a great extent on a correct assessment of its financial needs. Such an estimate is made not only by a new venture but also by an existing one. While planning fund requirements of a firm, an entrepreneur has to identify, in the first instance, the purpose for which capital would be needed. Following are the main purposes for which funds must be provided.

  i. To finance the acquisition of fixed assets viz., land, buildings, plant and machinery etc.
  ii. To supply current assets viz., inventories, receivables and cash.
  iii. To cover the cost of intangible assets.

After estimating fixed capital requirements of the firm the finance manager has to assess the amount of capital that would be needed to ensure smooth functioning of the enterprise. A manufacturing concern requires funds to pile up adequate amount of raw materials in stock, to ensure uninterrupted production activity. Likewise, sufficient stock of finished goods has also to be maintained in the anticipation of future demand.

Further, goods sold on credit do not return cash immediately. Firm will have, therefore to arrange funds to finance accounts receivable for the period until they are collected. Cash is also required for the payment of ordinary operations of the enterprise viz., wages, factory overhead before a product can be sold and receipts are collected. Ample cash is required to take advantage of cash discounts. Adequate cash is also essential from the point of view of maintaining good credit relations. Since uncertainty is always a characteristic of business, some

excess of cash should be maintained as insurance against unexpected adversities. Thus, the finance manager has to arrange capital for the following types of assets to ensure day-to-day operation of the firm.

   i.For building up inventories

   ii.For financing receivables.

   iii.For covering day-to-day operating expenses and contingencies.

21.1.1 Items to be included in the calculation of Working capital:

Therefore, proper estimation of the working capital requirements is a must for running the business efficiently and profitably. The following items are usually included in the calculation of working capital required at a particular level of business operation.

1. Total costs incurred on materials, wages and overheads.
2. Time lag during which raw materials are to remain in stock before they are issued for productive purposes.
3. Duration of the production cycle so that longer the duration of the cycle, larger will be the working capital required.
4. Length of the sales cycle indicating the duration of time during which finished products have to stay in the warehouse before sale. For certain business concerns having seasonal sales of goods, stocks have to be maintained throughout the rest of the year and the working capital requirement will be very heavy.
5. Period of credit allowed to debtors, If longer periods of credit are allowed to the customers by a company without the same being extended to it by its suppliers, a larger working capital will be needed.
6. The period of credit extended by creditors. When a longer period of credit is extended by suppliers of a company that that extended by it to its customers, working capital requirements will be considerably reduced.
7. Time lag involved in the payment of wages and other overheads.

The quantum of working capital required will be determined by taking all the above factors into account and by adding finally a flat percentage to this amount by way of provision for meeting contingencies. This provision for meeting contingencies must be effected since the forecast of working capital is compiled on the basis of estimates only. This provision helps in cushioning all the uncertainities involved in making the estimates.

21.1.2 Estimation of Certain Items:

An idea about how long working capital remains blocked with its various components might be available form annual reports. They can provide measure of time lag on an average. Although an accurate measure is not available, an average measure to working capital cycle can be derived from the volume of the time lags of its various components.

Two important types of information are necessary for the purpose. One relates to the information on annual cost of raw materials, finished goods, produced and sold which provides data on average daily purchases, production, etc. The other relates to how long on an average raw materials, work-in-progress, finished goods and debtors are held up. As we are aware working capital is blocked in (i) raw materials (ii) production process, (iii) finished goods and (iv) debtors. How long they are blocked may be estimated with the following ratios.

i.   For measuring time lag of raw materials = $\dfrac{\text{Average holding of raw materials}}{\text{Average daily purchases}} \times \text{days.}$

Average opening and closing stock should be considered here the numerator. Average daily purchases may be derived from annual purchases.

ii. For measuring time lag in production process =
$\dfrac{\text{Average holding of Work-in-Progress}}{\text{Average daily cost of goods produced/input to WIP}} \times \text{days.}$

iii. Time lag of cost of goods sold = $\dfrac{\text{Average holding of finished goods}}{\text{Average daily cost of sales}} \times \text{days.}$

iv. Credit allowed to debtors = $\dfrac{\text{Average trade debtors outstanding}}{\text{Daily credit sales}} \times \text{days.}$

v.   Credit from Suppliers = $\dfrac{\text{Average trade creditors outstanding}}{\text{Daily Credit purchases}} \times \text{days.}$

Information on annual purchase of raw materials, cost of goods procured, cost of goods sold, etc., required for the above ratio is not directly available from the annual accounts. They might be derived from the following profroma.

I. Annual Materials used:	Rs.	III. Cost of goods produced:	
Opening raw materials	x x x	Opening W.I.P.	x x x
Add: Purchases	x x x	**Add:** Cost of materials used	x x x
	x x x		x x x
Less: Closing raw materials	x x x	**Less:** Closing W.I.P.	x x x
Cost of materials used	x x x	Cost of goods produced	x x x
II. Cost of goods sold:			
Opening Finished goods	x x x		
Add: Cost of goods produced	x x x		
	x x x		
Less: Closing finished goods	x x x		
Cost of goods sold	x x x		

Note: WIP means Work-in-Progress

21.2 METHODS OF WORKING CAPITAL FORECASTING

There are two methods available fore estimating the requirements of working capital. They are given below:

21.2.1 Method – 1

By determining the amount of current assets and current liabilities: This is also known as Balance Sheet Method. The assessment of working capital requirements can be made on the basis of the current assets required for the business and the credit facilities available for the acquisition of such current assets, i.e., current liabilities. Thereafter, the difference between the two is taken out. This difference will indicate the deficiency or surplus of cash.

Illu.1: A and B, who want to buy a business seek your advice about the average working capital requirements in the first year's trading. The following estimates are available and you are asked to add 10% to allow for contingencies:

		Per annum
i.	**Average amount locked up in stocks:**	Rs.
	Stock of finished products and work-in-progress	**5,000**
	Stock of stores, material etc.	**8,000**
ii.	**Average credit given:**	
	Local sales – 2 weeks credit	**78,000**
	Outside the state – 6 weeks credit	**3,12,000**
iii.	**Time available for payment:**	
	For purchases – 4 weeks	**96,000**
	For wages – 2 weeks	**2,60,000**

Calculate the average amount of working capital required. Give details of your working.

Solution:

Statement showing the amount of
Working Capital Requirements

	Rs.	Rs.
Current Assets:		
Inventories:		
Stock of finished products and work-in-progress	5,000	
Stock of stores, material etc.	8,000	
		13,000

	Rs.	Rs.
Accounts Receivable:		
Local sales Rs.78,000 × $\frac{2}{52}$	3,000	
Outside the state Rs.3,12,000 × $\frac{6}{52}$	36,000	
		39,000
		52,000
Less: Current Liabilities:		
Accounts payable Rs.96,000 × $\frac{4}{52}$	7,385	
Outstanding wages Rs.2,60,000 × $\frac{2}{52}$	10,000	
		17,385
		34,615
Add: 10% for contingencies		3,462
Working capital required		38,077

Illu.2: M/s Dabur & Co. is desirous to purchase a business and has consulted you, and one point on which you are asked to advise them is the average amount of working capital which will be required in the first year's working.

You are given the following estimates and are instructed to add 10% to your computed figure to allow for contingencies.

		(Figures for the year)
		Rs.
i.	**Average amount locked up for the stocks:**	
	Stock of finished products	**5,000**
	Stock of stores, materials etc.	**8,000**
ii.	**Average credit given:**	
	Inland sales – 6 weeks credit	**3,12,000**
	Export sales – 1 ½ weeks credit	**78,000**
iii.	**Lag in payment of wages and other outgoings:**	
	Wages – 1 ½ weeks	**2,60,000**
	Stores, materials etc., 1 ½ months	**48,000**
	Rent, royalties, etc., - 6 months	**10,000**
	Clerical staff – ½ months	**62,400**
	Manager – ½ month	**4,800**
	Miscellaneous expenses – 1 ½ months	**48,000**
iv.	**Payment in advance:**	
	Sundry expenses (paid quarterly in advance)	**8,000**
v.	**Undrawn profits on the average throughout the year**	**11,000**

Set up your calculations for the average amount of working capital required.

Solution:

Statement of Average Working Capital Requirements

	Rs.	Rs.
Current Assets:		
Inventories:		
Stock of finished products	5,000	
Stock of stores, materials etc.	8,000	
		13,000
Book debts:		
Inland sales – 6 weeks sale of Rs.3,12,000 p.a.	36,000	
Export sales – 1 ½ weeks sale of Rs.78,000 p.a.	2,250	
		38,250
Advance payment of expenses		2,000
Investment in Current Assets		53,250
Less: Current Liabilities:		
Lags in payment of wages	7,500	
Stores, materials etc.	6,000	
Rent, royalties etc.	5,000	
Clerical staff	2,600	
Manager	200	
Miscellaneous	6,000	
		27,300
Net working capital		25,950
Add: 10% for contingencies		2,595
Average working capital requirements		28,545

Notes:

i) Undrawn profit has not been taken into consideration since it is a source of fund which may or may not be used as working capital. It does not affect the total amount required as working capital. Further, the figures given in the question reveal a loss and net profit.

ii)			Rs.
a.	Books debts in respect of inland Sales	$3,12,000 \times \dfrac{6}{52}$	36,000
b.	Wages outstanding:	$2,60,000 \times \dfrac{1\frac{1}{2}}{52}$	7,500
c.	Stores etc.	$48,000 \times \dfrac{1\frac{1}{2}}{12}$	6,000

Illu.3: From the following information prepare a statement in columnar form showing the estimated working capital requirements.

i.   **in total; and**
ii. **as regards each constituent part of working capital. Budgeted Sales Rs.2,60,000 per annum. Analysis of cost of each unit.**

	Rs.
Raw Materials	3
Labour	4
Overheads	2
Profit	1
	10

It is estimated that:
a. **Pending use, raw materials are carried in stock for three weeks and finished goods for two weeks.**
b. **Factory processing will take three weeks.**
c. **Suppliers will give five weeks' credit and customers will require eight weeks' credit.**

It may be assumed that production and overheads accrue evenly throughout the year.

Solution:

Estimation of Working Capital Requirements

	Rs.	Rs.
Current Assets:		
Inventories		
Stock of Raw materials (26,000 units × $\frac{3}{52}$ × 3)		4,500
Work-in-Progress		
Raw Materials (26,000 × $\frac{3}{52}$ × 3)	4,500	
Labour (26,000 × $\frac{3}{52}$ × 3)	4,500	
Overheads (26,000 × $\frac{3}{52}$ × 2)	3,000	
		12,000
Stock of finished goods:		
Raw Materials (26,000 × $\frac{2}{52}$ × 3)	3,000	
Labour (26,000 × $\frac{2}{52}$ × 4)	4,000	
Overheads (26,000 × $\frac{2}{52}$ × 2)	2,000	

	Rs.	Rs.
		9,000
Sundry Debtors (26,000 × $\frac{8}{52}$ × 9)		36,000
		63,000
Less: Current Liabilities:		
Sundry Creditors (26,000 × $\frac{5}{52}$ × 3)		7,500
Working capital required		55,500

Illu.4: XYZ Cements Ltd., sells its products on a gross profit 20% on sales. The following information is extracted form its annual accounts for the current year ended 31st December.

	Rs.
Sales at 3 months' credit	**40,00,000**
Raw material	**12,00,000**
Wages paid – average time lag 15 days	**9,60,000**
Manufacturing expenses paid – one month in arrears	**12,00,000**
Administrative expenses paid – one month in arrears	**4,80,000**
Sales promotion expenses – payable half yearly in advance	**2,00,000**

The company enjoys one month's credit from the suppliers of raw materials and maintains a 2 month's stock of raw materials and one-and half months' stock of finished goods. The cash balance is maintained at Rs.1,00,000 as a precautionary measure. Assuming a 10% margin, find out the working capital requirements of XYZ Cements Ltd.,

Solution:

Statement Showing the determination of Working Capital:

		Rs.	Rs.
Current Assets:	A		1,00,000
Cash Balance			
Inventories			
Raw Materials (Rs.12,00,000 × $\frac{2}{12}$)		2,00,000	
Finished Goods ($\frac{Rs.32,00,000 \times 15}{12}$)		4,00,000	
			6,00,000
Debtors ($\frac{Rs.32,00,000 \times 3}{12}$)			8,00,000
Prepaid Expenses ($\frac{Rs.2,00,000 \times 6}{12}$)			1,00,000
			16,00,000

Current Liabilities	B	Rs.	Rs.
Creditors for goods ($\frac{Rs.12,00,000 \times 1}{12}$)			1,00,000
Wages ($\frac{Rs.9,60,000 \times 1}{2 \times 12}$)			40,000
Manufacturing expenses ($\frac{Rs.12,00,000 \times 1}{12}$)			1,00,000
Administrative expenses ($\frac{Rs.4,80,000 \times 1}{12}$)			40,000
Total			2,80,000
C. Net Working Capital (A-B)			13,20,000
10% Margin			1,32,000
			14,52,000
Working Notes:			
1. Sales			40,00,000
Less: Gross profit 20%			8,00,000
Cost of Production			32,00,000

Illu.5: M/s Novartis Ltd., are engaged in large scale customer retailing. From the following information, you are required to forecast their working capital requirements.

Projected annual sales	**Rs.65 lakhs**
Percentage of net profit on cost of Sales	**25%**
Average credit allowed to debtors	**10 weeks**
Average credit allowed by creditors	**4 weeks**
Average stock carrying (in terms of sales requirements)	**8 weeks**

Add 10% to computed figures to allow for contingencies.

Solution:

Projected Annual Sales	Rs.65 lakhs p.a.
Net Profit (20% on Sales)	Rs.13 laksh p.a.
Cost of Sales (Rs.65 – 13)	Rs.52 lakhs p.a.
Cost of Sales per week	Rs.1.00 lakh

Statement of Working Capital Requirement

(Rs.in lakhs)

		Rs.
Current Assets:		
Stock	Rs.1.00 × 8	8.00
Debtors – At cost equivalent	Rs.1.00 × 10 = 10	
Profit	Rs.13 × $\frac{10}{52}$ = Rs.2.50	12.50

Less: Current Liabilities		Rs.
Creditors	Rs.1.00 × 4	4.00
Working Capital computed		16.50
Add: 10% for contingencies		1.65
Working capital required		18.15

21.2.2 Method 2:   CASH COST METHOD

It has already been stated that the working capital is the difference between current assets and the current liabilities. In order to estimate the requirements of working capital one has to forecast the amount of current assets, the cash costs involved are much less than the value of the current assets. For example, if the sundry debtors are estimated at Rs.10 lakhs and the cost of production of the goods with them is only Rs.7.5 lakhs, the amount of funds blocked with them is only Rs.7.5 lakhs and not Rs.1,00,000. Moreover, if the cost of production includes a sum of Rs.50,000 as depreciation the amount of actual funds blocked with the them is only Rs.7 lakhs. This is equally true of the cost of finished goods and work-in-progress which may include the amount of depreciation.

Working Capital forecast based on cash cost technique is likely to differ from the one determined on the balance sheet method. This is to be explained by the fact that the current assets shown in the balance sheet also indicate the amount which the firm is likely to realise sooner or later and this amount will be partly towards recovery of depreciation and the other non-cash charges and partly towards profit. When the cash is realised, it is for the firm to decide upon its utilisation. It may be used for acquiring fixed assets or for redeeming liabilities. It is not at all necessary that the whole of the cash should be kept as a liquid asset.

Many experts, therefore, calculate the working capital requirements by taking into account only the cash cost blocked in sundry debtors, stock of work-in progress and finished goods. According to this approach, the debtors are computed not as a percentage of sales but as a percentage of cash costs. Similarly the finished goods and work-in-progress are valued according to cash cost. Observe the following example.

Illu.6: TVS Ltd. sells goods on a gross profit of 25%. Depreciation is taken into account as a part of cost of production. The following are the annual figures given to you.

	Rs.
Sales (two months credit)	**18,00,000**
Materials consumed (one month credit)	**4,50,000**
Wages paid (one month lag in payment)	**3,60,000**
Cash manufacturing expenses	
(one month lag in payment)	**4,80,000**

	Rs.
Administration expenses (one month lag in payment)	1,20,000
Sales promotion expenses (paid quarterly in advance)	60,000
Income tax payable in 4 instalments of which one is payable next year	1,50,000

The company keeps one month 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 assuming 15% safety margin.

Solution:

Statement of Working Capital requirements

			Rs.
A.	**Current Assets:**		
	Debtors (Cash cost of goods sold, i.e. $14,70,000 \times \frac{2}{12}$)		2,45,000
	Prepaid sales expenses		15,000
	Inventories:		
	Raw materials ($\frac{Rs.4,50,000}{12}$)		37,500
	Finished goods ($\frac{Rs.12,90,000}{12}$)		1,07,500
	Cash-in-hand		1,00,000
			5,05,000
B.	**Current Liabilities:**		
	Sundry creditors ($\frac{4,50,000}{12}$)		37,500
	Outstanding manufacturing expenses $\frac{4,80,000}{12}$		40,000
	Outstanding administration expenses $\frac{1,20,000}{12}$		10,000
	Provision for taxation $\frac{1,50,000}{4}$		37,500
	Outstanding wages $\frac{3,60,000}{12}$		30,000
			1,55,000
	Working capital [(A) – (B)]		3,50,000
	Add: 15% for contingencies		52,500
	Working capital required		4,02,500

Working Notes:

		Rs.	Rs.
1.	**Total manufacturing expenses**		
	Sales		18,00,000
	Less: Gross profit 25% of sales		4,50,000
	Total manufacturing expenses		13,50,000
	Less: Cost of materials	4,50,000	
	Wages	3,60,000	
			8,10,000
	Manufacturing expenses/overhead		5,40,000
2.	**Depreciation:**		
	Total manufacturing expenses/overhead		5,40,000
	Less: Cash manufacturing expenses		4,80,000
	Depreciation		60,000
3.	**Total cash cost:**		
	Total manufacturing expenses		13,50,000
	Less: Depreciation		60,000
			12,90,000
	Add: Administration expenses		1,20,000
	Sales promotion expenses		60,000
	Total cash cost		14,70,000

Illu.7: Prepare working capital forecast of Siemen's Company Ltd., from the following information:

Issued Share Capital Rs.4,00,000

6% Debentures Rs.1,50,000

The fixed assets are valued at Rs.3 lakhs. Production during the previous year is 1 lakh 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 materials 50%

Direct wages 10%

Overheads 25%

The raw materials ordinarily remain in stores for 2 months before production. Every unit of production remains in process for 2 months. Finished goods remain in the warehouse for 4 months. Credit allowed by creditors is 3 months form the date of delivery of raw materials and credit given to debtors is 3 months from the date of despatch.

Selling price is Rs.6 per unit. Both production and sales are in a regular cycle.

Solution:

Working Capital Forecast

	Rs.
Current Assets	
Stocks:	
Raw materials	50,000
Work-in-process	67,500
Finished goods	1,70,000
Debtors	1,27,500
	4,15,000
Less: Current Liabilities	
Creditors	75,000
Working Capital required	3,40,000

Working Notes:

		Rs.
i.	Sales	
	Cost of sales	6,00,000
	Raw materials	3,00,000
	Direct wages	60,000
	Overheads	1,50,000
ii.	Stock of raw materials $\frac{Rs.3,00,000}{12} \times 2$	50,000
iii.	Work-in-process:	
	Raw materials Rs.3,00,000 $\times \frac{2}{12}$	50,000
	Direct wages Rs.60,000 $\times \frac{2}{12} \times \frac{1}{12}$	5,000
	Overheads Rs.1,50,000 $\times \frac{2}{12} \times \frac{1}{12}$	12,500
		67,500
iv.	Stock of finished goods 5,10,000 $\times \frac{4}{12}$	1,70,000
v.	Debtors: 5,10,000 $\times \frac{3}{12}$	1,27,500
vi.	Creditors: 3,00,000 $\times \frac{3}{12}$	75,000

Illu.8: A proforma cost sheet of a company provides the following particulars:

Element of cost:	Amount per Unit Rs.
Raw materials	80
Direct labour	30
Overheads	60
Total cost	170
Profit	30
Selling price	200

The following further particulars are available:

Raw materials are in stock on average one month. Materials are in process, on average, half a month. Finished goods are in stock on average one month.

Credit allowed by suppliers is one month. Credit allowed to debtors is two months. Time Lag in payment of wages is 1½ weeks. Lag in payment of overhead expenses is one month.

One-fourth of the output is sold against cash. Cash on hand and at bank is expected to be Rs.25,000.

Your are required to prepare a statement showing the working capital needed to finance a level of activity of 1,04,000 units of production when current assets are to be taken at (a) cash costs only and (b) total value. Which method do you consider better?

You may assume that production is carried on evenly throughout the year, wages and overheads accrue similarly and a time period of 4 weeks is equivalent to a month.

Solution: a) When current assets are taken at cash costs only

Statement of Working Capital Requirements

	Rs.	Rs.
Current assets:		
Cash at bank		25,000
Stock of raw materials for 8,000 Units @ Rs.80 per unit		6,40,000
Work in Progress:		
Material for 4,000 units @ Rs.80 per unit	3,20,000	
Labour and overheads equal to 4,000 units @ Rs.90 per unit	3,60,000	
		6,80,000
Finished goods, 8,000 units @ Rs.170 per unit		13,60,000
Sundry debtors: (at cost equivalent)		
Total sales in units (for 2 months)	16,000	
Less: Cash sales	4,000	
	12,000	
Credit sales 12,000 units @ Rs.170 per unit		20,40,000
Total		47,45,000

	Rs.	Rs.
Less: Current Liabilities		
Sundry creditors for 8,000 units @ Rs.80 per unit		6,40,000
Expenses outstanding:		
Wages on 3,000 units @ Rs.30 per unit	90,000	
Overheads on 8,000 units @ Rs.60 per unit	4,80,000	
		5,70,000
Working capital required		35,35,000

Working Notes:

i.   Sales per week will be 2,000 units i.e., $\dfrac{1,04,000}{52}$

ii.   The amount of depreciation included in overheads should be excluded for purposes of calculations made above. However, this could not be done in the absence of information on this point.

b) When current assets are taken at total value

	Rs.
Statement of Working Capital Requirements	
Working capital required as per statement (a)given above	35,35,000
Add: Profit on credit sales to debtors	
12,000 units × Rs.30	3,60,000
	38,95,000

Therefore, Method – I for estimating working capital requirements is better compared to the cash costs method. One does not lay aside the amount of profit expected to be earned as working capital.

Illu.9: The management of Kinetic, desires to determine the quantum of working capital needed to finance programme formulated to be put into operation with effect from 1st April, 2000. The following percentages which various elements of cost bear to the selling price have been extracted from the proforma cost sheet.

      Materials 50%
      Labour 20%
      Overhead 10%

Production in 2001 was 2,00,000 units and it is proposed to maintain the same during 2002.

Following further particulars are available.
1.   Raw materials are expected to remain in stores for an average period of one month before issue to production.

2. **Finished goods are to stay in the warehouse for two months on the average before being sold and sent to customer.**
3. **Each unit of production will be in process for one month on the average.**
4. **Credit allowed by suppliers from the date of delivery of materials is one month.**
5. **Debtors are allowed two months credit from the date of the sale of goods.**
6. **Selling price is Rs.9 per unit.**
7. **Sales and production follow a consistent pattern.**

Prepare an estimate of working capital requirements.

Solution:

Statement of Working Capital Requirements

	Rs.	Rs.
Current assets:		
Stock of Raw Materials (1 month)		75,000
Stock of Finished goods (2 months)		
Materials (75,000 × 2)	1,50,000	
Labour (30,000 × 2)	60,000	
Overhead (15,000 × 2)	30,000	
		2,40,000
Work-in-progress (1 month)		
Materials	75,000	
Labour	30,000	
Overhead	15,000	
		1,20,000
Debtors (at cost Equivalent for 2 months)		
Materials (75,000 × 2)	1,50,000	
Labour (30,000 × 2)	60,000	
Overhead (15,000 × 2)	30,000	
		2,40,000
		6,75,000
Less: Current Liabilities:		
Creditors (one month)		75,000
Working Capital required		6,00,000

Note:
1. Calculation of amount locked up in materials, labour and overhead per month. Sales for one month = Rs.18,00,000 × $\frac{1}{12}$ = Rs.1,50,000

Illu.10: Ajanta Co. Ltd., Bangalore commenced its business in 2001 and has prepared the following projected Profit and Loss account.

	Rs.	Rs.
Sales		21,00,000
Cost of goods sold		15,30,000
Gross Profit		5,70,000
Administrative Expenses	1,40,000	
Selling Expenses	1,30,000	
		2,70,000
Profit Before Tax		3,00,000
Provision for taxation		1,00,000
Profit after tax		2,00,000

The cost of goods sold has been arrived at as under:

Materials used	8,40,000
Wages and Manufacturing Expenses	6,25,000
Depreciation	2,35,000
	17,00,000
Less on stock of finished goods (10% of goods produced not yet sold)	1,70,000
	15,30,000

The figures given above relate only to finished goods and not to work-in-progress. Goods equal to 15% of the year's production (in terms of physical units) will be in process on the average requiring full materials but only 40% of the other expenses. The company believes in keeping materials equal to two months' consumption in stock.

All expenses will be paid one month in arrear; suppliers of material will extend 1 ½ months' credit; sales will be 20% for cash and the rest at two months' credit; 70% of the income tax will be paid in advance in quarterly instalments. The company wishes to keep Rs.80,000 in cash.

Prepare an estimate of the requirement of (i) working capital and (ii) Cash cost of working capital.

Solution:

(i) Estimate of Working Capital Requirements

	Rs.		Rs.	Rs.
Current Liabilities		**Current Assets**		
Sundry Creditors:		Finished Stock	84,000	
Raw Materials purchases	1,20,750	Wages	62,500	
Expenses and Wages	55,208	Depreciation	23,500	

	Rs.		Rs.	Rs.
Administrative and Selling Expenses	22,500	Work-in-Progress		1,70,000
Provision for taxation	30,000	Materials	1,26,000	
	2,28,458	Wages	37,500	
		Depreciation	14,100	1,77,600
		Raw material		1,61,000
Working capital required,	6,40,142	Sundry debtors		
(Current Assets – Current		Materials	1,00,800	
Liabilities)		Wages	75,000	
(Rs.8,68,000-2,28,458)				
		Depreciation	28,200	
		Admn. & Selling		
		Expenses	36,000	
		Profit	40,000	
				2,80,000
		Cash in hand		80,000
	8,68,600			8,68,600

(ii) Estimated Cash Cost of Working Capital

	Rs.
Working Capital as per statement given above	6,40,142
Less: Profit and Depreciation for which funds are not needed (See below)	1,05,800
Cash cost of working capital required	5,34,342

Working Notes:

	Rs.
(i) Work-in-Progress:	
15% of material consumed for finished goods	1,26,000
15% of 40% of wages and expenses	37,500
15% of 40% of Depreciation	14,100
	1,77,600

(ii) Raw materials will be $\frac{1}{6}$ of total material consumed, 1.6., Rs.8,40,000 for finished goods plus Rs.1,26,000 for work-in-progress.

(iii) Sundry Debtors: 80% of two months' sales, i.e., $21,00,000 \times \frac{80}{100} \times \frac{2}{12}$ or Rs.2,80,000

(iv) Individual items have been computed on that basis.

Creditors for raw material (Rs.8,40,000 + 1,26,000) $\times \dfrac{1\frac{1}{2}}{12}$ or Rs.1,20,750

(v) Creditors for expenses: (Rs.6,25,000 + 37,500) $\times \dfrac{1}{12}$ = Rs.55,208.

(vi) Creditors for administration and Selling expenses: Rs.2,70,000 $\times \ ^1/_2$ = Rs.22,500.

(vii) Depreciation and profit included in the cost of current assets:

Depreciation	Rs.
Finished goods	23,500
Work-in-progress	14,100
Debtors	28,200
	65,800
Profit included in Debtors	40,000
Profit included in Debtors (including income-tax i.e., Rs.13,333)	1,05,800

21.3 SELF ASSESSMENT QUESTIONS

1. What factors should the finance manager take into consideration while estiamting working capital needs of a firm?
2. Discuss the technique of forecasting working capital requirements of a firm.
3. How do you estimate the working capital under the cash cost method?

21.4 EXERCISES

1. From the following details, prepare an estimate of the requirement of working capital:

Production	60,000 units
Selling price per unit Rs.5	
Raw materials	60% of selling price
Direct wages	10% of selling price
Overheads	20% of selling price
Materials in hand	2 months requirements
Production Time	1 month
Finished Goods in stores	3 months
Credit for Material	2 months
Credit allowed to customers	3 months
Average cash balance	Rs.20,000

Wages and overheads are paid at the beginning of the month following. In production all the required materials are charged in the initial stage and wages and overheads acrue evenly.

[Ans.: Net Working capital requirement Rs.1,77,500]

2. You are supplied with the following information in respect of XYZ Ltd. for ensuring year:

Production for the year	69,000 units
Finished goods in store	3 months
Raw material in store	2 months' consumption
Production process	1 month
Credit allowed by creditors	2 months
Credit given by Debtors	3 months
Selling price per unit	Rs.50
Raw material	50% of selling price
Direct wages	10% of selling price
Overheads	20% of selling price

There is a regular production and sales cycle and wages and overheads acrue evenly. Wages are paid in the next month of accrual. Material is introduced in the beginning of production cycle. You are required to find out its working capital requirement.

[Ans.: Net Working Capital requirement Rs.17,53,750]

3. From the following projections of XYZ & Company for the next year, you are equired to work out the working capital required by the company.

	Rs.
Annual Sales	14,40,000
Cost of production including depreciation Rs.1,20,000	12,00,000
Raw material purchases	7,05,000
Monthly expenses	25,000

Anticipated opening stock of raw materials Rs.1,40,000
Anticipated closing stock of raw materials Rs.1,25,000

Inventory Norms	
Raw material	2 months
Work-in-Progress	15 days
Finished goods	1 month

The firm enjoys a credit of 15 days on its purchases, and allows one month's credit on its supplies. The company has received an advance of Rs.15,000 on sales orders. You may assumes that production is carried on evenly throughout the year, and the minimum cash balance desired to be maintained is Rs.10,000.

[Ans.: Net Working Capital Requirement Rs.3,35,625]

4. The Board of directors of Nanak Engineering Company Private Limited requests you to prepare a statement showing the working capital requirements for a level of activity at 1,56,000 units of production.

The following information is available for your calculation.

	Per unit (Rs.)
Raw materials	90
Direct labour	40
Overheads	75
Total	205
Profit	60
Selling price per unit	265

(i) Raw materials are in stock, on average, for one month.
(ii) Materials are in process (50% complete) on average for 4 weeks.
(iii) Finished goods are in stock, on average, for one month.
(iv) Credit allowed by suppliers is one month.
(v) Time lag in payment from debtors in 2 months.
(vi) Average lag in payment of wages is 1½ weeks.
(vii) Average lag in payment of overheads is one month.

20% of the output is sold against cash. Cash in hand and in bank is expected to be Rs.60,000. It is to be assumed that production is carried on evenly throughout the year, wages and overheads accrue similarly, and time period of 4 weeks is equivalent to a month.
[Ans.: Net Working Capital Requirement Rs.71,51,500]

5. AB Ltd. provides the following particulars relating to its working.

	Per unit
(i) Cost/Profit per unit	(Rs.)
Raw materials	84
Direct labour cost	36
Overheads (all variable)	36
Total cost	156
Profit	44
Selling Price	200
(ii) Average amount of back up stock	
Raw material	1 month
Work-in-progress (50% complete)	½ month
Finished goods	1 month
(iii) Credit allowed by suppliers	1 month
(iv) Credit allowed to customers	2 months
(v) Average time lag in the payments of:	
Wages	½ month
Overhead expenses	1½ months
(vi) Required cash in hand and at bank Rs.3,00,000	
(vii) 25% of the output is sold for cash	

For an expected sale of 1,00,000 units of AB Ltd., work out the working capital requirements assuming that production is carried on evenly throughout the year and wages and overheads accrue similarly.

[Ans.: Net Working Capital Requirement Rs.32,75,000]

6. Compute the estimated working capital requirement during the next year. (Assume 1 year = 360 days)

    Average collection period = 60 days

    Average payment period = 75 days

    Inventory holding period = 90 days (calculated with reference to cost of goods sold)

    Cash and bank balance = 2.5% of Sales.

    Sales Rs.20,00,000, gross profit = 25%

    Credit purchases – $\frac{1}{3}$ of the cost of goods sold

The company expects 50% increase in sales during the next year.

[Ans.: Net working capital requirement Rs.9,81,250]

7. Bhanu Ltd. supplies you the following information from its annual budget.

  (i)   Sales Rs.46.80 lakhs (78,000 units) 25% cash sales and balance in credit.

 (ii)   Raw material cost = 60% of sales value

 (iii)   Labour cost = Rs.6 per unit

(iv)   Variable overhead = Re.1 per unit
(v)   Fixed overhead Rs.5 lakhs (including Rs.1,10,000 as depreciation)
(vi)   Budgeted stock levels
       Raw material = 3 weeks
       Work in progress = 1 week (Material 100%, labour and overhead 50%)
       Finished goods = 2 weeks
       Debtors are allowed credit for 3 weeks
       Creditors allow 4 weeks credit
       Wages are paid bi-monthly i.e., by the 3rd week and by the 5th week for 1st and 2nd week and the 3rd and 4th weeks respectively.
       Lag in payment of overhead = 2 weeks
       Cash in hand required Rs.50,000
       Allow 10% margin for contingencies.

       Prepare the Working capital budget for a year for Bhanu Ltd., making the necessary assumptions you deem fit.
       [Ans.: Total working capital required Rs.4,21,300]

8. You are a responsible officer in the Finance Department of Resco Ltd. The data given below are estimates relating to the year ending 31st March, 2007.

		Rs.in lakhs
(i)	Opening balance	
	Raw materials	410
	Work in progress	100
	Finished goods	450
	Receivables	600
	Payables	450
(ii)	Estimated closing balance	
	Raw materials	450
	Work in progress	120
	Finished goods	500
	Receivables	740
	Payable	420
(iii)	Raw materials purchased	1,600
(iv)	Manufacturing expenses	1,100
(v)	Selling, Administration and Financing costs	480
(vi)	Sales	4,000

       You are required to compute the operating cycle period and prepare a statement showing the cash working capital of the company. Assume 360 days in the year.

       [Ans.: Cash working capital Rs.1,125 lakhs (approx); operating cycle period = 132 days]

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