UNIT 1 FINANCIAL MANAGEMENT: AN OVERVIEW

Structure

1.0 OBJECTIVES

After studying this unit, you should bc able to:

- explain the meaning of financial management;
- describe the nature of finance function and evolution of financial management;
- explain the key activities of financial manager and organisation of finance functions;
- discuss the goals of financial management and risk return trade off; and
- discuss the challenges faced by financial manager.

1.1 INTRODUCTION

Financial Management means management of finance/funds. Financial decisions are important for the business firm as growth and development of a firm depend upon its financial policies. Any wrong decision may affect the solvency of the firm. This unit introduces you to the meaning of financial management, nature and organisation of finance function, evolution and goals of financial management and key activities and the challenges faced by the financial manager.

1.2 NATURE OF FINANCE FUNCTION

Meaning

It is said that the finance is the life blood of business. 'Money begets money' and 'money makes the mare go', are the famous proverbs that highlight that finance actually matters to everybody. Management is concerned with planning, organising,

directing and control of any activity in a business. The successful business management is closely linked with efficient use of its finances. Financial management is concerned with planning, organising, directing and control of financial activities in a business. A firm has to decide the following:

I) From what sources tlie funds must be raised and how much from each source i.e., what should be tlie finance mix?

2) Where to invest those funds ? Wliat should be the composition of tlie assets of the firm?

3) I-Iow sliould the firm analyse, plan and control its affairs?

4) How large should a firm be so that it can grow fast?

Financial management, also called managerial finance or corporate finance, has been defined by different writers as follows :

"Financial management is concerned with efficient use of an important economic resource namely: capital funds. It is the study of the problems involved in the use and acquisition of funds". Ezra Solomon, The Theory of Financial Management: Columbia University Press (N.Y.) (1978).

"It can be broadly defined as the activity concerned with planning, raising, controlling and administering of funds used in the business." H. Guthman and H. Dougall : Corporate Financial Policy (Engleword Clifers) N. Y. Prentice Hall 1980.

Thus, financial management is concerned with managerial decision that results in procurement of funds and their effective utilization in the business. Financial management is nothing but managerial decision making on asset mix, capital mix and profit allocation.

Nature

According to Ezra Solomon, "the function of financial management is to review and control decision to commit and recommit funds to new and on going uses. In addition to raising funds, financial management is directly concerned with production, marketing and other functions within an enterprise whatever decisions are made about the acquisition or distribution of assets". From this statement, it is clear tliat the main function of financial management is not only to raise funds but includes the broader area of managing the finances for tlie firm more efficiently. Thus, the two main decisions involved in a firm are:

1) Investment Decision and 2) Financing decision including Dividend decision

1) Investment decision

The funds available may be invested in any project. The financial management provides a framework to make investment wisely. Investment decision relates to :

1) Management of working capital

2) Capital budgeting decision

3) Management of mergers, reorganisation and disinvestment

4) Buy or lease decisions

5) Securities analysis and portfolio management

The investment in fixed assets and management of current assets is major investment related problems in a company. Assets represent investment (or uses) of funds. Investment decision includes the decisions primarily relating to assets composition – fixed as will as current assets.

2) Financing Decision

The second function of financial management deals with financing pattern of tlie firm. The financing decision is mainly concerned with identification of sources of finance and determining financing mix and cultivating sources of funds and raising funds. The two main sources of funds are shareholders funds (owners' equity) and borrowed funds. The cost of funds, determination of debt equity mix, impact of tax, depreciation, consideration of control and financial strain, interest rate and inflation are some of the factors that affect the financing decision. A balance is to be maintained between owners' funds and outsiders' funds and long term and short term funds.

A firm usually maltes use of both internal and external funds. The employment of these sources in various combinations is called 'financial leverage'. Different types of analysis are required for this decision e.g., leverage analysis, EBIT – EPS analysis, which we will discuss later in this course.

Dividend Decision

This decision relates to disposition of distributable profit between dividends and retained earnings. Retained earnings being a source of funding, dividend decision is concerned as part of financing decision of the firm. The impact of levels of dividends and retention of earnings on market value of share and future earnings of the firm, funds required for future expansion, impact of legal and cash flow constraints and the future boom or recession are some factors that affect this decision. Retention of earnings depends upon reinvestment opportunities available and the opportunity to generate satisfactory rate of return for the shareholders. Dividends may be paid in cash or in the form of bonus shares. These and other aspects of dividend decision will be explained in detail later in this course.

1.3 EVOLUTION OF FINANCIAL MANAGEMENT

Finance management emerged as a separate field from accounting in 1900. The enterprises became big with complex decision to be made and requirement for huge funds growth in technological innovations and creation of new industries resulted in further need of funds hence promoting the study of finance to emphasise on investment, liquidity and financing of the firms.

The depression of the 30's meant firms had to concentrate on defensive aspect of survival, preservation of liquidity and reconstruction. Business lacked funding, those institutions which were willing to lend required exorbitant interest rates. During those times finance manager had the responsibility of ensuring that the enterprise was having optimal usage of funds, avoiding unnecessary expansion programmes and maintaining the loyalty of existing customers'. Use of computer brought better and fruitful analysis of financial performance. Introduction of various financial instruments in 1990s replacing hard cash as a transfer of funds and financial management emerged as a distinct management discipline and is linked to changes in business and socio-economic scenario, brought about by the advancements in information technology, multi division corporation and increasing global competition. The 21st century has brought globalisation through merger of firm, increased competition, access to international markets and need for quality products.

Financial management is important in all types of business as well as not for profit organisations like hospitals and schools. Sound financial management is necessary for the survival and growth of an enterprise.

Check Your Progress A

1) What is financial management?

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2) List the functions of financial nianagement.

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3) Differentiate between financing decision and investment decision.

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1.4 KEY ACTIVITIES OF FINANCIAL MANAGER

In a business firm the financial manager occupies a very important position. He is one of the dynamic members of corporate managerial team. His role, day-by-day, is becoming more and more significant.

The financial manager's task is not that of an accountant whose job is primarily to record the business transactions, prepare financial statements which show tlie working results of the organisation for a given period and its financial condition at a given point of time. The accountant is not concerned with tlie management of funds which is a syecialised task and he is seldom involved in tlie decision making process. In the modern day business, the role of financial manager has changed. Financial manager is expected to manage the funds in such a manner as to ensure their optimum utilisation and their procurement in a manner that the risk, cost and control considerations are properly balanced in a given situation.

Financial manager is responsible for effective utilisation of funds. He is to point out situations where tlie funds are being kept idle or where proper use of funds is not being made.

Important activities of the financial manager are : 1) estimating the requirement of funds; 2) decision regarding the capital structure; **3)** investment decision; **4)** dividend decision; 5) supply of funds to all part of the organisation or cash management; 6) evaluating financial performance witli respect to return on investment; 7) financial negotiations witli banks, financial institutions and public depositors; 8) keeping touch witli stock exchanges; and 9) maximising both the return on ordinary shares and the total wealth of the company.

In tlie present context the financial manager provides leadership in the cost effective use of an organisation's financial resources.

The responsibilities and duties of financial manager are indeed the organisation-wide, He interacts with production manager for a new plant, for forecasting and planning with marketing manager, for inventory level with purchase manager and sales manager for receivables pol icy.

1.5 GOALS OF FINANCIAL MANAGEMENT

A good goal must be clear, timely measureable and consistent. So must be the goal of financial management. A firm may have different goals e.g., production goals, sales goal, and financial management goal.

But what is the main goal of financial management ? The main goal of financial management should be such that is directed to achieve tlie ultimate goal of a firm.

The ultimate goal, as a good consensus, of a firm is to maximise the shareholders' wealth.

This in operational terms means:

a) Maximisation of profit

b) Maximisation of Return on capital employed

c) Growth in earning per share or market value of a share or dividends

d) Optimum level of leverage

e) Minimisation of costs of capital.

Let us examine in detail maximisation of shareholders wealth as an ultimate goal of financial management.

Maximisation of Shareholders' Wealth

The separation of ownership from management and the increase in intensity of competition has lead to the redefinition of profit maximisation objective of a firm. Financial theory, in general rests upon the promise that the objective of the firm should be maximisation of the value of the firm to the equity shareholders. It means maximising the market value of its equity shares. The justification of this objective is that it provides a rational guide for business decision making and helps in efficient allocation of resources. **A** second reason in favour of this objective is that equity shareholders provide risk (venture) capital for starting a company. They appoint the board of management. So this objective brings a responsibility on management to promote the welfare of equity shareholders.

The shareholders wealth can be maximised by maximising value of shares of a firm. The economic value of the shareholders' wealth is the market price of the share which is the present value of all future dividends and benefits expected from the firm. The underlying assumption in this approach is that shares are traded in efficient capital market where tlie effect of a decision is reflected in marlcet price of a share. With this objective in view the management will allocate the available economic resources in the best possible way keeping in view the risk involved. This objective timely guides three functions of financial management (investment, financing and dividend decision). The main problem of this objective is that an efficient capital market must exist which can really discover and reflect time marlcet price. Thus, wealth maximisation of shareholders is the main objective, though profit maximisation can be considered as a part of wealth maximisation objective.

1.6 RISK AND RETURN TRADE OFF AS A GUIDING FACTOR IN DECISION MAKING

From the financial point of view in any investment or financing proposal there is always the element of risk and return embeded. It is said that the greater the risk, greater the gain. So risk and return go together. Higher return entails higher risk; and lower return entails lower risk. Risk is defined as the 'variability of expected returns from an investment. If you invest in fixed deposit, there is no variability as income is fixed. But if you buy a share, dividend is not fixed. Less the variability, less is the risk and ***vice*** *versa.*

Return is defined as the "gain (or loss) expected over a given period of time by the decision makes". A financial manager cannot avoid risk, but wants greater returns at the same time. So he has to 'trade off between risk and return".

To explain the point further, let us assume: (a) that expected earnings are equal to expected cash flows, (b) that there are no taxes. Suppose you have Rs. 10,000 of which you have borrowed Rs. 2,000 @ 5% and you want to open a small photocopy shop. The total cost of operating in one year is Rs. 10,000 and sales are Rs. 11,000. The position is as follows :-

i) Financing — Risk and return
   - Debt Rs. 2,000 – Interest Rs. 100
   - Own funds Rs. 8,000 – Income Rs. 900

ii) Operating – Risk and Return
   - Operating costs Rs. 10,000
   - Cash sales Rs. 11,000

At the end of the year you have Rs. 11,000, of which you reinvest in the business Rs. 10,000. Of remaining Rs. 1000 you pay interest of Rs. 100 and keep with you Rs. 900. This return is product of two factors: (1) you earn Rs. 1,000, (2) Rs. 1,000 were divided between a creditor and you, the owner, which affected the owner's return. Based on the return on total assets you earned 10% (1000/10000), but earned a rate of return of 11.25% for the owner 900/8000 x 100, which is the result of operating and financing activities.

The rate of return from operations is determined by margin and turnover which are affected by sales, net operating income and net operating assets. The margin can be increased by either raising sales more than operating expenses or by reducing operating expenses more than sales. A turnover can be increased by increasing sales relatively more then operating assets or reducing operating assets relatively more than sales.

Financing **Risk and Return**

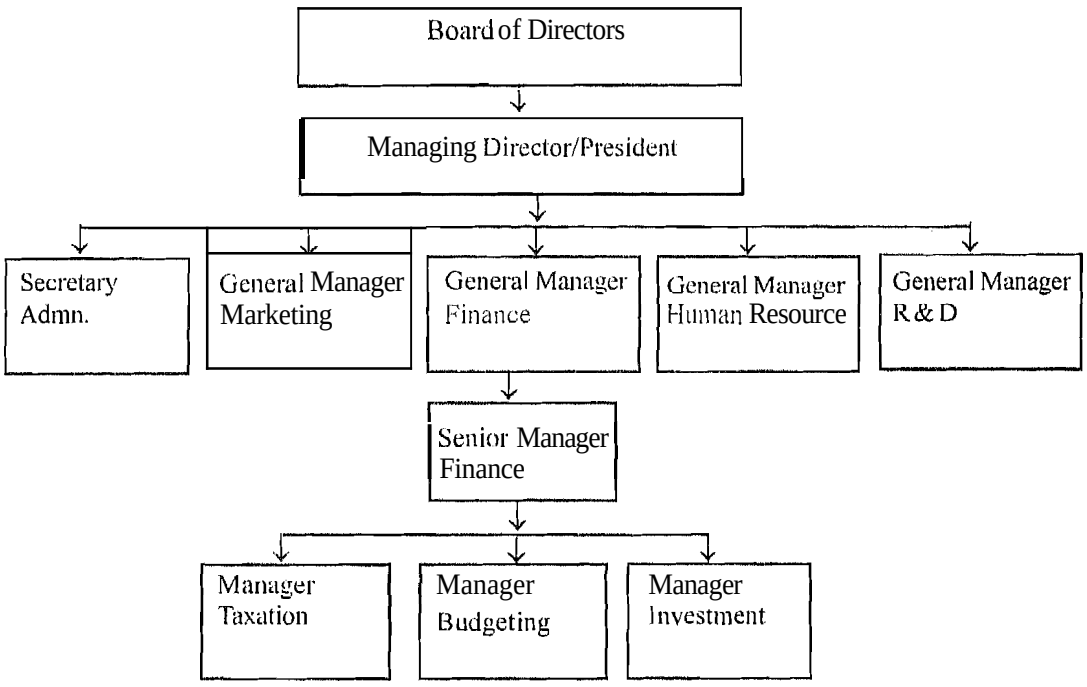
The next step towards maximisation of present value of owner's investment is to arrange source of funds so that the owner obtains as high a return as possible out of the earnings of the business without assuming undue risk. The difference between earning power of 10% and return on owner's equity of 11.25% is due to financial leverage". This is because you have used funds for which you are paying a fixed return. The leverage are : (1) the ratio of residual owner's equity to total funds supplied, and (2) the proportion of operating income used to pay interest payments.

The lower the ratio of residual owner's equity to total funds supplied, the higher the leverage factor (or vice versa) and the lower the proportion of operating income used for interest payment. the higher the leverage factor (or vice versa).

But net operating income is to be taxed. If tax is paid it will be deducted from net operating income left after charging interest expense. In that case rate of return or equity and earning per share shall be lower than the situation when tax is not paid on income. Financial leverage magnifies the fluctuations in earnings available for residual owners. When net operating income rises, the earnings of residual owners increase at a faster rate and if it falls, the earnings of residual owners decline more rapidly. The use of financial leverage widens the dispersion of possible earnings per share, thereby increasing the risk for equity owners. Thus, a balance is to be maintained between the chance of making greater profits for the owners against variability of returns and chances of firm going bankrupt.

1.7 ORGANISATION OF FINANCE FUNCTIONS

An organisation differs from company to company. An organisation can be vertical, horizontal or a circular. It can be on the basis of functions or divisions e.g. products or territories. However, a common type of organisation on functional basis is as given below :



Under above type of organisation each major function is organised as a separate department. Its emphasis is on specialisation. I-Iencc finance manager occupies a job of an expert. I-le not only supervises finance department but also coordinates activities with other departments. Thus, he plans, organises, controls and administers funds used in the business.

1.8 CHALLENGES FOR FINANCIAL MANAGER

While mobilisation of funds and investment of funds have been the prime respon bility of financial manager/CFO. Owing to momentous changes in the business environment particularly economic and financial, the nature of.challenges faced by financial manager have undergone immense shifts. The first and the foremost challenge is shareholders value creation. The shareholders, even the minority, have become demanding and vocal. They are no more satisfied with increasing sales, or decreasing costs; they want growing total shareholders return. **As** a consequence, the financial manager has to concentrate not only on earning per share but also on market capitalization.

The next important challenge comes from investors, both individual and institutional. Indeed the rise of the mutual funds signifies tlie major departure in tlie financial environment of business. In addition to tlie traditional skills of financial manager, a good understanding of tlie psychology of investors has emerged as tlie prime skill for them.

The third major challenge faced by financial manager is dealing with continually increasing risks in the market. With tlie onset of liberalisation, privatisation and globalisation of business, tlie business risks have multiplied. The generation of risk adjusted return lias emerged as a newer measures of performance of financial manager. A reading into a financial magazine brought out altogether a new challenge being faced by the financial managers. That magazine had mentioned that a research into tlie expectations of CEOs from financial managers had shown that the greatest expectation of tlie CEOs from financial managers is to make them look smart. Looking smart essentially means to be able to base your arguments on facts and figures. He should have sound interpersonal and communication skills, and overall organisational knowledge. Financial manager is expected to continually generate appropriate measures of performance for managerial performance evaluation within the company and reporting to tlie external shareholders etc. Therefore, rapid technological advancement, complied with large scale investment made by MNCs, merger movements and wide-spread diverification of products have made his job demanding. But rewards, financial or otherwise can be great for those who enjoy the challenges. All in all financial manager is in tlie new world of business and finance.

Check Your Progress B

1) List the key activities of a financial manager?

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2) What is risk'?

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3) Define return.

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1.9 LET US SUM UP

Financial management is also called corporate finance or managerial finance. It's mainly concerned with acquisition of funds and use of funds by a business firm. The goal of financial management is maximisaion of shareholders wealth, though profit maximisation can be a part of wealth maximisation objective. There are two basic dimensions of financial analysis: risk and return, higher the risk higher the return, and higher the market value; and lower the risk, lower the return and lower the market value. Financial manager is concerned witli planning and allocation of resources etc. There are many key activities of financial manager. In the era of globlisation, privatisation and libralisation financial manager has to face many challanges.

I . KEYWORDS

Earnings per share : Earnings after taxes divided by the number of common shares outstanding.

Financial Management : The acquisition, financing and management of assets.

Profit Maximisation : Maximising a firm's earnings after taxes.

Return : Gain or loss expected over a given period of time.

Risk : Variability of expected return over an investment.

1.11 TERMINAL QUESTIONS/EXERCISES

I) Critically evaluate the goals of financial management.

2) Explain basic finance functions. How do they evolve risk-return trade off'?

3) Discuss the challanges faced by the financial managers in India.

UNIT 2 TIME VALUE OF MONEY

Structure

2.0 OBJECTIVES

After studying this unit, you should be able to:

- explain future value and present value concepts;
- explain compound interest and discount;
- compute future value of a single amount and an annuity; and
- compute present value of a single amount and an annuity.

2.1 INTRODUCTION

You must have heard that a rupee today is worth more than a rupee tomorrow. Did you imagine, why is it so? Let me tell you by an example. Anil's grandfather decided to gift him rupee one lakh (1,00,000) at the end of five years; and gave him a choice of having Rs. 75,000 today. Had you been in Anil's place what choice would you have made? Would you have accepted Rs. 1,00,000 after five years or Rs. 75,000 today? What do you say? Apparently, Rs. 75,000 today is much more attractive than Rs. 1,00,000 after five years because present is certain than future. You could invest Rs. 75,000 in the inarket and earn return on this amount. Rs. 1,00,000 at the end of five years would have less purchasing power due to inflation, We hope you have got the message that a rupee today is worth more than a rupee tomorrow. But the matters money are not so simple. The time value of money concepts will unravel the mystery of such choices which all of us do face in our daily life. We may say a good understanding of time value of money constitute 90% of finance sense. Investment decisions involve cash flow occurring at different points of time. Therefore, recognition of time value of money is very important. In this unit, you will learn about compound interest and discount concepts and how future value of a single amount and an annuity and present value of a single amount and an annuity is calculated.

Let us start with future value of a single amount for a single period and more than one period.

2.2 FUTURE VALUE OF A SINGLE CASH FLOW

First of all let us explain the meaning of future value. By future value (FV) we mean the amount of money an investment will grow to over some period of time at some given interest rate. In other words, future value is the cash value of an investment at sometime in future.

Future Value of a Single Amount for Single Period

If you deposit Rs. 1000 in a fixed account of your bank at 10% interest per year, how much you will get after one year'? You will get Rs. 1100. This is equal to your principal amount Rs. 1000 and Rs. 100 interest which you have earned on it in a year. Hence, Rs. 1100 is the future value of Rs. 1000 deposited (invested) for one year at 10 per cent. It means that Rs. 1000 today is worth Rs. 1100 in one year given that 10 per cent is the interest rate.

Thus, if you invest for one period at an interest rate of i, your investment will grow to (1+i) per rupee invested. In tlic above example, i is 10 per cent.

Future Value of a Single Amount for more than One Period

Taking the previous example, if you invest the same amount for two years what will you have after two years, assuming tlic interest rate remain the same ? *You* will earn Rs. 1100 + 10 + Rs. 100 interest during the second year so you will have total of Rs. 1210 (1100+110). This is the future value of Rs. 1000 for two years at 10 per cent.

You can notice here that this Rs. 1210 has four parts. First part is Rs. 1000 which is the principal amount, second part is Its. 100 as interest earned in first year and third part is another Rs. 100 earned as interest in second year. The fourth and last is Rs. 10 which is the interest earnecl in second year on interest paid in first year Rs. 100 x 10 = Rs. 10. So tlie total interest earned is Its. 210. Hence, the future value is Rs. 1210 (1000+100+1oo+10).

The process of putting your money and any accumulated interest on an investment for more than a period, thereby reinvesting the interest is called **compounding.** Compounding tlie interest means earning interest on interest. We can call tlie result compound interest. The interest earned each period only on tlie original principal is called **simple interest.**

Future value of a single cash flow can be calculated by tlie following formula :

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

FV_n = future value for n years

PV = cash flow

i = rate of interest per year

n = total number of years

Future value of a single cash flow for n years

Year	Amount in the beginning of the period	Interest	Amount at the end of the period
1	PV	PV X i	$PV_1=PV(1+i)$
2	$PV(1+i)$	$PV(1+i)i$	$PV_2=PV(1+i)^2$
3	$PV(1+i)^2$	$PV(1+i)^2 i$	$PV_3=PV(1+i)^3$
n-1	$PV(1+i)^{n-2}$	$PV(1+i)^{n-2} i$	$PV_{n-1}=PV(1+i)^{n-1}$
n	$PV(1+i)^{n-1}$	$PV(1+i)^{n-1} i$	$PV_n=PV(1+i)^n$

The above equation in the table is a basic equation in compounding analysis. The $(1+i)^n$ factor is called the compounding factor or Future Value Interest Factor (FVIF). As the calculations become very difficult with increasing number of years, the published tables. called Future value tables are available showing value of $(1+i)^n$ with different combinations of i and n. You would see such tables attached at the end of this block of this course and can use these tables to find out future value factor. If you have to find future value factor at 10% for five years, find the column that corresponds to 10 percent and then look down the rows until you come to five years. That is how we found the future value factor 1.611 for the example given below.

What will be your Rs. 1000 worth after five years at 10% ?

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

$= 1000 \times 1.611$

$=$ Rs 1611

The total interest earned on Rs. 1000 in five years is Rs. 611.

In five years the total simple interest earned is Rs. 500, i.e., Rs.100 per year at 10% and Rs. 111 (Rs. 611–500) is from compounding. Table given below shows the simple interest, compound interest and total amount earned each year and at the end of five years.

Table 2.1

Year	Amount in the beginning	Simple interest	Compound interest	Total interest earned	Amount at the end of year
1	Rs. 1000	100	0	100	1100
2	Rs. 1100	100	10	110	1210
3	Rs. 1210	100	21	121	1331
4	Rs. 1331	100	33.1	133.1	1464.1
5	Rs. 1464.1	100	46.4	146.4	1610.5
		500	**110.5**	**610.5**	**1611**

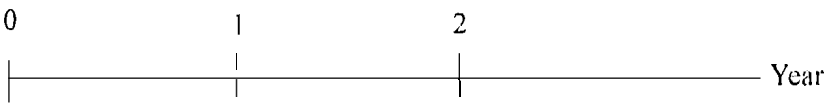
We have discussed the future value of a lumpsum (single) amount for number of years. Now let us calculate **future value of multiple cash flows.**

Let us start with same example. Suppose you deposit Rs. 1000 today in a bank at 10%. In one year you again deposit Rs. 1000. How much now you have in two years? **At** the end of the first year you will have Rs. 2100. i.e., (Rs. 1100 + second deposit Rs. 1000).

Since you have left this deposit for another year at 10%, Therefore at the end of second year you will have Rs. 2100 x 1.10 = Rs. 2310.00

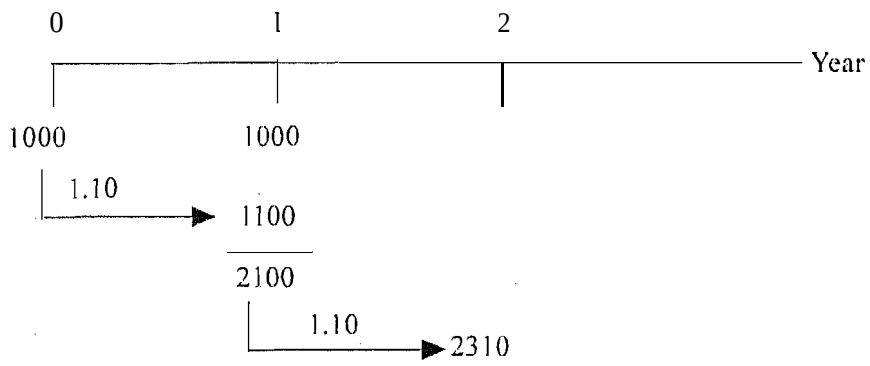
Let us illustrate it with help of a graph, also called time line

1)



Cash flows 1000 1000

2) Future value



This is one way of finding out future value of two deposits of Rs. 1000. There is another method. The first Rs. 1000 is deposited for two years at 10%, therefore, its future value is Rs. 1000 x 1.10^2 = 1000 x 1.2100 = Rs. 1210

The second Rs. 1000 is deposited for one year at 10%, so its future value is Rs. 1000 × 1.10 = Rs. 1100

The total value is = 1210 + 1100 = Rs. 2310

So there are two ways to calculate future value for multiple cash flows.

1) Compound the accumulated balance forward one year at a time.

2) Calculate tlie future value of each cash flow first and then add them.

Both methods will give you the same answer. You can use anyone of them.

Effect of Compounding

You may remember tlie example of Anil in the very beginning. Suppose his great grand father had invested Rs. 100 for 60 years ago at 10% interest rate. How much it would have grown till today? Let us find out the future value Factor.

FVIF = $(1 + .1)^{60} = 1.1^{60} = 304.48$

FV = 100 × 304.48 = Rs. 30,448.00

In this case simple interest is Rs. 600 where as the balance Rs. 29,848 (30,448 – 600) is from compounding. Therefore, the effect of compounding is great over long periods as compared to short periods

2.3 FUTURE VALUE OF AN ANNUITY

An annuity is a series of payments (or receipts) of fixed amount e.g., payment of premium in case of life policy and home loans etc. Annuity may be of two types : (n) regular or ordinary annuity, and (b) annuity due. In case of regular annuity the payment or receipt occurs at the end of each period. If the payment or receipt occurs at the beginning of each period it is called annuity due.

Future Value of Regular (ordinary) Annuity

The compound value of an annuity is the total amount one would have at the end of the annuity period if the amount is invested at a certain rate of interest and is held to the end of the annuity period. A promise to pay Rs. 1000 a year for 5 years is a 5 year annuity.

Illustration 1 : if you deposit Rs. 5000 at tlie end of every year in a bank for 5 years and the bank is paying 10% interest, the future value of this annuity will be Rs. 30,525.5.

$$Rs.5000(1.10)^4+Rs.5,000(1.10)^3+Rs.5000(1.10)^2+Rs.5000(1.10)+Rs.5,000$$

Or

$$Rs.5000\ (1.4641)+Rs.5,000(1.3310)+Rs.5000(1.2100)+Rs.5,000(1.10)+Rs.5,000$$

$$= Rs.\ 30,525.5$$

The above procedure can be expressed as given below :

Future Value of An Annuity

$$FVA = A \quad \frac{(1+i)^n-1}{}$$

A = Periodic cash flow

i = Interest rate

n = Number of years

Taking the figures from illustration 1

$$FVA = 5000 \left[\frac{(1+.10)^5-1}{.10}\right]$$

$$FVA = 5000 \left[\frac{(1.6105-1)}{.10}\right]$$

$$FVA = 5000 \times \frac{0.6105}{0.10}$$

$$FVA = 5000 \times 6.105$$

$$FVA = Rs.\ 30,525$$

In the formula $\frac{1+i)^n-1}{i}$ is called future value interest factor of an annuity. You can find out the FVIFA from the table, see the table for 10% for 5 years it is 6.105.

You can directly multiply 5000 by 6.105 and will get Rs. 30525 as future value of annuity.

Illustration 2: A person plans to contribute Rs. 2,000 every year to a retirement account which is paying 8% interest. If the person retires in 30 years, what is the future value of this amount?

$FVA = A\ [(1+i)^n - 1/i]$

$FVIFA = (1 + .08)^{30} - 1/.08$

$= 10.063 - 1/.08$

$= 113.28$

You can also directly find out future value interest factor for an annuity (FVIFA) at 8% for 30 years from tlie future value annuity table, it is 113.28

Future value of annuity is = 2,000 x 113.28 = Rs. 2,26560

Finding the interest rate (i)

Illustration 3 : Suppose you receive a lumpsum of Rs. 94,000 at the end of 8 years after paying annuity Rs. 8,000 for 8 years. What is the implicit rate (i) in this ?

First of all find $FVIFA_{in}$

$$96{,}000 = 8{,}000\ FVIFAi_8$$

$$FVIFAi_8 = \frac{96{,}000}{8{,}000} = 12$$

Look at tlie future value annuity table and see the row corresponding to 8 years until we find value close to 12, it is 12.300 and is below the column of 12%. Hence interest rate is below 12 per cent.

Finding the Annual Annuity

Now, take an example where the total **annuity future value** (received or paid), **rate of interest** and tlie **period is known.** You are required to find tlie amount of **annual annuity.** How much you should deposit in a bank annually so that you get Rs. 1,50,000 at the end of 10 years at 10% rate of interest?

$$\text{Annual Annuity} = 1{,}50{,}000 \times \frac{1}{FVIFA_{10,10}}$$

$$= \text{Rs. } 1{,}50{,}000 \times \frac{1}{15.937}$$

$$= \text{Rs. } 9{,}412.05$$

So you should deposit Rs. 9,412.05 in a bank every year for 10 years in order to get Rs. 1,50,000 at the end of 10 years.

Note: The $FVIFA_{in}$ is called sinking fund factor, when used as a denominator.

Illustration 4: How much a person should save annually to accumulate Rs. 1,00,000 for his daughter's marriage by tlie end of 10 years, at the interest rate of 8%.

$$\text{Annual Annuity} = 1{,}00{,}000 \times \frac{1}{FVIFA_{in}}$$

$$\text{Annual Annuity} = 1{,}00{,}000 \times \frac{1}{4.487}$$

$$= 1{,}00{,}000 \times .073$$

$$= \text{Rs. } 6{,}903$$

A person should save Rs. 6,903 annually for 10 years to get Rs. 1,00,000.

Future Value of Annuity Due

An annuity for which the cash flows occur at the beginning of each period is called, annuity due. Lease and installment are tlie example of annuity due.

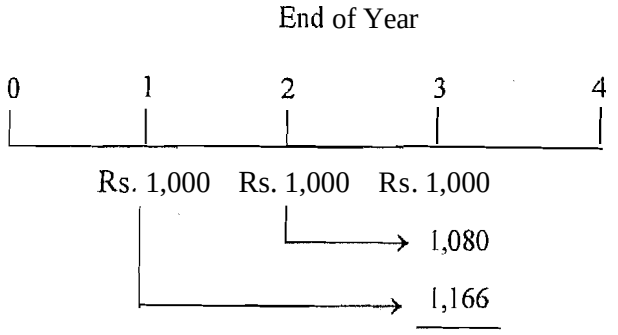
To compute annuity due. tlie methods used in calculating ordinary annuity with some changes will be applied.

Let us start with the calculation for tlie future value of a Rs. 1,000 ordinary annuity for 3 years at 8 percent and compare it with that of the future value of a Rs. 1,000 annuity due for 3 years at 8 per cent. Note that the casli flows for the ordinary annuity occur at the end of periods 1, 2, and 3, while those for the annuity due occur at the beginning of periods 2, 3 and 4. Therefore, the difference between tlie future value of an ordinary annuity and annuity due is the point at which the future value (FV) is calculated. For an ordinary annuity. FV is calculated as of the last cash flow. while for an annuity due, FV is calculated as of one period after tlie last cash flow.

Tie future value of the 3 year annuity due is simply equal to the Future value of a 3 year ordinary annuity compounded for one more period. The future value of an annuity due is determined as

$FVAD_n$ = ordinary annuity future value x (1+i)

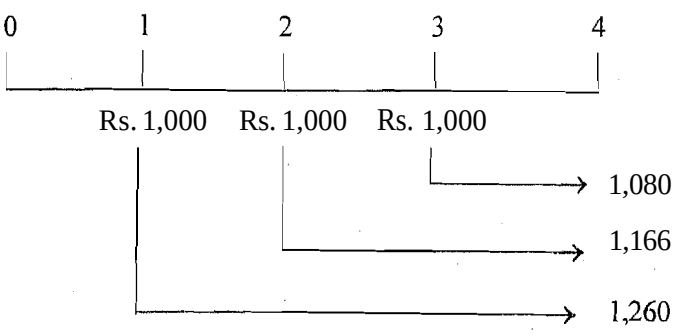
Ordinary annuity



(Rs. 1,000) ($FVIF_{8\%, 3}$) = (Rs. 1,000) (3.246) = Rs. 3,246

Future value of an ordinary annuity at 8% for 3 years, is Rs. 3246

Annuity due



(Rs. 1,000) ($FVIFA_{8\%\ 3}$) (Rs. 1.08) = (Rs. 3,246) (1.08) = Rs. 3,506

Future value of an annuity due of 8% for **3** years (FVAD,). = Rs. 3,506

Check Your Progress A

1) What do you mean by future value?

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2) What is compounding?

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3) What is the difference between regular annuity and annuity due?

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4) You have deposited Rs. 10,000 in a fixed deposit in a bank at 6% rate of interest. How much will you get after 5 years?

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5) How much Rakesh will get after 12 years if lie deposits Rs.2,500 today in a fixed disposit at 1O%?

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2.4 PRESENT VALUE OF A SINGLE CASH FLOW

You have seen that tlie future value of Re. 1 for one year at 10% is Rs. 1.10. Now, we put a question in a different way. How much you have to invest today at 10% to get Re. 1 in one year? You know tlie future value here is Re. 1, but what is tlie present value of Re. 1? You need Re. 1 at the end of the year, the present value will be:

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

$$PV = \frac{1}{(1+.1)^1} = \frac{1}{(1.1)}$$

$$= \text{Re } .909$$

Present value of Re 1 is Re. 909. Let us see the discount factor here

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

$$= FV, \frac{}{(1+i)^n}$$

In this equation $\frac{1}{(1+i)^n}$ is the present value interest factor or discount factor

Suppose you want to earn Rs. 1500 in three years at 7% rate of interest. How much should you invest today to get Rs. 1,500 in three years?

$$PV = 1500 \frac{1}{(1.07)^3}$$

$$= 1500 \times .8163 = \text{Rs. } 1224$$

Present value is just the opposite of future value. In future value we do compounding of money. In present value concept we discount back to the present. Tlie process of reducing future income payments to their present value is called **discounting.** The value today of the sum received in the future is called its present value. If you want to know PV of Rs. 500 in one year at 8%, then:

PV x 1.08 = Rs. 500

$$PV = 500' \times \frac{1}{1.08} = \text{Rs. } 462.5$$

You need not do much calculations. Present Value Tables help you in finding out present value of cash flow. These tables are given at the end of this block. Just multiply the present value interest factor by the amount. So, Rs.500 x 0.925 = Rs. 462.5. (See P.V. factor at 8% for one year in present value table, it is 0.925).

2.5 PRESENT VALUE OF SERIES OF CASH FLOWS

Tlie series of cash flows may be

a) Even series of cash flows i.e., annuity

b) Uneven series of cash flows

As you know in tlie equation the $1/(1+i)^n$ is called discount factor or present value factor and tlie rate used is called discount rate. Tlie technique of calculating the present value of a future cash flow is called 'Discounted Cash Flow (DCF)' valuation.

2.5.1 Present Value of an Annuity

You want to have Rs. 800 at tlie end of each of three years. If the discount rate is 10%. What tlie present value of Rs.2,400?

There are two methods to find out present value.

Under first method the present value of an annuity is tlie sum of the present values of all the inflows of this annuity. It can be expressed as follows:

$$\text{Rs. } 800\left(\frac{1}{1.10}\right)^1 + 800\left(\frac{1}{1.10}\right)^2 + 800\left(\frac{1}{1.10}\right)^3$$

= Rs. 800 x 0.9091 + Rs. 800 x 0.8264 + Rs. 800 x 0.7513

= Rs. 727.28 + 661.12 + 601.04 = Rs. 1989.44

Tlie above can be arrived by tlie formula

$$\text{or PVA} = \frac{A}{(1+i)} + \frac{A}{(1+i)^2} + \frac{A}{(1+i)^3} + \cdots\cdots + \frac{A}{(1+;)^{n-1}} + \frac{A}{(1+i)^n}$$

$$\text{PVA} = A\,\frac{(1+i)^n - 1}{i(1+i)^n}$$

$\left[\frac{(1+i)^n-1}{i(1+i)^n}\right]$ is present value interest factor for annuity ($PVIFA_{in}$)

A = annuity amount

I = discount rate

n = number of years

PVA = present value of annuity

Alternate Method

Instead of calculating present value for each year we can multiply annuity amount by annuity present value interest factor. See annuity P.V. interest factor table, it is 2.48685 at 10% for 3 years. So Rs. 800 x 2.48685 = Rs. 1989.44 is the present value of an annuity.

Note: If present value annuity table is not available the PVIFA can be calculated as follows:-

$$\text{Present value interest factor} = \frac{1}{(1.1)^3} - \frac{1}{1.331}$$

$$= .75131$$

$$\text{Present value interest factor for annuity} = \frac{1 - \text{P.V. factor}}{I}$$

$$= \frac{(1 - .75131)}{.10}$$

$$= \frac{.248685}{.10} = 2.48685$$

2.5.2 Present Value of Uneven Cash Flaws

You may often get uneven cash flow streams. The example is dividend on equity shares.

Illustration 5: Aman makes an investment in a mutual fund which promises following cash flows for five years. The discount rate is 10%. Find the present value.

Year	Cash flow (Rs.)
1	1,000
2	2,000
3	2,000
4	3,000
5	3,000

First, see present value table to find present value factor.

Year	**Cash** flows **(Rs.)**	**P.V. factor**	P.V. **of each cash flow (Rs.)**
1	1,000	0.9091	909.1
2	2,000	0.8264	1,652.8
3	2,000	0.7513	1,502.6
4	3,000	0.6830	2,049.0
5	3,000	0.6209	1,862.7
		Total P.V.	Rs. 7,976.2

Perpetuities: When the cash flow is for an indefinite period, it is called a perpetuity or CONSOLS. It is a special type of annuity. Its present value can be found by dividing cash flow by discount rate (Cash flow/ Discount rate). For example, if you get an offer of a perpetual cash flow of Rs 1000 every year and return required is 16%. The value of the perpetuity will be:

$$\frac{1000}{0.16} = \text{Rs. } 6250$$

It means if Rs, 6250 is invested at 16% rate of interest, it would provide a yearly income of Rs. 1,000 every year.

Present value of an annuity due

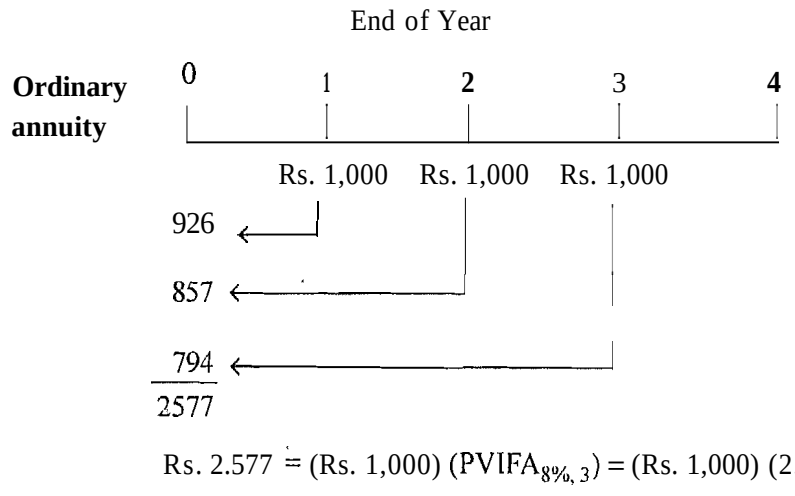
Let us see how the present value of an annuity due can be calculated. We will calculate both the present value of a Rs. 1,000 ordinary annuity at 8 per cent for 3 years (PVA_3), as well as the present value of Rs. 1,000 annity due at 8 per cent for 3 years (PVAD).

The present value of a 3 year annuity due is equal to the present value of a 2 year ordinary annuity plus one non-discounted periodic receipt or payment. In other words first calculate the present value of annuity for 2 year and add back the amount of annuity to that amount. It can be calculated as given below:

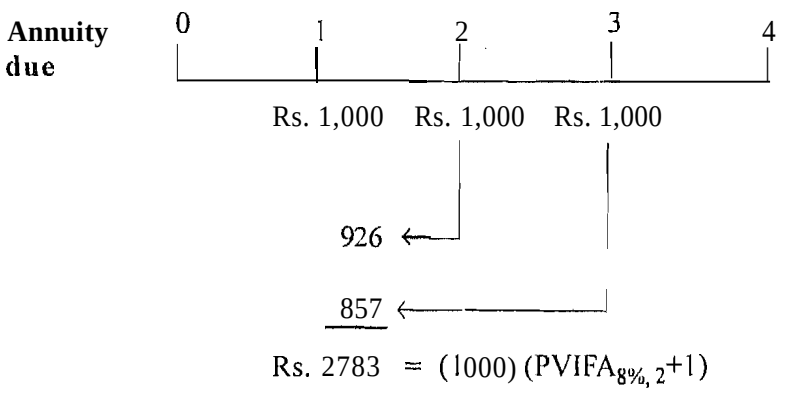
$PVADn = A\ (PVIFAi_{n-1} + 1)$

You could see the present value of an annuity due as the present value of an ordinary annuity that had been brought back one period too far. That is, you want the present value one period later than the ordinary annuity value and then compound it one period forward. The formula for camputing PVADn is:

$PVAD_{,,}$ = Ordinary annuity present value $\times (1+i)$



Rs. 2.577 = (Rs. 1,000) ($PVIFA_{8\%, 3}$) = (Rs. 1,000) (2.577)



Rs. 2783 = (1000) ($PVIFA_{8\%, 2}+1$)

(1.08) (Rs. 1,000) ($PVIFA_{8\%, 3}$) = Rs. (2783) = (Rs. 1,000) ($PVIFA_{8\%, 2+1}$)

(1.08) (Rs. 1,000) (2.577) = Rs. 2,783 = (Rs. 1.000) (2.783)

You notice here that above formula is used for calculating future and prsent value of annuity due.

So two steps are involved here.

i) Calculate the future/present value of annuity and .

ii) Multiply your figure by (1+i)

Finding Discount Rate, Annual Payments

Discount Rate

For a single period you can find tlie rate by using PV equation. Suppose you invest Rs. 1,200 and after one year you get Rs. 1,320. Using PV equation you get:

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

$$\text{Rs. } 1200 = \frac{1320}{(1+i)^1}$$

$$1+i = \frac{1320}{1200} = 1.10$$

$$i = 10\%$$

Suppose you want Rs. 1,200 to double in 8 years. At what rate should you invest?

$$(1+i)^8 = \frac{\text{Rs. } 2,400}{\text{Rs. } 1,200} = 2$$

To find the rate use future value table. The future value factor after 8 years is equal to 2. If you look the line corresponding to 8 periods in the Table, the future value factor 1.99256 (round of 2) corresponds to 9% . Therefore tlie interest rate is 9%.

Note:-A rule called 'Rule 72' can be used where the amount is to be doubled. The rule is divide 72 by interest rate. If interest rate is 9% tlie doubling period will be $\frac{72}{9} = 8$ years.

This rule can be used in the 5% to 20% range. For example for interest rate of 6% the doubling period is about $72 \div 6 = 12$ years. Another rule of thumb to calculate accurate doubling period is called Rule of 69. Formula is 0.35 + 69/interest rate. Take interest rate 9% and 12% from the example the doubling period will be 0.35 + 6919 = 8.01 years and 0.35 +69112 + = 6.1 years respeclively.

In case of an annuity, the rate can be known with the help of "Present value of an annuity" Table. Suppose a mutual fund offers pay you to Rs. 30,000 for 8 years, if you pay now Rs. 1,50,000. It means PV = 1,50,000, cash flow Rs. 30,000 and period is 8 years. In the table find tlie Factor 5 (1,50,000/30,000) in line of 8 years. It is about 12%.

In case of uneven series, tlie table can't be used. The rate is found by 'Trial and Error' method. Consider the following example :

Year	**Cash flows**	PV
1.	Rs. 10,000	Rs. 50,000
2.	Rs. 20,000	
3.	Rs. 40,000	

Steps

1) Assume two different rates
2) Find the present values at these two assumed rates
3) Compare these present values with PV as given and make approximation.
   a) Let us assume 20% and 15%.
   b) The PV at 20% = Rs. 45,330 and at 15% = Rs. 50,140. Since PV given is Rs. 50,000 so approximately rate is 15%.

The **annual** payment

Suppose you need a loan of Rs. 50,000 at the interest rate of 15%, and you want to repay your loan in six annual installment. What will be the annual payment?

$$\text{Present value of Annuity} = \text{Annual Annuity} \times \frac{1 - (\text{present value factor})}{i}$$

$$50{,}000 = \text{Annual Annuity} \times \frac{1 - \left(\frac{1}{(1.15)^6}\right)}{.15}$$

$$50{,}000 = \text{Annual Annuity} \times \frac{1 - .432}{.15}$$

$$50{,}000 = A \times 3.786$$

$$\text{Annual Annuity} = 50{,}000 / 3.786$$

Annual Annuity = Rs. 13206

You will have to pay Rs. 13,206 each for 6 years.

Check Your Progress B

1) Tick the correct Statement.

   a) Discount factor is rate of discount to calculate future value.

   b) Coinpounding is the process of calculating interest on principal.

   c) Dividend on preference shares is a perpetuity.

   d) Annuity is the same amount received every year.

   e) Rule of "72" can be applied every where.

2) What is the present value of a perpetuity?

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2.6 LET US SUM UP

The concept of time value of money refers to the fact that money say Re. 1 received today is different in its worth from Re. 1 received at any time in future. In other words money received in future is less valueable than the money received today. The time value of money helps in converting the different rupee amounts arising at different points of time into equivalent values of a particular point of time. These equivalent values can be expressed as future values or as present values, By compounding technique the present value can be converted into a future value and by discounting method future value can be converted to present value. For this we make use of rate of interest or discount factor. Both can be calculated for a single amount and an annuity.

2.7 KEYWORDS

Annuity : It is a series of equal future cash flows periodically.

Annuity due : An annuity for which the cash flows occur at the beginning of the period.

Compounding : The process of reinvesting principal and interest to earn interest for another period

Compound Interest : Interest earned on both the principal and the interest reinvested from prior periods.

Discount Factor or Rate : The rate of interest or cut off rate used to find the present value of future amount.

Future Value : The amount an investment is worth after a period.

Perpetuity : The cash flows of an annuity is for an indefinite period. It is also called CONSOLS.

Present Value : The current value of future cash flows discounted at the discount rate.

Simple Interest : The interest earned on original principal amount.

2.8 ANSWERS TO CHECK YOUR PROGRESS

A 4) Rs.13382; 5) Rs.7,846

B 1) (a) False (b) False (c) True (d) True (e) False

2.9 TERMINAL QUESTIONS / EXERCISES

1) Explain "Time Value of Money". What is the role of interest rate in it ?

2) A person deposits Rs. 1000 today, Rs. 2000 in two years and Rs. 5000 in five years. He withdraws Rs. 1500 in three year and Rs. 1000 in seven years. I-low must he will have after 8 years if interest relate is 7%? What is the present value of these cash flows'?

3) If a deposit of Rs. 3000 is made today and the interest rcccived is 10% yearly, how much the deposit will grow after 7 years and 11 years'?

4) You want to accumulate Ks. 20,000 by the end of 10 years. The discount rate is 12%. How much should you have annually?

5) Find the presentvalue of following cash follows, assuming 5% intcrcst rate.

Year	**cash flows**
1	Rs. 1000
2	Rs. 2000
3	Rs. 3000
4	Rs 4000
5	Rs. 5000

UNIT 3 VALUATION OF SECURITIES

Structure

3.0 OBJECTIVES

After studying this unit, you should be able to:

- explain the basic valuation model;
- examine the valuation methods of bonds; and
- describe the valuation process of preference shares and equity shares.

3.1 INTRODUCTION

If an investor wants to invest in securities, what will lie do? He will buy only those securities that may provide him maximum return. His decision to buy or sell a security is influenced by his own value and price of that security. Thus, an investor would generally follow two steps to make an investment decision. First, he will examine the risk-return of the security for the future holding period. This is known as security analysis. Second, he will compare the risk-return of different securities with each other. This is called 'Port folio analysis'.

The basic valuation process of securities consider three factors of cost, benefits and uncertainty. The performance of a firm is limited to the performance of the industry to which it belongs, which in turn depends upon the performance of the economy and the market in general. The performance of a firm can be judged from the price movement of its securities in the market. Tlie value determines price and both variables change randomly. In this unit we will examine the basic valuation model and valuation of bonds, preference shares and equity shares.

3.2 THE BASIC VALAUTION MODEL

An asset whether financial or real derives its value From the cash flows associated with it. The cash flows must be evaluated on a present value basis. Tlie value of an

UNIT 3 RATIO ANALYSIS

Structure **Page Nos.**

3.0 INTRODUCTION

The stakeholders of a firm viz., shareholders, creditors, suppliers, managers, employees, tax authorities, government and others are interested broadly in knowing what the firm is doing and whether the firm is financially sound or otherwise. The information requirement of each of these stakeholders may be different. Trade creditors and short term lenders are interested knowing the ability of the firm to meet short term liabilities, whereas term lending institution and banks are interested in the long term survival of the firm. Similarly, others stakeholders may have other information requirements.

Before introducing you to the concept of financial analysis let us recaptulate on the various types of financial statements, as all the variables used in ratio analysis are taken from these statements.

1. **Profit & Loss A/C (P&L A/C)**: The income statement or trading and profit and loss account shows the various variables regarding expenses and revenue and the aggregate difference between these two as either net profit or net loss.

2. **Balance Sheet**: Balance sheet is a statement which shows the financial position of a firm on a particular date, it summarises the assets owned by the business and the claim of the owners and creditors against these assets in the form of liabilities as on the date of the statement.

3. **Profit & Loss Appropriation A/C**: This statement which is also known as profit and loss appropriation account is a link between P&L A/C and Balance sheet. The net profit shown in the P&L A/C is transferred to the balance sheet after appropriation though this statement. Retained earnings are the accumulated excess of earnings over losses and dividends.

4. **Fund Flow Statement**: This statement shows the sources of funds from which additional funds were derived and the use (application) of these funds.

5. **Cash Flow Statement:** This statement depicts the change in cash position from one period to another.

Financial statements are the means of providing general information regarding operational results and the financial position of a business firm. These statements do not reveal significant information such as efficiency of management strength and weakness of the firm, potential of further progress etc. In order to extract meaningful

information these statements need to be analysed and interpreted for specific purposes. Analysis of financial statements is the systematic numerical calculation of the relationship between one fact with the other to measure the profitability, operational efficiency and the growth potential of the business. The main objectives of financial statement analysis and interpretation are as follows:

- Measuring financial soundness
- Judging solvency
- Measuring profitability
- Judging operational efficiency
- Indicating trends
- Assessing growth potential
- Inter firm and intra firm comparison.

A ratio is an arithmetical relation between two figures or variables. Financial ratio analysis is a study of ratios between various items or group of items in financial statements. Financial ratio analysis is an analytical tool for measuring the performance of an organisation. Ratio analysis is primarily used to analyse past performance and based on this make future projections.

Users of Financial Ratios

Financial ratio analysis is the process of establishing relationship between the variables of the balance sheet and profit and loss account, in order to find out the strength and weakness of the firm. Ratio analysis is undertaken by the various stock holders in the firm viz. trade creditors, suppliers of long-term debt, investors and the management itself. Trade Creditors are interested in the firm's ability to meet claims in the short run. Their analysis will therefore, be confined to the firm's liquidity position in the short run.

Suppliers of long-term debt, on the other hand are more concerned with long-term solvency and survival. They analyse the firm's profitability over time, its ability to generate cash, its ability to repay interest and the principle amount. They also analyse the capital structure. Long-term suppliers of credit do analyse the historical financial statements but their main focus is on projected or proforma financial statement to analyse its future solvency and profitability. Investors are interested in the firm's earnings and how these earnings are used. They concentrate on the firm's present and future profitability. They are also interested in the firm's financial structure to the extent that it influences the firm's earnings ability and risk.

The management of the firm would be interested in every aspect of the financial ratio analysis as, this helps them assess how efficiently and effectively the firm's resources are being used.

Nature of Ratio Analysis

Ratios are used as a bench mark for evaluating the financial position and performance of a firm. Accounting figures presented in the financial statements would convey some meaning only if they are seen in relation to the other variables. Ratios help to other summarise large quantities of financial information (data). Through ratio analysis one can make a qualitative judgment. The ratios basically reflect a quantitative relationship among different variables.

Standards of Comparison

A ratio in itself would not provide any useful information, until and unless the ratios are compared with some standard. Standards of comparison may consist of:
Past ratios, i.e., ratios calculated from the past financial statements of the same firm. Competitor's ratios, i.e., ratios of some selected firms preferably the firms having similar turnover. Another approach is to compare the firm's ratios with that of the market leader. Industry ratios, i.e., the average ratios of the industry to which the firm belongs Projected ratios, i.e., ratios calculated using the projected or proforma financial statements of the same firm.

3.1 OBJECTIVES

After going through this unit, you should be able to:

- provide a broad classification of ratios;
- learn how to extract useful information from financial statement through ratio analysis;
- recognise the diagnostic role of financial ratios;
- highlight the utility of financial ratios in credit analysis and competitive analysis, and
- identify ratios which are appropriate for the control of activities.

3.2 CATEGORIES OF RATIOS

The ratios are broadly classified under categories as follows

- Solvency ratios
- Liquidity ratios
- Activity ratios
- Profitability ratios
- Market test ratios

3.2.1 Long-term Solvency Ratios

These ratios are primarily calculated to predict the ability of the firm to meet all its liabilities including those not currently payable. A set of ratios will give us information on the ability of the firm to meet all its financial obligation in future. Before proceeding further let us make a distinction between long term and short tem financial liabilities. Long-term financial liabilities are those financial liabilities which are to be met in the subsequent financial years whereas short-term liabilities are to be met in the current financial year itself. The ratios which are used to measure solvency are as follows:

- Debt Equity Ratio
- Shareholders Equity Ratio
- Debt to Net Worth Ratio
- Capital Gearing Ratio
- Fixed Asset to Long-Term Funds Ratio
- Proprietary Ratio
- Dividend Cover
- Interest Cover
- Debt Service Coverage Ratio

a) **Debt Equity Ratio**: There are basically two sources of capital – equity and debt. Debts are raised when owners want to increase investment but are

unwilling to dilute the equity or the cost of debt is less than that of equity. There are many ways to calculate this ratio but the most commonly used method is,

$$\text{Debt equity ratio} = \frac{Long\ term\ debt}{Share\ holder\ funds}$$

In other method instead of long term debts all the debts are taken into consideration. This ratio indicates the relationships between loan funds and net worth of the company which is known as **gearing**. It also depicts the relative contribution of owners and creditors. A company with a high components of debt capital relative to it's equity is known as a highly geared company and *vice-versa.* There is no standard debt equity ratio and the same will vary from industry to industry. For capital-intensive industries and industries having a high gestation period this ratio will be high.

b) **Shareholder's Equity Ratio:** This ratio is calculated as follows:

$$\frac{Shareholder\ equity}{Total\ assets\ (tangible)}$$

The financial strength of a firm can be gauged by the proportion of equity capital in it's capital structure, higher the proportion of equity, stronger is the firm's financial strength. This ratio depicts the relationship between the shareholders equity and the total assets. This ratio also indicates the degree to which unsecured creditors are protected against loss in the event of liquidation. Shareholders equity includes equity and preference capital plus reserves and surplus. An increase in this ratio implies that the dependence of the firm on outside sources of funds is decreasing.

c) **Debt to Net Worth Ratio**: This ratio is calculated as follows:

$$\frac{Long\ term\ debt}{Net\ worth}$$

This ratio computes long term debts of the firm to that of net worth. Net worth is calculated as capital and free reserves less fictitious assets like carry forward losses and deferred expenditure. This ratio is a refinement of the debt equity ratio and gives a factual idea of the adequacy of assets to meet long-term liabilities.

d) **Capital Gearing Ratio:** It is calculated as follows:

$$\frac{Fixed\ interest\ bearing\ funds}{Equity\ shareholder\ funds}$$

This ratio indicates the degree to which the firm is trading on equity which in turn indicates the volatility of earnings available to shareholders. The fixed interest bearing funds includes debentures, long-term loans and preference share capital. Equity shareholders funds include equity share capital, and reserves and surplus.

e) **Fixed Assets to Long-term Funds Ratio:** It is calculated as follows:

$$\frac{\textit{Fixed assets}}{\textit{Long term funds}}$$

This ratio indicates the proportion of long term funds (Share capital reserves and surplus and long term loans) deployed in fixed assets (gross fixed assets minus depreciation). A high ratio indicates the safety of funds in case of liquidation. This ratio also indicates the proportion of long-term funds invested in working capital.

f) **Proprietary Ratio:** It is calculated as follows:

$$\frac{\textit{Net worth}}{\textit{Total assets}}$$

Reserves which are created and earmarked for specific purposes should not be included in the calculation of net worth. A high ratio is an indication of a strong financial position.

g) **Interest Cover:** It is calculated as follows:

$$\frac{\textit{Profit before interest depreciation and tax}}{\textit{Interest}}$$

The interest coverage ratio reflects the number of times interest charges are covered by the funds that are available for payment of interest. Generally a ratio of 2:1 is considered as adequate.

h) **Dividend Cover:** It is calculated as follows:

$$\frac{\textit{Net profit after tax}}{\textit{Dividend}}$$

This ratio indicates the number of times the dividends are covered by net profit. This ratio also highlights the retained earnings.

i) **Debt Service Coverage Ratio:** It is calculated as follows:

$$\frac{\textit{Profit before interest and taxes}}{\textit{Interest + perodic loan instalment}}$$

This ratio reflects the ability of the firm to service its obligations on account of interest payment and loan repayments. A high ratio is an indicator of the fact that the firm is less likely to default on payments.

☞ Check Your Progress 1

1) From the following statement calculate: (1) Current Ratio, (ii) Liquidity Ratio, (iii) Debt-Equity Ratio, (iv) Proprietary Ratio and (v) Solvency Ratio.

Condensed Balance Sheet

Liabilities	Rs.	Assets	Rs.
Paid up Capital	1,00,000	Fixed Assets less Dep.	2,19,810
Reserves and Surplus	84,500	Stock	49,460
Debentures	1,00,000	Trade Debtors	11,710
Bills Payable	6,500	Cash at Bank	26,020
	3,07,000		3,0,000

2) Balance Sheet of S.K. Ltd. is given below:

	Rs.		Rs.
Equity Capital	50,000	Fixed Assets	1,40,000
12% Pref. Capital	30,000	Stock	20,000
15% Debentures	70,000	Debtors	16,000
Capital Reserve	5,000	Bank	14,000
P and L Account	10,000		
Creditors	12,000		
Bank Overdreaft	8,000		
Proposed Dividend	5,000		
	1,90,000		1,90,000

Calculate the Capital Gearing Ratio, Liquidity Ratio and Fixed Assets Ratio.

3) From the following information, calculate Interest Coverage Ratio, and Debt to Cash Flow Coverage Ratio:

Net Income After Tax	Rs. 15,630
Depreciation Charges	Rs. 20,000
Tax Rate	50% of net income
5% Mortage Bonds	Rs. 2,50,000
Fixed Interest Charges	Rs. 14,750
Sinking Fund Appropriations	5% of Outstanding Bonds

3.2.2 Liquidity Ratios (Short-term Solvency Ratios)

a) **Current Ratio:** It is calculated as follows:

$$\frac{Current\ assets\ loans\ and\ advances}{Current\ liabilities\ and\ provisions}$$

This ratio measures the solvency of the company in the short run (1 year). Current assets are those assets which can be converted into cash within one accounting period (usually 1 year) and current liabilities are those liabilities which are payable within a year. A current ratio of 1:33:1 is the minimum ratio required by banks to finance working capital needs. A very high current ratio implies that the firm has blocked the funds either in inventories, debtors or idle cash.

b) **Quick Ratio or Liquid Ratio:** It is calculated as follows:

$$\frac{Current\ assets, loans\ \&\ advaces - Inventories}{Current\ liabilities\ \&\ Provisions - Bank\ Overdraft}$$

This ratio is a modification of the current ratio. In this ratio inventories are subtracted from current assets and the bank overdraft is subtracted from, current liabilities. The reason for doing so is, that the bank overdraft is secured by inventories. This ratio depicts the ability of the firm to service current liabilities other than the bank overdraft.

c) **Absolute Liquid Ratio (Super Quick Ratio):** It is calculated as follows:

$$\frac{Absolute\ liquid\ Assets}{Current\ liabilities}$$

It is a ratio of absolute liquid assets to quick liabilities. However, for calculation purpose current liabilities are taken into consideration. Absolute liquid assets

are cash, bank balances and marketable securities. An ideal absolute liquid ratio is taken as 1:2 or .5.

d) **Bank Finance to Working Capital Gap Ratio:** It is calculated as follows:

$$\frac{Short\ term\ bank\ borrowings}{Working\ Capital\ gap}$$

This ratio shows the dependence on bank finance for working capital. Working capital gap is equal to current assets minus current liabilities other than bank borrowings.

e) **Interval Measures:** A dynamic measure of liquidity, the interval measure is defined as:

$$\frac{Quick\ assets}{Average\ daily\ expenses\ on\ operations}$$

Interval measure shows the time interval for which the liquid assets of the firm will suffice to meet its operating expenditure.

☞ Check Your Progress 2

1) Following is the Balance Sheet of Idiot Limited as on 31st March, 2004.

Liabilities	Rs.	Assets	Rs.
Equity Share Capital	72,000	Plant and Machinery	1,35,000
Profit and Loss A/c.	18,000	Stock	36,000
Debentures	45,000	Sundry Debtors	27,000
Sundry Creditors	70,200	Cash at Bank	6,840
Provision for Taxation	1,800	Prepaid Expenses	2,160
	2,07,000		2,07,000

Calculate the following ratios:

1) Current Ratio,
2) Liquidity Ratio.

What conclusions do you draw about the company on the basis of these ratios?

3.2.3 Activity or Turnover Ratios

a) **Inventory:** For manufacturing and trading firms a considerable amount of funds may be tied up in financing of raw material, work in progress and finished goods. A good inventory management practice is to keep inventory level consistent with the need to fulfil customer's order in time.

$$\text{Inventory turnover ratio} = \frac{Cost\ of\ goods\ sold}{Average\ inventory} \text{ or}$$

$$= \frac{Sales}{Average\ Inventory}$$

Average inventory = $\frac{Opening\,Stock + Closing\,Stock}{2}$

Higher the inventory turnover ratio or lower the stock turnover period the better it is.

b) **Debtors:** The three main debtors ratio are as follows:

(i) Debtor turnover ratio: It is calculated as follows:

$$\frac{Credit\,Sales}{Average\,Debtors}$$

This ratio measures the efficiency of a firm in converting debtors into cash, higher ratios indicate better efficiency:

(ii) Average Collection period: It is calculated as follows:

$$\frac{Average\,debtors}{Credit\,sales} \times 365$$

This ratio measures the time it takes to collect the amount from debtors.

(iii) Bad debts: It is calculated as follows:

$$\frac{Bad\,debts}{Sales}$$

This ratio reflects the efficiency of credit control procedures.

c) **Creditors**

(i) Creditors payment period: It is calculated as follows:

$$\frac{Average\,creditors}{Purchase} \times 365$$

This ratio measures the average time taken to pay for goods and services purchased by the company. In general, longer the period better it is, because the operation of the firms are financed interest free by suppliers. An unduly long period would indicate liquidity problem on one hand and may also impact the credit rating of the firm.

(ii) Creditors turnover ratio: It is calculated as follows:

$$\frac{Credit\,purchase}{Average\,creditors}$$

d) **Assets Turnover Ratio:** These ratios measure the firms ability to generate sales revenue in relation to the size of the asset investment.

(i) Fixed assets turnover ratio:

$$\frac{Sales}{Fixed\,assets}$$

This ratio measures sales per rupee of investment. This ratio measures the efficiency with which fixed assets are being employed. When the fixed assets of the firm are old and substantially depreciated the fixed asset turnover ratio tends to the high.

(ii) Total assets turnover ratio: It is calculated as follows:

$$\frac{Sales}{Total\ assets}$$

This ratio measures how efficiently assets are employed overall.

(iii) Working capital turnover ratio: It is calculated as follows:

$$\frac{Sales}{Capital\ Employed}$$

This ratio indicates the extent of working capital turned over in achieving sales:

(iv) Sales to capital employed Ratio: It is calculated as follows:

$$\frac{Sales}{Capital\ employed}$$

This ratio indicates efficiency in utilisation of capital employed in generating revenue.

☞ Check Your Progress 3

1) Compute the stock turnover ratio with the help of following figures relating to Meenakshi Limited:

Trading Account
For the year ending 31 st March, 2004

	Rs.		Rs.
To Opening Stock	15,920	By Sales	78,000
To Purchases	39,000	By Closing Stock	14,400
To Carriage Inwards	1,000		
To Gross Profit	36,480		
	92,400		92,400

2) Raj & Co. sells goods on cash as well as on credit. The following particulars are extracted from the books of accounts for the year 2004:

	Rs.
Total Gross Sales	1,50,000
Sales Returns	30,000
Total Debtors for Sales as on 31.12.04	10,500
Bills Receivable as on 31.12.04	13,500
Provision for Doubtful Debts as on 31.12.04	3,000
Total Creditors on 31.12.04	1,000

Calculate the Average Collection period.

3) Tyagi and Sons Limited purchases goods on cash and credit terms. From the following particulars obtained from the books, calculate the creditors turnover and average payable period.

Rs.

Total Purchases	8,40,000
Cash Purchases	70,000
Purchases Returns	40,000
Creditors at the end of the year	1,20,000
Bills Payable at the end of the year	20,000
Provision for Discount on Creditors	7,500

4) The following is the Balance sheet of Sanchit Company Ltd. as on 31st 2004:

Liabilities	Rs.	Assets	Rs.
Share Capital	80,000	Fixed Assets	1,60,000
General Reserve	30,000	Debtors	60,000
Profit and Loss A/c	50,000	Bills Receivable	20,000
Mortgage Loan @ 10%	80,000	Cash at Bank	50,000
Creditors	40,000	Preliminary Expenses	10,000
Bills Payable	20,000		
Total	3,00,000		3,00,000

Other information:
Sales during the year 2003-04 amounted to Rs. 1,60,000.

Calculate:

(i) Capital Turnover Ratio
(ii) Fixed Assets Turnover Ratio
(iii) Working Capital Turnover Ratio
(iv) Current Assets Turnover Ratio
(v) Total Assets Turnover Ratio.

3.2.4 Profitability Ratios

The purpose of calculating these ratios is to assess the adequacy of the profits earned by the company and also to estimate the trend of profitability over a period of time. Profitability of a company is the net result of numerous policies and decision. These ratios show the combined effect of capital budgeting, liquidity management, asset management on operating results. Profitability, ratios are measured with reference to sales, capital employed, total assets, shareholders funds etc. The major profitability ratios are as follows:

a) Return on Capital Employed (ROCE) or Return on Investment (ROI)
b) Earning Per Share (EPS)
c) Cash Earning Per Share (cash EPS)
d) Gross Profit Margin
e) Net profit Margin
f) Cash Profit Ratio
g) Return on Assets
h) Return on Net Worth (or Return on Shareholders Equity)
i) Operating Ratios.

a) **Return on Investment:** The aim of any business enterprise is to earn a return on capital employed. ROI is determined by dividing the net profit or income by the capital employed or investment made to achieve the profit.

$$\text{ROI} = \frac{\textit{Net Profit}}{\textit{Capital Employed}} \times 100$$

ROI consists of two components (i) Profit Margins (ii) Investment Turnover.

$$ROI = \frac{Net\ profit}{Sales} \times \frac{Sales}{Investment\ in\ assets}$$

(Profit Margin) (Investment Turnover)

ROI can be improved by increasing the profit margin and investment turnover or both. The capital employed is found out by adding the debt and equity components of the balance sheet viz., Share Capital (paid up), Reserves and Surplus and Loans (secured and unsecured), from this total subtract if any, (i) Capital Work in Progress (ii) Investment Outside the Business Activities (iii) Preliminary Expenses (iv) Debit Balance of P&L A/C.

ROI is a measure regarding optimal utilisation of the assets of the company. This measures helps in selecting and disposing of assets as well as in selecting various investment proposals.

(b) **Earnings Per Share (EPS):** One of the objectives of the firm/company is wealth/value maximisation, of the stake of various stakeholders. The value is maximised when the market price of equity shares increases. The market price of equity shares is a function of the present and future earning potential of the firm. An appropriate and operationally feasible way to measure value maximisation is to measure Earning Per Share (EPS).The EPS is one of the important measures of economic performance of an economic entity. A higher EPS among the comparable firms means a better capital productivity.

$$EPS = \frac{Net\ profit\ after\ tax\ and\ preference\ dividend}{No.of\ equity\ shares}$$

1. EPS when debt and equity is used:

$$\frac{(EBIT - I)(I - T)}{N}$$

II. EPS when debt equity and preference shares are used:

$$\frac{(EBIT - I)(I - T) - D_p}{N}$$

Where EBIT = Earning before Interest and Taxes
I = Interest
T = Rate of Corporate Tax
Dp = Preference Dividend
N = Number of Equity Shares

c) **Cash Earning Per Share:** The cash earning per share is calculated by dividing the Net Profit + Depreciation by number of Equity Shares.

$$Cash\ EPS = \frac{Net\ Profit + Depreciation}{No.of\ Equity\ Shares}$$

d) **Gross Profit Margin:** The gross profit margin is calculated as follows:

$$= \frac{Sales - cost\ of\ goods\ sold}{sales} \times 100$$

or

$$= \frac{Gross\ profit}{Sales} \times 100$$

The gross profit measures, the excess of sales proceed over their cost before taking into consideration administration, selling, distribution and financing charges. This ratio measures, the efficiency of the company's operation. Under normal circumstances the gross profit margin should remain unchanged over a period of time irrespective of the level of production and sales, since it is based on the assumption that all cost deducted when computing gross profit are directly variable with sales. Variation in gross profit margin may be due to the following reasons:

1) price cuts
2) cost increases
3) change in product mix
4) under or over valuation of stocks.

e) **Net Profit Margin:** This profit is calculated as follows:

$$\frac{Net\ profit\ before\ interest\ and\ tax}{Sales} \times 100$$

This ratio reflects net profit margin on the total sales after deducting all expenses but before deducting the interest and corporate tax. The non-operating incomes and expenses are ignored in computation of net profit before tax, depreciation and interest. This ratio is used to compare performance with that of the previous year as well as with the competitors.

f) **Cash Profit Ratio:** This ratio is computed as follows:

$$\frac{\text{Cash profit}}{\text{Sales}} \times 100$$

where Cash profit= Net profit+Depreciation

This ratio measures the cash generated by the company as a result of the operations expressed in terms of sales. In situations where the profit fluctuates from year to year, due to changes in tax rates and depreciation rates and policies, this ratio is a reliable indicator of performance. This ratio is not affected by the method of depreciation used to charge depreciation.

g) **Return on Assets:** This ratio is calculated as follows:

$$\frac{Net\ profit\ after\ tax}{Total\ assets} \times 100$$

This ratio establishes the relationships of profits with the total assets of the organisation. This ratio indicates the efficiency of utilisation of assets in generating revenue.

h) **Return on Shareholders Funds or Return on Net Worth:**

$$\frac{Net\ profit\ after\ interest\ and\ tax}{Net\ worth} \times 100$$

Where Net Worth= Equity capital+reserves and surplus. This ratio expresses the net profit in terms of the equity shareholder funds.

i) **Operating Ratios**

The ratio of all operating expenses (i.e., materials used, labour, factory overheads, administration and selling expenses), to sales is the operating ratio over a period of time would reveal the behaviour of the particular cost. The operating ratios are classified as follows:

(a) **Material cost ratio** $= \frac{Materials\ consumed}{Sales} \times 100$

(b) **Labour cost ratio** $= \frac{Labour\ cost}{Sales} \times 100$

(c) **Factory overhead ratio** $= \frac{Factory\ expenses}{Sales} \times 100$

(d) **Administrative Expense Ratio** $= \frac{Administrative\ expenses}{Sales} \times 100$

(e) **Selling and distribution** $= \frac{\text{Selling and distribution experience}}{\text{Sales}} \times 100$

3.2.5 Market Test Ratios

The market test ratio relates the firm's stock price to its earning and book value per share. These ratios are indicators of the performance of the company and also reflects the likely performance of the company in the near future. If the firm's profitability, solvency and turnover ratios are good then the market test ratios will be high. The market test ratios are as follows:

a) Divided Payout Ratio
b) Dividend Yield
c) Book Value

a) **Dividend Payout Ratio:**

$$\frac{Dividend\ per\ share}{Earnings\ per\ shares}$$

Dividend payout ratio is the dividend per share divided by the earnings per share. Dividend payout ratio indicates the extent of the net profit distributed to the shareholders by way of dividend. A higher dividend payout ratio indicates that the company does not require further funds in the near future or it may also indicate that the cost of borrowing is less than the cost of equity. A low payout ratio is an indicator of the fact that company is in requirement of funds.

b) **Dividend Yield:**

$$\frac{Dividend\ per\ share}{Market\ price} \times 100$$

This ratio reflects the percentage yield earned by investors by investing in company's share at the current market price. This measures is specially useful for those investors who are interest in regular returns rather than capital appreciation.

c) **Book Value:**

$$\frac{\textit{Equity capital + Reserves – Profite Loss A/C debit balance}}{\textit{Total number of equity shares}}$$

This ratio indicates the net worth per equity share. Book Value is a function of the past earnings and distribution policy of the company.

☞ Check Your Progress 5

1) The capital of Sun Ltd. is as follows:

	Rs.
9% 30,000 Preference Shares of Rs. 10 each	3,00,000
80,000 Equity Shares of Rs. 10 each	8,00,000
	11,00,000

The following additional information has been obtained form the books of the company.

Profit after tax at 60% Rs. 2,0,000; Depreciation Rs. 60,000; Equity Dividend Paid 20% Market Price of Equity Share Rs. 40.

You are required to calculate (i) Dividend Yield on Equity Share; (ii) Earnings Per Share; (iii) Price Earning Ratio, and (iv) Dividend Pay-out Ratio.

3.3 UTILITY OF RATIO ANALYSIS

The ratio analysis is one of the most widely used tools of financial analysis. The various stakeholders in the firm would be interested in the information relating to operating and financial efficiency. They would also be interested in knowing the growth prospect of the firm. The various stake holders use ratio to determine those financial characteristics of the firm in which they are interested. With the help of ratios, one can determine:

- the ability of the firm to service its current obligations;
- the effect of borrowings on long term solvency;
- the efficiency with which the firm is utilising its assets in generating sales revenue; and
- the overall operating efficiency and performance of the firm.

Performance Analysis:

As stated above various stakeholders have different interests in the firm; short term creditors will be interested in the current financial position, while profitability long term creditors will be interested in the solvency of the firm. The equity holders are generally concerned with the returns. It is to be noted here that in every kind of financial analysis short-end long term financial position along with profitability are tested, but the emphasis would differ depending upon the interest of the stakeholder.

3.4 DIAGNOSTIC ROLE OF RATIOS

Profitability Analysis

1. How profitable is the company? What accounting policies and practices are followed by the company? Are they stable?
2. Is the profitability (RONA) of the company high/low average? What are the underlying reasons for current profitability? Is it due to:

    - Profit Margins
    - Asset Utilisation
    - Non Operating Income
    - Window Dressing
    - Changes in Accounting Policy
    - Inflationary Conditions?

3. Is the return on equity (ROE) high/low/average? Is it due to:

    - return on investment
    - financing mix
    - capitalisation of reserves?

4. What is the trend of profitability? Is it improving because of better utilisation of resources or curtailment of expenses of strategic importance?
5. Will the company be able to sustain high profitability or improve the profitability given the competitive and other environment utilisations.

Asset Utilisation

These types of ratios are basically used to gauge the effective utilisation of assets. Here assets include, both fixed as well as current assets. Through calculating these ratios we try to find out:

1. How effectively assets are being utilised to generate sales?
2. Are the level of debtors and inventories relative to sales reasonable in view of the firm's competitive and operating characteristics?
3. What are the trends in collection periods, inventory turnover and fixed assets turnover?
3. Is the improvement in the fixed assets turnover due to

    - depreciated book value of fixed assets?
    - disposal of some fixed assets.

Liquidity Analysis

As already discussed these ratios are used to predict short term and long-term solvency of the firm. In addition to this these ratios are also used to analyse the following:

1. What is the level of current assets and liabilities? Is it reasonable in the context of the firm's business?
2. What is the frequency and duration of payment to the creditors? If it is high or low what is the effect of it?
3. How efficiently and frequently does the company convert it's current assets into cash?
4. Given the company's riskiness and future financial needs, what is the pattern of financing :
   - What is the mix of debt and equity?
   - What is the maturity structure of debt and is the company faced with large debt repayment in the near future?
5. What are the lease commitments of the firms and the quantum of contingent liabilities?

3.5 APPLICATION OF FORMULAS

Example 3.1: The following is the Trading and Profit and Loss A/C and Balance Sheet of a firm:

Trading and Profit and Loss Account

Particular	Rs.	Particular	Rs.
To Opening Stock	10,000	By Sales	1,00,000
To Purchases	55,000	By Closing Stock	15,000
To Gross Profit c/d	50,000		
	1,15,000		1,15,000
		By Gross Profit b/d	50,000
To Administration Expenses	15,000		
To Interest	3,000		
To Selling Expenses	12,000		
To Net Profit	20,000		
	50,000		50,000

Balance Sheet

Liabilities	Rs.	Assets	Rs.
Capital	1,00,000	Land and Buildings	50,000
Profit and Loss A/C	20,000	Plant and Machinery	30,000
Creditors	25,000	Stock	15,000
Bills Payable	15,000	Debtors	15,000
		Bills Receivable	12,500
		Cash at Bank	17,500
		Furniture	20,000
	1,60,000		1,60,000

Calculate the following ratios: (1) Inventory turnover ratio (2) Current ratio (3) Gross profit ratio (4) Net Profit (5) Operating ratio (6) Liquidity ratio (7) Proprietary ratio

Solution:

1. **Inventory Turnover Ratio** = $\frac{Cost\ of\ Goods\ Sold}{Average\ Stock}$

Cost of Goods Sold =

Opening Stock	10,000
Purchase	55,000
	65,000
Less: Closing Stock	15,000
	50,000

$$\frac{Opening\ Stock + ClosingStock}{2}$$

$$\frac{10,000+15,000}{2}=12,500$$

$$\text{Inventory Turnover Ratio} = \frac{50,000}{12,500} = 4 \text{ times.}$$

2. **Current Ratio:**

$$\text{Current Ratio} = \frac{Current\ Assets}{Current\ Liabilities}$$

Current Assets	Rs.	Current Liabilities	Rs.
Stock	15,000	Creditors	25,000
Debtors	15,000	Bills Payable	15,000
B/R	12,500		
Cash in Bank	17,500		40,000
	60,000		

$$\text{Current Ratio} = \frac{60,000}{40,000} = 1.5:1$$

3. **Gross Profit Ratio:**

$$\text{Gross Profit Ratio} = \frac{Gross\ Profit}{Net\ Sales} \times 100 = \frac{50,000}{1,00,000} \times 100 = 50\%$$

4. **Net Profit Ratio:**

$$\text{Net Profit Ratio} = \frac{Net\ Profit}{Net\ Sales} \times 100 = \frac{20,000}{1,00,000} \times 100 = 20\%$$

5. **Operating Profit:** $\frac{Cost\ of\ Goods\ sold + Operating\ expenses}{Net\ Sales} \times 100$

Cost of Goods Sold = 50,000

Operating Expenses (Rs.)

Administration Expenses	15,000
Selling Expenses	12,000
	27,000

Operating Ratio $\frac{50,000 + 27,000}{1,00,000} \times 100 = 77\%$

6. **Liquidity ratio =** $\frac{Liquid\ Assets}{Current\ Liabilities}$

Liquid Assets	Rs.	Current Liabilities	Rs.
Cash in Bank	17,500	Creditors	25,000
Bills Receivable	12,500	Bills Payable	15,000
Debtors	15,000		40,000
	45,000		

Liquidity Ratio = $\frac{45,000}{40,000} = 1.125:1$

7. **Proprietary Ratio**

Proprietary Ratio = $\frac{Shareholder's\ funds}{Total\ Assets} \times 100$

Capital	1,00,000
Profit and Loss A/C	20,000
	1,20,000

Total Assets = Rs. 1,60,000

Proprietary ratio = $\frac{1,20,000}{1,60,000} \times 100 = 75\%$

Example 3.2: There are three companies in the country manufacturing a particular chemical. Following data are available for the year 2003-04.

Company	Net Sales	Operating Cost	Operating Assets
A Ltd.	300	255	125
B Ltd.	1,500	1,200	750
C Ltd.	1,400	1,050	1,250

Which is the best performer as per your assessment and why?

Solution:

Comparative statement of performance (Rs. Lakhs)

Particular	A Ltd.	B Ltd.	C Ltd.
Sales	300	1500	1,400
Less: Operating Cost	255	1200	1,050
Operating Profit (A)	45	300	350
Operating Assets (B)	125	750	1,250
Return on Capital Employed (A)/(B)×100	36%	40%	28%

Analysis: Basing on the return on capital employed, B Ltd. is the best performer in comparison to A Ltd. and C Ltd.

Example 3.3: Calculate the P/E ratio from the following:

Equity Share Capital (Rs.20 each)	50,00,000
Reserve and surplus	5,00,000
Secured Loans at 15%	25,00,000
Insured Loans at 12.5%	10,00,000
Fixed Assets	30,00,000
Investments	5,00,000
Operating Profit	25,00,000

Income tax Rate 50%. Market Price/Share Rs.50.

Solution:

(Rs.)

Operating Profit		**25,00,000**
Less: Interest on		
Secured Loans @ 15%	3,75,000	
Unsecured Loans @ 12.5%	1,25,000	5,00,000
Profit Before Tax (PBT)		20,00,000
Less: Income-Tax @ 50%		10,00,000
Profit After Tax (PAT)		10,00,000

Number of equity shares $= \frac{50,00,000}{20} = 2,50,000$

Earning as per share (EPS) = $\frac{Profit\ after\ tax}{No.of\ equity\ Shares} = \frac{Rs.10,00000}{Rs.2,50,000} = Rs.4$

Price per share = Rs.50.
P/E ratio = Market price per share/EPS = Rs.50/Rs.4
= 12.50

Example 3.4: Profit and Loss Account of Happy Ltd.for the year ended 31st March 2004.

	Rs.		Rs.
To Opening stock	90,000	By Sales	9,00,000
To Purchases	5,60,000	By Closing Stock	90,000
To Wages	2,14,000		
To Gross Profit	1,26,000		9,90,000
	9,90,000		
To Salaries	16,000	By Gross Profit	1,26,000
To Electricity	10,000		
To Miscellaneous Expenses	10,000		
To Depreciation	30,000		
To Net profit	60,000		
	1,26,000		1,26,000

Balance Sheet of Happy Ltd. As on 31st March, 2004

Liabilities			Rs
			1,80,000
Equity Share Capital			1,20,000
Reserves and Surplus			2,10,000
Secured Loans			90,000
Creditors		Total:	6,00,000
Assets			
Fixed Assets	5,40,000		3,90,000
Less: Depreciation	1,50,000		
Stock			90,000
Debtors			1,05,000
Cash			15,000
			6,00,000

Discuss under the following important functional grouping the usual ratios and comment on the financial strength and weakness: (i) Liquidity and solvency ratios; and (ii) Profitability test ratios.

Solution:

I) Liquidity ratios

1. $$\text{Current Ratio} = \left[\frac{\textit{Current Assets}}{\textit{Current Liabilities}}\right] = \frac{2,10,000}{90,000} = 2.3$$

2. $$\text{Acid test Ratio} = \left[\frac{\textit{Liquid Assets}}{\textit{Current Liabilities}}\right] = \frac{1,20,000}{90,000} = 1.3$$

II) Solvency ratios

1. $$\text{Debt} - \text{Equity Ratio} = \left[\frac{\textit{Debt}}{\textit{Equity}}\right] = \frac{2,10,000}{3,00,000} = 0.7$$

2. $$\text{Fixed Assets Ratio} = \left[\frac{\textit{Fixed Assets}}{\textit{Long term funds}}\right] = \frac{3,90,000}{5,10,000} = 0.76$$

III) Profitability test ratios

1. $$\text{Gross Profit Ratio} = \left[\frac{\textit{Gross Profit}}{\textit{Sales}} \times 100\right] = \frac{1,26,000}{9,00,000} = 14\%$$

2. $$\text{Net Profit Ratio} = \left[\frac{\textit{Net Profit}}{\textit{sales}} \times 100\right] = \frac{60,000}{9,00,000} \times 100 = 6.7\%$$

$$\text{Return on Capital employed} = \left[\frac{\textit{Net Profit}}{\textit{Capital Employed}} \times 100\right] = \frac{60,000}{5,10,000} \times 100 = 11.7\%$$

Analysis

1. The current and acid test ratios are satisfactory. Since they are above the ideal standards of 2:1 and 1:1 respectively.

2. The debt equity ratio is marginally higher than the ideal standard of 2:1. However, the debt-equity ratio fixed assets ratios reflect a satisfactory position of the company.

3. The Gross Profit Ratio and Net Profit Ratio and Return on Capital Employed is not impressive and effort needs to be made to improve the profitability of the Company.

Example 3.5: The summarised Balance Sheet of M/s Ram Shyam. Traders Ltd. for the year 31.3.2005 is given below:

(Rs. in Lakh)

Capital and Liabilities		Assets		
Equity Share Capital (fully paid-up)	140	Fixed Asset (at cost)	210	
		Less: Depreciation	25	185
Reserves and Surplus	45	Current Assets:		
Profit and Loss Account	20	Stock	25	
Provision for Taxation	10	Debtors	30	70
Sundry Creditors	40	Cash	15	
Total:	255		Total:	255

The following further particulars are also given for the year:

(Rs. in lakhs)

Sales	120
Earnings before interest and tax (EBIT)	30
Net Profit After Tax (PAT)	20

Calculate the following for the company and explain the significance of each in one or two sentences:

(i) Current ratio; (ii) Liquidity ratio; (iii) Profitability ratio; (iv) Profitability on funds employed; (v) Debtors' turnover; (vi) Stock turnover; (vii) Average collection period; (viii) Return on equity.

Solution:

(i) Current Ratio

(Rs. Lakhs)

Current Assets	
Stock	25
Debtors	30
Cash	15
Total	70
Current Liabilities	40

$$= \left[\frac{Current\ Assets}{Current\ Liabilities} \right] = \left[\frac{70}{40} \right] = 1.75 : 1$$

This ratio indicates the financial position of firm in meeting current liabilities out of current assets. The prudential norm is 2:1.

(ii)

$$\text{Liquidity Ratio} = \left[\frac{quick\ assets}{Current\ liabilities}\right] = \left[\frac{Current\ assets - Stock}{Current\ liabilities}\right] = \left[\frac{70-25}{40}\right] = 1.125:1$$

Liquidity ratio indicates the liquidity position of the company in meeting its current liabilities out of the liquid assets. The prudential norm is 1:1

(iii)

$$\text{Profitablitiy Ratio} = \left[\frac{EBIT}{Sales} \times 100\right] = \frac{30}{120} \times 100 = 25\%$$

This ratio indicates the margin of profit made on sales.

(iv) Profitability on funds employed:

$$= \left[\frac{EBIT}{Share\ capital\ and\ longterm\ loan} \times 100\right] = \frac{30}{205} \times 100 = 14.64\%$$

This ratio indicates the margin of profit made on sales.

(v) $$\text{Debtor's turnover} = \left[\frac{Sales}{Average\ Debtors}\right]\frac{120}{30} = 4 \text{ times}$$

It indicates the speed in conversion of debtors into cash.

(vi) $$\text{Stock turnover} = \left[\frac{Sales}{Average\ Stock}\right] = \frac{120}{25} = 4.8 \text{ times}$$

It indicates the number of times the stock is converted into sales.

(vii) $$\text{Average collection period} = \left[\frac{Average\ Debtors}{Credit\ sales} \times 12\right] = \frac{30}{120} \times 12 = 3\ months$$

This ratio indicates the average credit period allowed to the customers.

(viii) $$\text{Return on equity} = \left[\frac{PAT}{Shareholder's\ funds} \times 100\right] = \frac{20}{205} \times 100 = 9.76\%.$$

This ratio indicates the percentage profit after tax earned on shareholders funds.

Example 3.6: The Profit and loss Account and Balance Sheet of XYZ Ltd. are as under:

Profit and Loss Account for the year ended 31st December, 2004.

Net Sales		3,00,000
Less: Cost of Production		2,58,000
		42,000
Less: Operating Expenses:		
Selling	2,200	
General Administration	4,000	
Rent of Office	2,800	9,000
Gross Operating Profit		33,000
Less: Depreciation		10,000
		23,000
Net-Operating Profit		1,500
Other Income (Interest on Government Securities)		
Gross Income (before tax)		24,500
Less: Other Expenses:		
Interest on Bank Overdraft	300	
Interest on Debentures	4,200	4,500
Net Income (before Tax)		20,000
Tax 50% on net income		10,000
Net Income (after Tax)		10,000

Balance Sheet as at 31st December, 2004

(Rs.)

Liabilities		
Equity Share Capital		50,000
7% Preference Share Capital		10,000
Reserves and Surplus		40,000
6% Mortgage Debentures		70,000
Creditors		6,000
Bills Payable		10,000
Outstanding Expenses		1,000
Provision for Taxation		13,000
		2,00,000
Assets		
Fixed Assets	1,80,000	1,30,000
Less: Depreciation	50,000	
		15,000
Investment in Government securities		
Debtors		20,000
Stock		30,000
Cash		5,000
		2,00,000

You are required to calculate the following ratios: (i) Return on Investment; (ii) Net Profit Ratio; (iii) Current Ratio; (iv) Net Worth to Capital Employed; (v) Cost of Production to Capital Employed.

Solution:

(i) Return on Investment

$$\frac{Net\ Operating\ Profit \times 100}{Capital\ employed} = \frac{Rs.22,700 \times 100}{Rs.1,55,000} = 14.65\%$$

Operating Profit = Net profit before non-operating income but after Interest on bank overdrafts

Capital employed = Net fixed assets+Current assets-Current liabilities

Alternatively,

Return on Investment =

$$\frac{Net\ Profit\ (before\ interest\ and\ tax) \times 100}{Capital\ employed} = \frac{Rs.24,200 \times 100}{Rs.1,70,000} = 14.24\%$$

Tax and profit includes income from interest on Government Securities (less interest on bank overdrafts) and capital employed covers investment n government securities also.

(ii) **Net Profit Ratio:**

$$\frac{Net\ Profit\ (after\ tax) \times 100}{Net\ Sales} = \frac{Rs.10,000 \times 100}{Rs.3,00,000} = 3.33\%$$

$$Alternatively, \frac{Net\ Operating\ Profit \times 100}{Net\ Sales} = \frac{Rs.23,000 \times 100}{Rs.3,00,000} = 7.67\%$$

(iii) **Current Ratio:**

$$\frac{Current\ Assets}{Current\ Liabilities} = \frac{Rs.55,000}{Rs.30,000} = 1.83:1$$

$$\text{or} = \frac{Rs.70,000}{30,000} = 2.33:1$$

(Current Assets inclusive of Investment in Government Securities)

(iv) **Net Worth to Capital employed:**

$$\frac{Net\ Worth}{Capital\ Employed} = \frac{Rs.1,00,000}{Rs.1,70,000} = 58.32\%$$

$$\text{or} = \frac{Rs.1,00,000 \times 100}{Rs.1,55,000} = 64.52\%$$

(v) **Cost of Production to Capital Employed**

$$= \frac{Current\ of\ Production \times 100}{Capital\ Employed} = \frac{Rs.2,58,000 \times 100}{Rs.1,70,000} = 151.76\%$$

$$\text{or} = \frac{Rs.2,58,000 \times 100}{Rs.1,55,000} = 166.45\%$$

Example 3.7: From the Final Accounts of Product Ltd. Given below, calculate the following:

(i) Gross profit ratio (ii) Current ratio, (iii) Liquid ratio; and (iv) Return on investment ratio.

Trading and Profit and Loss Account for the year ended 31st March, 2004

		Rs.		Rs.
To Material Consumed			By Sales	85,000
Opening Stock	9,050		By Profit	600
Purchase	54,525		By Interest on Investment	300
	63,575			
Less: Closing stock	14,000			
		49,575		
To Carriage Inwards		1,425		
To Office Expenses		15,000		
To Sales Expenses		3,000		
To Financial Expenses		1,500		
To Loss on Sales of Tired Assets		400		
To Net Profit		15,000		
		85,900		85,900

Balance Sheet as on 31st March, 2004

Liabilities		Rs.	Assets		Rs.
Share Capital 2,000 Equity Shares of Rs. 10 each, fully paid		20,000	Fixed Assets:		
			Buildings	15,000	
General Reserve		9,000	Plant	8,000	23,000
Profit and Loss Account		6,000	Current Assets:		
Bank Overdraft		3,000	Stock-in-trade	14,000	
Sundry Creditors			Debtors	7,000	
			Bills Receivable	1,000	25,000
For Expenses	2,000		Bank Balance	3,000	48,000
For Others	8,000	10,000			
		48,000			

Solution:

$$\text{Gross Profit Ratio} = \frac{Gross\ Profit}{Sales} \times 100$$

		Rs.
Sales		85,000
Less: Material Consumption	49,575	
Carriage Inwards	1,425	51,000
		34,000

$$\text{Gross Profit Ratio} = \frac{Rs.34,000}{Rs.85,000} \times 100 = 40\%$$

Stock	14,000
Debtors	7,000
Bills Receivable	1,000
Bank	3,000
Current Assets	25,000

$$\text{Current Ratio} = \frac{\textit{Current Assets}}{\textit{Current Liabilities}}$$

	Rs.
Sundry Creditors	10,000
Bank Overdraft	3,000
Current Liabilities	13,000

$$\text{Current Ratio} = \frac{\text{Rs.}25{,}000}{\text{Rs.}13{,}000} = 1.92:1$$

Calculation of Liquid Ratio

Liquid ratio =

$$\frac{\text{Liquid Assets}}{\text{Current Liabilities}} = \frac{\textit{Current Assets} - \textit{Stock}}{\textit{Current Liabilities}} = \frac{\text{Rs.}25{,}000 - \text{Rs.}14{,}000}{\text{Rs.}13{,}000} = 0.84:1$$

$$\text{Return on investment} = \frac{\textit{Operating Profit}}{\textit{Capital Employed}} \times 100$$

		Rs.
Net Profit		15,000
Add: Loss on Sale of Fixed Assets		400
Financial Charges		1,500
		16,900
Less: Interest on Investment	300	
Profit (non-operating)	600	
Operating Profit		900
		16,000

	Rs.
Share Capital	20,000
General Reserve	9,000
Profit & Loss A/c	6,000
Capital Employed	35,000

$$\text{Return on investment} = \frac{\text{Rs.}16{,}000}{\text{Rs.}35{,}000} \times 100 = 45.71\%$$

Example 3.8: The following data has been extracted from the annual accounts of a company:

	(Rs. in lakhs)
Share Capital Divided into 20,00,000 Equity Shares of Rs. 10 each	200.00
General Reserve	150.00
Investment Allowance Reserve	50.00
15% Long Term Loan	300.00
Profit Before Tax	140.00
Provision for Taxation	84.00
Proposed Dividends	10.00

From the details given above calculate the following: (i) Return on capital employed; (ii) Return on net worth.

Solution:

(a) Calculation of Capital Employed

Share Capital	200
General Reserve	150
Investment Allowance Reserve	50
15% Long Term Loan	300
Capital Employed	700

(b) Calculation of Return

Profit before Tax	140
Add: 15% Interest on Long Term Loan	45
Return	185

(c) Calculation of Net Worth

Share Capital	200
General Reserve	150
Investment Allowance	50
Reserve	400

(d) Return on Shareholders' Fund

Profit before Taxation	140
Less: Provision for Taxation	84
	56
Return	

On the basis of the above the following ratios have been calculated:

(i) Return on Capital Employed =

$$\frac{Return}{Capital\ Employed} \times 100 = \frac{185 \times 100}{700} = 26.4\%$$

(ii) Return on net worth =

$$\frac{Return\ on\ shareholders\ funds}{Net\ worth} \times 100 = \frac{56 \times 100}{400} = 14\%$$

Example 3.9: From the following final accounts of XYZ Ltd. For the year ended 31st March 2004, you are required to calculate the following: (i) Acid test ratio; (ii) Stock Turnover ratio; (iii) Operating Ratio;

Balance sheet as on 31st March 2004

Liabilities	Rs.	Assets	Rs.
Share Capital (in shares of Rs. 10 each	5,00,000	Land and Buildings	5,00,000
		Plant and Machinery	2,00,000
General Reserve	4,00,000	Stock	1,50,000
Profit and Loss A/c	1,50,000	Sundry Debtors	2,50,000
Sundry Creditors	2,00,000	Cash and Bank Balance	1,50,000
	12,50,000		12,50,000

Profit and Loss account for the year ended 31st March, 2004

Opening Stock	2,50,000		
Purchases	10,50,000	Sales	18,00000
Gross Profit c/d	6,50,000	Closing Stock	1,50,000
	19,50,000		19,50,000
Admn. Expenses	2,30,000		6,50,000
Selling and Distribution Expenses	1,00,000		50,000
		Gross Profit b/d	7,00,000
Expenses of Financing	20,000	Other Income (misc.)	
	3,50,000		
Net Profit	7,00,000		

Solution:

Working Notes:

(i) Cost of Goods Sold = (Opening Stock + Purchases – Closing Stock)

= Rs. 2,50,000+10,50,000 – Rs. 1,50,000 = Rs. 11,50,000

or

= Sales-Gross profit = Rs. 18,00,000-Rs 6,50,000 = Rs.11,50,000

(ii) Operating Expenses = Administrative Exp. + Selling and Distribution Exp.

= Rs. 2,30,000+Rs. 1,00,000 = 2,30,000

(iii) Statement of Capital Employed

Share Capital	5,00,000
General Reserve	4,00,000
Profit and Loss A/c	1,50,000
Shareholders' Funds	10,50,000

(iv) Average Stock =

$$\frac{Opening\ Stock + Closing\ Stock}{2} = \frac{\text{Rs.}2{,}50{,}000 + \text{Rs.}1{,}50{,}000}{2} = \text{Rs.}2{,}00{,}000$$

Calculation of Ratios

(i) Acid Test Ratio = $\frac{Liquid\ Assets}{Current\ Liabilities} = \frac{Rs.4{,}00{,}000}{Rs.2{,}00{,}000} = 2:1$

(ii) Stock Turnover Ratio = $\frac{Cost\ of\ Goods\ Sold}{Average\ Stock\ at\ Cost} = \frac{Rs.11{,}50{,}000}{Rs.2{,}00{,}000} = 5.75\ times$

(iv) Operating Ratios = $\frac{Cost\ of\ Goods\ Sold + Operating\ Express \times 100}{Net\ Sales}$

$$\frac{(Rs.11,50,000 + Rs.3,30,000) \times 100}{Rs.18,00,000}$$

$$\text{Fixed Assets to Net Worth Ratio} = \frac{1,40,000}{90,000} = 1.55:1$$

Example 3.10: From the following data: (a) Current ratio (b) Quick ratio (c) Stock Turnover ratio (d) Operating ratio (e) Rate of return on equity capital.

Balance Sheet as on December 31, 2004

Liabilities	Rs.	Assets	Rs.
Equity Share Capital (Rs. 10 shares)	10,00,000	Plant and Machinery	6,40,000
		Land and Buildings	80,000
Profit and Loss Account	3,68,000	Cash	1,60,000
Creditors	1,04,000	Debtors	
Bills Payable	2,00,000	Less: Provision for Bad Debts	3,20,000
			4,80,000
Other Current Liabilities	20,000	Stock Prepaid Insurance	12,000
	16,92,000		16,92,000

Income Statement for the year ending 31st December 2004

(Rs.)

Sales	40,00,000
Less: Cost of good	30,80,000
	9,20,000
Less: Operating expenses	6,80,000
Net Profit	2,40,000
Less: Income tax paid 50%	1,20,000
Net profit after tax	1,20,000

Solution:

Balance at the beginning of the year:

Debtors Rs. 3,00,000
Stock Rs. 4,00,000

(a) Current Ratio $\frac{Current\ Assets}{Current\ Liabilities}$

Current Assets	Rs.	Current Liabilities	Rs.
Cash	1,60,000	Creditors	1,04,000
Debtors	3,20,000	Bills Payable	2,00,000
Stock	4,80,000	Other Current	20,000
Prepaid	12,000	Liabilities	3,24,000
Insurance	9,72,000		

Current Ratio = $\frac{9,72,000}{3,24,000} = 3:1$

(b) Quick Ratio

Quick Ratio = $\frac{Liquid\ Assets}{Current\ Liabilities}$

Liquid assets

	Rs.
Cash	1,60,000
Debtors	3,20,000
	4,80,000

Liquid Ratio = $\frac{4,80,000}{3,24,000} = 1.48:1$

(c) Stock Turnover Ratio = $\frac{Cost\ of\ goods\ sold}{Average\ stock}$

cost of good sold = 30,80,000

Average stock =

$$\frac{Opening\ Stock + Closing\ Stock}{2} = \frac{4,00,000 + 4,80,000}{2} = 4,40,000$$

Stock Turnover ratio = $\frac{30,80,000}{4,40,000} = 7\ times$

(d) Operating ratio =

$$\frac{Cost\ of\ goods\ sold + Operating\ expenses}{Net\ Sales} \times 100 = \frac{30,80,000 + 6,80,000}{40,00,000} \times 100 = 94\%$$

(e) Rate of Return on equity capital

$$\frac{Net\ Profit\ after\ Tax}{Equity\ Share\ Capital} \times 100 = \frac{1,20,000}{10,00,000} \times 100 = 12\%$$

Example 3.11 The capital of Growfast Co. Ltd. is as follows:

Preference shares of Rs.10 each	50,00,000
Equity share Rs. 100 each	70,00,000
	1,20,00,000

Additional Information:

Profit after tax at 50%	Rs. 15,00,000	Equity dividend paid	10%
Depreciation	Rs. 6,00,000	Market price per equity share	Rs.200

Calculation the following: (i) The cover for the preference and equity dividends; (ii) The earnings per share; (iii) The price earnings ratio; (iv) The net funds flow.

Solution:

(1) Cover for the Preference and Equity dividends

$$\frac{Profit\ after\ tax}{Preference\ dividend + Equity\ dividend} = \frac{Rs.15,00,000}{Rs.5,00,000 + Rs.7,00,000} = 1.25\ Times$$

(ii) Earning Per Share

$$\frac{\textit{Net Profit after Preference dividend}}{\textit{Number of equity shares}} = \frac{\text{Rs.15,00,000} - \text{Rs.5,00,000}}{70{,}000} = \text{Rs.14.29}$$

(iii) Price Earnings Ratio

$$\frac{\textit{Market Price per share}}{\textit{Earning per share}} = \frac{\text{Rs.200}}{\text{Rs.14.29}} = 14\,\text{Times}$$

(iv) The net funds flow:

Profit after tax 15,00,000
Add: Depreciation
6,00,000
15,00,000+6,00,000
21,00,000

3.6 SUMMARY

A large number of ratios are used to measure performance and exercise control. The ratios are used by all the stakeholders of the business viz., owners, managers, creditors, bankers, suppliers, government etc. The ratios are basically divided into five categories. The short and long term solvency ratios are used to judge the ability of the firm to meet it's financial obligations. Activity or turnover ratios are used to find out how effectively and efficiently the firm's resources are being used. Profitability ratios are used to gauge the profitability of the firm with reference to sales and assets. The market test ratios are used to gauge the firm performance in terms of share prices and dividends.

Liquidity Ratios:

Current Ratio	$\frac{\textit{Current Assets}}{\textit{Current Liabilities}}$
Quick Ratio	$\frac{\textit{Current Assets} - \textit{Inventory}}{\textit{Current Liabilities}}$
Interval measure	$\frac{\textit{Current Assets} - \textit{Inventory}}{\textit{Average daily cash operating expenses}}$

Leverage Ratios:

Total debt ratio	$\frac{\textit{Total debt}}{\textit{Capital employed}}$
Debt-equity ratio	$\frac{\textit{Net worth}}{\textit{Total debt}}$
Capital-equity ratio	$\frac{\textit{Capital employed or net assets}}{\textit{Net Worth}}$
Interest Coverage	$\frac{\textit{EBIDTA}}{\textit{Interest}}$

Activity Ratios:

Inventory turnover	$\frac{Cost\ of\ goods\ sold\ or\ sales}{Inventory}$
No. of days, inventory	$\frac{360}{Inventory\ turnover}$
Debtors turnover	$\frac{Credits\ sales\ or\ Sales}{Debtors}$
Collection period	$\frac{360}{Debtors\ turnover}$
Assets turnover	$\frac{Sales}{Net\ assets\ or\ capital\ employd}$
Working capital turnover	$\frac{Sales}{Net\ working\ capital}$

Profitability Ratios:

Gross margin	$\frac{Gross\ profit}{Sales}\ or\ \frac{EBIT}{Sales}$
Net margin	$\frac{Profit\ after\ tax}{Sales}\ or\ \frac{EBIT\ (1-\ )}{Sales}$
PAT to EBIT ratio	$\frac{PAT}{EBIT}$
Return on Investment (ROI) before tax	$\frac{EBIT}{Net\ assets\ or\ capital\ employed}$
Return on Investment (ROI) after tax	$\frac{EBIT\ (1-Tax\ rate)}{Net\ assets\ or\ capital\ employd}$
Return on Investment (ROI) before tax	$\frac{EBIDTA}{Total\ assets\ or\ Net\ assets}$
Return on equity (ROE)	$\frac{Profit\ after\ tax}{Net\ worth}$

There exists a relationship between various ratios. For example, ROE can be expressed as follows:

ROE	$\frac{\text{Sales}}{\text{Net assets}} \times \frac{\text{EBIT}}{\text{Sales}} \times \frac{\text{PAT}}{\text{EBIT}} \times \frac{\text{Net assets}}{\text{Net Worth}}$

In practice companies calculate many other ratios. Most important ratios include:

EPS	$\frac{\text{PAT}}{\text{No. of shares}}$
DPS	$\frac{\text{Profit distributed}}{\text{No. of shares}}$
Payout	$\frac{\text{DPS}}{\text{EPS}}$
Price-earnings ratio	$\frac{\text{Market value of share}}{\text{EPS}}$
Market value-book value ratio	$\frac{\text{Market value of share}}{\text{Book value of share}}$

3.7 SELF-ASSESSMENT QUESTIONS/EXERCISES

1) What are the different types of financial ratios?

2) Discuss the importance of liquidity ratios?

3) Define and evaluate various leverage ratios?

4) Discuss the important turnover ratios.

5) Explain the important profit margin ratios?

6) Compare the following: rate of return ratios, return on total assets ratios, and returns on equity?

7) Discuss key valuation ratios?

8) If the market price per share is equal to the book value per share, the following are equal, return on equity, price earning ratio, and total yield. Prove.

9) Write short notes on 'Debt Service Coverage Ratio'.

10) Explain proprietary ratio.

11) 'Ratios are indicators – sometimes pointers but not in themselves powerful tools of management'. Explain.

12) Ratio analysis is only a technique for making judgments and not a substitute for judgments. Examine.

13) Write short notes on (i) Return on investments
(ii) Pay-out Ratio.

14) Explain the limitations of ratio analysis for evaluating investment proposals and liquidity analysis.

15) Ratios are symptoms like blood pressures, the, pulse or the temperature of an individual'. Explain, also name and explain in brief the ratios made use to judge the long-term solvency of a concern.

16) Write short notes on 'Earnings per share'.

17) Distinguish between Operating Ratios and Turnover Ratio.

18) Ratio analysis is an important tool for judgement of the health of any organisation. Elaborate.

19) Write notes on uses and limitations of 'Ratio Analysis'.

PROBLEMS

1) Premier Company's net margin is 5 per cent. The total return assets turnover ratio is 1.5 times, debt to total assets ratios is 0.7. What is the return on equity for premier?

2) McGill Inc. has a profit before tax of Rs.40 ml. If the company's times interest covered ratio is 6? What is the total interest charge?

3) The following data applies to a firm.

Interest Charges	Rs. 150,000
Sales	Rs. 7,000,000
Tax Rate	60 per cent
Net Profit Margin	6 per cent

What is the firm's times covered ratio?

4) A firm's current assets and current liabilities are 600 and 1,500 respectively. How much can it borrow from a bank without reducing the current ratio given below 1.5? Justify.

5) A firm has a total annual sales of 1,000,000 and accounts receivable is collected if management want to reducing the accounts receivable to 120,0000?

6) Determine the sales of a firm with the following financial data:

Current Ratio	1.5
Acid-test Ratio	1.2
Current Liabilities	800,000
Inventory Turn Over Ratio	times

7) Complete the balance sheet and sales data (fill in the blanks) using the following financial data:

Debt/Equity Ratio	0.60
Acid-Test Ratio	12
Total Assets Turnover Ratio	15
Day's Sales Outstanding in Account Receivable	40 days
Gross Profit Margin	20 per cent
Inventory Turnover	5

Balance sheet

Equity Capital	50,000	Plant and Equipment
Retained Earning	60,000	Inventories
		Account Receivable Cash

8) The 19X0-balance sheet and income statement for Omex limited is given below. Compute the financial ratios for Omex. Evaluate Omex performance with reference to the standards.

Omex limited balance sheet 31 December 2005

Liabilities and Equity

	Rs.
Equity Capital	10,000, 000
Reserves and Surplus	22,500,000
Long Term Debt	12,500,000
Short Term Bank Borrowing	15,000,000
Trade Creditors	10,000,000
Provision	5,000,000
Total	**75,000,000**

	Rs.
Assets Fixed Assets (net)	30, 000,000
Current Assets	
Cash in bank	5,000,000
Receivable	15,000,000
Inventories	20,000,000
Pre Paid Expenses	2,500,000
Other	2,500,000
Total	**75,000,000**

Omex limited income statement for the year Ended.
December 31, 2005

	Rs.
Net Sales	95,000,000
Cost of Goods Sold	72,000,000
Gross Profit	23,000,000
Operating Expenses	10,000,000
Operating Profit	12,500,000
Non- Operating Surplus	2,600,000
Profit Before Interest and Tax	15,100,000
Interest	5,000,000
Profit before Tax	10,100,000
Tax	5,000,000
Profit After Tax	5,100,000
Dividends	1,600,000
Retained Earnings	3,300,000

Omex	**Standard**
Current Ratio	1.5
Acid-test Ratio	0.80
Debt-Equity Ratio	1.5
Times Interested Covered Ratio	3.5
Inventory Turnover Ratio	4.0
Average Collection Period	60 days
Total Assets Turnover Ratio	1.0
Net Profit Margin Ratio	6%
Earning Power	10%
Return on Equity	12%

3.8 SOLUTIONS/ANSWERS

Check Your Progress 1

1)

i) Current Ratio = $\frac{Current\ Assets}{Current\ Liabilities}$

$= \frac{Rs.87,190}{Rs.22,500} = 3.88:1$

Current Assets = Cash at Bank + Trade Debtors +Stock

= Rs. 26,020 + Rs. 11,710 + Rs. 49,460

= Rs. 87,190

Current Liabilities = Creditors + Bills Payable

= Rs. 16,000 + Rs. 6,500 = Rs. 22, 500

ii) Liquidity Ratio = $\frac{Current\ Assets}{Current\ Liabilities}$

$= \frac{Rs.37,730\,(Rs.26,020+11,710)}{Rs.22,500} = 1.68:1$

iii) Debt-Equity Ratio = $\frac{Total\ Debts}{Shareholders'\ Funds}$

$\frac{Rs.1,22,500}{Rs.1,84,500} = 0.66:1$

Total Debts = Debentures +Current Liabilities

= Rs. 1,00,000+Rs. 22,500 = Rs. 1,22,500

Shareholders' Funds = Rs. 1,00,000+Rs. 84,500 = Rs. 1,84,500

(iv) Proprietary Ratio = $\frac{Proprietory\ Funds}{Total\ Assets}$

$\frac{Rs.1,84,500}{Rs.13,07,000} = 0.6:1$

(v) Solvency Ratio = $\frac{Total\ Debts}{Total\ Assets}$

$= \frac{Rs.1,22,500}{Rs.3,07,000} = 0.4:1$

2) i) Capital Gearing Ratio = $\frac{Variable\,Cost\,bearing\,Capital}{Fixed\,Cost\,bearing\,Capital}$

$= \frac{Rs.65,000}{Rs.1,00,000} = 65:1$ It is High Gearing

Variable Cost Bearing Capital

= Equity Capital + Capital Reserve + P. & L. A/c.

= Rs. 50,000 + Rs. 10, 000 + Rs. 5,000 = Rs. 65,000

Fixed Cost Bearing Capital

= 2% Pref. Capital + 15% Debentures

= Rs. 30,000 + Rs. 70,000 = Rs. 1,00,000

ii) Liquidity Ratio = $\frac{Liquid\ Assets}{Current\ Liabilities}$

$= \frac{Rs.30,000}{Rs.25,000} = 1.2:1$

Liquid Assets = Debtors + Bank

= Rs. 16,000 + Rs. 14,000 = Rs. 30,000

Current Liabilities = Creditors + Overdraft + Proposed Dividend

= Rs. 12,000 + Rs. 8,000 + Rs. 5000

= Rs. 25,000

(iii) Fixed Assets Ratio = $\frac{Long\ term\ Funds}{Fixed\ Assets}$

$= \frac{Rs.1,65,500}{Rs.1,40,000} = 1.18:1$

3)

i) Interest Coverage Ratio or Debt Service Ratio

$= \frac{Net\ Profit\ before\ Interest\ and\ Tax}{Fixed\ Interest\ Charges}$

$\frac{Rs.1,56,370 + Rs.1,56,370 + 14,750}{Rs.14,750}$

$\frac{Rs.3,27,490}{Rs.14,750} = 22\ times\ (Approx.)$

ii) Debt to Cash Flow Coverage Ratio

$$\frac{Annual\ Cash\ Flow\ Before\ Interest\ and\ Tax}{Interest + \frac{Sinking\ Fund\ Appropriations}{1 - Tax\ Rate}}$$

$$= \frac{Rs.1,56,370 + Rs.1,56,370 + Rs.14,750 + Rs.20,000}{Rs.14,750 + \frac{12,500}{1.50}}$$

$$= \frac{Rs.3,47,490}{Rs.37,750} = 8.\ times\ (Approx)$$

Check Your Progress 2

1)

i) Current Ratio = $\frac{Current\ Assets}{Current\ Liabilities}$

$$= \frac{Rs.36,000 + 27,000 + 6,840 + 2,160}{Rs.70,200 + 1,800}$$

$$= \frac{Rs.72,000}{Rs.72,000} = 1:1$$

ii) Liquidity = $\frac{Liquid\ or\ Quick\ Assets}{Current\ Liabilities}$

Or

Quick Ratio or

$$\frac{Current\ Assets - (Stock + Prepaid\ Exp)}{Current\ Liabilities}$$

$$= \frac{Rs.72,000 - (Rs.36,000 + Rs.2,160)}{Rs.72,000}$$

$$= \frac{Rs.33,840}{Rs.72,000} = 0.47:1$$

Check Your Progress 3

1)

Stock Turnover Ratio = $\frac{Cost\ of\ Goods\ Sold}{Average\ Inventory\ at\ Cost}$

$$= \frac{Rs.41,520}{Rs.15,160} = 2.74 \text{ times}$$

Cost Goods Sold = Opening Stock + Purchases + Carriage Inward – Closing Stock

= Rs. 15,920 + 39,000 + 4,000-14,400

= Rs. 44,520

Average Inventory = $\frac{Opening\ Stock + Closing\ Stock}{2}$

$$= \frac{Rs.15,920 + Rs.14,400}{2}$$

$$= \frac{Rs.30,320}{2} = Rs.\ 15,160$$

Average Number of days to Turnover = $\frac{Day\ in\ a\ year}{Inventory\ Turnover}$

Or

Stock Velocity = $\frac{365}{2.74}$ =133.21 or 133 days

2)

Average Collection Period = $\frac{Account\ Collection\ Periods}{Net\ Credit\ Sales} \times 365$

$$= \frac{Rs.16,500 X 365}{Rs.1,09,500}$$

= 55 days

or

$$\text{Average Collection Period} = \frac{365}{\text{Debtors Turnover}}$$

$$= \frac{365}{6.64} = 55 \text{ days}$$

$$\text{Debtors Turnover} = \frac{\text{Net Credit Sales}}{\text{Accounts Receivables}}$$

$$= \frac{Rs.1,09,500}{16,500} = 6.64 \text{ times}$$

(i) Calculation of Accounts Receivables:

= Debtors + Bills Receivable

= Rs. 13,500 + 3,000= Rs. 16,500

(ii) Calculation of Net Credit Sales:

= Total Gross Sales – Cash Sales- Sales Returns

Rs. 1,50,000- 30,000-10,500= Rs. 1,09,500

3)

$$\text{Creditors Turnover} = \frac{\text{Net Credit Purchases}}{\text{Total Payable}(Crs. + B/P)}$$

$$= \frac{Rs.7,30,000}{Rs.1,40,000}$$

$$= \frac{73}{14} = 5.21 \text{ times}$$

$$\text{Average Payable Period} = \frac{\text{Total Payables}}{\text{Net Credit Purchases}} \times 365$$

$$= \frac{Rs.1,40,000}{Rs.7,30,000} \times 365 = 70 \text{ days}$$

or

$$= \frac{\text{Days in a Year}}{\text{Creditors Turnover}}$$

$$= \frac{365}{5.21} = 70 \text{ days}$$

(i) Total Payables = Creditors + Bills Payable

= Rs. 1,20,000 + 20,000

Rs. 1,40,000

(ii) Net Credit Purchases = Total Purchases – Cash Purchases- Returns

= Rs. 8,40,000 – 70,000 – 40,000

= 7,30,000

(iii) The amount of provision for discount on creditors will not be deducted from the creditors.

4)

(i) Capital Turnover Ratio = $\frac{Sales}{Capital\ Employed}$

$= \frac{Rs.1,60,000}{Rs.2,30,000} = 0.69$ times

(ii) Capital Employed:

Fixed Assets		1,60,000
Add: Current Assets:		
Debtors	60,000	
Bills Receivables	20,000	
Cash in Bank	50,000	
	30,000	
Less: Current Liabilities:		
Creditors + B/P (40,000 + 20,000)	60,000	70,000
Capital Employed		2,30,000

Or

Share Capital	80,000
Add: General Reserve	30,000
Profit and Loss A/c	50,000
Mortgage Loan	80,000
	2,40,000
Less: Preliminary Expenses	10,000
	2,30,000

(i) Fixed Assets Turnover Ratio = $\frac{Sales}{Fixed\ Assets}$

$= \frac{Rs.1,60,000}{Rs.1,60,000} = 1$ time

(ii) Working Capital Turnover Ratio = $\frac{Sales}{Working\ Capital}$

$= \frac{Rs.1,60,000}{Rs.70,000} = 2.28$ times

(iii) Current Asset Turnover Ratio = $\frac{Sales}{Current\ Assets}$

$= \frac{Rs.1,60,000}{Rs.1,30,000} = 1.23$ times

(iv) Total Assets Turnover Ratio = $\frac{Sales}{Total\ Assets}$

$= \frac{Rs.1,60,000}{Rs.2,90,000} = 0.55$

Check Your Progress 4

1)

i) Gross Profit Ratio = $\frac{Gross\ Profit}{Sales} \times 100$

$= \frac{Rs.3,84,000}{Rs.8,00,000} \times 100 = 48\%$

ii) Operating Profit Ratio = $\frac{Operating\ Profit}{Net\ Sales} \times 100$

$= \frac{Rs.2,80,000}{Rs.8,00,000} \times 100 = 35\%$

Operating Profit :

Net Profit + Non-operating Expenses – Non-operating Income

= Rs. 2,81,200+Rs.3,400 – Rs.4, 600 = Rs. 2,80,000

iii) Operating Ratio =

$$\frac{Cost\ of\ Goods\ Sold + Operating\ Expenses}{Net\ Sales} \times 100$$

$$= \frac{Rs.4,16,000 + Rs.1,04,000}{Rs.8,00,000} \times 100$$

$$= \frac{Rs.5,20,000}{Rs.8,00,000} \times 100 = 65\%$$

Cost of Goods Sold:

Operating Stock +Purchase + Direct Exp – Closing Stock

= Rs. 60,000+Rs.4, 20,000+Rs. (28,000+8,000) – 1,00,000 = Rs. 4,16,000

Operating Expenses

Office Expenses + Selling and Distribution Expenses

= Rs. 48,000+Rs. 56,000

= Rs. 1,04,000

iv) a) Office Expenses Ratio= $\frac{Office\ Expenses}{Net\ Sales} \times 100$

$= \frac{Rs.48,000}{Rs.8,00,000} \times 100 = 6\%$

b) Selling and Distribution Expenses Ratio:

$$\frac{Selling\ and\ Distribution\ Expenses}{Net\ Sales} \times 100$$

$$= \frac{Rs.56,000}{Rs.8,00,000} \times 100 = 7\%$$

c) Non-Operating Expenses Ratio =

$$\frac{Non-operating\ Exp}{Net\ Sales} \times 100$$

$$= \frac{Rs.3,400}{Rs.8,00,000} \times 100 = 0.425\%$$

v) Net Profit Ratio= $\frac{Net\ Profit}{Net\ Sales} \times 100$

$$= \frac{Rs.2,81,200}{Rs.8,00,000} \times 100 = 35.15\%$$

2)

1) Return on Capital Employed = $\frac{Net\ Profit\ After\ Tax}{Capital\ Employed} \times 100$

$$\frac{Rs.1,50,000}{Rs.11,00,000} \times 100 = 13.63\%$$

2) Return on Equity Shareholders' Funds:

$$\frac{Net\ Profit\ after\ tax - Pref.\ Share\ Dividend\ Operating\ Profit}{Equity\ Shareholders,\ Funds} \times 100$$

$$= \frac{Rs.1,50,000 - Rs.16,000}{Rs.7,50,000} \times 100 = 35\%$$

3) Return on Total Assets = $\frac{Net\ Profit\ after tax}{Total Assets} \times 100$

$$= \frac{Rs.1,50,000}{Rs.11,25,000} \times 100 = 13.33\%$$

$$\frac{Net\ Profit\ after\ tax + Interest}{Total\ Assets} \times 100$$

$$= \frac{Rs.1,50,000 + Rs.23,500}{Rs.11,25,000} \times 100$$

$$= \frac{Rs.1,73,500}{Rs.11,25,000} \times 100 = 15.42\%$$

Check Your Progress 5

1) Dividend Yield on Equity Shares = $\frac{\textit{Dividend Per ShareNet}}{\textit{Marked Price Per Share}} \times 100$

$= \frac{\text{Rs.}\,2\,(20\%\,\text{of Rs.}10)}{\text{Rs.}\,40} \times 100 = 5\%$

2) Earnings per Equity Share = $\frac{\textit{Net Profit after tax} - \textit{Pref. Dividend}}{\textit{No. of Equity Shares}} \times 100$

$= \frac{\text{Rs.}\,2{,}70{,}000 - \text{Rs.}\,27{,}000}{\text{Rs.}\,80{,}000}$

$= \frac{\text{Rs.}\,2{,}43{,}000}{\text{Rs.}\,80{,}000}\,\text{Rs.}\,3.04$

3) Price Earning Ratio = $\frac{\textit{Market Price Per Share}}{\textit{Earning Per Share}} \times 100$

$= \frac{\text{Rs.}\,40}{\text{Rs.}\,3.04} \times 13.16 : 1$

4) Dividend Pay-out Ratio = $\frac{\textit{Dividend per share}}{\textit{Earning Per Share}} \times 100$

$= \frac{2}{\text{Rs.}\,3.04} \times 100 = 66\%$

Financial management

UNIT -6

CAPITAL BUDGETING - I

Concept of capital budgeting and its importance

The term capital budgeting refers to expenditure on capital assets. No business can be performed without creating some assets and only through these assets the process of production can take place, i.e. the inputs can be converted into outputs.

Spending money on capital assets is a very important decision that a finance manager is required to make. Capital investment expenditure may be on Plant, Machinery Equipment, Land, Buildings, Roads, and Bridges etc. Although spending money on anything is important and prudence must be exercised in all such matters, but spending money on capital assets is especially more important and the finance manager is, therefore, required to be much more cautious in making such a decision, for the following reasons;

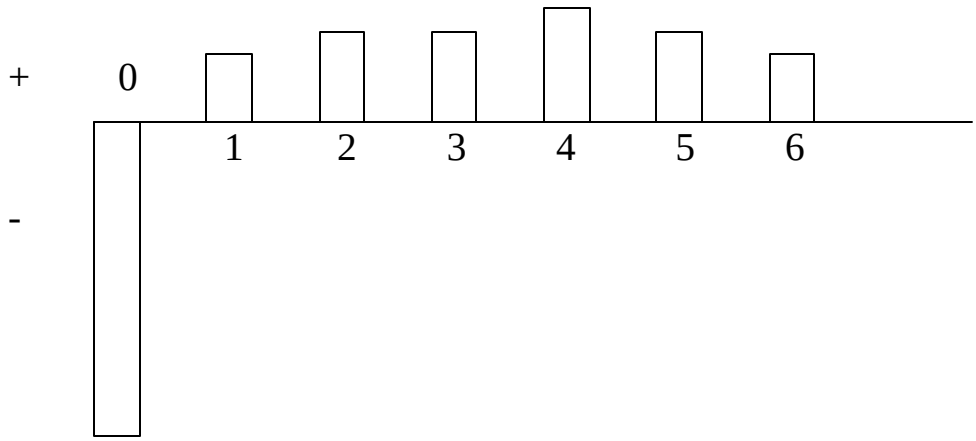
(i) It involves substantially higher amounts than for other routine expenses.

(ii) The decision is irreversible, i.e. it is not possible to withdraw your steps easily, once you have taken few steps in this regard.

(iii) It has long term impact on the affairs of a company and it, infact, determines the future of a company.

Any expenditure is done on a capital asset has a long term prospective. We spend today, to gain some advantage in future. This expenditure of a capital nature may be on construction/ purchase of a plant, machinery, equipment, etc. Each such expenditure involves a big outflow of funds initially, compensated by small but recurring doses of inflow of funds in future for some time. The nature of inflows and outflows can be depicted in the following exhibit.

Cash flows in a Project



The essence of the capital budgeting decision making is to determine whether the initial expenditure of funds is duly compensated by the inflows of funds occurring in future. If greater values can be assigned to the inflow of funds than the

present expenditure, then that capital investment proposal must be accepted because that will add to the wealth of the company.

Nature And Types Of Capital Budgeting Decision

The capital budgeting decision is a decision on an expenditure of capital nature (as against revenue expenditure) which is intended to create physical assets. The assets are is turn expected to reap benefits to the company for years to come. The expenditure on monetary assets (like purchase of Bonds, Shares, Treasury bills, Debentures etc.) is not to be treated as a capital budgeting expenditure. Only investment in physical assets is appraised in capital budgeting while investment in monetary and financial assets is appraised under portfolio analysis.

The capital budgeting expenditure may also be called an expenditure on a project – big or small. Thus the financial appraisal of a project is also a capital budgeting decision. The investment done on physical assets may be of the following types:

1. **New Projects**- The new projects mean expenditure on creation of new assets. For example, setting up an entirely new factory, a new building, a new plant, a new bridge etc. these projects are generally of a big size and take a relatively longer time for its completion and for the returns to flow in.

2. **Expansion Projects**- Wherever an existing capital asset needs expansion of capacities like setting up more machines in an existing factory or expanding the building of a factory or constructing a new facility etc., this will be called an 'expansion project'. This type of project is relatively of a smaller size and gives the returns faster.

3. **Renewal / Renovation Projects**- Whenever a new factory has been set up, after some years some machines or part of it become technically obsolete and need replacement in order to remain competitive. In such a situation the old machinery is disposed off and new machinery is installed in its place. Fundamentally it is also a project like the above ones, with the only difference that the disposal of old machines will fetch some price which must be accounted for, when we take the cost of the new machine.

4. **Exploration Projects**-Exploration projects are those projects when some new resources are to be discovered. The expenditure incurred on e.g. oil exploration may be called a project of this kind. This expenditure is also a capital budgeting expenditure, where we spend money now to reap benefits in future, with the only difference that there is far greater uncertainty about finding the resource for which the expenditure is to be incurred.

5. **Research and Development (R & D) Projects**- R & D projects are those projects in which present expenditure is being incurred in the hope of getting a new product, a new raw material, a new design or an improvement in the exiting ones. These projects are typically of a higher uncertainty than the above ones, because when we are undertaking a research project, we are neither sure of the time duration, nor of the expenditure, nor of the end result. Many R & D projects take a pretty long time in its completion with a high degree of uncertainty of end result.

6. **Projects for the Compliance of Certain Statutory Requirements**- There are some projects which are not undertaken explicitly for business prospects, but are nevertheless undertaken in compliance of legal requirements. These projects may be for ensuring certain safety requirements, e.g. installing fire fighting equipment or modification in existing structures for the safety of workers, or may be for controlling pollution from the factory e.g. an effluent treatment plant. Although no direct business profit seems to be coming but still no responsible company can ignore these projects. Sometimes or the other the law will take its course with immense cost to the company in terms of penalties and even closures. The case of Supreme Court ordering the closure the closure of all polluting factories around Taj Mahal is not a very old one.

Capital budgeting process

The entire capital budgeting process can be sub divided into several phases. It starts from the idea generation to project execution and involves several specialists. It is not merely the financial analyst, but a team of experts is needed in the whole process. It can be divided into the following phases;

1. Generation of Investment Ideas: - The whole process starts with generation of investment ideas. Somebody sees a business opportunity for future and starts exploring it. It can be called the entrepreneurial function. Generally the entrepreneur/ owner of a firm or top executives of corporate enterprises identify the business opportunity and then ask their subordinates to explore its viability.

2. **Estimating Cash Flows: -** After an idea has been identified the next step is to crystallize it. For this purpose a team of engineers, marketing and financial experts work on the proposal. They estimate the cost of the whole project including cost of land / building, machinery, and equipment; its installation, the expected life of the plant; the expected output, the cost of operation, the revenue generation for different years and also requirements of working capital.

3. **Evaluating Cash Flow: -** **A**fter an estimate of above variables has been prepared, there is need to evaluate it. The evaluation will be for its certainty as well as for adjusting its value for different years. This is mostly done by the financial analyst with inputs from the marketing expert.

4. **Selecting a Project: -** After the evaluation of the cash flows, the decision to accept or reject a project; or selecting a project from amongst alternatives is taken on the basis of some decision criteria. This is done by the owner / entrepreneur on the basis of evaluation done by the financial analysist. The advantages or disadvantages of decision criteria are also taken into account in selecting the decision criteria and making the final decision.

5. Execution and Monitoring: - After a decision to undertake a project has been taken, the process of its implementation starts. This again involves a team of engineers, financial experts, marketing experts under the leadership of the owner / entrepreneur. Proper monitoring of the implementation process is very important to avoid time and cost overruns, because this will adversely affect the whole exercise of estimation and evaluation of cash flows and make it go awry. Thus, it can be seen that the whole process of capital budgeting is a long and exhaustive process. Although other experts are involved, the key role of financial experts can not be overlooked

and anybody who is studying financial management must study this particular aspect also.

Activity -

1. list a company or a public sector organization and find out the different types of projects undertaken by them in the last five years

2. Also find out the process of their decision making and the experts involved in the whole process.

Methods of Appraising Investment Proposals

An Overview

It has already been pointed out in earlier pages that every investment proposal involves cash flows- large initial outflows followed by small but recurring inflows. The crux of the whole process is to asses whether the value of inflows is greater then the outflows or not. If a greater value can be assigned to the inflows/returns than the outflows/expenditure the proposal may be treated as profitable and therefore, acceptable. There are several methods to judge this. They may be divided into two categories-

1. Methods based on the assumption of certainty of cash flows.
2. Methods which take in to consideration uncertainty of cash flows.

Methods based on the assumption of certainty of cash flows are those methods which assume that whatever cashflows that have been estimated will be certain and no changes are expected in them. They may be further subdivided into two categories-

Simple methods:- Simple methods are those methods which are simple to calculate and do not involve elaborate calculation and discounting of cash flows. They are as follows;

a) Payback-period and
b) Accounting / Average Rate of Return (ARR)

Scientific Methods:- Scientific Methods are those methods which take into calculation the time value of money and, therefore, undertake discounting of cash flows... They are

a) Net Present Value (NPV)
b) Internal Rate of Return (IRR) and
c) Benefit-Cost (B-C) Ratio or Profitability Index (PI)

Methods which take into consideration uncertainty of cash flow are more realistic because any future directed estimate has an element of uncertainty. Therefore, a realistic method should be one which also considers this uncertainty. The following methods help us reduce the risk of uncertainty.

a) Conservative Estimates
b) Certainty Equivalent Coefficient
c) Risk- adjusted Discount Rate

d) Probability Distribution of uncertainty

e) Sensitivity Analysis etc.

Although the above methods help us overcome the risk in capital budgeting, but it must be understood that there role is only partial. In fact, no method can eliminate risk; we can only reduce it by improving our methodology.

Requirements of a good method

The previous section has shown us various methods, which may be used for investment decision making. In fact, each method has its own advantages as well as shortcomings. Given below are the requirements of a good method of investment decision making.

1. It should be based on cash-flows rather than on profits or expenditure.
2. Cash flows to be covered over the entire expected life of the asset rather than few years only.
3. It should give the absolute value of gain or loss.
4. It should consider time value of money.
5. It should indicate relative profitability between different alternatives so that a ranking can be made between different proposals.
6. It should indicate the degree of risk and the chances of getting profit or loss in a given situation.

There is probably no method which will posses all the above attributes but different methods do posses some of them. As we get introduced to different methods in this and the next unit, we will be able to assess the suitability of a method /methods for different situations.

Principles of Cash Flows Estimation

In this part we are going to see, how a capital budgeting decision is to be made and what are the principles that must be observed in order to make an estimation of cash flows in a scientific manner. As pointed out in previous section all estimates of receipts and payments should be based on cash flow rather than on revenue and expenditure or profit and loss. The reason is that cash flows are very certain amounts and are not subject to different interpretation by different people. Accrual principle is considered better for the purpose of accounting, (probably because it calculates profit or loss for a given year), but for a long term investment decision making cash principle will be better. Every payment of cash, for whatever purpose, is an outflow, while every receipt of cash, for whatever reason is an inflow. Any non cash expenditure (like depreciation) will not be accounted for because it does not involve any cash outflow. The following principle should be adhered to in estimating cash-flows in respect of a project.

1. All calculation of cash flows should be done on incremental basis rather than on aggregate basis. If any inflow is in addition to the exiting inflows, it should be accounted for otherwise not. If a machine costs Rs. 1,00,000 and it replaces an old machine which has fetched Rs. 20,000, then the cash outflow should be taken as only Rs. 80,000, even if the cost of machine is Rs. 1,00,000.
2. Cash flow should be taken on 'After-tax' basis. Each income of a company is subject to corporate income tax. So the amount of tax is cash outflow even if we may not consider it as expenditure. Hence, if we have to find out net cash inflow the amount of tax paid should be subtracted and 'cash flow after tax '(CFATs) should be calculated.
3. Sunk- costs should be ignored. The costs which have already been incurred and which are non recoverable should not be taken into account while calculating cash outflows for a period. This is because no net cash flows are taking place on account of a particular decision (since they have already been incurred and can not be recouped).
4. Calculation of cash flows should also take into account the opportunity cost even if no actual cash inflow or outflow takes place. For example, if we are using our own premises for a particular project, then possible rental should be taken as the cash outflow while making our calculations.

This is because in making our decision we are foregoing this income and this should be regarded as a cost.

5. A very important aspect of cash flow calculation is that cash flows on account of interest payments are not to be considered while making the calculation of cash flows. This may look odd, because the interest payment is an actual outflow and ignoring it may appear to be incorrect. However, it must be understood that the discounting of cash flows for their time value automatically takes into account the interest cost of any investment. Therefore, subtracting interest payment and then discounting it for time value will lead to double counting. Rate of interest is a compensation for time value of money and when we discount some cash flows for their time value at the given rate of interest, there is no need to subtract interest payments separately.
6. Cash needs for working capital should be treated as a cash outflow at the time of commencement of a project and should be treated as inflows when that cash is released at the time of closure or termination of project. Increases or decreases of working capital should be treated as outflows and inflows respectively as and when they take place.

CALCULATION OF CASH FLOWS AFTER TAX- AN ILLUSTRATION (6.1)

A company desires to make an investment of Rs. 1,00,000 in a new machinery. Additional installation and transportation cost is Rs. 20,000. The machine has a life of 5 years after which it is expected to fetch Rs. 10,000 as a scrap value. The machine is expected to generate an output of 2000 units p.a.in the first 2 years and 3000 units p.a. for the next 3 years. The product is expected to fetch Rs. 15 in the first 3 years and Rs. 18 in the last 2 years. The additional cost of operating a machine is expected to be Rs. 5,000 annually for the first three years and Rs. 8000 annually thereafter.

Calculate 'cash flows after tax' (CFATs) for the above proposal on the assumption of straight line depreciation and tax rate 40%.

Calculation of depreciation.

Cost of machinery		Rs1,00,000
Add: - Transportation and Installation cost		Rs.20,000
Less:-Scrap value		Rs. 10,000
Total amount to be depreciated	=	1,10,000

$$\text{Annual depreciation} = \frac{\text{Amount to be depreciated}}{\text{Life of the machinery}}$$

$$= \frac{1,10,000}{5} = \text{Rs. } 22,000$$

Calculation of CFATs

S.N.	Year	1	2	3	4	5
1.	Output (units)	2000	2000	3000	3000	3000
2.	Price (Rs.)	15	15	15	18	18
3.	Revenue (Rs.)	30,000	30,000	45,000	54,000	54,000
4.	Operating Expenses (Rs.)	5,000	5,000	5,000	8,000	8,000
5.	Depreciation	22,000	22,000	22,000	22,000	22,000
6.	Profit Before tax (PBT) [3-(4+5)]	3,000	3,000	18,000	24,000	24,000
7.	Tax 40%	1,200	1,200	7,200	9,600	9,600
8.	Profit after tax (PAT) (6-7)	1,800	1,800	10,800	14,400	14,400
9.	**CFAT [8+5]**	**23,800**	**23,800**	**32,800**	**36,400**	**36,400**
10.	**Scrap value**					**10,000**

As it has already been pointed out that cash flows calculation should not take into account non cash expenses, therefore CFAT can also be calculated by subtracting only the cash outflows for the revenue. For example for year 1

and 2 it will be 30,000 - (5000+1200) = 23,800, for third year it will be Rs. 45,000 - (5000+7200) = 32,800 and so on.

It can be seen from the above table that although depreciation does not affect cash flows directly, because it is a non cash expense but it, nevertheless affects cash flows, because depreciation will affect profit and profit will affect tax. Thus, the amount of depreciation will have bearing on CFATs. The amount of annual depreciation is dependent on the method of depreciation followed. The straight line method followed above is for the sake of simplicity only. Alternative methods will lead to alternative figures of annual depreciation.

The Income Tax law in India permits the use of Diminishing Balances Method only for calculating permissible depreciation amounts for calculating tax liability. The Law permits depreciation rates as follows. The different types of assets have been divided into 21 categories; each category is called a block. The types of assets and permissible depreciation rates are as follows.

Block	Types of assets	Rate of Depreciation
1.	Residential Buildings	5%
2.	Office, Factory Buildings	10%
3.	Hotel Buildings	20%
4.	New Buildings acquired before march 31,1999 and before April 1,2002	40%

5.	Temporary Erection and Wooden structures	100%
6.	Furnitures	10%
7.	Furnitures used in Hotels, Restaurants Cinema houses, schools etc.	15%
8.	Plant and Machinery	25%
9.	Motor vehicles, ships, launches	20%
10.	Buses, lorries taxies	40%
11.	Plant and machinery, containers made of glass or plastics	50%
12.	Computers and new commercial vehicles acquired in replacement of condemned vehicles of 15 years of age	60%
13.	Air/ water pollution control equipment, recycle and resources recovery equipment etc.	100%
14.	Ships being vessals operative on inland waters other than speed boats	10%
15.	Know-how acquired after March 31,1998	25%
16.	Patents acquired after March 31,1998	25%
17.	Copyrights acquired after March 31,1998	25%
18.	Trademarks acquired after March 31,1998	25%
19.	Licenses acquired after March 31,1998	25%
20.	Franchises acquired after March 31,1998	25%
21.	Other business and economical rights acquired after March 31,1998	25%

METHODS OF CAPITAL BUDGETING

As indicated in the previous section, we now discuss different methods of making an investment decision.

ACCOUNTING RATE OF RETURN

The Accounting Rate of Return also called the Average Rate of Return (ARR) is the average of the rate of return for different years for the whole life of an asset. It is a ratio between the Net Profit After Tax and the amount of initial investment made in the project.

$$ARR = \frac{\text{Average PAT}}{\text{Initial Investment}}$$

Illustration (6.2):- A company wishes to make an investment of Rs. 50,000 in a machine. The machine has a life of 5 years. The profit after tax on account of this machine for next five years is Rs. 7,500; Rs. 8,200; Rs. 7,900; Rs. 8,900 and Rs. 6,500 respectively. Calculate the ARR for this investment purpose.

$$ARR = \frac{(7,500+8,200+7,900+8,900+6,500)/5}{50,000} \times 100$$

$$= \frac{(39,000/5)}{50,000} \times 100$$

$$= \frac{7800}{50,000} \times 100 = 15.6\%$$

Another view about ARR is that since we take average of the PAT for calculating ARR we should also use average level of investment for the project. In such a situation the equation for calculating ARR should be modified as follows.

$$ARR = \frac{\text{Average Profit After Tax}}{\text{Average Investment}}$$

Average Investment would be found by taking the average book value for each year. The following Illustration will explain this:

Illustration (6.3) A company decided to make an investment in a new project which costs Rs. 1,00,000. The working life of the project is expected to be 5 years after which it is expected to be sold for a scrap value of Rs. 10,000. The company's incremental PAT is expected to be Rs.6,000, Rs.7,000, Rs.8,000, Rs. 7,500 and Rs. 6,500 for the next 5 years. Assuming depreciation on a straight line basis and tax rate 40%, find out the ARR.

$$\text{Annual Depreciation} = \frac{1,00,000 - 10,000}{5}$$

$$= \frac{90,000}{5} = 18,000$$

Calculation of Book value for each year

Year / (Rs.)	1	2	3	4	5	Average
Book value of machine						
Beginning	1,00,000	82,000	64,000	46,000	28,000	-
Ending	82,000,	64,000	46,000	28,000	10,000	-
Average	91,000	73,000	55,000	37,000	19,000	55,000
PAT	6,000	7,000	8,000	7500	6,500	7,000

$$\text{ARR} = \frac{7,000}{55,000} \times 100 = 12.72\%$$

If we calculate ARR on the basis of initial investment then

$$\text{ARR} = \frac{7,000}{1,00,000} \times 100 = 7\ \%$$

Average investment can be also found by the following formula

$$\text{Average investment} = \frac{[\text{Initial value} + \text{Scrap Value}]}{2}$$

$$= \frac{1,00,000 + 10,000}{2}$$

$$= 55,000$$

Thus we find a wide gap between the two concepts. It may be further noted that some authors prefers to

calculate ARR on the basis of EBIT (Earnings Before Interest and Tax) and not PAT (Profit After Tax).

Acceptance & Ranking Rule:-

When we adopt ARR as the decision criteria, then the acceptance rule is that the calculated ARR should be greater than some specified rate. We will reject those proposals which have an ARR lower than this specified rate. So far as ranking of projects is concerned, the project with a higher ARR should be ranked higher than other project which has a lower ARR.

Evaluation of ARR Method:-

The ARR method is a relatively simple method involving the calculation of averages. It is also based on easily understood accounting information like EBIT/PAT, depreciation, investment etc. However, when it is evaluated for its suitability as a investment criteria for making long term investment decisions, we find it deficient in several respects. Firstly, it is ill defined; we do not know whether to use EBIT or PAT; Initial Investment or Average Investment. Each variable will give different values of ARR. Moreover, accounting information itself is not very certain and subject to great manipulation; Thirdly the average of income, whether EBIT or PAT ignores time value of money and hence not suitable for scientific decision making, and lastly the bench mark rate,

against which the calculated ARR will be compared is arbitrary and there is no scientific basis for deciding it.

PAYBACK PERIOD

The Payback- period is the time duration required to recover the initial cash outflows. This method is based on cash flows and not on accounting data like the ARR. Ordinary people not well versed in appraisal techniques, often use very simple technique to judge the profitability of any investment proposal. They think in terms of initial expenditure (outflow) and the time duration in which this amount can be recovered. Suppose somebody spent Rs.50,000 on any project and expects that within 3 year he can get back this amount, then the payback period is 3 years. Payback period of any proposal can be calculated as follows;

If the cash inflows are uniform then

$$\text{Payback period} = \frac{\text{Initial cash outflow}}{\text{Annual cash inflows}}$$

If the cash inflows are not uniform then

Payback period = time period in which the cumulative cash flows are equal to initial inflows.

Illustration: - (6.4) A company is considering a proposal to spend Rs. 1,00,000 on a new proposal. The cash inflows are

expected as follows. Year 1, Rs. 20,000, year 2, Rs. 30,000, year 3, 33,000, year 4, 40,000, year 5, Rs. 40,000. The payback period in this case would be calculated as follows.

Year	Cash inflows (Rs.)	Cumulative cash inflows (Rs.)
1	20,000	20,000
2	30,000	50,000
3	30,000	80,000
4	40,000	1,20,000
5	40,000	1,60,000

The cumulative column shows that Rs.1,00,000 cumulative figure comes between year 3 and 4. Fourth year adds Rs. 40,000, whereas only Rs. 20,000 needs to be added in Rs. 80,000 to make it equal to Rs. 1,00,000 (the initial investment). Assuming a uniform collection rate Rs. 20,000 can be recovered in ½ year, i.e. in 6 months. So the payback period is

$$3+ \frac{20,0000}{40,000} = =3 \frac{1}{2} \text{ years}$$

or three years and six months.

Acceptance Rule and Ranking Rule: - If the calculated payback is less than any predicted value then an investment proposal is acceptable, otherwise it will be rejected. So far as

ranking is concerned, the lower the value of the payback the higher will be the ranking of any investment proposal.

Evaluation of payback method: -

It is a simple method in concept and understanding. That is why even lay men can understand and use it with ease. Moreover, since its emphasis is on early recovery of investment, it automatically takes care of risk. Projects with smaller payback are considered safer and secure as compared to the projects with longer payback.

The payback method, however, suffers from serious drawbacks. Firstly it takes into account only early cash flows which determine the payback and ignores those which come later. This may be often leading to wrong conclusions.

Illustration (6.5):-There are two alternative projects X and Y with the following pattern of cash flows.

Cash flows

Year	Project X	Project Y
0	-50,000	-50,000
1	15,000	10,000
2	20,000	15,000
3	30,000	20,000
4	20,000	30,000
5	0	40,000
6	0	30,000

If we calculate the payback for the above projects it is 2 ½ years for X and 3 1/6 years for Y. Project X will appear to be a better project. However, a comprehensive analysis of projects would show the project Y is a superior project with greater value of inflows.

Secondly, payback method ignores time value of money. It is a simple summation of inflows without adjusting for their time period.

Illustration (6.6):-

Cash flows

Year	Project X	Project Y
0	-60,000	-60,000
1	10,000	30,000
2	20,000	20,000
3	30,000	10,000

The payback for the above two projects is 3 years, but if we analyze the timings of cash flows we find that project Y is superior because the higher cash flows are occurring initially and will have a higher value if time value of money is taken into consideration.

Thirdly, Payback period is considered only a measure of capital recovery and it is not a perfect measure for profitability.

In spite of these limitations of the payback method, it is still widely used in modern project appraisal mainly because of its simplicity and ease of calculation. However, it is used only for a preliminary screening and not for final decision making. For example, a financial institution may

decide that it will consider the projects only if they have a payback of upto 4 years. In such a case the projects with a payback less than 4 years will be considered but a final decision would be based on more scientific methods (discussed in the next unit) and not merely on payback period.

DISCOUNTED PAYBACK

The concept of discounted cashflows for calculating payback period has emerged in recent years. It is suggested by some authors that in order to overcome the limitation of payback that it does not use time value of money, we may use the discounted cashflows in order to calculate the payback period. Obviously the discounted payback will be longer than the simple payback period.

Illustration (6.7) A company is considering a project with an initial outflow of Rs. 1,00,000, the cash inflows from the project are expected to be as follows. Find out the payback period by traditional method as well as by discounted method @ 10% rate of discount.

Year	Cash flows(Rs.)
1	20,000
2	30,000
3	30,000
4	40,000
5	30,000
6	20,000

Solution

Year	Cash flows	Cumulative	Discounted	Discounted

	Rs.	Cash Flows Rs.	Cash Flows Rs.	Cumulative Cash Flows Rs.
1	20,000	20,000	18182	18182
2	30,000	50,000	24793	42975
3	30,000	80,000	22539	65514
4	40,000	1,20,000	27321	92835
5	30,000	1,50,000	18628	1,11,463
6	20,000	1,70,000	11289	1,22,752

The traditional payback is

$$3 + \frac{1,00,000 - 80,000}{1,20,000 - 80,000} = 3 + \frac{20,000}{40,000} = 3.5 \text{ years}$$

The discounted payback is

$$4 + \frac{1,00,000 - 92,385}{1,11,463 - 92385} = 4 + \frac{7165}{18628} = 4.38 \text{ years}$$

The discounted payback considers the time value of money but simply for this reason it does not become a superior technique because it will still retain other limitations of payback method. Moreover, it is not in consonance with the traditional view of payback and hence is not very popular.

Key Words

Capital Budgeting Decision: - It is a decision regarding a proposed expenditure of capital nature, which is intended to create physical assets.

Cash Flows: - It is a cash transaction. A receipt of cash is called an inflow and a payment is called an outflow.

CFAT (Cash Flow After Tax): - It is the cash receipt or payment after tax. It is the net value of cash flow.

Scrap Value: - It is the value which may be received from the sale of assets after the project period is over. It is treated as the additional cash inflow in the terminal year of the project.

Opportunity Cost: - It is the possible earning that can be made from a resource from its alternative use.

Depreciation: - It is the reduction in the value of a physical asset due to its wear and tear. It is treated as a non cash expense.

Working Capital: - It is the money needed to keep a machine working. It is used for the purchase of raw material, payment of wages and other sundry expenses; it is, therefore, needed only till the machine, plant or equipment is working. Once they stop work there is no need for the working capital and this is called release of working capital.

Self Assessment Questions:-

1. What is a Capital Budgeting Decision? What is its importance?

2. What are the different types of projects? And what is the distinguishing feature of each type of project? Which project do you think involves highest risk and why?
3. Projects are not always for certain future benefits, they may be undertaken to avoid certain penalties in future.' Discuss this statement.
4. What is Capital Budgeting Process, and who are the specialists, whose services may be needed to make a decision. ?
5. "A capital budgeting decision is not an individual's work, it is a team work." Analyse this statement.
6. What are the requirements of a good method of capital budgeting decision making? Give an overview of different methods.
7. Why do we use a cashflow analysis instead of a profit analysis in a capital budgeting decision? What are the general principles of cash flow estimation?
8. "Interest payment is not accounted for in capital budgeting decision, even though it involves cash flows," Why?
9. What is an ARR and how is this to be calculated?
10. What is a payback and what is its importance?
11. Calculate CFATs (Cash flows after taxes) in the following example.

(a)	Initial investment	Rs.2,00,000
(b)	Additional cost of installation & Transport	Rs.50,000
(c)	Life	6 years
(d)	Scrap Value	Rs.40,000

The projected output, the price, the operating expenses are as follows.

Year	Output (Units)	Price per unit (Rs.)	Operating expenses (Rs.)
1	2,000	22	8,000
2	3,000	22	12,000
3	4,000	25	20,000
4	5,000	25	25,000
5	4,000	25	25,000
6	4,000	30	30,000

Assume straight line depreciation and a tax rate of 40%.

12. Calculate ARR in the above example on the basis of initial investment and average investment.
13. Calculate pay back period on a traditional basis and also on a discounted cashflow basis assuming a discount rate of 8%.
14. Given below are two investment proposals with earning before Depreciation and tax.

	Project X	Project Y
Initial investment (Rs.)	50, 000	60,000
Life	4 yrs	5 yrs
Additional sales revenue (Rs.)	20,000 p.a	18,000 p.a
Additional expenses (Rs.)	5,000	4,000 p.a
Tax rate	40%	40%

Evaluate them on the basis of payback and ARR. Which one is a superior project on each basis?

Solutions

11. Annual Depreciation = $\frac{2,00,000 + 50,000 - 40,000}{6} = 35,000$

Calculation of CFATs

Year	1	2	3	4	5	6
Output units	2,000	3,000	4,000	5,000	4,000	4,000
Price	22	22	25	25	25	30
TR	44,000	66,000	1,00,000	1,25,000	1,00,000	1,20,000
Expenses	8,000	12,000	20,000	25,000	25,000	30,000
Depreciation	35,000	35,000	35,000	35,000	35,000	35,000
PBT	1,000	19,000	45,000	65,000	40,000	55,000
Tax @ 40%	400	7,600	18,000	26,000	16,000	22,000
PAT	600	11,400	27,000	39,000	24,000	33,000
CFATs	**35,600**	**46,400**	**62,000**	**74,000**	**59,000**	**68,000**

12.

$$ARR = \frac{\text{Average PAT}}{\text{Initial Investment}} \times 100 = \frac{(1,35,000/6)}{2,50,000} \times 100$$

$$= \frac{22,500}{2,50,000} \times 100 = 9\%$$

$$ARR = \frac{\text{Average PAT}}{\text{Average Investment}} = \frac{22,500}{(2,50,000 + 40,000)/2} = 15.52\%$$

13. **Payback Calculation**

Year	CFATs (Rs.)	Cumulative CFATs (Rs.)	Discounted CFATs (Rs.)	Cumulative Discounted CFATs(Rs.)
1	35,600	35,600	32,962.96	32,962.96
2	46,400	82,000	39,780.52	72,748.43
3	62,000	1,44,000	49,218.07	1,21,961.55
4	74,000	2,18,000	54,391.77	1,76,353.32
5	59,000	2,77,000	40,155.17	2,16,508.49
6	62,000	3,39,000	39,069.88	2,55,598.37

Payback Period, $= 4 + \frac{32,000}{59,000} = 4.54$ years

Payback Period (discounted) = $5 + \frac{33,491.51}{39069.88} = 5.86$ years

14.

	Project X	Project Y
Initial Investment	50,000	60,000
Annual Depreciation	12,500	12,000
PBIT	15,000	14,000
Tax	6,000	5,600
PAT	9,000	8,400
CFAT	21,500	20,400
Payback	$\frac{50,000}{21,500} = 2.33$	$\frac{60,000}{20,400} = 2.94$
ARR	$\frac{9,000}{25,000} \times 100 = 36\%$	$\frac{8,400}{30,000} \times 100 = 28\%$

Project X is superior on the basis of both payback as well as ARR.

UNIT-7

CAPITAL BUDGETING II

In the previous unit, we have seen the two methods of investment decision making – i.e. ARR and Payback. They are only elementary methods and are not considered very scientific and, therefore, can lead to wrong conclusions. In this Unit we are going to study the scientific and, therefore, more appropriate methods of capital budgeting. These methods come under what is called discounted cash flow approach. The first and the most commonly used one is called Net Present Value Method.

NET PRESENT VALUE :- It is net present value of all the cash flows that occur during the entire life span of a project: The outflows will have negative values while the inflows will have positive values. Obviously, if the present value of inflows is greater than outflows, we get a positive NPV and if the present value of outflows is greater than inflows, we get a negative NPV. The positive NPV means a net gain in value maximization and, therefore, any project which gives a positive NPV is an acceptable project and if it gives a negative NPV, then the project should not be accepted. NPV can be expressed as follows;

$$NPV = \sum_{t=1}^{n} \frac{A_t}{(1+i)^t} - \text{Initial investment}$$

Where

A_t= cash flow at time t

i =The rate of interest or cost of capital at which funds are to be discounted

Investment= The initial amount spent on a project

If initial investment is also treated as a cash flow then it can be written as follows

$$NPV = \sum_{t=0}^{n} \frac{A_t}{(1+i)^t}$$

Acceptance Rule & Ranking Rule

The acceptance rule for NPV is that, if it is positive, then the proposal should be accepted and if it is negative then it can not be accepted. In case of same size projects, the higher the value of NPV the higher would be the ranking of a project.

Illustration (7.1):-A firm is considering an investment proposal worth Rs.80,000. The CFATs (cash flows after tax) are expected to

be as follows. The rate of discount is 10%. Find out whether the project is worthwhile or not.

Year	CFATs (Rs.)
1	15,000
2	22,000
3	27,000
4	29,000
5	21,000

Solution

$$NPV = \sum_{t=1}^{n} \frac{A_t}{(1+i)^t} - C_0$$

$$= \frac{15,000}{1.1} + \frac{22,000}{(1.1)^2} + \frac{27,000}{(1.1)^3} + \frac{29,000}{(1.1)^4} + \frac{21,000}{(1.1)^5} - 80,000$$

= 13,636.36 + 18,181.82 + 20,285.50 + 19807.39 + 13039.43 - 80,000

= 84,950.50 - 80,000 = **Rs. 4,950.50**

In this project the PV of inflows is Rs. 84950.50 while the PV of outflows is Rs. 80,000. Hence the NPV is Rs. 4950.50 which makes the project an acceptable project because NPV is positive.

Interpretations of NPV: - NPV is the absolute value of a net gain in future. This may be treated as a net addition to the value of the firm and therefore, is also called unrealized capital gain.

Another interpretation of NPV is that it represents the maximum price that a firm should pay for foregoing the right to undertake the project or to sell the project to some other party.

It also represents the amount that a firm could raise from the market at given rate of inertest, in addition to the initial cost of the project, and ensure that this will be paid off from the receipts of the project. For example; A firm is undertaking a project at a cost of Rs. 50,000 with a positive NPV of Rs. 10,000. In this case, the firm can not borrow merely Rs. 50,000 to meet the initial cost, but can also raise Rs. 10,000 (for any other purpose) and be rest assured that this sum with interest can be paid off from the proceeds of the given project.

Properties of NPV: - The NPV method is a very scientific and appropriate technique of capital budgeting and is therefore, widely used for investment decision making. The following properties can be identified.

It is based on cash flows over the entire life of project.

(i) It considers time value of money.

(ii) It is an absolute value.

(iii) It possesses the property of additions, i.e. the total NPV of two projects is the summation of their individual NPVs.

(iv) NPV for different rates of interest can be found separately, and

(v) It allows different rates of interest for different time period in the life of a project.

Limitations of NPV

It gives the absolute value and therefore, comparison between two different projects is not easy, especially when they are of different sizes.

(i) Many a times, it is not possible to know in advance the rate of interest at which discounting is to be done. Similarly a given NPV may not be appropriate if the rate of interest has changed.

(ii) It may lead to wrong decision making especially when limited funds are available and we have to choose between different options.

UNIT 8 SOURCES OF LONG TERM FINANCE

Structure

8.0 OBJECTIVES

After studying this unit you should be able to:

- List different sources of long term finance
- Discuss the characteristics of equity finance and preference capital and how a company can issue new equity finance
- Explain different types of debentures/bonds their features merits and demerits
- Discuss term loan, and venture capital

8.1 INTRODUCTION

Finance is the money necessary to be raised for an enterprise. The requirement may be for short periods or long, which would determine the type and source of finance. Money can be raised for short-, medium- or long-terms. Long-term finance is typically finance of maturities of over five years.

Long-term finance is required for medium to long-term purposes to meet the cost of acquisition of fixed assets for diversification, expansion, modernisation as also, to meet permanent working capital requirements. There have been findings that firms grow faster and are more productive when more long-term finance is available to them. Government subsidies do not produce the same effect and in some cases are associated with less productivity and growth.

The sources of finance can be in the national currency, which in India is the Indian Rupee. Since liberalisation of the economy, finance can

also be availed in India in foreign currency such as the US Dollar, Great Britain Pound, Euro etc.

In this unit you will learn above different sources of long term finance their features and advantages.

Long-term finance can be categorised into three broad groups depending on the sources of funds viz. a) own b) borrowed and c) other.

a) Own funds include 1) equity share capital 2) preference share capital 3) convertible preference share capital 4) reserves or retained earnings

b) Borrowed funds include those raised from 1) convertible debentures 2) non-convertible debentures 3) fixed deposit 4) term loans 5) lease/hire purchase/suppliers' credit

c) Other funds can be 1) subsidies 2) factoring 3) venture capital 4) ADR/GDR/bond issues 5) seed capital

Borrowing and lending are beneficial if it is more widespread. If a large amount of money were to be borrowed, for a long period of time, one would find it difficult to find a lender. If however, a debt were transferable, it would be easier to find many people willing to lend the same amount over shorter periods of time. The ability to transfer debt is made possible by the use of credit instruments. These are written evidences of the extension of credit. By selling the credit instrument, debt is transferred from one person to another.

Money is generally, made available through financial contracts referred to as financial instruments. Their terms and conditions largely determine the nature of the instruments. These instruments become the sources of finance. Credit instruments have some common features such as identity of the debtor, amount of debt, arrangements as to maturity and payments of interest.

Some instruments essentially have short terms and are used for short-term requirement of funds while others finance long-term requirement of funds. Capital markets are the source of long-term finance where as source of short-term finance is called the money market. The entities that participate in the capital market are government, banks, financial institutions, and businesses.

Generally, the type of capital that a company can acquire requires a

provision in its articles of incorporation. The decision on capital structure (mix of debt and equity) is generally taken on the basis of the effect of taxes the company and its claim holders pay, cost of raising it or its investment policy. Debt enjoys tax benefit over equity as allowed by governments. Further, in the case of debt, tax is paid on before-tax earnings.

An investment policy would help as otherwise companies may simply decide to stop investment when faced with too much debt, since revenues from investment would largely go to pay off debt, while cost of raising funds would be borne by all investors, especially equity holders. Too little debt can also be bad; especially in mature industries where companies not disciplined by the need to service debt, can fritter away excess cash in unprofitable investments. Long-term debt is the preferred mode of finance since it is less onerous to service, considering both interest and principal do not have to be paid in the short run.

The first step in sourcing involves ascertaining resource requirements and defining borrowing parameters such as maturties and sourcing. Even though the sources are many, markets and instruments may not be accessible to all borrowers. Companies then have to do a cost analysis to decide the source or sources to be tapped.

In this Unit, we shall discuss about retained earnings, equity capital preference capital, debentures, bonds, term loans and venture capital in detail. Let us start with Retained Earnings.

8.2 RETAINED EARNINGS

These are the earnings of an entity and it includes surplus or net income or profit, for the current accounting year after distribution of dividend i.e. the amount available for carrying forward into the next accounting period. It also includes accumulated profits of past periods left invested in the business but not definitely allocated for any purpose. Retained earnings can be appropriated for contractual agreements requiring such appropriations provided it is permitted by the board of directors.

Retained earnings are those earnings, that are kept as reserves in various reserve accounts. They are shareholder funds and are used for purposes of capital or current expenditure of the company. When they

reach a level of accumulation, with due regard to taxation, they may be distributed as bonus shares, to the existing equity holders, in a certain ratio to their equity holdings.

There is a general belief that dividend yield is the most important indicator of stock value. Nevertheless, companies can create value for shareholders with earnings that are not paid out as dividends. Retained earnings can be used for buying back share, retiring debt or reinvesting for growth which action can increase future earnings per share. If the return that the organisation receives from its retained earnings matches that which can be achieved by the individual investor, the dividend payout will not matter. Retained earnings can finance only a part of investment programmes since they are generally insufficient to provide all the needed funds.

Some companies do not pay dividends at all, because they wish to retain the funds for expansion. They do not think it necessary to formalise the retention of earnings by declaring a stock dividend and would argue that there were no advantages in issuing more shares, thereby imposing a burden on the management to maintain future earnings. If earnings could not be maintained, the dilution effect would take place (retained earnings, when invested, earn a smaller amount than do previously invested funds, hence earnings are said to be diluted). Alternatively, companies may not pay dividends because they cannot afford them with their present and future expectation of profit. Perhaps the company is in receivership or is being reorganised.

Retained earnings offer such advantages as not having to approach lenders or shareholders, eliminating costs of issue and losses by virtue of underpricing.

8.3 EQUITY CAPITAL

The stock/shares of a company issued to investors for money or property or out of accumulated earnings constitutes its equity capital and it is divided into a number of equal parts of shares, usually with a specified par value.

It is the capital raised by issuing stock and is the asset of a company. It is limited by the company's articles of association and its bye-laws and the amount authorised towards share capital. A company issues shares of equal values amounting to the value of authorised capital. It is however, not obliged to issue all shares up to the authorised

amount. Issued and outstanding shares are certificates of ownership held by the shareholder and it represents the shareholder's interest in the company, as also the amount of accountability of the company to the shareholder but is uncollectable by the latter through legal procedure. Any amount of the authorised capital stock not issued is known as unissued stock.

Common stock (equity capital) is an ownership security. When common stock is issued, there is no guarantee or contractual agreement that the dividend will remain fixed or even that the dividend will be paid. This makes income for the shareholder, unstable and uncertain. Therefore, stock prices fluctuate widely, and both principal and current income could be lost. It guarantees nothing to the owner except the right to share in the earnings of the company. If earnings do not materialise or if losses are sustained, then the stockholder must share the losses up to the asset value of the company. The significance of this statement is that there is nothing certain about earnings on common stock, and the investor can lose as well as earn a profit. However, the stockholders liability is restricted to the capital contributions/investments in stock.

It is classified as long-term source of funds, because it has no maturity. Bonds and mortgages represent debt whereas stocks represent ownership. Money market securities are expected to be cheaper to a company and offer a low return to the investor but then they require to be serviced within a short period. Equity capital is expected to give higher return to the investor than most debt securities because it exhibits a higher degree of risk.

Equity capital is used for financing new business or expanding existing ones. It represents partial ownership of a company. The investor becomes owner. The equity-issuing company is not obliged to repurchase its stock at any time in the future. Shareholders can sell the stock to other investors in the secondary market. Stocks are issued for obtaining long-term funds and investors may wish to obtain partial ownership and therefore invest long term.

More specifically, it is the contribution of the owner(s) who bear(s) the risk of ownership and is rewarded by way of dividend or profit. It is raised by promoter's contribution or public issue of shares. Contributors to such capital have voting rights. Typically, each share of common stock has one vote. This is referred to as ordinary voting.

The advantage of this type of voting is that it allows a minority group of shareholders or an individual shareholding of a large amount of stock to be represented on the board of directors. Granting stock options for management, approving mergers, issuing debt securities, waiving the right to subscribe to new shares, changing the par value of the stock, increasing the authorised capital of the company, election to the board of directors, approval of amendment to corporate charter and adoption of bye-laws are all matters upon which the owners may vote. However many shareholders fail to vote, as a result, management normally receives majority of the votes and can elect or bring about changes as desired.

However, non-voting shares, as the name suggests, can also be issued. Historically, non-voting class of common stock was issued to allow the original voting stockholders to maintain control; non-voting stock could be sold to allow the original voting-stockholders to raise additional money without losing control of the company. Non-voting stocks are seldom used today for this purpose, as certain institutional changes have tended to work against their use.

A company uses the incentive of higher dividends to compensate the non-voting shareholder. Non-voting shares would help to keep at bay the possibility of hostile takeovers (since they have all the features of the voting share) and the chief executive of a company can refuse to register change in ownership.

The equity investor is apparently preoccupied with short-term profit and dividend announcements. In some cases, the right to vote is taken away from a portion of the common stock. A company might issue class A and class B common, for example, one class with voting rights and the other with limited rights, or none at all. The company must note that the investor is also vitally concerned with the yield earned over the period that the stock is owned, since the yield for the holding period represents the total earnings to the investor and is a measure of performance to be compared to those of other securities investments.

In some instances, companies may use bonds, scrips and notes to pay dividend on stock, when as a matter of conservative financial policy, none should be paid. The weakness of the practice is that the stockholder receiving the dividend changes his relationship to the company. He/she becomes a creditor rather than an owner. An

investor could interpret these types of dividends as a sign of financial weakness rather than as benefit.

Since equity is residual claim, it is much more sensitive to a company's value than debt. As a result, if organisations want to raise equity, the market may not be ready especially if it is to be raised at short notice. Generally equity issuances are looked upon as bad news as it signals that the company is not confident of servicing additional debt or that it intends to share impending losses with new investors. Over valued companies too may be tempted to issue equity.

Usually there is little secondary market for securities that have been privately placed; for example, a bank that lends money to a company cannot easily sell that loan on to another investor, though sales of bank loans do occasionally take place. Lenders such as banks need to be compensated for the lack of marketability and therefore private placements generally, carry a higher rate of interest. In some cases, private placements can be bought and sold freely but only within a limited group of investors.

Those investments, which are issued to the public at large, are frequently listed on a stock exchange or they may be freely traded 'over-the-counter' through investment dealers. However, there are also many investments that are publicly offered but cannot be resold easily.

Public issues can take many forms. Sometimes securities are auctioned off to the highest bidders; at other times, securities are offered for sale at a fixed price. Within these two broad classifications there are many variations.

Earnings yield provides a measure of the relative valuation placed on equity claims on corporate earnings streams and for that reason, are considered by many to be a more useful measure of the cost of capital than the market price of shares alone. Their inverse, the price/earnings multiple(p/e) is more widely quoted, but provides similar information. Higher earnings yields reflect a higher cost of equity and coincide with lower levels of issuance activity.

Some companies pay a dividend of both cash and stock, which is attractive to all stockholders. The company recognises that a policy of paying some dividend is desirable and that some people desire stock dividends for tax advantages. The company itself might wish to

conserve cash for investment in plant or working capital.

No amount of stock dividends will turn a company with declining earnings into an investment success. In principle, a stock dividend is valuable only if the company continues to grow and prosper. Stock dividends are desirable however, when a company must conserve cash or is experiencing rapid growth, where per-share earnings and price will not be diluted and when the investor is in the tax bracket where cash dividends are not wanted.

Dividends are declared by the board of directors. The date of announcement usually precedes the date of record by several weeks. After the date of record, the stock sells ex-dividend; that is, a person buying it after that date does not receive the declared dividend. A person who buys stock in anticipation of receiving a dividend, must make certain that he becomes a stock holder of record before the stock goes ex-dividend. He must buy the stock with the dividends 'on'. The actual date of payment will be some time after the date of record.

8.5 PREFERENCE CAPITAL

Preference shares are so called, because they confer preferential right to payment of dividend at a fixed rate and for repayment of capital at the time of winding up of a company. Because of the fixed rate of dividend, they share a feature with debt instruments. Preference shares may be cumulative or non-cumulative, redeemable or irredeemable(perpetual), convertible or non-convertible and participating or non-participating.

Dividends on preference shares are said to be cumulative when it accumulates year after year if it is not paid for any year i.e. profits are insufficient to pay dividend at the full rate for the year. The unpaid dividends constitute a claim, which gets precedence over dividends on common shares. Therefore, dividends cannot be paid on common shares so long as there are arrears of dividend on preference shares.

Dividends are non-cumulative if profits are insufficient to pay in full the dividend for the year, although they are a prior claim in any given year, and they do not accumulate i.e. if dividend is not possible to be paid in any year it is lost. The company does not have an obligation to pay it subsequently.

Preference shares are redeemable when they have a limited life after

which the company has to retire them. Most preference shares are redeemable. Usually the preferred stock is callable at the option of the company. The call or redemption feature allows the company to retire all or part of the issue at a price stated in the original agreement. This provides flexibility to company management but is detrimental to the investor. Dividends on preferred stock, are stated as a percentage of the par value. Dividends in arrears, because of a cumulative nature, may often force a company to change its capital structure or to recapitalise to eliminate past unpaid dividends. When recapitalisation is completed, the company will once again be in a position to pay dividend on common stock. A perpetual preference share has no maturity.

Preference shares are convertible if there is a provision for their conversion into equity capital after a specified period in a certain ratio to the existing shares. If such provision is not made, preference capital cannot be converted to equity capital. Convertible preferred stock enjoys the advantage of enabling a share in the profit of the company through capital growth of common stock. Such stocks offer the investor greater stability and security of income than do common stock and at the same time, an opportunity to hedge against loss of purchasing power caused by inflation if the common stock increases in price. The investor retains the risk of loss, however, because of yield variability. Convertibles provide a good, aggressive defensive security for the investor and are an attractive instrument when unusual uncertainty surrounds the market. If the common stock price rises, the price of the preferred will increase, and the preferred investor will share in the gain. Should the market decline, and along with it the price of common stock, preferred stock will then sell as regular preferred, offering greater security of price than the common stock.

A danger of convertible preferred stock is that it could be called for redemption. Most preferred stock issued today, particularly convertible preferred is callable at the option of the company. If it is called, the investor has the option of accepting the call or redemption price, or converting his preferred stock into common stock. A convertible preferred usually offers less risk and less reward than a common stock as a basic principle. If the preferred dividend is eliminated by a recapitalisation of the company, the investor continues to be in a relative poor position. In the recapitalisation process, preferred dividend arrearages are exchanged for either

common or preferred stock. In come cases both the preferred stock and dividends are exchanged for a new preferred or combination of preferred and common stock on the theory that the company will be able to afford to pay the new dividend rate on a regular basis. One typical arrangement is to exchange the old preferred for common stock on which there is no dividend requirement. These changes help the company meet its immediate problem of being unable to pay dividends, but they usually impose more severe requirements on future dividends. The net effect is that the investor is in a junior position and does not receive any greater income than he would have if the recapitalisation had not taken place. Preferred with dividend arrearages are weak speculative securities that offer the investor high rewards along with high risks.

Some investors consider preferred stock with large arrearages an attractive outlet for their funds. The reason being that the unpaid dividends might eventually be paid in cash, or the capitalisation of the company might be changed and the arrearages eliminated by issuing stock to replace the dividends. This type of reasoning may be true in certain unusual situations, but it does not generally hold. A company that has not paid current dividend from past earnings has not had sufficient earnings to meet its claims. The circumstances that created arrearages in the first place, often continue so that these claims cannot be paid off in the future, and current dividends may not be paid. This is true of the majority of companies that have dividends in arrears. The investor who purchases the preferred with arrearages is speculating on the possibility of a windfall that is unlikely to occur.

Preference shares are participating, when they attract a share in the profits over and above the guaranteed fixed rate of dividend. The level of dividend, payable on equity shares is then specified at, and over which, dividend is required to be paid on preference capital.

Preferred stock dividends are technically, compensation to owners of the company and therefore dividends are not tax deductible. Preferred stock(unless redeemable) has no maturity and therefore represents a permanent source of finance. From a cost perspective, preferred stock is a less desirable source of capital, than bonds. Because there is no legal requirement for a company to pay preferred stock dividends, investors must be enticed to assume the risk involved by receiving

higher dividends. Because dividends on preferred stock can be omitted, firms assume less risk when they issue it than when they issue bonds. However, if a company omits preferred stock dividends, it may be unable to raise new capital until the omitted dividends have been paid, because investors will be reluctant to make new investments in a company that is unable to compensate its existing sources of capital.

Preferred stock, an ownership security, has certain risks not associated with a fixed income debt security. Dividends are contingent upon earnings rather than mandatory as in the case of interest on bonds; and the preferred stock's claim on corporate assets is subordinate to that of bonds. Yet, dividends on preferred stock are usually fixed in amount, just as with bonds. In many respects, preferred stock is a unique security.

Companies have not relied heavily upon preferred stock as a major source of funds. New preferred issues have represented only a small portion of the money raised by companies through the sale of securities because preferred stock does not possess the tax advantages of bonds, yet the payment of dividends is almost as binding as the interest payment on bonds.

There are however, preferred stock attributes that make them of interest to certain investors.

1. Preference of their dividends, on earnings of the company.
2. Claim on assets over common stock in the unusual case of liquidation and in the more usual case of reorganization, refinancing or adjustment of a company's capital account.

Preferred stock is usually non-voting. Its owner does not vote to elect company directors. However, it has contingent voting rights. That is in times of financial trouble when dividend payments are in arrears, preferred stockholders would be given the right to elect some of the directors. It has no maturity date and therefore in this respect it is similar to common stock.

The investor who buys preferred stock is interested in stability of income, and for this reason may be more interested in the safety of his/her dividend than in the net assets per share. If the company is able to maintain adequate earnings on each share outstanding, the

dividend will be secure. When preferred stock represents only a small part of the capital structure, earnings per share will be extremely high and will provide adequate coverage of the investor's dividend, insuring stability of income.

Preference or preferred shares rank after bonds and floating debt but ahead of common shares. Debt interest takes priority over preferred and common dividends. When both, bonds and preferred stocks are issued, the company must demonstrate an ability to cover adequately all charges against income. The advantage of preferred stock ownership is its stability of income; if dividends are in jeopardy, the investor will lose this advantage. Preferred stock is a hybrid. It does not share in earnings of a company, nor does it have security of a bond. However, these are simply its limitations for investment, its use is not completely precluded and under some conditions is whole-heartedly encouraged.

Ordinary preferred stock is attractive to investors who want more income than they could receive from bonds. The yield on high-grade preferred stocks is unusually greater than that on investment grade bonds and there is a comparable degree of price stability. These stocks would offer the investor somewhat more income with only a moderate decrease in security. A high quality preferred stock of a sound company, with adequate assets and earnings coverage, will be more attractive to the investor having an immediate need for maximum current income and desiring stability of yield as well. The high-grade preferred fluctuates in yield but follows the pattern of money rates closely.

Check Your Progress A

1) What are the rights of an ordinary shareholder ?

2) What are redeemable preference shares ?

3) Differentiate between voting shares and non voting shares ?

4) What are cumulative preference shares ?

8.5 DEBENTURES / BONDS

Debentures and bonds are terms used for long-term (other than the general assets of the issuer) debts. They are loans taken by a company from the public. Debenture simply means a document, acknowleding

a loan made to a company and, providing for payment of interest on the sum borrowed, until the debenture is redeemed that is the repayment of principal sum. It may or may not be under seal and does not necessarily imply that any charge is given on the company's assets, though such charge usually exists.

Debentures are transferable like equity shares by the execution of transfer deeds and registration of transfer in the books of the companies. Transfer deeds may not be date-stamped as in the case of equities. Stamp duty is payable on debentures and the rates vary from state to state. The rates are different from those payable on equity shares.

Unregistered debentures are bearer bonds that are freely transferable by endorsement and physical delivery, without registration with the company. There is no need for execution of a transfer deed. These are generally not favoured, due to difficulties in establishing ownership for repayment of principal and the fear of loss of the certificates. Interest is paid on production of the warrants/coupons, attached to the certificates.

Redeemable debentures are those where the principle amount is repaid after a fixed period of time, in one or more instalments, as per terms of the issue. Irredeemable debentures, can be repaid only at the will of the company i.e. there is no fixed period for repayment. Convertible debentures are those which at the option of the debentures holder can be converted into equity or preference shares, at the specified rate of conversion, after a certain period. Preferential debentures are those that may be repaid, only at the time of liquidation of the company. The latter debentures are not permitted to be issued. Interest on debenture is a debt. It is fixed and known is called contractual or coupon rate of interest. It is payable whether they are profits or not. Such interest is usually to be charged against income account before arriving at the profit for the year. The interest on debenture is generally paid in accordance with the agreed terms. A debenture should contain the provisions (a) an agreement to pay interest and (b) a provision stating that if the principal amount is not paid back at the due date. The interest shall continue to be payable at agreed date. There is no different between bonds and debentures in India. Both are debt instruments issued by corporations or

government. Dated securities issued by central government, state government and semi government authorities are usually called bond in India even though there are no hard and fast rules about these. Bonds issued by the government are also called `GLITS'. Government bonds are usually known as GOI secs or Guild Edged Securities. This means that these securities are of the best quality. Individuals, firms, companies, corporate bodies, state government, provident funds, banks, insurance companies, NBFCs, etc. can invest in them.

Bonds sold by government corporations and agencies offer investment outlets for funds, individuals and institutions. These bonds may or may not, be backed by government guarantee.

In spite of large and increasing debt, governments enjoy a good credit position with domestic and sometimes foreign lenders. Most bond-rating agencies, give government bonds the highest rating. So the **first** advantage of government securities is their obvious quality and the security they afford the investor. A **second** is the stability of income they provide, particularly the long-term government securities. A **third** is their great degree of marketability. There is a broad and ready market for government securities, particularly among institutional investors, or they can be sold quickly and easily in the bond market when funds are needed immediately. Also, government bonds eliminate the market risk and the business risk because of their security of principle and stability of income. A fourth advantage is their ability to meet the investment needs of financial institutions and institutional investors.

Disadvantages are several. Unless the investor buys government bonds that are selling below par, there is no capital gain without trading in the securities. Government securities are debt instruments. The government simply guarantees to repay principal at maturity. The income is stable and secure but offers no chance for increase in the future as the interest rate is established by contract and will not be changed over the life of the bond. They do not provide guard against risks of inflation and changes in money rate. Bonds do not provide a hedge against inflation because incomes and maturity values are fixed. If yield in the market should increase, the price of the bond existing in the market place will decline and the investor will lose if the bond must be sold. Even if he can hold, the investor will lose the difference between the low rate of interest paid on the existing bond

and the rates on the new bonds. If a person can invest in the bonds at a high rate of interest this risk of loss is minimised. In this situation, if yield declines, the price of the bond will go up, and the investor will gain owing to the inverse relationship between bond price and bond yields.

Bonds are classified as treasury or corporate bonds depending on the issuer. The treasury bonds, are commonly called government securities in India. Bonds may have a call feature allowing the issuer to repurchase the bonds prior to maturity. The bid price (what the buyer is willing to pay) and the ask price (what the seller is willing to sell for) are quoted on the face value which is generally Rs.100/- per bond.

It is a promise by the borrower to pay to the lender, a certain sum of money at a fixed future date. It differs from a promissory note, in that, it is issued in a series and in like tenor and account. It is generally, issued for periods not less than 5 years and up to 30 years. Although the bond is assignable, it is not negotiable.

It differs from a share of stock in that it is a promise to pay with different terms as to amount, interest, maturity, whereas the share contains no promise to repay. The bondholder is a creditor whereas the shareholder is the owner. Although both bonds and shares may be traded, the former are quoted as a percent of their face value. The coupon rate or interest rate, is also shown in the bond. Interest is usually paid semi-annually and is based on the face value of the bond.

Bonds, which have a single fixed maturity, are called term bonds, whereas serial bonds are those that repay the principle in a series of instalments. If, bonds are sold at a price above the face value, it is said to be sold at a premium. If bonds are sold at a premium, it would mean that the effective interest rate would be less than the nominal because the issue would receive more than the face value but the issuer would be required to pay interest on face value.

If the bond is sold below its face value, it is said to be at a discount. In that event, the issuer would receive less than the face value but pay interest on the face value, thus making the effective interest rate higher than the nominal.

Floating rate bonds allow the investor to benefit from a rising market in interest rates over a period of time, whereas they allow the issuer to

benefit from declining rate over period of time.

Bonds classified by their ownership structure, are bearer bonds or registered bonds. The former require the owner to clip coupons attached to the bonds and send them to the issuer to receive coupon payments. Registered bonds require the issuer to maintain records of who owns the bond and automatically send coupon payments to owners. Bonds are generally, registered in the name of the investor, by the issuer.

Coupon bonds, are those that can be transferred by one investor to another by delivery along with interest coupons attached to the bond. On scheduled interest payment dates, coupons have to be detached and submitted to the issuer or its agent.

A zero coupon bond is one where there are no periodic payments of interest but one at maturity. The maturity value is the principle plus interest compounded semi-annually at the original interest rate.

The warrant bond is a type of security that offers the investor some of the same advantages as convertible bonds. One warrant is associated with one bond, but a warrant attached to the bond gives the owner the right to buy a specified number of common shares at a stated price - called the subscription price - for a limited period of time. The time-period may be as long as five years. Therefore, it is not a short-term agreement. The warrant, may be exercised separately from the bond, in which case it is called a detachable warrant. A bond having a detachable warrant could benefit the investor in one of two ways 1) if the warrant could be sold and the gain realised or 2) the warrant could be exercised and the stock bought at the option price, then sold at the market price. If, the stock were held and the ownership of the bond retained, the investment position would change. The investor would be a bondholder and a stockholder. The warrant however may be non-detachable, in which case it would be necessary to send the bond to the company's agent. He would detach the warrant and return the bond at the time the option was to be exercised.

Bonds with warrants allow investors to share in the growth of company without undue risk, by participating in the potential increase in value of the common stock. If the market price of the common stock remained below the subscription price set in the bond agreement, then the bond would be held without exercising the warrant. If the stock increased in price, the warrant could be sold and

the bond retained. A profit on the warrant could be earned, and a s afe debt type security could be held for investment.

Bonds with warrants, however, are not common in present-day markets as the more popular convertible bonds. The market price of the bond plus the market value of the stock from the warrant, compared with the market price of the bond plus the cash cost of exercising the warrant, will help decide the relative advantage of buying the bond or the stock. Bonds with stocks selling on a high current-yield basis might be attractive because of the expected profit potential of the growth in common stock price. The ability to share in price increases by means of warrants is not as great as it is for convertible bonds. The warrant bond offers protection against purchasing power and business risk. Bonds with warrants offer a higher yield and a higher risk than ordinary bonds.

Convertible bonds are those that may be exchanged for equity during a specified time and at a determinable or determined price. Non-convertible bonds are tradable and transferable like other debentures and may be redeemable after a specified period.

In convertible bonds the conversion is effected at the conversion price i.e. the price at which the shares of stock may be exchanged or the conversion rate i.e. in terms of the number of shares at which each bond may be converted. It makes little difference how the conversion is established; the effect in either case is the same. Convertible bonds offer the possibility of an increase in capital value. A disadvantage of such bonds is their relative lack of security compared to other corporate debt. Most are rated, lower than comparable non-convertible bonds. Many convertible bonds are subordinated to other debts, giving them a junior claim to assets in case of failure.

Convertible bonds are hybrid instruments having both debt and equity characteristics. Like straight bondholders, holders of convertibles are entitled to receive coupons and principal payments. However, the holder of convertible bonds can forego these cash flows by converting their bonds into pre-specified number of shares. Companies seek capital in this form when they believe that their stock price would rise over time and convertibles provide a way of selling common stock at a price above the existing market price. It also provides a way to lower dilution over an outright equity issue. The equity sweetener of the convertible bond, also allows for the coupon to be lower. Thus,

convertible debt can be a cheaper source of finance as the equity makes it less sensitive to changes in risk. Therefore, compensation for increases in risk will not be required.

Value can be shifted from debt to equity by increasing risk of the company's projects since limited liability protects equity if the company should perform poorly.

Bonds go some way to limit a company's ability to increase risk. Therefore, shareholders may actually wish to increase risk while the actual value of the company falls.

Undervalued companies would be tempted to issue debt, whereas over valued ones may be tempted to issue equity. Convertibles fall somewhere in between when under-valuation is not grossly so. Thus, a company signals its value by its choice of capital.

Bonds, that are perceived to have high risk are referred to as junk bonds. As a result, they offer relatively higher yields. Issuers may wish to expand without issuing new stock so that profits can be distributed to existing shareholders. The higher yields contain a risk premium.

The call provision normally requires the firm to pay a price above par value when it calls its bonds. The difference between the bonds call price and par value is the call premium. Call provisions have two principal uses. One is, should market interest rate decline after a bond issue is sold, the firm may end up paying higher rate of interest than the prevailing rate for a long period of time. Under these circumstances the corporate can consider selling new issue of bonds with a lower interest rate and use the proceeds to retire old issues by calling the old bonds. Bondholders may consider the call provision as disadvantage because it would reduce their return and disrupt their investment plan; as a result corporate pay slightly higher rates of interest on bonds that are callable.

The issuer's cost of financing with bonds, is commonly measured by the so-called yield to maturity, which reflects the annualised yield that is paid by the issuer over the life of the bond. The yield to maturity is the annualised discount rate that equates the future coupon and principle payments to the initial proceeds received from the bond offering. The yield to maturity does not include transaction costs associated with issuing the bond. An investor who invests in a bond when it is issued and holds it till maturity will earn the yield to

maturity. But investors do not hold a bond until maturity, and focus on the return for the holding period. If they hold the bond for a short period (less than 1 year), the return will be the sum of coupon payments plus the difference between the selling price and purchase price as percentage of the purchase price. If the bond is to be held for a long period the yield is the annualised discount rate that equates the payments received to the initial investment. Since the selling price of the bond is uncertain if they do not hold the bond to maturity, the holding period yield is uncertain at the time they purchase the bond. Consequently, an investment in bonds is subject to the risk that the holding period return is less than that expected.

Bonds are purchased on a yield to maturity basis. The fulcrum around which yields vary is the interest rate, which is fixed in amount over life of the bond. It is usually stated as a percentage of the par value of a bond. If the market price of a bond drops, the yield to maturity or yield goes up. If the market price of the bank goes up, the yield goes down.

For corporate entities the cost of debt capital as represented by debentures is lower than the cost of preference capital or equity capital. Debenture capital has the added attraction of not diluting control as debenture holders are not entitled to vote. Besides it has no uncertainty as to the amount of burden to the company even with changes in price of the instrument. This of course, can also be an embarrassment to the corporate entity if it is unable to meet its payment obligations. The fixed cost of debenture finance could result in raising the cost of equity capital.

Check Your Progress B

1. What is a debenture ?
2. List the advantages of bond.
3. What are coupon bonds ?
4. What are convertible debentures

8.6 TERM LOANS

Financial Institutions are intermediaries in the transfer of funds from agents with free cash flows or financial surpluses to those with financial deficits. It results in funds shifting from the personal to the business sector. Banks and insurance companies perform this

function. Loans can be tailored to the borrower's requirements. It is a type of debt finance which requires repayment over a period of three to ten years.

Term loans are offered mainly by banks and financial institutions primarily to finance the purchase of fixed assets such as machinery. A term loan is a specified amount of funds, loaned out for a specified period of time, and for a specified purpose. The assets purchased with the borrowed funds may serve as partial or full collateral on the loan.

Term loan is essentially a secured borrowing, secured by means of equitable mortgage of immovable, and hypothecation of movable, properties of the borrower. Maturities on term loans are commonly 3 to 5 years and sometimes as long as 10 years. Because term loans are long term, sufficient documentation is needed to specify any conditions the borrower might need to abide by. These conditions are often referred to as protective covenants, such as limit on additional debt the borrower can accumulate, a management set-up that satisfies the lending institution and furnishing of periodic information on operations. Term loans can be amortised so that the borrower makes fixed periodic payments over the life of the loan. Alternatively, the bank can request periodic payment of interest, with the principal to be paid-off in one lump-sum (called a balloon payment) at a specified date in the future. This is called a bullet loan. Several combinations are possible e.g. a portion of the loan may be amortised over the life of the loan, while remaining portion is covered with a balloon payment.

Interest rate is related to the credit risk of the proposal and the borrower. Default on repayments leads to imposition of penalty. The borrower applies to a bank/financial institution for a limit, which is sanctioned for a specified period and, upon which it draws over the defined period. If the borrower fails to draw upon the limit within the specified period, it becomes liable to pay commitment charges on the undrawn portion of the amount sanctioned.

Term loans constitute the principal assets of banks. They are direct loans to their customers. They are the bank's primary source of income but they are relatively illiquid assets. Loans are generally associated with non-negotiable credit instruments, although, bank loans may be marketed. This is however, done without the knowledge of the borrower. Interest payments and repayment of principal are

generally made to the original lender.

A bank that lends money to a company cannot easily sell that loan to another investor, though sales of bank loans do take place occasionally, lenders such as banks, need to be compensated for the lack of marketability and therefore carry a higher rate of interest.

Development banks and institutions play a significant role in the supply of term loans to corporate customers. In India many industrial financing institutions have been created by the government, both at the national and regional levels to supply long-term and medium-term loans to corporate customers directly as well as, indirectly. These development financial institutions dominate the industrial finance scene in India. They comprise IDBI, IFCI, ICICI (now merged with ICICI Bank) and state financial corporations. They help in identifying investment opportunities, encourage new entrepreneurs and support modernisation efforts.

8.7 VENTURE CAPITAL

According to International Finance Corporation Venture Capital is an equity or equity featured capital seeking investment, new companies, new ideas, new production new processes or new services that offer high returns or investment. The Venture Capital may also invest in a firm that is unable to raise finance through conventional means.

Venture Capital is that capital, in the form of equity or debt, which is used to finance high-risk ventures. The ventures are generally new and sunshine industries but may also be old and risky ones.

Typically, these enterprises or industries have a high mortality rate and therefore, do not find finance from banks or private sector companies. It is here that professional investors step in with risk capital and entrepreneurial management skills to launch new products requiring sometimes, advanced technology. Such providers of capital, are called venture capitalists and have the ability to assess and manage enormous risks. Naturally, the returns expected are high. The capital investment would go hand in hand with nurturing the company by way of managerial and technical assistance.

Venture Capital differs from conventional financing in three respect

(a) It invest in equity rather than extending loans.

(b) It does not look to current income, but returns by way of capital appreciation

(c) assessment is based on potential returns rather than risks.

Venture Capitalists generally :

1. Finance new, young and rapidly growing or changing companies
2. Purchase equity securities
3. Assist in the development of new products or services or companies
4. Add value to the company through active participation
5. Take higher risks with the expectation of higher rewards
6. Have a long-term orientation

Venture capitalists carefully screen the technical and business merits of the proposed company for considering an investment. Venture capitalists only invest in a small percentage of the businesses they review and have a long-term perspective. They also actively work with the company's management, especially with contacts and strategy formulation.

Venture capitalists mitigate the risk of investing by developing a portfolio of young companies in a single venture fund. Many times they co-invest with other professional venture capital firms. In addition, many venture partnerships manage multiple funds simultaneously. For decades, venture capitalists have nurtured the growth of America's high technology and entrepreneurial communities resulting in significant job creation, economic growth and international competitiveness. Companies such as Digital Equipment Corporation, Apple, Federal Express, Compaq, Sun Microsystems, Intel, Microsoft and Genentech are famous examples of companies that received venture capital early in their development.

In India, these funds are governed by the Securities and Exchange Board of India (SEBI) guidelines. According to this, venture capital fund means a fund established in the form of a company or trust, which raises monies through loans, donations, issue of securities or units as the case may be, and makes or proposes to make investments in accordance with these regulations.

The basic principal underlying venture capital – invest in high-risk projects with the anticipation of high returns. These funds are then invested in several fledging enterprises, which require funding, but are unable to access it through the conventional sources such as banks and financial institutions. Typically first generation entrepreneurs

start such enterprises. Such enterprises generally do not have any major collateral to offer as security, hence banks and financial institutions are averse to funding them. Venture capital funding may be by way of investment in the equity of the new enterprise or a combination of debt and equity, though equity is the most preferred route.

Since most of the ventures financed through this route are in new areas (worldwide venture capital follows "hot industries" like infotech, electronics and biotechnology), the probability of success is very low. All projects financed do not give a high return. Some projects fail and some give moderate returns. The investment, however, is a long-term risk capital as such projects normally take 3 to 7 years to generate substantial returns. Venture capitalists offer "more than money" to the venture and seek to add value to the investee unit by active participation in its management. They monitor and evaluate the project on a continuous basis.

The venture capitalist is however not worried about failure of an investee company, because the deal which succeeds, nets a very high return on his investments – high enough to make up for the losses sustained in unsuccessful projects. For them potential returns outweigh risk factors. They generally invest in unlisted companies i.e. in an early stage company with little or no history. The returns generally come in the form of selling the stocks when they get the company listed on the stock exchange or by a timely sale of his stake in the company to a strategic buyer. The idea is to cash in on an increased appreciation of the share value of the company at the time of disinvestment in the investee company. If the venture fails (more often than not), the entire amount gets written off. Probably, that is one reason why venture capitalists assess several projects and invest only in a handful after careful scrutiny of the management and marketability of the project.

Venture capitalists also lend support and provide entrepreneurs with many other facilities. The even participate in management process.

Venture Capital In India

In India the need for Venture Capital was recognized in the 7th five year plan and long term policy for the government of India. Venture Capital technology development and information company of India, promoted by I.C.I.C.I. and U. T. I. A technology development fund was set up. The First private venture capital fund was sponsored by credit capital Finance Corporation and promoted by Bank of India, Asian Development Bond and the Commonwealth Development Corporation viz., Credit Capital Venture fund. The reasons for slow start to venture capital are following :

1) License Raj and IPO boom
2) Mind set for conventional financing
3) Multiplicity of regulators like RBI, SEBI, CBDT and Foreign Investment Promotion Board etc.
4) Difficult Entry and Exit routes
5) Valuation mismatches.

Regulations

SEBI has framed venture capital funds (amendment) regulations 2000.

Following are the salient features of SEBI (Venture Capital Funds)(Amendment) Regulations, 2000 :

1 (a) Definition of Venture Capital Fund : The Venture Capital Fund is now defined as a fund established in the form of a Trust, a company including a body corporate and registered with SEBI which:

A. has a dedicated pool of capital;
B. raised in the manner specified under the Regulations; and
C. to invest in Venture Capital Undertakings in accordance with the Regulations."

(b) Definition of Venture Capital Undertaking: Venture Capital Undertaking means a domestic company :-

a. Whose shares are not listed on a recognised stock exchange in India
b. Which is engaged in business including providing services, production or manufacture of articles or things, or does not include such activities or sectors which are specified in the negative list by the Board with the approval of the Central Government by notification in the Official Gazette in this behalf. The **negative list** includes real estate, non-banking financial services, gold financing, activities not permitted under the Industrial Policy of the Government of India.

(c) Minimum contribution and fund size : the minimum investment in a Venture Capital Fund from any investor will not be less than Rs. 5 lacs and the minimum corpus of the fund before the fund can start activities shall be atleast Rs. 5 crores.

(d) Investment Criteria : The earlier investment criteria has been substituted by a new investment criteria which has the following requirements :

- disclosure of investment strategy;
- maximum investment in single venture capital undertaking not to exceed 25% of the corpus of the fund;
- Investment in the associated companies not permitted;
- atleast 75% of the investible funds to be invested in unlisted equity shares or equity linked instruments.
- Not more than 25% of the investible funds may be invested by way of:

a. subscription to initial public offer of a venture capital undertaking whose shares are proposed to be listed subject to lock-in period of one year;
b. debt or debt instrument of a venture capital undertaking in which the venture capital fund has already made an investment by way of equity.

It has also been provided that Venture Capital Fund seeking to avail benefit under the relevant provisions of the Income Tax Act will be required to divest from the investment within a period of one year from the listing of the Venture Capital Undertaking.

(e) Disclosure and Information to Investors: In order to simplify and expedite the process of fund raising, the requirement of filing the Placement memorandum with SEBI is dispensed with and instead the fund will be required to submit a copy of Placement Memorandum/ copy of contribution agreement entered with the investors along with the details of the fund raised for information to SEBI. Further, the contents of the Placement Memorandum are strengthened to provide adequate disclosure and information to investors. SEBI will also prescribe suitable reporting requirement from the fund on their investment activity.

2. QIB status for Venture Capital Funds : The venture capital funds will be eligible to participate in the IPO through book building route as Qualified Institutional Buyer subject to compliance with the SEBI (Venture Capital Fund) Regulations.

3. Relaxation in Takeover Code: The acquisition of shares by the company or any of the promoters from the Venture Capital Fund under the terms of agreement shall be treated on the same footing as that of acquisition of shares by promoters/companies from the state level financial institutions and shall be exempt from making an open offer to other shareholders.

4. Investments by Mutual Funds in Venture Capital Funds: In order to increase the resources for domestic venture capital funds, mutual funds are permitted to invest upto 5% of its corpus in the case of open ended schemes and upto 10% of its corpus in the case of close ended schemes. Apart from raising the resources for Venture Capital Funds this would provide an opportunity to small investors to participate in Venture Capital activities through mutual funds.

5. The following are the salient features of SEBI (Foreign Venture Capital Investors) Regulations, 2000 :

a. Definition of Foreign Venture Capital Investor : any entity incorporated and established outside India and proposes to make investment in Venture Capital Fund or Venture Capital Undertaking and registered with SEBI.

b. Eligibility Criteria : entity incorporated and established outside India in the form of investment company, trust, partnership, pension fund, mutual fund, university fund, endowment fund, asset management company, investment manager, investment management company or other investment vehicle incorporated outside India would be eligible for seeking registration from SEBI. SEBI for the purpose of registration shall consider whether the applicant is regulated by an appropriate foreign regulatory authority; or is an income tax payer; or submits a certificate from its banker of its or its promoters track record where the applicant is neither a regulated entity nor an income tax payer.

c. Investment Criteria :

- disclosure of investment strategy;
- maximum investment in single venture capital undertaking not to exceed 25% of the funds committed for investment to India however it can invest its total fund committed in one venture capital fund;
- atleast 75% of the investible funds to be invested in unlisted equity shares or equity linked instruments.

- Not more than 25% of the investible funds may be invested by way of:

    a. subscription to initial public offer of a venture capital undertaking whose shares are proposed to be listed subject to lock-in period of one year;
    b. debt or debt instrument of a venture capital undertaking in which the venture capital fund has already made an investment by way of equity.

6. Hassle Free Entry and Exit : The Foreign Venture Capital Investors proposing to make venture capital investment under the Regulations would be granted registration by SEBI. SEBI registered Foreign Venture Capital Investors shall be permitted to make investment on an automatic route within the overall sectoral ceiling of foreign investment under Annexure III of Statement of Industrial Policy without any approval from FIPB. Further, SEBI registered FVCIs shall be granted a general permission from the exchange control angle for inflow and outflow of funds and no prior approval of RBI would be required for pricing, however, there would be ex-post reporting requirement for the amount transacted.

7. Trading in unlisted equity : The Board also approved the proposal to permit OTCEI to develop a trading window for unlisted securities where Qualified Institutional Buyers(QIB) would be permitted to participate

Check Your Progress C

1) What are term loans ?

2) Define Venture Capital

3) Differentiate between Venture Capital and Conventional financing ?

4) Give reasons for slow growth in venture capital in India.

8.8 LET US SUM UP

Long term finance is required for medium to long term purposes to meet the long term requirement ranging from 3 to 10 years.

The principal sources of long term finance are retained earnings equity capital, preference capital, debentures, term loans and venture capital equity capital represents ownership capital as equity shareholders own the firm. They enjoy the dividend and also bear the

risk of ownership.

Retained earnings are the reserve earnings not distributed as dividend. It also includes accumulated profits of past years. Retained earnings can finance only a small portion of investment projects. Some companies do not pay dividend at all and with to retain the funds. Some companies do not pay dividends because they cannot afford them with their present and future expectation of profits. For retained earning companies need not have to approach the lenders. Equity capital is used for financing new or expanding business. There are two types of equity shares voting and non voting shares. The advantage of voting is that its allows a minority group of shareholders or an in divided shareholding of a large among of sock to be represented on board of directors.

Preference shares have the right to divided at a fixed rate and fro repayment of capital at the time of winding up of a company. Preference shares may be cumulative, or non cumulative, redeemable or irredeemable, convertible or non convertible and participating or non participating.

Debentures/ Bonds are long term debts i.e. loans taken by a company from the public debentures are transferable like equity shares. Interest and debentures is a debt. It is fixed. Debentures are redeemable irredeemable and preferential convertible or non convertible. Bonds are issued by government so there is no default in repayment of capital and interest on bonds term loans are loans more than one year maturity. They are offered by banks and financial institution. They are available from 3 to 10 yeas. Interest on loan is tax deductible. Venture capital is the capital provided by investors for the risky projects at an early stage on the promise high risk and high return. SEBI has made regulations 2000 relating to eligibility and investment criteria for domestic companies as well as foreign venture capital investors.

8.9 KEY WORDS

Initial/Seed Capital - Small amount of capital provided to the entrepreneur for concept testing.

First Stage - Funds raised to initiate commercial manufacturing and sales, after initial capital runs out.

Second Stage - Usually to fund working capital for initial expansion.

Third Stage - Funds provided for major growth plans, generally used for capacity expansion, marketing and working capital.

Follow-on/Later Stage - Subsequent investment made by an investor who already has an exposure in the company.

Buyout - Funds provided to enable acquisitions.

Secondary Purchase - Purchase of already issued company shares from an existing shareholder.

Bridge/Mezzanine - Financing a company just before its IPO.

IPO/Initial Public Offering - A company's first offering of stock to the public.

Equity Related Loan - Convertible debt.

Private Placement - Sale of securities to a small group of "informed" investors.

Secondary Public Offering - Any offering subsequent to IPO.

Underwriting - An investment bank acting as underwriter sells securities from the issuer to the public to ensure successful distribution. The types of underwriting are best efforts and firm commitment. With best efforts, the underwriters have the option to buy and authority to sell securities, or if unsuccessful, may cancel the issue and forgo any fees. This arrangement is more common with speculative securities and with new companies. With a firm commitment, the underwriters purchase outright the securities being offered by the issuer.

Venture Capital - Capital with which investors fund early stage, more risk oriented businesses, on the basic premise of high risk, high return.

Angels - High networth individuals who provide seed money.

Term Loans : Refers to debt finance which has a maturity of more than one year.

Venture Capital : It is the funds provided by professionals to young, and rapidly growing high risk ventures.

Convertible Preference Shares : The preference shares which can be converted is equity for a specified period.

Redeemable Preference Shares : The preference shares which can be retained after a certain period.

Bonds/Debentures : Debt instruemtn issued by corporations or government.

8.10 SELF ASSESSMENT QUESTIONS/EXERCISES

1) What are the sources of long-term finance and to what uses can they be put ?
2) What limitations does a company encounter in the use of retained earnings as a source of long-term finance?
3) When does a company resort to acquiring equity capital?
4) Discuss the nature of equity and debt instruments.
5) What features do preference shares share with bonds?
6) What functions do venture capitalists perform?

2) Download the cash flow statement of a company (visit the web site) for two years and read the statement carefully. Write your observation whether the benefits stated in the AS-3 is actually true.

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3) List down your difficulties in understanding cash flow statement given in the annual reports.

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8.7 CASH FLOW STATEMENT FORMATS

The statement of cash flow requires restating of the information presented on a Balance Sheet but in flow format. The Balance Sheet is prepared by measuring the assets and liabilities at a point of time, usually as on March 31st of the year. In flow statements, whether it is funds flow or cash flow, we measure the changes in assets and liabilities during the period. For example, the liability side of the Balance Sheets contains so many items, which are essentially brought funds for the company. How much of cash is received under each item or how much cash was given back on each item constitute one part of the cash flow statement. Similarly, cash flows on the assets sides are also computed. The changes in retain earning part of the Balance Sheet actually reflect Profit and Loss Account. Cash Flow statement separately computes cash generated and paid for various operating activities. Cash Flow Statement can be prepared in two ways. They are called direct and indirect method. Actually, these two methods differ on the part in which we compute cash from operating activities. It may be noted that AS-3, IAS-7 and also FASB Statement No. 95 all recommend presentation of the direct method in the primary statement though firms are allowed to use either method. However, companies normally provide the statement in indirect format and you will shortly realise some of the reasons behind such practice. While direct method logically summarises cash flow movement under broad operating heads, indirect method works backward from Net profit and remove all non- cash income and expenses to get cash from operating activities. The format used under these two methods is given below:

Table 1
Cash Flow Statement under Listing Agreement and Ind-AS: 7

IAS-7 (Indirect Method) /SEBI Format	**IAS – 7 (Direct Method)**
A. Cash flow from operating activities	**A. Cash flow from operating activities**
Net profit before tax & extraordinary items	Cash receipt from customers
Adjustments for:	
Depreciation	Less : Cash paid to suppliers & other operating expenses
Foreign Exchange	

Investments **Operating Profit before working capital changes** Adjustments for: Trade and other receivables Inventories Trade Payables **Cash generated from operations** Less: Interest paid Direct tax paid **Cash flow before extraordinary items** Extraordinary items **Net Cash from/(used in) operating activities**	 **Cash generated from operation** Less : Interest paid Interest tax paid **Cash flow before extraordinary items** Less : Extraordinary items Net Cash from / (used in) Operating activities
B. Cash flow from Investing activities Purchase of fixed assets Sale of fixed assets Acquisition of companies Purchase of investments Sale of investments Interest Received Dividend Received **Net Cash used in investing activities**	**B. Cash flow from investing activities** Purchase of fixed assets Proceeds from sale of fixed assets Investment in subsidiaries Investment in trade investment Loans and Advances Taken/(returned) Current Investments made Interest/Dividend Received **Net Cash used in investing activities**
C. Cash flows from financing activity Proceeds from issue of share capital Proceeds from long-term borrowings (net) Repayment of financial lease liabilities Dividend Paid **Net Cash used in financing activities**	**C. Cash flows from financing activity** Proceeds from issue of share capital Proceeds from long-term borrowings Repayment of Loans Dividend Paid **Net Cash used in financing activities**
Net Increase in cash & cash equivalents	**Net increase in cash & cash equivalents**

Direct Method

Under Direct method, the difference between cash receipts from customers and cash paid to suppliers and other operating expenses represents "cash generated from operations". Both cash receipts from customers and cash paid to suppliers and operating expenses can be calculated as follows:

Cash receipts from customers

Cash sales during the year			xxx
Credit sales during the year		xxx	
Add: Sundry debtors at the beginning	……	xxx	
" Bills receivable at the beginning	…….	xxx	
Less: Sundry debtors at the end	xxx		
"Bills receivable at the end	…..	xxx	xxx
Cash receipts from the Customers			**xxx**

Cash paid to Suppliers and employees

Cost of goods sold	xxx		
Operating expenses	xxx		xxx
Add: Sundry creditors at the beginning		...	
Bills Payable at the beginning		...	
Outstanding expenses at the beginning		...	
Stock at the end		...	
Prepaid expenses at the end		...	xxx
Less: Sundry Creditors at the end		...	
Bills Payable at the end		...	
Stock at the beginning		...	
Prepaid expenses at the beginning		...	xxx
Cash paid to Suppliers and employees			xxx

Under direct method all non-cash transactions such as depreciation, goodwill, preliminary expenses, discount on shares and/or debentures etc. and loss or profit on sale of assets and investments are to be ignored as these are non-cash transactions. Similarly, non-operating income such as income from interest and dividends are not to be considered.

The cash flows associated with extraordinary items like bad debts recovered, insurance claim received, loss of stock by fire, earthquake etc., cash flows from interest and dividends received and paid should be disclosed separately. Cash flow from operating activities is computed under the following heads using a set of equation listed against each.

Cash Flow Item	**Methodology**
Cash collection from customers	Sales — Increase in Accounts Receivables + Decrease in Accounts Receivables
Cash Paid to suppliers	Cost of Goods Sold — Decrease in Inventory + Increase in Inventory
Cash Paid to Employees	Salary Expenses — Increase in accrued/outstanding Salaries payable + Decrease in accrued/outstanding Salaries payable
Cash Paid for Other operating expenses	Other Operating Expenses — Depreciation and other non-cash expenses — Decrease in prepaid expenses — Increase in outstanding operating expenses + Increase in prepaid expenses + Decrease in outstanding operating expenses
Cash paid/received for interest	Net Interest Expenses (expense-income) — Increase in outstanding interest + Decrease in outstanding interest

	— Increase in interest receivable + Decrease in interest receivable
Cash from dividend or other sources	Dividend or Other Income + Decrease in other income receivable — Increase in other income receivable
Cash Paid for Taxes	Tax Expense — Increase in deferred tax liability + Decrease in deferred tax liability — Decrease in deferred tax asset + Increase in deferred tax asset — Increase in taxes payable + Decrease in taxes payable — Decrease in prepaid taxes + Increase in prepaid taxes.

For some of you the above table may be confusing but it is relatively easier to understand. The first item of the equation is actually the figure you get from P&L account. We know the figure that has given in the P&L account is mostly based on accrual concept and hence include 'non cash' part. The second and subsequent lines of the equation are actually for weeding out the 'non cash' part to get the 'cash' part of the expenses. Take a simple item of the above table namely 'cash paid to employees'. The figure Salary and Wages given in the P&L account need not be equal to actual salary and wages that the company has paid. For instance, the company may not have paid March month salary on 31st March as many companies pay their work on 7th of every month. We know this item will appear under salary outstanding. To get the cash amount of salaries and wages, we need to deduct, salary outstanding. Suppose, there is a salary outstanding at the beginning of the year, which means that the company has not paid some salary last year. Assume this value be Rs. 15 lakhs. At the end of the year, the company has not paid March salary and assume this value be Rs. 25 lakhs. If the outstanding salary account at the end of the year shows Rs. 25 lakhs, it means the company would have paid Rs. 15 lakhs of the previous year salary during the current year. Though this Rs. 15 lakhs will not be included in salary expense shown in P&L account (there is no need to show this value as it relates to previous year expenses), we need to consider the same for computing cash paid for salary, where we are not bothered whether the expenses is related to last year or current year. Suppose, if the salary expenses shown in the P&L account is Rs. 300 lakhs, we deduct from Rs. 300 lakhs, a value equal to Rs. 10 lakhs (Rs.25 lakhs — Rs. 15 lakhs) and state that cash paid for salary is equal to Rs. 290 lakhs. This value represents Rs. 275 lakhs salary of this year and Rs. 15 lakhs salary of the previous year and both paid during the year. Try to develop such logic for each of the equation to understand the concept better.

A comprehensive illustration is provided in the next section.

Indirect Method

Under this method net profit or loss is adjusted for the non-cash items as well as the items for non-operating incomes. The net profit or loss as shown by the profit and loss account cannot be treated as cash from operations. As you are aware that there are certain items like depreciation, goodwill, preliminary expenses etc., which appear or the debit side of profit and loss account but do not affect cash. Such items are added back to net profit. Similarly, items of non-trading incomes like profit on sale of fixed assets, interest and dividend received on investments, refund

of taxes, provision for discount on creditors etc., which appear on credit side of profit and loss account, should be deducted from net profit to find out cash from operation.

In addition to the above, there are two certain items which do not appear in the profit and loss account, but have effect on cash. Such items represent changes in current assets and current liabilities. All these adjustments must be made to the net profit or loss as shown by the profit and loss account to ascertain actual amount of cash flow from operations. The Proforma for computing the actual cash flow from operations is given below:

Proforma for
Computation of Cash Flow from Operating Activities

	Rs.	Rs.
Net Profit (Before tax and Extraordinary items)		.....
Add : Adjustments for: Depreciation	.....	
Misc. Expenses written off	.....	
Foreign Exchange	.....	
Loss on sale of fixed assets	.....	
Interest expenses	.....	
(—) Profit on sale of Fixed asset	.....	
(—) Dividend received	.....	.....
Operating Profit before Working Capital Changes		**.....**
Add: Adjustment for (working capital changes)	.....	
Decrease in current assets (Excluding cash and equivalents)	.....	.....
Increase in current liabilities		.....
Less : Increase in current Assets	.....	.....
Decrease in current Liabilities	.....	
Cash generated from operating activities		**.....**
Less : Income tax paid		.....
Cash flow before extraordinary items		.....
Add: Income from extraordinary items:		**.....**
Bad debts recovered	.....	
Insurance claim received	.....	
Income from lottery	.....	**.....**
Gain from exchange operations etc.		
Less: Loss from extraordinary items:		
Loss of stock from fire, floods etc.	.....	
Loss from earthquake	.....	
Loss from exchange operations	.....	.....
Net Cash from Operating Activities		xxx

Here under indirect method, you will be seeing a lot of adjustments. These adjustments are mainly to remove non-cash items. For example, if a firm sells Rs. 3000 worth of goods but received only Rs. 2000 and the balance is not received at the end of the period, the receipt of

Rs. 2000 can be found out using P&L and Balance sheet values. Assume the company has an opening receivables balance of Rs, 2000. Immediately after the sale, it should have gone up to Rs. 5000 and when it collects Rs. 2000, the closing balance should be Rs. 3000. So, we have the following figures in our P&L and Balance Sheet.

Receivables (opening balance)	Rs. 2000
Receivables (closing balance)	Rs. 3000
Sales	Rs. 3000

Thus, the cash collected from customers is equal to Opening Receivables Balance plus Sales less Closing Receivables Balance i.e. Rs. 2000 + 3000 —3000 = Rs. 2000. Alternatively, we can deduct Rs. 1000 (which is the changes in opening and closing receivable balance) as adjustment to see the impact of the credit sales on the cash.

We will discuss more on these issues in the next section. At this stage, you note sown that cash flow statement shows three important values: Net Cash Generated through Operating Activities, Net Cash spent for Investing. Activities and finally, net cash generated through financing activities

In the part one of the table, we have removed non-cash items and in the second part, we removed the impact of changes in inventory. While removal non-cash expenses or income included in the net income is obvious, when changes in current assets and liabilities are adjusted. A firm invests in current assets (raw materials, receivables, etc.) and acquires current liabilities mainly operating purpose. An increase in current assets means spending some money to buy fresh current assets during the period but not necessarily the firm incurs that amount fully. Since part of the amount is received through current liabilities (creditors), we also look into the changes in current liabilities. For instance, if inventory increases by Rs. 50 lakhs and creditors also increases by Rs. 20 lakhs, it means the company has spent Rs. 30 lakhs cash and hence it has negative impact on the cash value.

8.8 CASH FLOW FROM OPERATING ACTIVITIES

We use an illustration to explain the three important items of cash flow statement. Before you proceed further, read the Cash Flow Statement of Infosys Technologies Ltd. given below:

Infosys Technologies Ltd.

Cash Flow Summary	**2020-21**	**2019-20**	**2018-19**
Cash and Cash Equivalents at Beginning of the year	577.74	508.37	416.66
Net Cash from Operating Activities	834.22	560.49	259.41
Net Cash Used In Investing Activities	—280.23	—451.3	—146.2
Net Cash Used In Financing Activities	—104.77	—39.82	—21.54
Net Inc/(Dec) In Cash And Cash	449.22	69.37	91.71
Cash And Cash Equivalents At End of the year	1,026.96	577.74	508.37
Cash Flow From Operating Activities	**2020-21**	**2019-20**	**2018-19**
Net Profit Before tax & Extraordinary Items	943.39	696.03	325.65
Adjustment For Depreciation	160.65	112.89	53.23
Interest(Net)	—51.23	—38.47	0
Dividend Received	0	0	0
P/L on Sales of Assets	—0.09	—0.09	0
P/L on Sales of Invests	0	0	0
Prov. & W/O(NET)	0	15.29	0
P/L In Forex	—13.26	—20.17	0
Others	—139.96	—85,18	—36.71
Op. Profit Before Working Capital Changes	899.5	680.3	342.17
Adjustment For			
Trade & other Receivables	—34.36	—166.2	—58.3
Inventories	0	0	0
Trade Payables	—5.16	60.93	42.65
Loan & Advances	—39.02	—34.72	—41.5
Direct Taxes Paid	0	0	—35.54
Cash Flow Before Extraordinary Items	820.96	540.32	249.48
Extraordinary Items			
Gain on Forex Exchange Transaction	13.26	20.17	9.93
Net Cash Flow From Operating Activities	**834.22**	**560.49**	**259.41**

The first part of the table shows the summary of Cash Flows of Infosys Technologies Ltd. and the second part lists detail working of Net Cash Flow Operating Activities. Infosys has generated Rs. 834.22 Cr. during the year 2020-21 through its operation against Rs. 560.49 cr. during the previous year. How this is comparable with the net profit figure? It is comparable for this company since during the year 2020-21, the company reported a net profit value of Rs. 807.96 cr. But it need not be true for other companies where the net profit and cash from operating activities may show substantial difference. For instance, Penta media Graphics Ltd. has reported a net profit of Rs. 9875 Cr. for the year ending March, 2021 whereas for the same period, its cash flow from operating activities is a negative value of Rs. 360.88 Cr. There could be several reasons for such wide difference between the reported book profit and cash flow from operating activities.

In the Infosys Cash Flow Statement, the first part of the adjustment is related to removing non-cash expenses and income and the second part of adjustment is related to impact of changes in current assets and liabilities. In the third part, cash arising out of extraordinary items is shown separately since the profit figure of the first line excludes such extraordinary items. In terms of relative importance, the part one adjustments are high value. While this may be true for companies like software where working capital is not high, the second component may be large for manufacturing companies. For instance, the cash flow statements of Cipla Ltd. for the year ending 2021 shows an adjustment factor of Rs. 1.25 Cr. (negative) for non- cash items against Rs. 183.13 Cr. (negative) for working capital items. The adjustments relating to extra-ordinary items are not a regular feature and in the Cipla's case, it has not shown any value in the last three years. An analysis of component of the three operating items shows further insight on where the cash is drained. A year-to-year comparison also shows how much of additional amount is being pumped in each of these items. While such an analysis is possible balance sheets figures alone, an analysis on cash basis is much simpler and straight principles and policies related issues. Increasingly, users of financial statement rely on cash flow statement for this reason.

Activity 5

1) Collect Cash Flow from Operations of few companies and examine how is related to Profit reported in P&L account?

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2) Compare the each components of cash flow from operating activity over the period and record your observations here.

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8.9 CASH FLOW FROM INVESTING AND FINANCING ACTIVITIES

\Measuring cash flow from investing and financing activities is simple and straight forward. Any amount spent in purchase of fixed assets forms part of investing activities. For instance if a firm spends Rs. 20 lakhs to buy new assets and also sold Rs. 3 lakhs worth of asset for Rs. 8 lakhs, the net cash flow on investing activities is Rs. 12 lakhs (Cash outflow of Rs.20 lakhs less Cash inflow Rs. 8 lakhs). Similarly, it is easier to compute cash flow from financing activities. Here we will try to find out the fresh equity and loan that the company has raised during the period

and from that we deduct loan amount repaid. In addition to this, we also deduct dividend since dividend is outcome of financing activities. However, you may wonder why interest is not deducted here since it is also related to financing activity. There is no straight answer to this but accounting standards require interest to be shown as a cash outflow item in operating activities.

The cash flow from investing and financing activities of Infosys is given below. Infosys is spending a lot on fixed asset acquisition during the last three years. At the same time, it is not raising any fresh capital and hence its cash flow financing activities is also negative due to high dividend payment.

Cash Flow from Investing and Financing Activities of Infosys Technologies Ltd.

Cash Flow From Investing Activities	**2020-21**	**2019-20**	**2018-19**
Investment In Assets			
Purchased of Fixed Assets	—322.74	—463.4	—159.9
Sale of Fixed Assets	1.6	0.23	0.1
Financial/Capital Investment:			
Purchase of Investments	—10.32	—26.65	—13.08
Sale of Investments	0	0	0
Investment Income	0	0	26.69
Interest Received	51.23	38.47	0
Dividend Received	0	0	0
Invest, in Subsidiaries	0	0	0
Net Cash Used in Investing Activities	—280.23	—451.3	—146.2
Cash Flow From Financing Activities	**2020-21**	**2019-20**	**2018-19**
Proceeds:			
Proceeds from Issue of share capital	0	0	—1.76
Dividend Paid	—109.37	—42.2	—19.93
Others	4.6	2.38	—3.37
Net Cash Used in Financing Activities	**—104.77**	**—39.82**	**—21.54**

Illustration 8.2

Using the Profit and Loss account and Balance Sheet given below, prepare Cash Flow Statement both under direct and indirect method:

Profit and Loss Account for the year ended 31st March, 2021

(Rs. in Thousands)

	Year 2020-21	Year 2019-20
Sales	111780	98050
Other Income	390	220
Cost of Goods sold	41954	39010
Selling and Distribution Expenses	16178	12500
Profit Before Tax	54038	46760
Less Income Tax	21615	18704
Profit After Tax	32423	28056

(b) Balance Sheet as on 31st March, 2021

(Rs. In thousands)

Liabilities and Shareholder Equity		As on 31-3-21	As on 31-3-20
Equity Share Capital		180000	180000
Retained Earnings		134045	101622
Current Liabilities			
Accounts Payable		3526	4330
Income Tax Payable		21615	--
Dividend Payable		--	25000
Total Liabilities		339186	310952
Assets			
Fixed Assets	393000 (370000)		
Less: Depreciation	92400 (90000)	300600	280000
Current Assets		6380	6000
Cash			
Accounts Receivable:	20064		
Less: Provision —	(972)	19092	23568
Inventory : Raw Materials		516	636
Finished Good		598	748
Investments		12000	--
Total Assets		339186	310952

Solution

Cash Flow Statement under Direct Method (Rs in thousands)

(A) Operating Activities			
Cash Collection from Sales		115716	
Less: Cash Paid for:			
Raw Materials	(18478)		
Direct Labour	(13452)		
Overhead	(8758)	(40688)	
Less: Cash Paid for Non-factory Costs:			
Salaries and Wages	(14625)		
Other Sales and Administration	(413)	(15038)	
Cash Generated from Operation			59990
Add: Interest Earned			390
Net Cash from Operating Activities			60380
(B) Investment Activities			
Purchase of Plant Assets		(23000)	
Short-term investments		(12000)	
Add: Interest Earned			
Net Cash Flow from Investing Activities			(35000
(C) Financing Activities			
Dividends paid		(25000)	
Net Cash Flow from Financing Activities			(25000)
(D) Net Change in Cash			380
Cash at the Beginning of the year			6000
Cash at the End of the Year			6380

Cash Flow Statement Under Indirect Method/as per Listing Agreement

(A) Operating Activities			
Profit After Tax or Net Income		32423	
Adjustments for:			
Depreciation	2400		
Trade Receivables	4476		
Inventories	270		
Income Tax	21615		
Accounts Pay able	(804)	27957	
Net Cash from Operating Activities			60380
(B) Investment Activities			
Purchase of Plant Assets		(23000)	
Short-term investments		(12000)	
Net Cash from Operating Investments			(35000)
(C) Financing Activities			
Dividends Paid		(25000)	
Net Cash Flow form Financing Activities			(25000)
(D) Net Change in Cash			380
Cash at the Beginning of the year			6000
Cash at the End of the Year			6380

UNIT 18: INVENTORY MANAGEMENT

Structure

18.0 OBJECTIVES

After studying this unit, you should be able to explain:

- The need for holding the inventories and cost-benefits associated with it.
- Economic order quantity as a tool to control inventory management costs.
- Re-order level, where the risk of non-availability of inventory for production needs is minimum.
- Quantify safety stocks and minimum stock levels to ensure continuous production.
- Tools of selective inventory controls such as ABC analysis applying the principles of the management by exception.

18.1 INTRODUCTION

The dilemma of the Chief Operating Officer (COO) of a firm in the present day world is to decide levels of different inventories to carry in order to ensure continuous and smooth production and in turn maximize the value of the firm. The average age of inventory along with average age of receivables will determine the days operating cycle (DOC) of a firm. Days operating cycle less average payment period to suppliers determine the days' working capital (DWC). Long DOC and short or negative DWC constitute high risk. DOC and DWC are the measures of the risk. The ratio of cash flow from operating activities to the sales is termed as cash conversion efficiency and is a measure of return. The COO has to make a trade-off between these two measures of risk and return while designing strategy for the working capital management. The working capital performance of corporate India in the diversified industry group for the year 2001 and the three-years' average is given in Table 18.1. The three-years average days working capital is 110 days and CCE is 15.64%.

Table 18.1 Working Capital Performance of Diversified Industry Group

	2001 CCE	3-Yr Avg. CCE	2001 DOC (days)	3-Yr Avg. DOC (days)	2001 DWC (days)	3-Yr. Avg. DWC (days)
Diversified Industry Group						
Century Textiles & Inds. Ltd.	15.93%	15.63%	157	178	102	128
E I D-Parry (India) Ltd.	7.64%	9.88%	151	143	75	75
Grasim Industries Ltd.	16.92%	18.15%	152	174	104	132
Hindustan Lever Ltd.	15.44%	13.63%	93	88	2	3
I C I India Ltd.	8.41%	10.17%	125	141	56	61
Indian Rayon & Inds. Ltd.	12.05%	14.63%	163	181	135	148
Kesoram Industries Ltd.	13.80%	19.17%	110	165	65	114
Larsen & Toubro Ltd.	8.59%	6.89%	233	210	162	142
Rallis India Ltd.	0.43%	3.94%	206	174	125	100
Raymond Ltd.	9.97%	17.50%	210	202	164	157
Reliance Industries Ltd.	19.30%	17.05%	58	64	4	-10
Tata Chemicals Ltd.	34.64%	40.97%	309	319	268	269
Industry Average	**13.59%**	**15.64%**	**164**	**170**	**105**	**110**

CCC = Cash conversion efficiency. It is the ratio of cash flows from operating activities to sales. It is a measure of return.

DOC = Days operating cycle. It is the sum of average age of inventory and average age of receivables. It is an average length of the operating cycle of the firm. It is a measure of risk.

DWC = Days working capital. It is DOC less average payment period to the vendors. It is also a measure of risk.

Anand and Gupta (2003) have found that the cash conversion efficiency ratio for the period 2000 -2001 is highest (62.01%) in case of Coal and Lignite Industry as against three-year (1998-99 to 2000 -2001) average of 47.57% in case of Telephone Services. The lowest CCE ratio for the period 2000 -2001 is -54.94% of Readymade Garments Industry as against three-year (1998-99 to 2000 -2001) average of -1.97% in case of Communication Equipment Industry.

For the period 2000 -2001, the highest DOC is of Computer Hardware Industry (2541 days) while it is of Telephone Services (3242 days) for three-year (1998-99 to 2000 -2001) average. The lowest DOC for the period 2000 -2001 is 45 days of Liquor Industry as against three-year (1998-99 to 2000 -2001) average of 41 days in case of Health Services.

The highest DWC for the year 2000-01 is of Computer Hardware Industry (2481days) while it is of Telephone Services (3155 days) for three-year (1998-99 to 2000 -2001) average. The lowest DWC for the period 2000-2001 is -234 days of Tourism Industry as against three-year (1998-99 to 2000 -2001) average of -272 days in same industry.

In this unit, you will learn as to how the COOs make trade off between risks and return while determining optimal levels of the different inventories of the firm.

18.2 NEED FOR HOLDING INVENTORIES

The firm holds inventory to ensure continuous production and to avoid a situation of stock-out. In the process, it incurs the carrying and handling costs. These are insurance, interest on funds blocked in the inventories, obsolescence, and handling & maintenance. The need for holding the inventories appears to be same as for the cash. The generally accepted arguments for holding inventories are transaction needs, precautionary needs, and speculative needs.

18.2.1 Transaction needs

The transaction need of holding inventories is dependent upon the manufacturing cycle & normal production level of the firm and policy of the management. The manufacturing cycle of the firm will vary from industry to

industry. It will be very large (months) in case engineering, procurement, & construction contractor and will be small in case of food processing, and detergent & soap manufacturer. The policy of the management such as aggressive, moderate, and conservative will also guide the inventory-holding period of the firm. An aggressive management will hold minimal inventories and conservative firm will hold high level of inventories.

18.2.2 Precautionary needs

The firm will like to hold some level of inventory for precautionary needs. The actual level of production may exceed the planned level and thus there is need for higher level of inventories. It may be in case of firm, which is in a seasonal industry or has just come out of a recession. The objective is not to have stock out but at the same time not to erode the profitability of the firm by maintaining excessive inventories.

18.2.3 Speculative needs

The management of the firm depending on its attitude may like to benefit from speculative activities by maintaining the higher level of inventories to benefit from the price fluctuations.

Maintaining inventories entails cost. Lack of inventories causes disruption in production, unsatisfied demand, and customer switching to the competitors. Thus, there is a need that firm should be able to quantify optimum level of inventories and hold it.

18.3 OBJECTIVES OF INVENTORY MANAGEMENT

The firm has to make a difficult choice between maintaining a large size of inventory to ensure continuous production and at the same time have minimum investment in the inventories to increase the profitability.

18.3.1 Return

The objective of firm should be to have optimal investment in the inventories, which yields maximum return on investment (ROA). The inventories constitute a major part of assets in case of retailer.

$$ROA = \frac{NOPAT}{Sales} \times \frac{Sales}{Assets}$$

Where:

NOPAT = Net operating profits after taxes or EBIT (1-Tc)

Assets = Investment in Fixed assets and current assets less non-interest bearing current liabilities

Tc = corporate income tax rate

18.3.2 Risk

The risk relating to the inventories faced by the management of the firm is the possibility of stock out. In case of manufacturing firm, the product may be held up due to non-availability of raw materials, stores, and thus lead to delay in delivery and loss of customer. The firm should have optimum investment in the inventory.

To quantify the optimum level of inventories will not be difficult if the firm is able to estimate the annual consumption levels and time required to replenish the stocks precisely. This is possible in a certain environment. However, the firms operate in an uncertain environment. Thus, the firm has to make most likely forecasts, optimum forecasts, and pessimistic forecasts to decide inventory levels. It may follow a conservative policy or aggressive policy. The firm with aggressive management style may carry minimum safety stock. The firm with conservative approach will carry higher level of inventories to avoid the possibility of stock out.

18.3.3 Risk & Return trade off

The CFO of the firm has to make a risk return trade off in the following context:

- To decide how much safety stock level to maintain in order to avoid the stock out situation. It involves the analysis of expected stock out cost and relevant carrying cost of safety stock.

The management situation on this dilemma will be discussed in the next section after the discussions on the various stock levels.

- To determine the inventory holding period vis-à-vis cash operating profits of the firm.

The Indian industry practice on the above dilemma is presented in section 18.6.

18.4 INVENTORY MANAGEMENT TECHNIQUES

18.4.1 Economic order quantity

The firm has to decide the inventory order quantity. If the order quantity is large, the firm economizes on the ordering cost, as the number of the orders will be less during the year. The ordering cost is the administrative cost associated with the placing of an order. For example, if the annual production level of a motorbike manufacturer is 100,000 units, the tyres and tubes required will be 200,000. If the firm places an order for 50000 tyres and tubes at one time, it has to place just four orders during the year. However, the inventory carrying cost of 50,000 tyres and tubes will be very high. The inventory carrying cost includes the insurance, rental of stores, spoilage, obsolescence, and interest on investment in the inventories. Thus, the trade-off is between the ordering cost and the carrying cost.

The economic order quantity is that quantity where the total cost of inventory management is the minimum. The cost of inventory management includes the purchasing cost, carrying cost and the ordering cost.

The model for determination of the economic order quantity makes the following assumptions:

- The ordering cost per order and carrying cost per unit per annum are know a priori and are fixed.
- The material cost per unit is known a priori and is constant.
- The material consumption level during the year are known in advance
- No stock out occurs.

Let the annual material requirement in quantity be equal to A. The ordering cost per order be equal to O. Let the raw material cost per unit equal to C and carrying cost per annum be i%. The order quantity be equal to Q.

Since the raw material cost per unit is assumed constant. Hence, the relevant costs of inventory management for the analysis are carrying cost and the ordering cost.

Carrying cost

= Average order quantity X cost per unit X carrying cost percentage p.a.

= Q/2 X C X i%

The firm will be incurring carrying cost on the average inventory level.

Ordering Cost

= Number of orders placed during the year X Ordering cost per order
= A/Q X O

The order size and the annual material requirement will determine the number of orders to be placed during the year.

Total Cost (TC) = Carrying cost + Ordering cost

TC = Q/2 X C X i% + A/Q X O

We have to determine at what level of Q, the total cost of inventory management is the minimum.

Let us differentiate (using the first principle of differentiation) both sides with respect to Q and equate it to zero.

dTC/dQ = Ci%/2 d/dQ Q + AO d/dQ (1/Q)

zero = Ci%/2 - AO/Q^2 ($d/dx\ x^n = nx^{n-1}$)

Q^2 = 2AO/Ci%

Therefore Q = $(2AO/Ci\%)^{1/2}$

EOQ = [(2 X Annual material requirements quantity X ordering cost per order)/ (material cost per unit X carrying cost percentage per annum)] $^{0.5}$

Illustration

Suppose a TV manufacturer plans to manufacture 25000 CTVs for the year 2005. It purchases colour picture tubes from other manufacturer. Its annual requirement of colour picture tube is 25000 units. The purchase cost is Rs. 3500 per colour picture tube. The ordering cost is Rs. 529.375 per order and carrying cost per annum is 10%. Determine the economic order quantity.

Solution:

A = 25000 units
O = Rs. 529.375
C = Rs. 3500
i% = 10%

EOQ = $[(2 \times 25000 \times 529.375) / (3500 \times 10\%)]^{0.5}$

= 275 units

The graphic presentation of the economic order quantity is as under:

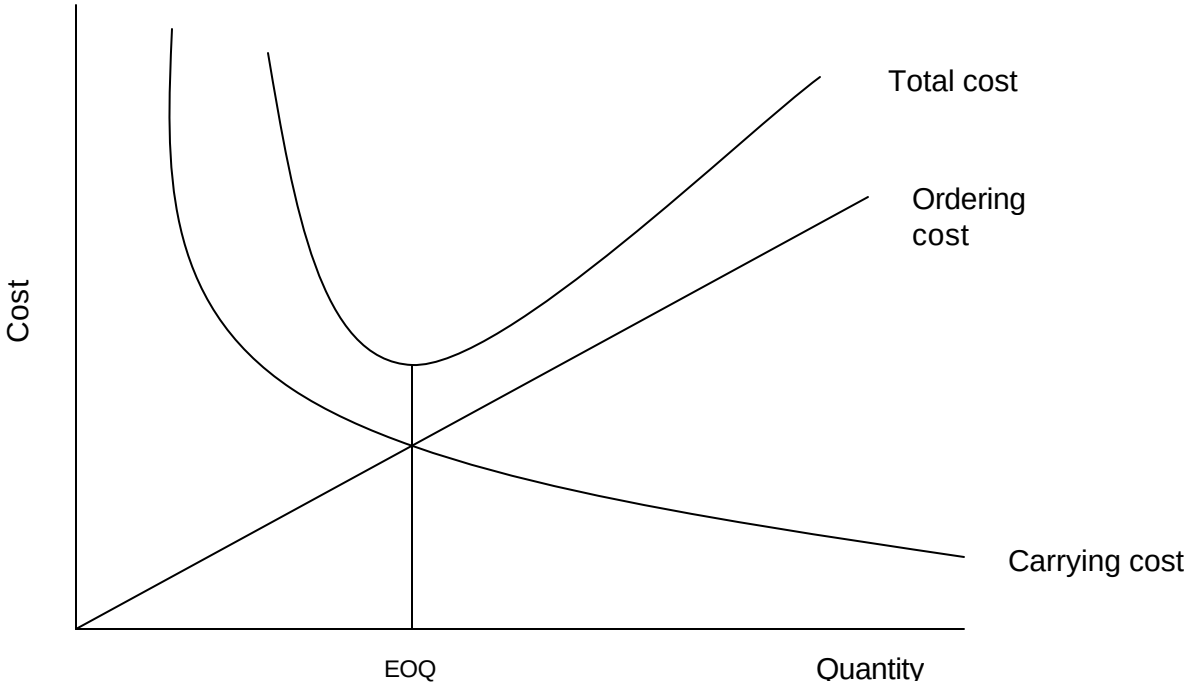

Fig.18.1 Economic Order Quantity

18.4.2 EOQ with quantity discount

The firm generally gets quantity discount, if it places an order for large quantity. Thus, quantity discount becomes relevant advantage in the economic order quantity analysis. Instead of using EOQ formula now tabular approach is suggested. The following illustration will substantiate this argument.

Illustration:

ABCM Limited has received the following quantity discount offer from its suppliers:

Price per ton (Rs)	Order quantity (tons)
2700	Less than 1000
2655	1000 but less than 2000
2610	2000 but less than 4000
2565	4000 but less than 6000
2520	6000 and above

The annual requirement of the material is 12000 units. The ordering cost is Rs. 5000 per order and inventory carrying cost is 25% of the material cost per annum.

Determine the EOQ.

Solution:

We will take minimum of the order size for availing quantity discount as quantity discount will be available and carrying cost will increase with the increase in order size.

As we increase the order size, the benefits are quantity discount and savings in the ordering cost. The cost associated with the increase in the order size is increase in the carrying cost. Thus, the cost benefit analysis will facilitate the determination of order size, where the total cost of inventory management is minimum.

Table 18.1: Computation of EOQ with quantity discount

Order Size (Q) (1)	Number of orders (A/Q) (2)	Purchase cost (A X C) (3)	Ordering cost (A/Q) XO (4)	Carrying cost (Q/2)XCXi% (5)	Total cost (3+4+5) (6)
500	=12000/500 = 24	=12000 X 2700 =3,24,00,000	= 24 X 5000 = Rs 120000	=(500X2700X 25%)/2 = Rs. 168750	Rs. 3,26,88,750
1000	= 12000/1000 = 12	=12000 X 2655 = 3,18,60,000	= 12 X 5000 = Rs. 60000	= (1000X2655X25%)/2 = Rs. 331875	Rs. 3,22,51,875
2000	=12000/2000 = 6	=12000 X 2610 = 3,13,20,000	= 6 X 5000 = Rs. 30,000	= (2000X2610X25%)/2 = Rs 652500	Rs. 3,20,02,500
4000	=12000/4000 = 3	=12000 X 2565 = 3,07,80,000	= 3X 5000 = Rs 15000	= (4000X2565X25%)/2 = Rs. 1282500	Rs. 3,20,77,500
6000	= 12000/6000 = 2	=12000 X 2520 =3,02,40,000	= 2 X 5000 = Rs 10000	= (6000X2520X25%)/2 = Rs. 1890000	Rs 3,21,40,000

Thus, the economic order quantity is 2000 units.

18.4.3 Re-order level

The re-order level is that stock level; on reaching the same, the firm places an order for the economic order quantity. The re-order level lies between the minimum stock level and the maximum stock level. The re-order level ensures that there is enough quantity available during the lead time to meet the normal production requirements and minimum stock level will meet the contingencies of either lead time reaching maximum or consumption during the lead time going to the maximum or both.

Re-order level = Minimum stock level + (Normal lead time X Normal level of raw material consumption per unit of time)

Re-order Level = Maximum lead time X Maximum level of raw material consumption per unit of time

Lead Time = Time taken to replenish the inventory levels.

The graphic presentation of the re-order level is as under:

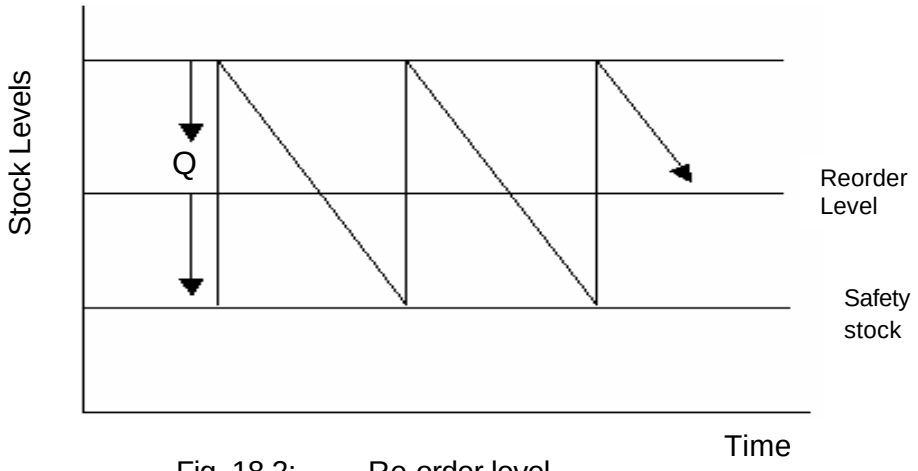

Fig. 18.2: Re-order level

The firm places an order for fixed order quantity i.e. economic order quantity, once the re-order level is reached.

18.4.4 Safety stock levels

The safety stock is the inventory held by the firm during all the times irrespective of the order size EOQ. The firm carries safety stock levels to meet the contingencies of lead-time going to the maximum and consumption levels also going to the maximum. It is a cushion to avoid stock out situation. It is also called minimum stock levels.

Safety stock level = Re-order level – (Normal Lead time X Normal level of material consumption per unit of time)

In such a situation the total cost of inventory management will include expected stock out cost besides carrying cost and ordering cost. The maintenance of safety stock has the benefit of avoiding loss of profits by meeting delivery schedules. The cost associated with it is the carrying cost. The safety stock is that stock level where the total cost of inventory management is the minimum.

18.4.5 Maximum stock levels

It is the maximum level of inventory maintained by the firm at any point of time. The firms with conservative approach will maintain the maximum stock levels. It is to be ensured that the firm has necessary storage space and funds to maintain this level.

Maximum Level of Inventory = Re-order Level + Re-order Quantity – (Minimum consumption X Minimum lead-time)

18.5 SELECTIVE INVENTORY CONTROL

18.5.1 ABC Analysis

Always best control (ABC) analysis is a system of inventory control. It applies the principles of the management by exception to the inventory management. It argues that management should classify its inventories into three categories namely low-volume but high value; moderate volume and moderate value; high-volume but low-value items. Thus, the management should focus on low-volume but high value items as far as applications of inventory management tools are concerned to deliver value to the shareholders.

Table18.2: ABC classification of inventories

Number of inventory items	% Of Inventory items	% Value of inventory holding (average)	Inventory Classification
595	12.53%	70%	A
1425	30%	20%	B
2730	57.47%	10%	C
4750	100%	100%	

The tools such as re-order level, economic order quantity and safety stock levels are applied to A-category items. The firm should order most of its requirements in respect of C-category items in one or two go to avail the benefits

of the quantity discount, since the associated carrying cost are going to be too small as they are low value items.

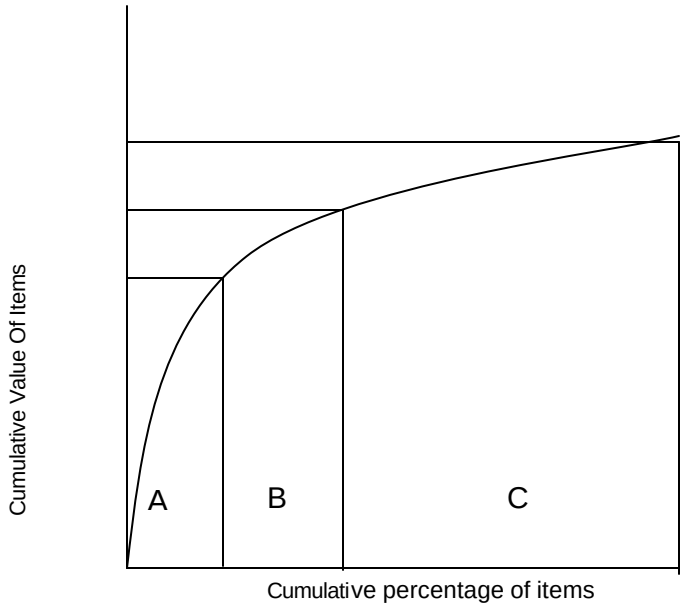

Fig. 18.3: ABC Classification of inventories

18.5.2 Just In Time Inventory Control (JIT)

Just-in-time inventory controls ask a basic question: does inventory create value? Just-in-time purchasing is the purchasing of materials and stores on time and having a situation of zero inventories.

Just-in-time inventory control approach requires developing the relationship with the suppliers and placing small size frequent orders. It is not that instead of having inventory in our factory and keeping it with the suppliers. It is a situation of not having inventories in the entire value chain and at the same time to ensure smooth production and meeting the delivery schedules. It is a win-win situation both for the manufacturers and the vendors. This kind of scenario is possible in information technology enabled communication networks and excellent road infrastructure. It calls for supply chain management initiatives. The Japanese firms have introduced the JIT concept initially and they have used it as a strategic tool to achieve competitive advantage.

The Indian firms such as Maruti Udyog Limited, Bajaj Auto Limited have managed their cost through a lot of supply chain cost management initiatives.

Needless to mention that buyer-supplier interface with the firm needs to be more efficient in order to manage cost across the value chain and thus create value. Few examples to bring improvements at the supplier end are: improve delivery performance; manage quality, smaller batch deliveries, and shorter lead times. On the other side of the value chain i.e. to bring improvements at the buyer end, the few examples are: reduce reliance on custom as opposed to standard products and reduce number of changes to the sales orders. The improvements at the firm level could be effected through total quality management and electronic data interchange with the supply chain and the distribution change.

18.5.3 Inventory Turnover Ratios

The firms also use inventory turnover ratios to manage inventories. These ratios are:

Finished Goods Inventory Turnover ratio
= Cost of goods sold / Average finished goods inventories at cost

Raw-material inventory turnover ratio
= Annual raw materials consumption / Average raw material inventory

Work-in-progress inventory turnover ratio
= Factory cost / Average work-in-progress inventory

Average Raw material purchases per day
= Annual raw material purchases / 360 days

Average raw material inventory holding period
= Average raw material inventory / Average Raw material purchases per day

Average Factory cost incurred per day
= Factory cost incurred during the year / 360

Average age of finished goods inventory
= Average Finished goods inventory / Average factory cost incurred per day

The firms can also classify their inventories into fast moving, slow moving and non-moving inventories for the purpose of control. This analysis is called as FSN analysis.

14.7 LET US SUM UP

Most of the chief financial officer's (CFO) time and efforts are devoted to working capital management. Still, a large number of business failures have been attributed to inability of financial managers to plan and control properly the inventories of their respective firms. (Smith, 1973). Therefore, there is a need to develop sustainable inventory management practices.

- The objectives of holding inventories by the firms are to meet transaction needs, precautionary needs, and speculative needs.
- The holding of excessive inventories block the funds of the firm and reduces the profitability of the firm. Whereas holding inadequate inventories result in loss of production and in turn customer and profits. Therefore, the objective of the firm is to have optimum investment in the inventories to maximize the value of the firm.
- The costs associated with the inventory management are purchase cost, carrying cost, ordering cost and stock out cost. The objective of the inventory management is to reduce the total cost of inventory management.
- The inventory management tools provide the inputs on re-order level, re-order quantity, minimum stock level, and maximum stock level to the plant management for inventory control.
- The selective inventory control techniques such as ABC analysis suggests that sophisticated inventory control tools should be used in respect of high value items.
- The objective to reduce inventory levels to minimum lead the focus of the firms to the supply chain management.
- The analysis of working capital performance based on firm's financial statement will facilitate the monitoring of the average age of the inventories.

14.8 KEY WORDS

ABC analysis	The inventory control technique based on the principles of

	management by exception. It suggests application of sophisticated inventory management tool to high value inventory items termed as A category items.
Carrying cost	It is the storage, insurance, obsolescence and opportunity cost associated with the holding of the inventories.
Days Working Capital	Average age of inventory + Average age of receivables – Average age of payables
Economic order quantity	It is that order quantity where total cost of inventory management is the minimum.
Fill rate	The number of times the supplier has delivered on time.
FSN analysis	It is classification of inventories into fast moving, slow moving, and non-moving items and controlling accordingly.
JIT Inventory Management	Zero inventories in an IT-enabled environment with supply chain management initiatives.
Lead Time	Time taken to replenish the inventories. The time from placing of an order to vendors to the time actually material and stores received.
Minimum stock level	The safety stock level to meet the contingency of lead time and consumption level exceeding from normal level to maximum level.
Ordering cost	The administrative cost associated with the placing of an order.
Re-order level	The stock level, where fresh order is placed for economic order quantity.
Re-order quantity	See economic order quantity.
Safety stock	See minimum stock level.
Value chain analysis	Analysis of linkages and interdependencies between the suppliers, buyers, intermediaries and their end-users.

14.9.1 TERMINAL QUESTIONS / EXERCISES

1. What is purpose of holding the inventories? Why is the inventory management important?
2. Define the economic order quantity and discuss the process of its determination.
3. What are the inventory carrying cost and ordering cost and what are their roles in inventory management?
4. Write short notes on the following
    a) Re-order level
    b) Minimum stock level
    c) Maximum stock level
5. Discuss the process of selective approach to inventory management.
6. Discuss the Indian Industry practices with respect to working capital management.

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