

CORPORATE FINANCE

(As per the Revised Syllabus of Mumbai University for M.Com., Semester II, 2016-17)

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Preface

It is a matter of great pleasure to present this new edition of the book on ***Corporate Finance*** to the students and professors of M.Com., Semester II, University of Mumbai. This book is written on lines of syllabus instituted by the Mumbai University. The book presents the subject matter in a simple and convincing language.

We owe a great many thanks to a great many people who helped and supported us during the writing of this book which includes Principals, Professors and Students of M.Com. Section.

The syllabus contains a list of the topics covered in each chapter which will avoid the controversies regarding the exact scope of the syllabus. The text follows the term-wise, chapter-topic pattern as prescribed in the syllabus. We have preferred to give the text of the section and rules as it is and thereafter added the comments with the intention of explaining the subject to the students in a simplified language. While making an attempt to explain in a simplified language, any mistake of interpretation might have crept in.

This book is an unique presentation of subject matter in an orderly manner. This is a student-friendly book and tutor at home. We hope the teaching faculty and the student community will find this book of great use. We welcome constructive suggestions for improvement.

We are extremely grateful to Shri K.N. Pandey of Himalaya Publishing House Pvt. Ltd. for their devoted and untiring personal attention accorded by them to this publication. We gratefully acknowledge and express our sincere thanks to the following people without whose inspiration and support, constructive suggestions of this book would not have been possible.

- ***Mr. Jitendra Singh Thakur (Trustee, Thakur College)***
- ***Dr. Chaitaly Chakraborty (Principal, Thakur College)***
- ***Mrs. Janki Nishikant Jha***

Authors

Syllabus

SN	Modules	No. of Lectures
1	Scope and Objectives of Financial Management	15
2	Time Value of Money	15
3	Financial Analysis – Application of Ratio Analysis in Financial Decision Making	15
4	Financial Decisions	15
Total		60

Objectives

SN	Modules
1	To enhance the abilities of learners to develop the objectives of Financial Management
2	To enable the learners to understand, develop and apply the techniques of investment in the financial decision making in the business corporates
3	To enhance the abilities of learners to analyse the financial statements

SN	Modules/Units
1	Scope and Objectives of Financial Management
	Introduction, Meaning, Importance, Scope, Objectives, Profit v/s Value Maximization
2	Time Value of Money
	Concept, Present Value, Annuity, Techniques of Discounting, Techniques of Compounding, Bond Valuation and YTM
3	Financial Analysis - Application of Ratio Analysis in Financial Decision Making
	Management Analysis - Profitability Ratios: Gross Profit Ratio, Operating Profit Ratio, Return on Capital Employed - Efficiency Ratios: Sales to Capital Employed, Sales to Fixed Assets, Profit to Fixed Assets, Stock Turnover Ratio, Debtors Turnover Ratio, Creditors Turnover Ratio - Liquidity Ratios: Current Ratio, Quick Ratio - Stability Ratio: Capital Gearing Ratio, Interest Coverage Ratio - Investor's Analysis - Earnings per Share, P/E Ratio, Dividend Yield
4	Financial Decisions
	- Cost of Capital - Introduction, Definition of Cost of Capital, Measurement of Cost of Capital, WACC, Marginal Cost of Capital - Capital Structure Decisions - Meaning, Choice of Capital Structure, Importance, Optimal Capital Structure, EBIT-EPS Analysis, Cost of Capital, Capital Structure and Market Price of Share, Capital Structure Theories, Dividend Policy - Pay Out Ratio - Business Risk and Financial Risk - Introduction, Debt v/s Equity Financing, Types of Leverage, Investment Objective/Criteria for Individuals/Non-business Purpose

Question Paper Pattern

(Practical Courses)

Maximum Marks: 60 Marks

Questions to be Set: 04

Duration: 2 Hours

All questions are compulsory carrying 15 Marks each.

Question No.	Particulars	Marks
Q.1	Practical Question	15 Marks
	OR	
Q.1	Practical Question	15 Marks
Q.2	Practical Question	15 Marks
	OR	
Q.2	Practical Question	15 Marks
Q.3	Practical Question	15 Marks
	OR	
Q.3	Practical Question	15 Marks
Q.4	Objective Question (Multiple Choice/ True or False/ Fill in the Blanks/ Match the Columns/ Short Questions.)	15 Marks
	OR	
Q.4	Short Notes (Any three out of five)	15 Marks

Note: Full length question of 15 marks may be divided into two sub questions of 08 and 07 marks.

(Internal Assessment)

Maximum Marks: 40 Marks

Questions to be Set: 03

Duration: 1½ Hours

Question No.	Particulars	Marks
Q.1	Objective Questions Students to answer 10 sub-questions out of 15 sub-questions (Multiple Choice/True or False/Match the Columns/Fill in the Blanks) OR Objective Questions (A) Sub-questions to be asked and to be answered (any 05) (B) Sub-questions to be asked and to be answered (any 05) (Multiple Choice/True or False/Match the Columns/Fill in the Blanks)	10 Marks
Q.2	Concept Based Short Questions Students to answer 05 sub-questions out of 08 sub-questions	10 Marks
Q.3	Practical Problems or Short Questions Students to answer 02 sub-questions out of 03 sub-questions	20 Marks

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Chapter



Scope and Objectives of Financial Management

EVOLUTION OF FINANCIAL MANAGEMENT

Financial management emerged as a distinct field of study at the turn of this century. Its evolution may be divided into three broad phases (though the demarcating lines between these phases are somewhat arbitrary): the traditional phase, the transitional phase, and the modern phase

The *traditional phase* lasted for about four decades. The following were its important features:

- The focus of financial management was mainly on certain episodic events like formation, issuance of capital, major expansion, merger, reorganization, and liquidation in the life cycle of the firm.
- The approach was mainly descriptive and institutional. The instruments of financing, the institutions and procedures used in capital markets, and the legal aspects of financial events formed the core of financial management.
- The outsider's point of view was dominant. Financial management was viewed mainly from the point of the investment bankers, lenders, and other outside interests.

A typical work of the traditional phase is *The Financial Policy of Corporations* by Arthur S. Dewing. This book discusses at length the types of securities, procedures used in issuing these securities, bankruptcy, reorganisations, mergers, consolidations and combinations. The treatment of these topics is essentially descriptive, institutional and legalistic.

The *transitional phase* being around the early forties and continued through the early fifties. Though the nature of financial management during this phase was similar to that of the traditional phase, greater emphasis was placed on the day to day problems faced by finance managers in the areas of fund analyses, planning and control. These problems, however, were discussed within limited analytical frameworks. A representative work of this phase is *Essays on Business Finance* by Wilford J. Eiteman *et al.*

The *modern phase* began in the mid-fifties and has witnessed an accelerated pace of development with the infusion of ideas from economic theory and application of quantitative methods of analysis. The distinctive features of the modern phase are:

- The scope of financial management has broadened. The central concern of financial management is considered to be a rational matching of funds to their uses in the light of appropriate decision criteria.
- The approach of financial management has become more analytical and quantitative.
- The point of view of the managerial decision maker has become dominant.

Since the beginning of the modern phase many significant and seminal developments have occurred in the fields of capital budgeting, capital structure theory, efficient market theory, option pricing theory, arbitrage pricing theory, valuation models, dividend policy, working capital management, financial modeling and behavioural finance. Many more exciting developments are in the offing making finance a fascinating and challenging field.

- Early 1900: instrument, institution, and procedures of capital market and money market
- Around 1920: focus on security and banking sector, and investment in common stock
- Around 1930: focus on liquidity, debt, regulation, bankruptcy, reorganization
- Early 1940 and 1950: internal analysis, planning and controlling cash flow
- End of 1950: capital budgeting, valuation, and dividend policy
- Around 1960: development of portfolio theory
- Around 1970: CAPM model and APT model that can be used to value the financial assets
- Around 1980: focus on uncertainty, asymmetric information, financial signaling
- Around 1990: multinational financial management, behavioral finance, enterprise risk management, good corporate governance.

MEANING OF FINANCIAL MANAGEMENT

Financial Management means planning, organizing, directing and controlling the financial activities such as procurement and utilization of funds of the enterprise. It means applying general management principles to financial resources of the enterprise.

IMPORTANCE OF FINANCIAL MANAGEMENT

In a big organisation, the general manager or the managing director is the overall incharge of the organisation but he gets all the activities done by delegating all or some of his powers to men in the middle or lower management, who are supposed to be specialists in the field so that better results may be obtained.

For example, management and control of production may be delegated to a man who is specialist in the techniques, procedures and methods of production. We may designate him "Production Manager". So is the case with other branches of management, i.e., personnel, finance, sales, etc.

The incharge of the finance department may be called financial manager, finance controller, or director of finance who is responsible for the procurement and proper utilisation of finance in the business and for maintaining coordination between all other branches of management.

Importance of finance cannot be overemphasised. It is, indeed, the key to successful business operations. Without proper administration of finance, no business enterprise can reach its full potentials for growth and success. Money is a universal lubricant which keeps the enterprise dynamic – develops product, keeps men and machines at work, encourages management to make progress and creates values. The importance of financial administration can be discussed under the following heads:

- (i) **Success of Promotion Depends on Financial Administration.** One of the most important reasons of failure of business promotions is a defective financial plan. If the plan adopted fails to provide sufficient capital to meet the requirements of fixed and fluctuating capital and particularly, the latter, or it fails to assume the obligations by the corporations without establishing earning power, the business cannot be carried on successfully. Hence, sound financial plan is very necessary for the success of a business enterprise.
- (ii) **Smooth Running of an Enterprise.** Sound financial planning is necessary for the smooth running of an enterprise. Money is to an enterprise, what oil is to an engine. As, Finance is required at each stage of an enterprise, i.e., promotion, incorporation, development, expansion and administration of day to day working, etc., proper administration of finance is very necessary. Proper financial administration means the study, analysis and evaluation of all financial problems to be faced by the management and to take proper decision with reference to the present circumstances in regard to the procurement and utilisation of funds.
- (iii) **Financial Administration Coordinates Various Functional Activities.** Financial administration provides complete coordination between various functional areas such as marketing, production, etc., to achieve the organisational goals. If financial management is defective, the efficiency of all other departments can, in no way, be maintained. For example, it is very necessary for the finance department to provide finance for the purchase of raw materials and meeting other day to day expenses for the smooth running of the production unit. If financial department fails in its obligations, the production and the sales will suffer and consequently, the income of the concern and the rate of profit on investment will also suffer. Thus, Financial administration occupies a central place in the business organisation which controls and coordinates all other activities in the concern.
- (iv) **Focal Point of Decision Making.** Almost, every decision in the business is taken in the light of its profitability. Financial administration provides scientific analysis of all facts and figures through various financial tools, such as different financial statements, budgets, etc., which help in evaluating the profitability of the plan in the given circumstances, so that a proper decision can be taken to minimise the risk involved in the plan.
- (v) **Determinant of Business Success.** It has been recognised, even in India that the financial managers play a very important role in the success of business organisation by advising the top management for the solution of the various financial problems as experts. They present important facts and figures regarding financial position and the performance of various functions of the company in a given period before the top management in such a way so as to make it easier for the top management to evaluate the progress of the company to amend

suitably the principles and policies of the company. The financial managers assist the top management in its decision making process by suggesting the best possible alternative out of the various alternatives of the problem available. Hence, financial management helps the management at different levels in taking financial decisions.

- (vi) **Measure of Performance.** The performance of the firm can be measured by its financial results, i.e., by its size of earnings. Riskiness and profitability are two major factors which jointly determine the value of the concern. Financial decisions which increase risks will decrease the value of the firm and on the other hand, financial decisions which increases the profitability will increase value of the firm. Risk and profitability are two essential ingredients of a business concern.

The importance of financial management can be summarized as follows:

1. It brings economic growth and development through investments, financing, dividend and risk management decision which help companies to undertake better projects.
2. When there is good growth and development of the economy it will ultimately improve the standard of living of all people.
3. Improved standard of living will lead to good health and financial stress will reduce considerably.
4. It enables the individual to take better financial decision which will reduce poverty, reduce debts, increase savings and investments.

Better financial ability will lead to profitability which will create new jobs and in turn lead to more development, expansion and will promote efficiency

SCOPE/ELEMENTS AND OBJECTIVES OF FINANCIAL MANAGEMENT

Scope/Elements

1. Investment decisions includes investment in fixed assets (called as capital budgeting). Investment in current assets are also a part of investment decisions called as working capital decisions.
2. Financial decisions - They relate to the raising of finance from various resources which will depend upon decision on type of source, period of financing, cost of financing and the returns thereby.
 - (a) *Dividend decision:* The finance manager has to take decision with regards to the net profit distribution. Net profits are generally divided into two: Dividend for shareholders – Dividend and the rate of it has to be decided.
 - (b) *Retained profits:* Amount of retained profits has to be finalized which will depend upon expansion and diversification plans of the enterprise.

Scope of Financial Management: Financial management has a wide scope. According to **Dr. S. C. Saxena**, the scope of financial management includes the following **five ‘A’s**.

1. **Anticipation:** Financial management estimates the financial needs of the company, that is, it finds out how much finance is required by the company.
2. **Acquisition:** It collects finance for the company from different sources.
3. **Allocation:** It uses this collected finance to purchase fixed and current assets for the company.
4. **Appropriation:** It divides the company’s profits among the shareholders, debenture holders, etc. It keeps a part of the profits as reserves.
5. **Assessment:** It also controls all the financial activities of the company. Financial management is the most important functional area of management. All other functional areas such as production management, marketing management, personnel management, etc., depends on financial management. Efficient financial management is required for survival, growth and success of the company or firm.

Objectives of Financial Management

The financial management is generally concerned with procurement, allocation and control of financial resources of a concern. The objectives can be –

1. To ensure regular and adequate supply of funds to the concern.
2. To ensure adequate returns to the shareholders which will depend upon the earning capacity, market price of the share, expectations of the shareholders.
3. To ensure optimum funds utilization. Once the funds are procured, they should be utilized in maximum possible way at least cost.
4. To ensure safety on investment, i.e., funds should be invested in safe ventures so that adequate rate of return can be achieved.
5. To plan a sound capital structure. There should be sound and fair composition of capital so that a balance is maintained between debt and equity capital.

CONFLICTS IN PRINCIPLES OF PROFIT VS. VALUE MAXIMISATION

Goals mean financial objective of a firm. Experts in financial management have endorsed the view that the goal of Financial Management of a firm is maximization of economic welfare of its shareholders. Maximization of economic welfare means maximization of wealth of its shareholders. Shareholders’ wealth maximization is reflected in the market value of the firms’ shares. A firm’s contribution to the society is maximized when it maximizes its value. There are two versions of the goals of financial management of the firm:

Profit Maximization: In a competitive economy, profit maximization has been considered as the legitimate objective of a firm because profit maximization is based on the cardinal rule of efficiency.

Under perfect competition allocation of resources shall be based on the goal of profit maximization. A firm's performance is evaluated in terms of profitability. Investor's perception of company's performance can be traced to the goal of profit maximization. But, the goal of profit maximization has been criticized on many accounts:

1. The concept of profit lacks clarity. What does the profit mean?
 - (a) Is it profit after tax or before tax?
 - (b) Is it operating profit or net profit available to shareholders?Differences in interpretation on the concept of profit expose the weakness of the goal of profit maximization.
2. Profit maximization ignores time value of money because it does not differentiate between profits of current year with the profit to be earned in later years.
3. The concept of profit maximization fails to consider the fluctuation in the profits earned from year to year. Fluctuations may be attributable to the business risk of the firm but the concept fails to throw light on this aspect.
4. Profit maximization does not make clear the concept of profit as to whether it is accounting profit or economic normal profit or economic supernormal profits.
5. Because of these deficiencies, profit maximization fails to meet the standards stipulated in an operationally feasible criterion for maximizing shareholders wealth.

Value or Wealth Maximization: Wealth Maximization has been accepted by the finance managers, because it overcomes the limitations of profit maximisation. Wealth maximisation means maximizing the net wealth of the company's shareholders. Wealth maximisation is possible only when the company pursues policies that would increase the market value of shares of the company.

Following arguments are in support of the superiority of wealth maximisation over profit maximisation:

1. Wealth maximisation is based on the concept of cash flows. Cash flows are a reality and not based on any subjective interpretation. On the other hand there are many subjective elements in the concept of profit maximisation.
2. It considers time value of money. Time value of money translates cash flows occurring at different periods into a comparable value at zero period. In this process, the quality of cash flows is considered critically in all decisions as it incorporates the risk associated with the cash flow stream. It finally crystallizes into the rate of return that will motivate investors to part with their hard earned savings. It is called required rate of return or hurdle rate which is employed in evaluating all capital projects undertaken by the firm. Maximizing the wealth of shareholders means positive net present value of the decisions implemented. Positive net present value can be defined as the excess of present value of cash inflows of any decision implemented over the present value of cash outflows associated with the process of implementation of the decisions taken. To compute net present value we employ time value factor. Time value factor is known as time preference rate, i.e., the sum of risk free rate and

risk premium. Risk free rate is the rate that an investor can earn on any government security for the duration under consideration. Risk premium is the consideration for the risk perceived by the investor in investing in that asset or security.

X Ltd., is a listed company engaged in the business of FMCG (Fast Moving Consumer Goods). Listed means the company's shares are allowed to be traded officially on the portals of the stock exchange. The Board of Directors of X Ltd., took a decision in one of its Board meeting, to enter into the business of power generation. When the company informs the stock exchange at the conclusion of the meeting of the decision taken, the stock market reacts unfavourably with the result that the next days' closing of quotation was 30 % less than that of the previous day.

The question now is, why the market reacted in this manner. Investors in this FMCG Company might have thought that the risk profile of the new business (power) that the company wants to take up is higher compared to the risk profile of the existing FMCG business of X Ltd. When they want a higher return, market value of company's share declines. Therefore, the risk profile of the company gets translated into a time value factor. The time value factor so translated becomes the required rate of return. Required rate of return is the return that the investors want for making investment in that sector.

Any project which generates positive net present value, creates wealth to the company. When a company creates wealth from a course of action it has initiated the shareholders benefit because such a course of action will increase the market value of the company's shares.

Functions of Financial Management

1. **Estimation of Capital Requirements:** A finance manager has to make estimation with regards to capital requirements of the company. This will depend upon expected costs and profits and future programmes and policies of a concern. Estimations have to be made in an adequate manner which increases earning capacity of an enterprise.
2. **Determination of Capital Composition:** Once the estimation have been made, the capital structure have to be decided. This involves short and long-term debt equity analysis. This will depend upon the proportion of equity capital a company is possessing and additional funds which have to be raised from outside parties.
3. **Choice of Sources of Funds:** For additional funds to be procured, a company has many choices like:
 - (a) Issue of shares and debentures
 - (b) Loans to be taken from banks and financial institutions
 - (c) Public deposits to be drawn like in form of bonds.

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

4. **Investment of Funds:** The finance manager has to decide to allocate funds into profitable ventures so that there is safety on investment and regular returns is possible.

5. **Disposal of Surplus:** The net profits decision have to be made by the finance manager. This can be done in two ways:
 - (a) *Dividend declaration:* It includes identifying the rate of dividends and other benefits like bonus.
 - (b) *Retained profits:* The volume has to be decided which will depend upon expansional, innovational, diversification plans of the company.
6. **Management of Cash:** Finance manager has to make decisions with regards to cash management. Cash is required for many purposes like payment of wages and salaries, payment of electricity and water bills, payment to creditors, meeting current liabilities, maintenance of enough stock, purchase of raw materials, etc.
7. **Financial Controls:** The finance manager has not only to plan, procure and utilize the funds but he also has to exercise control over finances. This can be done through many techniques like ratio analysis, financial forecasting, cost and profit control, etc.

EXERCISE

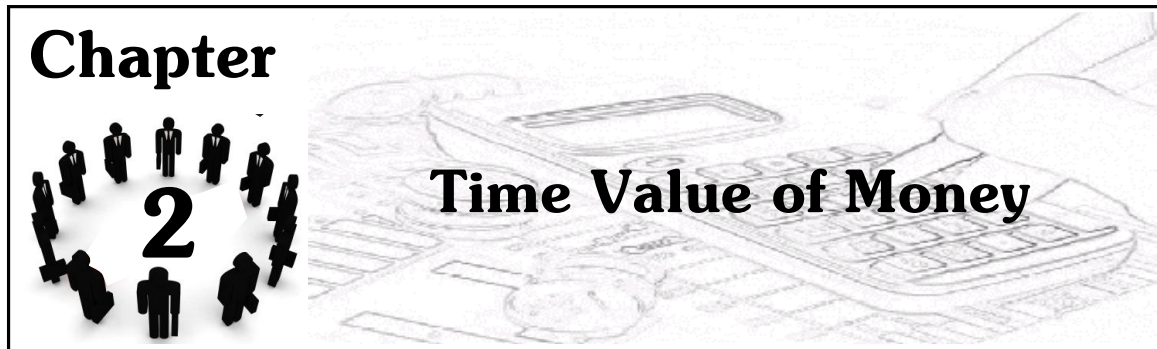
Self-assessment Questions

1. Financial Management deals with procurement of funds at the least cost and _____ of funds.
2. Under perfect competition, allocation of resources shall be based on the goal of _____.
3. _____ is based on cash flows.
4. _____ consider time value of money.
5. _____ lead to investment in real assets.
6. _____ relate to the acquisition of funds at the least cost.
7. Formulation of inventory policy is an important element of _____.
8. Obtaining finance is an important function of _____.

(Ans.: 1. Effective utilization, 2. Profit maximisation, 3. Wealth maximization, 4. Wealth maximization, 5. Investment decisions, 6. Financing decisions, 7. Liquidity, 8. Treasurers)

Terminal Questions

1. What are the objectives of financial management?
2. How does a finance manager arrive at an optimal capital structure?
3. Examine the relationship of financial management with other functional areas of a firm.



THE TIME VALUE OF MONEY

Introduction

To keep pace with the increasing competition, companies have to go in for new ideas implemented through new projects be it for expansion, diversification or modernization. A project is an activity that involves investing a sum of money now in anticipation of benefits spread over a period of time in the future. How do we determine whether the project is financially viable or not? Our immediate response to this question will be to sum up the benefits accruing over the future period and compare the total value of the benefits with the initial investment. If the aggregate value of the benefits exceeds the initial investment, the project is considered to be financially viable.

While this approach *prima facie* appears to be satisfactory, we must be aware of an important assumption that underlies. We have assumed that irrespective of the time when money is invested or received, the value of money remains the same. Put differently, we have assumed that: value of one rupee now = value of one rupee at the end of year 1 = value of one rupee at the end of year 2 and so on. We know intuitively that this assumption is incorrect because money has time value. How do we define this time value of money and build it into the cash flows of a project? The answer to this question forms the subject matter of this chapter.

We intuitively know that ₹ 1,000 in hand now is more valuable than ₹ 1,000 receivable after a year. In other words, we will not part with ₹ 1,000 now in return for a firm assurance that the same sum will be repaid after a year. But we might part with ₹ 1,000 now if we are assured that something more than ₹ 1,000 will be paid at the end of the first year. This additional compensation required for parting with ₹ 1,000 now is called 'interest' or the time value of money. Normally, interest is expressed in terms of percentage per annum for example, 12 per cent p.a. or 18 per cent p.a. and so on.

Why should money have time value? Here are some important reasons for this phenomenon:

Money can be employed productively to generate real returns. For instance, if a sum of ₹ 100 invested in raw material and labor results in finished goods worth ₹ 105, we can say that the investment of ₹ 100 has earned a rate of return of 5 per cent.

In an inflationary period, a rupee today has a higher purchasing power than a rupee in the future.

Since future is characterized by uncertainty, individuals prefer current consumption to future consumption.

The manner in which these three determinants combine to determine the rate of interest can be symbolically represented as follows:

Nominal or market interest rate

= Real rate of interest or return + Expected rate of inflation

+ Risk premiums to compensate for uncertainty

There are two methods by which the time value of money can be taken care of – compounding and discounting. To understand the basic ideas underlying these two methods, let us consider a project which involves an immediate outflow of say ₹ 1,000 and the following pattern of inflows:

Year 1: ₹ 250

Year 2: ₹ 500

Year 3: ₹ 750

Year 4: ₹ 750

The initial outflow and the subsequent inflows can be represented on a time line as given below:

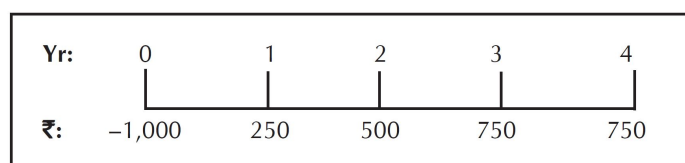


Figure 2.1: Time Line

Process of Compounding

Under the method of compounding, we find the future values (FV) of all the cash flows at the end of the time horizon at a particular rate of interest. Therefore, in this case we will be comparing the future value of the initial outflow of ₹ 1,000 as at the end of year 4 with the sum of the future values of the yearly cash inflows at the end of year 4. This process can be schematically represented as follows:

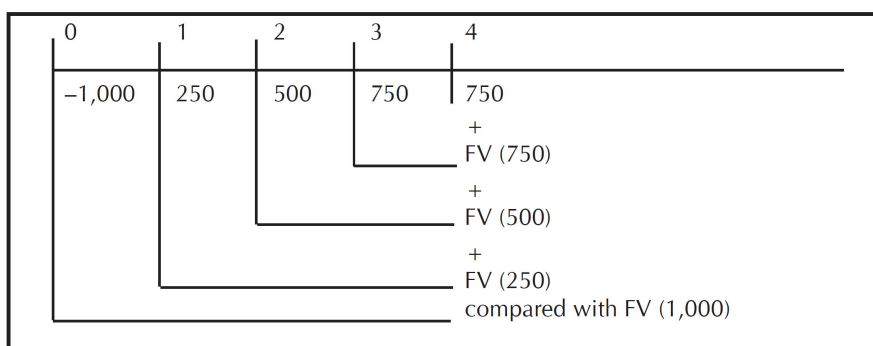


Figure 2.2: Process of Compounding

Under this method of compounding, the future values of all cash inflows at the end of the time horizon at a particular rate of interest are found. Interest is compounded when the amount earned on an initial deposit becomes part of the principal at the end of the first compounding period. If Mr. A invests ₹ 1,000 in a bank which offers him 5% interest compounded annually, he has ₹ 1,050 in his account at the end of the first year. The total of the interest and principal ₹ 1,050 constitutes the principal for the next year. He thus earns ₹ 1,102.50 for the second year. This becomes the principal for the third year. This compounding procedure will continue for an indefinite number of years. The compounding of interest can be calculated by the following equation:

$$A = P(1 + i)^n$$

Where, A = Amount at the end of the period

P = Principal at the end of the period

i = Rate of interest

n = Number of years

The amount of money in the account at the end of various years is calculated as under, using the equation:

Amount at the end of year 1 = ₹ 1,000 (1 + 0.05) = ₹ 1,050

Amount at the end of year 2 = ₹ 1,050 (1 + 0.05) = ₹ 1,102.50

Amount at the end of year 3 = ₹ 1,102.50 (1 + 0.05) = ₹ 1,157.63

Year	1	2	3
Beginning amount	₹ 1,000	₹ 1,050	₹ 1,102.50
Interest rate	5%	5%	5%
Amount of interest	50	52.50	55.13
Beginning principal	1,000	₹ 1,050	₹ 1,102.50
Ending principal	₹ 1,050	₹ 1,102.50	₹ 1,157.63

The amount at the end of year 2 can be ascertained by substituting

₹ 1000 (1 + 0.05) for

₹ 1,050, that is, ₹ 1,000(1 + 0.05) (1 + 0.05) = ₹ 1,102.50.

Similarly, the amount at the end of year 3 can be ascertained by substituting

₹ 1,000(1 + 0.05) (1 + 0.05) (1 + 0.05) = ₹ 1,157.63.

Thus by substituting the actual figures for the investment or ₹ 1,000 in the formula $A = P(1 + i)^n$, we arrive at the result shown above in the Table.

Process of Discounting

Under the method of discounting, we reckon the time value of money now, i.e., at time 0 on the time line. So, we will be comparing the initial outflow with the sum of the present values (PV) of the future inflows at a given rate of interest. This process can be diagrammatically represented as follows:

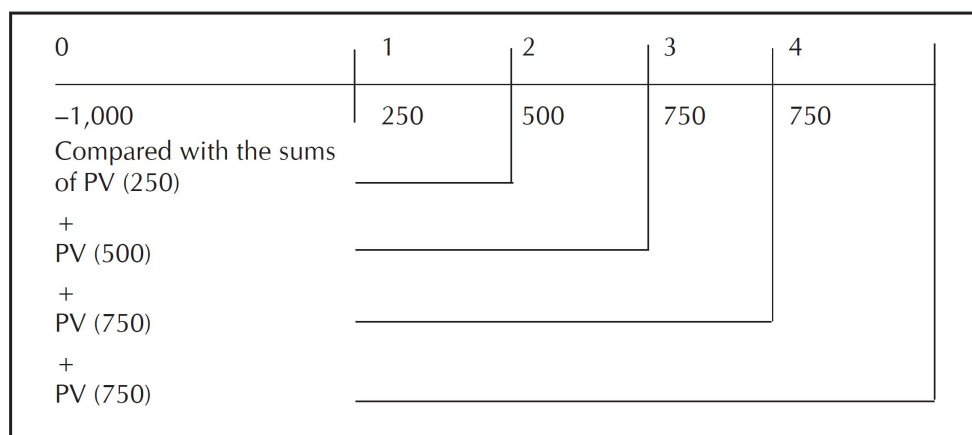


Figure 2.3: Process of Discounting

How do we compute the future values and the present values? This question is answered in the latter part of the chapter. But before that, we must draw the distinction between the concepts of compound interest and simple interest. We shall illustrate this distinction through the following illustration.

Under the method of discounting, we find the time value of money now, that is, at time 0 on the time line. It is concerned with determining the present value of a future amount. This is in contrast to the compounding approach where we convert present amounts into future amounts; in discounting approach we convert the future value to present sums. For example, if Mr. A requires to have ₹ 1,050 at the end of year 1, given the rate of interest as 5%, he would like to know how much he should invest today to earn this amount. If P is the unknown amount and using the equation we get $P(1 + 0.05) = 1,050$. Solving the equation, we get $P = ₹ 1,050/1.05 = ₹ 1,000$.

Thus ₹ 1,000 would be the required principal investment to have ₹ 1,050 at the end of year 1 at 5% interest rate. In other words, the present value of ₹ 1,050 received one year from now, rate of interest 5%, is ₹ 1,000. The present value of money is the reciprocal of the compounding value. Mathematically, we have $P = A \{1/(1 + i)^n\}$ in which P is the present value for the future sum to be received, A is the sum to be received in future, i is the interest rate and n is the number of years.

Illustration 1

If X has a sum of ₹ 1,000 to be invested, and there are two schemes, one offering a rate of interest of 10 per cent, compounded annually, and other offering a simple rate of interest of 10 per cent, which one should he opt for assuming that he will withdraw the amount at the end of (a) one year (b) two years, and (c) five years?

Solution:

Given the initial investment of ₹ 1,000, the accumulations under the two schemes will be as follows:

End of Year	Compounded Interest Scheme	Simple Interest Scheme
1	$1000 + (1000 \times 0.10) = 1,100$	$1000 + (1000 \times 0.10) = 1,100$

2	$1100 + (1100 \times 0.10) = 1,210$	$1100 + (1000 \times 0.10) = 1,200$
3	$1210 + (1210 \times 0.10) = 1,331$	$1200 + (1000 \times 0.10) = 1,300$
4	$1331 + (1331 \times 0.10) = 1,464$	$1300 + (1000 \times 0.10) = 1,400$
5	$1464 + (1464 \times 0.10) = 1,610$	$1400 + (1000 \times 0.10) = 1,500$

From this Table, it is clear that under the compound interest scheme interest earns interest, whereas interest does not earn any additional interest under the simple interest scheme. Obviously, an investor seeking to maximize returns will opt for the compound interest scheme if his holding period is more than a year. We have drawn the distinction between compound interest and simple interest here to emphasize that in financial analysis we always assume interest to be compounded.

Future Value of a Single Flow (Lump Sum)

The above Table illustrates the process of determining the future value of a lump sum amount invested at one point of time. But the way it has gone about calculating the future value will prove to be cumbersome if the future value over long maturity periods of 20 years or 30 years is to be calculated. A generalized procedure for calculating the future value of a single cash flow compounded annually is as follows:

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

where,

FV_n = Future value of the initial flow n years hence,

PV = Initial cash flow

k or i = Annual rate of interest

n = Life of investment

In the above formula, the expression $(1 + k)^n$ represents the future value of an initial investment of ₹ 1 (one rupee invested today) at the end of n years at a rate of interest k referred to as Future Value Interest Factor (FVIF, hereafter). To simplify calculations, this expression has been evaluated for various combinations of k and n and these values are presented in Table 1 at the end of this book. To calculate the future value of any investment for a given value of 'k' and 'n', the corresponding value of $(1 + k)^n$ from the table has to be multiplied with the initial investment.

Illustration 2

The fixed deposit scheme of Andhra Bank offers the following interest rates.

Period of Deposit	Rate per Annum
46 days to 179 days	10.0%
180 days to < 1 year	10.5%
1 year and above	11.0%

An amount of ₹ 10,000 invested today will grow in 3 years to

Solution:

$$\begin{aligned}
 FV_n &= PV(1 + k)^n \\
 &= PV \times FVIF(11, 3) \\
 &= 10,000 (1.368) \\
 &= ₹ 13,680
 \end{aligned}$$

Illustration 3

The fixed deposit scheme of a bank offers the following interest rates:

Period of Deposit	Rate per Annum
<45 days	9%
46 days to 179 days	10%
180 days to 365 days	10.5%
366 days and above	12%

How much does an investment of ₹ 10,000 invested today grow to in 3 year?

Solution:

$$\begin{aligned}
 FV_n &= PV(1 + i)^n \text{ or } PV \times FVIF(12\%, 3y) \\
 &= 10,000 \times 1.4049 \text{ (from the Tables)} \\
 &= ₹ 14,049
 \end{aligned}$$

Doubling Period: A frequent question posed by the investor is, “How long will it take for the amount invested to be doubled for a given rate of interest”. This question can be answered by a rule known as ‘rule of 72’. Though it is a crude way of calculating this rule says that the period within which the amount will be doubled is obtained by dividing 72 by the rate of interest.

For instance, if the given rate of interest is 6 per cent, then doubling period is $72/6 = 12$ yrs.

However, an accurate way of calculating doubling period is the ‘rule of 69’, according to which, doubling period

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

Illustration 4

The following is the calculation of doubling period for two rates of interest, i.e., 6 per cent and 12 per cent.

Solution:

Rate of interest	Doubling Period
6%	$= 0.35 + 69/6 = 0.35 + 11.5 = 11.85$ yrs.
12%	$= 0.35 + 69/12 = 0.35 + 5.75 = 6.1$ yrs.

Growth Rate: The compound rate of growth for a given series for a period of time can be calculated by employing the future value interest factor table (FVIF).

For instance, if your company currently has 5,000 employees and this number is expected to grow by 5% p.a. How many employees will your company have after 10 years.

$$= 5,000 (1.05)^{10} = 5,000 \times (1.629) = 8,145$$

Illustration 5.

Years	1	2	3	4	5	6
Profits (in lakh)	95	105	140	160	165	170

How is the compound rate of growth for the above series determined? This can be done in two steps:

Solution:

The ratio of profits for year 6 to year 1 is to be determined, i.e., $170/95 = 1.79$

The FVIF_{k,n} table is to be looked at. Look at a value which is close to 1.79 for the row for 5 years. The value close to 1.79 is 1.762 and the interest rate corresponding to this is 12 per cent. Therefore, the compound rate of growth is 12 per cent.

Increased Frequency of Compounding: In the above illustration, the compounding has been done annually. Suppose we are offered a scheme where compounding is done more frequently. For example, assume you have deposited ₹ 10,000 in a bank which offers 10 per cent interest per annum compounded semi-annually which means that interest is paid every six months.

Now, amount in the beginning	=	10,000
Interest @ 10 per cent p.a. for first six months	=	500
Amount at the end of six months $\left(10,000 \times \frac{0.1}{2}\right)$	=	10,500
Interest for second 6 months $\left(10,500 \times \frac{0.1}{2}\right)$	=	525
Amount at the end of the year	=	11,025

Instead, if the compounding is done annually, the amount at the end of the year will be 10,000 $(1 + 0.1) = ₹ 11,000$. This difference of ₹ 25 is because under semi-annual compounding, the interest for first 6 months earns interest in the second 6 months.

The generalized formula for these shorter compounding periods is:

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

Where,

FV_n = Future value after 'n' years

PV = Cash flow today

k or i = Nominal interest rate per annum

m = Number of times compounding is done during a year

n = Number of years for which compounding is done.

Illustration 6

Under the Vijaya Cash Certificate scheme of Vijaya Bank, deposits can be made for periods ranging from 6 months to 10 years. Every quarter, interest will be added on to the principal. The rate of interest applied is 9 per cent p.a. for periods from 12 to 23 months and 10 per cent p.a. for periods from 24 to 120 months.

Solution:

An amount of ₹ 1,000 invested for 2 years will grow to

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

where m = Frequency of compounding during a year

$$= 1,000 \left(1 + \frac{0.10}{4} \right)^8$$

$$= 1,000(1.025)^8$$

$$= 1,000 \times 1.2184$$

$$= ₹ 1,218$$

Illustration 7

Under the Andhra Bank's Cash Multiplier Scheme, deposits can be made for periods ranging from 3 months to 5 years. Every quarter, interest is added to the principal. The applicable rate of interest is 9% for deposits less than 23 months and 10% for periods more than 24 months. What will the amount of ₹ 10,000 today be after 2 years?

Solution:

$$\begin{aligned} FV_n &= PV(1 + i/m)^{m \times n} \\ &= 1,000 (1 + 0.10/4)^{4 \times 2} \\ &= 1,000 (1 + 0.10/4)^8 \\ &= ₹ 12,180 \end{aligned}$$

Effective vs. Nominal Rate of Interest: We have seen above that the accumulation under the semi-annual compounding scheme exceeds the accumulation under the annual compounding scheme by ₹ 25. This means that while under annual compounding scheme, the nominal rate of interest is 10 per cent per annum, under the scheme where compounding is done semi-annually, the principal amount grows at the rate of 10.25 per cent per annum. This 10.25 per cent is called the effective rate of interest which is the rate of interest per annum under annual compounding that produces the same effect as that produced by an interest rate of 10 per cent under semi-annual compounding.

The general relationship between the effective and nominal rates of interest is as follows:

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

where, r = Effective rate of interest

k = Nominal rate of interest

m = Frequency of compounding per year

Illustration 8

Find out the effective rate of interest, if the nominal rate of interest is 12 per cent and is quarterly compounded.

Solution:

Effective rate of interest

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

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

$$= (1 + 0.03)^4 - 1 = 1.126 - 1$$

$$= 0.126 = 12.6\% \text{ p.a.}$$

Future Value of Multiple Flows: Suppose we invest ₹ 1,000 now (beginning of year 1), ₹ 2,000 at the beginning of year 2 and ₹ 3,000 at the beginning of year 3, how much will these flows accumulate to at the end of year 3 at a rate of interest of 12 per cent per annum? This problem can be represented on the time line as follows:

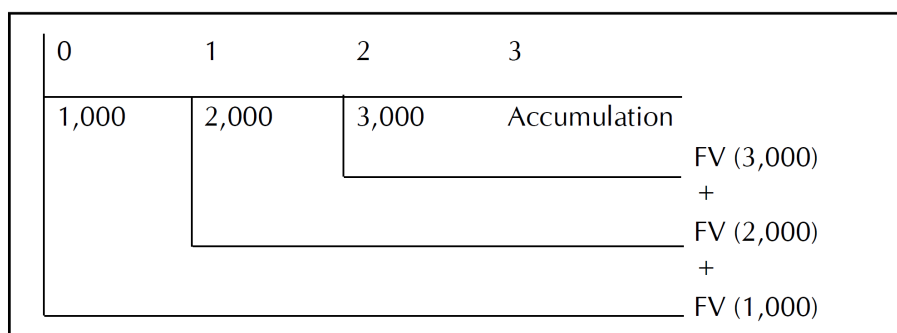


Figure 2.4: Compounding Process for Multiple Flows

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

FV ₹ 1,000 FV ₹ 2,000 FV ₹ 3,000

At $k = 0.12$, the above sum is equal to

$$\begin{aligned}
&= ₹ 1,000 \times FVIF_{12,3} + 2,000 \times FVIF_{12,2} + 3,000 \times FVIF_{12,1} \\
&= ₹ [1,000 \times 1.405 + 2,000 \times 1.254 + 3,000 \times 1.120] = ₹ 7,273
\end{aligned}$$

Therefore, to determine the accumulation of multiple flows as at the end of a specified time horizon, we have to find out the accumulations of each of these flows using the appropriate FVIF and sum up these accumulations. This process can get tedious if we have to determine the accumulation of multiple flows over a long period of time, for example, the accumulation of a recurring deposit of ₹ 100 per month for 60 months at a rate of 1 per cent per month. In such cases a short cut method can be employed provided the flows are of equal amounts. This method is discussed in the following section.

Illustration 9

We have considered only single payment made once and its accumulation effect. An investor may be interested in investing money in installments and wish to know the value of his savings after n years. For example, Mr. Madan invests ₹ 500, ₹ 1,000, ₹ 1,500, ₹ 2,000 and ₹ 2,500 at the end of each year for 5 years. Calculate the value at the end of 5 years compounded annually if the rate of interest is 5% p.a.

Solution:

End of Year	Amount Investment	Number of Years Compounded	Compounded Interest Factor from Tables	FV in ₹
1	₹ 500	4	1,216	608
2	₹ 1,000	3	1,158	1,158
3	₹ 1,500	2	1,103	1,654
4	₹ 2,000	1	1,050	2,100
5	₹ 2,500	0	1,000	2,500
Amount at the end of 5th Year				₹ 8,020

Future Value of Annuity: Annuity is the term used to describe a series of periodic flows of equal amounts. These flows can be either receipts or payments. For example, if you are required to pay ₹ 200 per annum as life insurance premium for the next 20 years, you can classify this stream of payments as an annuity. If the equal amounts of cash flow occur at the end of each period over the specified time horizon, then this stream of cash flows is defined as a regular annuity or deferred annuity. When cash flows occur at the beginning of each period the annuity is known as an annuity due.

The future value of a regular annuity for a period of n years at a rate of interest ' k ' is given by the formula:

$$FVA_n = A(1+k)^{n-1} + A(1+k)^{n-2} + A(1+k)^{n-3} + \dots + A$$

which reduces to

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

where, A = Amount deposited/invested at the end of every year for n years

k or i = Rate of interest (expressed in decimals)

n = Time horizon

FVA_n = Accumulation at the end of n years

The expression $\left[\frac{(1+k)^n - 1}{k} \right]$ is called the Future Value Interest Factor for Annuity (FVIFA,

*Candidates who would like to know whether there is any short cut for evaluating $(1+k)^n$ for values of ' k ' not found in the table, are informed that there is no short cut method except using logarithms or the X^Y function found in scientific calculators.

Illustration 10

M. Ram Kumar deposits ₹ 3,000 at the end of every year for 5 years into his account for 5 years, interest being 5% compounded annually. Determine the amount of money he will have at the end of the 5th year.

End of Year	Amount Investment	Number of Years Compounded	Compounded Interest Factor from Tables	FV in ₹
1	₹ 2,000	4	1,216	2,432
2	₹ 2,000	3	1,158	2,316
3	₹ 2,500	2	1,103	2,206
4	₹ 2,000	1	1,050	2,100
5	₹ 2,500	0	1,000	2,000
Amount at the end of 5th Year				₹ 11,054

OR Using formula and the tables we can find that:

$$= 2000 \text{ FVIFA}(5\%, 5y)$$

$$= 2,000 \times 5.526$$

$$= \text{₹ } 11,052$$

We notice that we can get the accumulations at the end of n period using the tables. Calculations for a long time horizon are easily done with the help of reference tables. Annuity tables are widely used in the field of investment banking as ready reckoners.

Illustration 11

Calculate the value of an annuity flow of ₹ 5,000 done on a yearly basis for 5 years, yielding an interest of 8% p.a.

Solution:

$$= 5000 \text{ FVIFA}(8\%, 5y)$$

$$= 5,000 \times 5.867$$

$$= \text{₹ } 29,335$$

Illustration 12

Under the recurring deposit scheme of the Vijaya Bank, a fixed sum is deposited every month on or before the due date opted for 12 to 120 months according to the convenience and needs of the investor. The period of deposit, however, should be in multiples of 3 months only. The rate of interest applied is 9 per cent p.a. for periods from 12 to 24 months and 10 per cent p.a. for periods from 24 to 120 months and is compounded at quarterly intervals.

Solution:

Based on the above information the maturity value of a monthly installment of ₹ 5 for 12 months can be calculated as below:

Amount of deposit = ₹ 5 per month

Rate of interest = 9 per cent p.a. compounded quarterly

$$\text{Effective rate of interest per annum} = \left(1 + \frac{0.09}{4}\right)^4 - 1 = 0.0931$$

$$\begin{aligned}\text{Rate of interest per month} &= (1 + 0.0931)^{1/12} - 1 \\ &= (1 + 0.0931)^{1/12} - 1 \\ &= 1.0074 - 1 = 0.0074 = 0.74\%\end{aligned}$$

Maturity value can be calculated using the formula

$$\begin{aligned}\text{FVA}_n &= A \left\{ \frac{(1 + k)^n - 1}{k} \right\} \\ &= 5 \left\{ \frac{(1 + 0.0074)^{12} - 1}{0.0074} \right\} \\ &= 5 \times 12.50 = ₹ 62.50\end{aligned}$$

If the payments are made at the beginning of every year, then the value of such an annuity called annuity due is found by modifying the formula for annuity regular as follows:

$$\text{FVA}_n (\text{due}) = A (1 + k) \text{FVIFA}_{k,n}$$

Illustration 13

Under the Jeevan Mitra Plan offered by Life Insurance Corporation of India, if a person is insured for ₹ 10,000 and if he survives the full term, then the maturity benefits will be the basic sum of ₹ 10,000 assured plus bonus which accrues on the basic sum assured. The minimum and maximum age to propose for a policy is 18 and 50 years respectively.

Let us take two examples, one of a person aged 20 and another of 40 years old to illustrate this scheme.

The person aged 20, enters the plan for a policy of ₹ 10,000. The term of policy is 25 years and the annual premium is ₹ 41.65. The person aged 40, also proposes for the policy of ₹ 10,000 and for

25 years and the annual premium he has to pay comes to ₹ 57. What are the rates of return enjoyed by these two persons?

Solution:

Rate of return enjoyed by the person of 20 years of age

Premium = ₹ 41.65 per annum

Term of Policy = 25 years

Maturity Value = ₹ 10,000 + bonus which can be overlooked as it is a fixed amount and does not vary with the term of policy.

We know that the premium amount when multiplied by FVIFA factor will give us the value at maturity.

$$\text{i.e., } P \times (1 + k) \text{ FVIFA}(k, n) = MV$$

where,

P = Annual premium

n = Term of policy in years

k = Rate of return

MV = Maturity value

Therefore,

$$41.65 \times (1 + k) \text{ FVIFA}(k, 25) = 10,000$$

$$(1 + k) \text{ FVIFA}(k, 25) = 240.01$$

From table 2 at the end of the book, we can find that

$$(1 + 0.14) \text{ FVIFA}(14, 25) = 207.33$$

$$\text{i.e., } (1.14) \text{ FVIFA}(14, 25) = 1.14 \times 181.871 = 207.33$$

and

$$(1 + 0.15) \text{ FVIFA}(15, 25) = 244.71$$

$$\text{i.e., } (1.15) \text{ FVIFA}(15, 25) = 1.15 \times 212.793 = 244.71$$

By interpolation:

$$k = 14\% + (15\% - 14\%) \times \frac{240.01 - 207.33}{244.71 - 207.33}$$

$$= 14\% + 1\% \times \frac{33.68}{33.38}$$

$$= 14\% + 0.87\% = 14.87\%$$

Rate of return enjoyed by the person aged 40

Premium = ₹ 57 per annum

Term of Policy = 25 years

Maturity Value = ₹ 10,000

Therefore, $57 \times (1 + k) \text{ FVIFA } (k, 25) = 10,000$

$(1 + k) \text{ FVIFA } (k, 25) = 175.44$

From table 2 at the end of the book, we can find that

$(1 + k) \text{ FVIFA } (13\%, 25) = 175.87$

i.e., $(1.13) (155.62) = 175.87$

i.e., $k = 13\%$ (approx.)

Here we find that the rate of return enjoyed by the 20-year old person is greater than that of the 40-year old person by about 2 per cent in spite of the latter paying a higher amount of annual premium for the same period of 25 years and for the same maturity value of ₹ 10,000. This is due to the coverage for the greater risk in the case of the 40-year old person.

Now that we are familiar with the computation of future value, we will get into the mechanics of computation of present value.

Sinking Fund Factor

We have the equation

$$\text{FVA} = A \left[\frac{(1 + k)^n - 1}{k} \right]$$

We can rewrite it as

$$A = \text{FVA} \left[\frac{k}{(1 + k)^n - 1} \right]$$

The expression $\left[\frac{k}{(1 + k)^n - 1} \right]$ is called the Sinking Fund Factor. It represents the amount that has

to be invested at the end of every year for a period of “n” years at the rate of interest “k”, in order to accumulate Re. 1 at the end of the period.

Discounting or Present Value of a Single Flow

Discounting as explained earlier is an alternative approach for reckoning the time value of money. Using this approach, we can determine the present value of a future cash flow or a stream of future cash flows. The present value approach is the commonly followed approach for evaluating the financial viability of projects.

If we invest ₹ 1,000 today at 10 per cent rate of interest for a period of 5 years, we know that we will get ₹ $1,000 \times \text{FVIF } (10, 5) = ₹ 1,000 \times 1.611 = ₹ 1,611$ at the end of 5 years. The sum of ₹ 1,611 is called the accumulation of ₹ 1,000 for the given values of ‘k’ and ‘n’. Conversely, the sum of ₹ 1,000 invested today to get ₹ 1,611 at the end of 5 years is called the present value of ₹ 1,611 for the

given values of 'k' and 'n'. It, therefore, follows that to determine the present value of a future sum we have to divide the future sum by the FVIF value corresponding to the given values of 'k' and 'n' i.e. present value of ₹ 1,611 receivable at the end of 5 years at 10 per cent rate of interest.

$$= ₹ \frac{1,611}{FVIF(10,5)} = ₹ \frac{1,611}{1,611} = ₹ 1,000$$

In general the present value (PV) of a sum (FV_n) receivable after n years at a rate of interest (k) is given by the expression.

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

The inverse of $FVIF(k, n)$ is defined as $PVIF(k, n)$ (Present Value Interest Factor for k, n). Therefore, the above equation can be written as

$$PV = FV_n \times PVIF(k, n)$$

Therefore to determine the present value of a future sum, we have to just locate the PVIF factor for the given values of k and n and multiply this factor value with the given sum. Since $PVIF(k, n)$ represents the present value of Re. 1 receivable after n years at a rate of interest k, it is obvious that PVIF values cannot be greater than one. The PVIF values for different combinations of k and n are given in table 3 at the end of this book.

For instance, what is the present value of ₹ 1,000 receivable after 8 years. If the rate of discount is 15%.

$$P.V. = 1,000 \{1/(1+0.15)^8\} = 1,000 \times 0.327 = ₹ 327.$$

Illustration 14

Calculate the PV of an annuity of ₹ 500 received annually for 4 year, when discounting factor is 10%.

End of Year	Cash Inflows	PV Factor	PV in ₹
1	₹ 500	0.909	454
2	₹ 500	0.827	413
3	₹ 500	0.751	375
4	₹ 500	0.683	341

Present Value of an annuity ₹ 1,585.

OR by directly looking at the table we can calculate:

$$= 500 \times PVIFA(10\%, 4y)$$

$$= 500 \times 3.170$$

$$= ₹ 1,585$$

Illustration 15

Find out the present value of an annuity of ₹ 10,000 over 3 years when discounted at 5%.

Solution:

$$\begin{aligned}
 &= 10,000 \times \text{PVIFA}(5\%, 3y) \\
 &= 10,000 \times 2.773 \\
 &= ₹ 27,730
 \end{aligned}$$

Illustration 16

The cash certificates of Andhra Bank are a term deposit scheme under reinvestment plan. Interest on deposit money earns interest as it is reinvested at quarterly rests. These deposits suit depositors from lower and middle income groups, since the small odd sums invested grow into large amounts over a period of time @ 12% p.a. If ₹ 100 certificate is available at ₹ 90, then should we buy or not?

Solution:

Given an interest rate of 12 per cent p.a. on a certificate having a value of ₹ 100 after 1 year, the issue price of the cash certificate can be calculated as below.

The effective rate of interest has to be calculated first.

$$\begin{aligned}
 r &= \left(1 + \frac{k}{m}\right)^m - 1 \\
 r &= \left(1 + \frac{0.12}{4}\right)^4 - 1 = 12.55\%
 \end{aligned}$$

The issue price of the cash certificate is

$$\begin{aligned}
 \text{PV} &= \frac{\text{FV}_n}{(1+k)^n} \\
 &= \frac{100}{(1+0.1255)^1} = ₹ 88.85
 \end{aligned}$$

∴ we will not buy above certificate @ ₹ 90.

Illustration 17

Pragati cash certificate scheme of Syndicate Bank is an ideal scheme for all classes of people under different income groups. A small odd sum can be invested for a period ranging from 1 to 10 years. The certificates are issued in convenient denominations of ₹ 25, ₹ 100, ₹ 1,000, and ₹ 1,00,000. The rate of interest is 12 per cent p.a. compounded quarterly. If ₹ 1,00,000 certificate is available at ₹ 30,000, then should we buy such certificate or not?

Solution:

To calculate the issue price of a certificate of ₹ 1,00,000 to be received after 10 years, the following formula can be used

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

Firstly, the effective rate of interest has to be calculated.

$$r = \left(1 + \frac{0.12}{4}\right)^4 = 12.55\%$$

The issue price of the cash certificate can now be calculated as:

$$\begin{aligned} PV &= \frac{FV_n}{(1+k)^n} \\ &= \frac{1,00,000}{(1+0.1255)^{10}} = ₹ 30,658 \end{aligned}$$

As present value of the certificate is ₹ 30,658 and it is available at ₹ 30,000. Therefore, we should buy such certificate, and we will make a profit of ₹ 658.

Present Value of Uneven Multiple Flows

Suppose a project involves an initial investment of ₹ 10 lakh and generates net inflows as follows:

- End of Year -> 1 ₹ 2 lakh
 -> 2 ₹ 4 lakh
 -> 3 ₹ 6 lakh

What is the present value of the future cash inflows? To determine it, we have to first define the relevant rate of interest. The relevant rate of interest as we shall see later, will be the cost of the funds invested. Suppose, we assume that this cost is 12 per cent p.a. then we can determine the present value of the cash flows using the following two-step procedure:

Step 1

Evaluate the present value of cash inflow independently. In this case, the present values will be as follows:

Year	Cash Flow (₹ in lakh)	Present Value (₹ in lakh)
1	2	$2 \times PVIF (12,1) = 2 \times 0.893 = 1.79$
2	4	$4 \times PVIF (12,2) = 4 \times 0.797 = 3.19$
3	6	$6 \times PVIF (12,3) = 6 \times 0.712 = 4.27$

Step 2

Aggregate the present values obtained in Step 1 to determine the present value of the cash flow stream. In this case the present value of the cash inflows associated with the project will be ₹ (1.79 + 3.19 + 4.27) lakh = ₹ 9.25 lakh.

A project is said to be financially viable if the present value of the cash inflows exceeds the present value of the cash outflow. In this case, the project is not financially viable because the present

value of the net cash inflows (₹ 9.25 lakh) is less than the initial investment of ₹ 10 lakh. The difference of ₹ 0.75 lakh is called the net present value.

Like the procedure followed to obtain the future value of multiple cash flows, the procedure adopted to determine the present value of a series of future cash flows can prove to be cumbersome, if the time horizon to be considered is quite long. These calculations can, however, be simplified if the cash flows occurring at the end of the time periods are equal. In other words, if the stream of cash flows can be regarded as a regular annuity or annuity due, then the present value of this annuity can be determined using an expression similar to the FVIFA expression.

Illustration 18.

Year	Cash flows ₹
1	1,000
2	2,000
3	3,000
4	4,000
5	5,000

Present value at 10% discount factor is .909, .826, .751, .683, .621 for 1st, 2nd, 3rd, 4th and 5th year.

Find out the present value of cash flows.

Solution:

Year	Cash flows `	PV factor	Present value `
1	1,000	.909	909
2	2,000	.826	1,652
3	3,000	.751	2,253
4	4,000	.683	2,732
5	5,000	.621	3,105
			10,651

Illustration 19:

Find out value of the cash flow.

Year	Cash flows `
1	500
2	1,000
3	1,500
4	2,000
5	2,500

Discounted rate = 10%

Solution:

Year end	Cash Flows	Present Value Factor	Present Value
1	500	0.909	454.5
2	1,000	0.826	826.0
3	1,500	0.751	1,126.5
4	2,000	0.683	1,366.0
5	2,500	0.621	1,552.5
			5,325.5

Illustration 20

An investor will receive ₹ 10,000, ₹ 15,000, ₹ 8,000, ₹ 11,000 and ₹ 4,000 respectively at the end of each of 5 years. Find out the present value of this stream of uneven cash flows, if the investor's interest rate is 8%.

$$PV = 10,000/(1 + 0.08) + 15,000/(1 + 0.08)^2 + 8,000/(1 + 0.08)^3 + 11,000/(1 + 0.08)^4 + 4,000/(1 + 0.08)^5$$

$$= ₹ 39,276$$

Or

$$PV = 10,000 \text{ PVIF}(8,1) + 15,000 \text{ PVIF}(8,2) + 8,000 \text{ PVIF}(8,3) + 11,000 \text{ PVIF}(8,4) + 4,000 \text{ PVIF}(8,5)$$

$$= 10,000 \times 0.926 + 15,000 \times 0.857 + 8,000 \times 0.794 + 11,000 \times 0.735 + 4,000 \times 0.681$$

$$= ₹ 39,276$$

Present Value of an Annuity

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

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

which reduces to

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

The expression $\left[\frac{(1+k)^n - 1}{k(1+k)^n} \right]$ is called the PVIFA (Present Value Interest Factor Annuity) and it

represents the present value of a regular annuity of Re. 1 for the given values of k and n. The values of PVIFA (k,n) for different combinations of 'k' and 'n' are given in Table 4 given at the end of the book. It must be noted that these values can be used in any present value problem only if the following conditions are satisfied: (a) the cash flows are equal; and (b) the cash flows occur at the end of every year. It must also be noted that PVIFA (k,n) is not the inverse of FVIFA (k,n) although PVIF (k,n) is the inverse of FVIF (k,n). The following illustration illustrates the use of PVIFA tables for determining the present value.

Illustration 21

The Swarna Kalash Yojana at rural and semi-urban branches of SBI is a scheme open to all individuals/firms. A lump sum deposit is remitted and the principal is received with interest at the rate of 12 per cent p.a. in 12 or 24 monthly installments. The interest is compounded at quarterly intervals.

Solution:

The amount of initial deposit to receive a monthly installment of ₹ 100 for 12 months can be calculated as below:

Firstly, the effective rate of interest per annum has to be calculated.

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

$$= \left(1 + \frac{0.12}{4}\right)^4 - 1 = 12.55\%$$

After calculating the effective rate of interest per annum, the effective rate of interest per month has to be calculated which is nothing but

$$(1.1255)^{1/12} - 1 = 0.00990$$

The initial deposit can now be calculated as below:

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

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

$$= 100 \times \left[\frac{0.1255}{0.01114} \right]$$

$$= 100 \times 11.26 = ₹ 1,126.$$

Illustration 22

The annuity deposit scheme of SBI provides for fixed monthly income for suitable periods of the depositor's choice. An initial deposit has to be made for a minimum period of 36 months. After the first month of the deposit, the depositor receives monthly installments depending on the number of months he has chosen as annuity period. The rate of interest is 11 per cent p.a. which is compounded at quarterly intervals.

Solution:

If an initial deposit of ₹ 4,610 is made for an annuity period of 60 months, the value of the monthly annuity can be calculated as below.

Firstly, the effective rate of interest per annum has to be calculated

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

$$= \left(1 + \frac{0.11}{4}\right)^4 - 1 = 11.46\%$$

After calculating the effective rate of interest per annum, the effective rate of interest per month has to be calculated which is nothing but

$$(1.1146)^{1/12} - 1 = 0.00908$$

The monthly annuity can now be calculated as

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

$$4,610 = A \times \left[\frac{(1+0.00908)^{60} - 1}{0.00908(1+0.00908)^{60}} \right]$$

$$4,610 = A \times \left[\frac{\quad}{\quad} \right] = 99.8833$$

$$\Rightarrow A = 99.8833$$

$$A = ₹ 100$$

Capital Recovery Factor: Manipulating the relationship between PVA_n , A , k & n we get an equation:

$$A = PVA_n \left[\frac{(1+k)^n - 1}{k(1+k)^n} \right] \quad \text{or} \quad \frac{\text{Loan Amount}}{PVIFA(k_d, n)}$$

$$\left[\frac{(1+k)^n - 1}{k(1+k)^n} \right] \text{ is known as the capital recovery factor.}$$

Illustration 23

A loan of ₹ 1,00,000 is to be repaid in five equal annual installments. If the loan carries a rate of interest of 14 per cent p.a. the amount of each installment can be calculated as below.

Solution:

If R is defined as the equated annual installment, we are given that

$$R \times PVIFA(14\%, 5) = ₹ 1,00,000$$

$$\text{Therefore, } R = \frac{₹ 1,00,000}{PVIFA(14\%, 5)}$$

$$= \frac{₹ 1,00,000}{3.433} = ₹ 29,129$$

Notes:

1. We have introduced in this example the application of the inverse of the PVIFA factor which is called the capital recovery factor. The application of the capital recovery factor helps in answering questions like:
 - What should be the amount paid annually to liquidate a loan over a specified period at a given rate of interest?
 - How much can be withdrawn periodically for a certain length of time, if a given amount is invested today?
2. In this example, the amount of ₹ 29,129 represents the sum of the principal and interest components. To get an idea of the break-up of each installment between the principal and interest components, the loan repayment schedule is given below:

Year (A)	Equated Annual Installment (B) (₹)	Interest Content of (B) (C) (₹)	Capital Content of (B) [(D) = (B – C)] (₹)	Loan Outstanding After Payment (E) (₹)
0	–	–	–	1,00,000
1	29,129	14,000	15,129	84,871
2	29,129	11,882	17,247	67,624
3	29,129	9,467	19,662	47,962
4	29,129	6,715	22,414	25,548
5	29,129	3,577	25,552	–

The interest content of each installment is obtained by multiplying interest rate with the loan outstanding at the end of the immediately preceding year.

As can be observed from this schedule, the interest component declines over a period of time whereas the capital component increases. The loan outstanding at the end of the penultimate year must be equal to the capital content of the last installment but in practice there will be a marginal difference on account of rounding-off errors.

3. The equated annual installment method is usually adopted for fixing the loan ment schedule in a hire purchase transaction. But the financial institutions in India repaylike IDBI, IFCI and ICICI do not follow this scheme of equal periodic amortization. Instead, they stipulate that the loan must be repaid in equal installments. According to this scheme, the principal component of each payment remains constant and the total debt-servicing burden (consisting of principal repayment and interest payment) declines over time.

Sinking Fund: Sinking fund is a fund which is created out of fixed payments each period to accumulate to a future sum after a specified period. The sinking fund factor is useful in determining the annual amount to be put in a fund to repay bonds or debentures or to purchase a fixed asset or a property at the end of a specified period.

$$A = FVA \times i / \{(1 + i)^n - 1\}$$

$i / \{(1+i)^n - 1\}$ is called the *Sinking Fund Factor*.

Present Value of Perpetuity

An annuity of an infinite duration is known as perpetuity. The present value of such perpetuity can be expressed as follows:

$$P = A \times PVIFA_k$$

Where, P = Present value of a perpetuity

A = Constant annual payment

$PVIFA_k$ = Present value interest factor for a perpetuity

Therefore, The value of $PVIFA_k$ is

$$\sum_{t=1}^{\infty} \frac{1}{(1+k)^t} = \frac{1}{k} \quad \text{or} \quad \frac{FV}{\text{Interest}}$$

We can say that PV interest factor of a perpetuity is simply one divided by interest rate expressed in decimal form. Hence, PV of a perpetuity is simply equal to the constant annual payment divided by the interest rate.

Illustration 24

If the principal of a college wants to institute a scholarship of ₹ 5,000 to a meritorious student in finance every year, find out the PV of investment which would yield ₹ 5,000 in perpetuity, discounted at 10%.

Solution:

$$\begin{aligned} P &= A/i \\ &= 5,000/0.10 \\ &= ₹ 50,000 \end{aligned}$$

This means he should invest ₹ 50,000 to get an annual return of ₹ 5,000.

Illustration 25

What is the future value of a regular annuity of ₹ 1.00 earning a rate of 12% interest p.a. for 5 years?

Solution:

$$1 \times FVIFA(12\%, 5y) = 1 \times 6.353 = ₹ 6.353$$

Illustration 26

If a borrower promises to pay ₹ 20,000 eight years from now in return for a loan of ₹ 12,550 today, what is the annual interest being offered?

Solution:

$$20000 \times PVIF(k\%, 8y) = ₹ 12,550 \text{ K is approximately } 6\%.$$

Illustration 27

A loan of ₹ 5,00,000 is to be repaid in 10 equal installments. If the loan carries 12% interest p.a. what is the value of one installment?

Solution:

$$A \times PVIFA(12\%, 10y) = 5,00,000 \text{ So } A = 5,00,000/5.650 = ₹ 88,492.$$

Illustration 28

A person deposits ₹ 25,000 in a bank that pays 6% interest half-yearly. Calculate the amount at the end of 3 years.

Solution:

$$25,000 \times (1+0.06)^{3 \times 2} = 25,000 \times 1.194 = ₹ 29,850$$

Illustration 29

Find the present value of ₹ 1,00,000 receivable after 10 years if 10% is the time preference for money.

Solution:

$$1,00,000 \times (0.386) = ₹ 38,600$$

Illustration 30

Ms Sushma wants to find out the present value of ₹ 50,000 to be received 5 years from now, at 10% rate of interest. We have to see 10% column of the 5th year in the Present Value tables. The relevant present value factor is 0.621.

Solution:

$$PV = A (PVIF)$$

$$\text{Therefore, Present Value} = 50,000 (0.6210)$$

$$= ₹ 31,040$$

Illustration 31

You deposit ₹ 10,000 annually in a bank for 3 years and your deposits earn a compound interest rate of 10%. What will be an annuity at the end of 3 years?

Solution:

$$\begin{aligned} & ₹ 10,000 (1.10)^2 + ₹ 10,000 (1.10) + ₹ 10,000 \\ &= ₹ 10,000 (1.21) + ₹ 10,000 (1.10) + ₹ 10,000 \\ &= 12,100 + 11,000 + 10,000 \\ &= ₹ 33,100 \end{aligned}$$

Illustration 32

You deposit ₹ 30,000 annually in a bank for 8 years and your deposit earns a compound interest rate of 12%. What will be annuity at the end of 8 years?

Solution:

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

$$FVA_g = 30,000 [912.3]$$

$$= ₹ 3,69,000$$

Illustration 33

Suppose you have decided to deposit ₹ 30,000 per year in your Public Provident Fund account for 30 years. What will be accumulated amount in your Public Provident Fund account at the end of 30 years if the interest rate is 11 %?

Solution:

The accumulated sum will be :

$$= ₹ 30,000 \frac{[(1.11)^{30} - 1]}{.11}$$

$$= ₹ 30,000 [199.02]$$

$$= ₹ 59,70,600$$

Illustration 34

You want to buy a house after 5 years when it is expected to cost ₹ 50 lakhs. How much should you save annually if your savings earn a compound interest of 10%?

Solution:

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

$$50,00,000 = A [6.105]$$

$$A = \frac{50,00,000}{6.105}$$

$$= ₹ 8,19,000$$

FINDING THE INTEREST RATE**Illustration 35**

A finance company advertises that it will pay a lump sum of ₹ 8,000 at the end of 6 years to Investors who deposit annually ₹ 1,000 for 6 years. What interest rate is implicit in this offer?

Solution:

Lump sum amount = ₹ 8,000.

Read the row corresponding to 6 years until you find value close to 8,000. Doing so, we find that FVIFA 12% 8.115.

So we conclude that the interest rate is slightly below 12%.

Illustration 36

A firm decides to make a deposit of ₹ 10,000 at the end of each year, for the next 10 years at 10% rate of interest. What will be the total cumulative deposit at the end of 10th year from today? The firm may also be interested to know the total deposit if the rate of interest is 9% or 11% in this case.

Solution:

Calculation for 10%:

$$\begin{aligned} FVA_n &= A \frac{[(1+r)^n - 1]}{r} \\ &= 10,000 \times 15.937 \\ &= ₹ 1,59,370. \end{aligned}$$

Calculation for 9%:

$$\begin{aligned} FVA_n &= 10,000 \times 15.193 \\ &= ₹ 1,51,930 \end{aligned}$$

Calculation for 11 %:

$$\begin{aligned} FVA_n &= 10,000 \times 16.722 \\ &= ₹ 1,67,220. \end{aligned}$$

Illustration 37

You expect to receive ₹ 1,000 annually for 2 years, each receipt occurring at the end of the year. What is the present value of this stream of benefits if the discount rate is 10%?

Solution:

$$\text{1st year} = 1,000 \left[\frac{1}{1.10} \right] = 1,000 \times 0.9091 = 909$$

$$\text{2nd year} = 1,000 \left[\frac{1}{1.10} \right]^2 = 1,000 \times 0.8264 = 826.4$$

$$\text{Total} = 1,735.4$$

Illustration 38

A student is awarded a scholarship and two options are placed before him.

- (a) To receive ₹ 1,100 now.
- (b) To receive ₹ 100 pm at the end of each of next 12 months. Which option be chosen if the rate of interest is 12% p.a.?

Solution:**Option I :**

The amount of ₹ 1,100 receivable now is already expressed in the present money and therefore does not require any adjustment.

Option II:

$$\begin{aligned}
 PV &= A \times PVAF(1\%, 12) \\
 &= 100 \times 11.255 \\
 &= ₹ 1,125.50.
 \end{aligned}$$

Since the present value in Option II is higher than the present value in Option I, the student should choose Option II.

Illustration 39

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

Solution:

$$\begin{aligned}
 PV_p &= \text{Annual cash flow}/r \\
 &= ₹ 2,500 / 0.12 \\
 &= ₹ 20,833.
 \end{aligned}$$

Illustration 40

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

Solution:

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

If the rate of interest is 8%.

$$\begin{aligned}
 PVP &= \text{Annual cash flow}/r \\
 &= ₹ 80 / 0.08 \\
 &= ₹ 1,000
 \end{aligned}$$

If the rate of interest is 5%, then

$$\begin{aligned}
 PVP &= \text{Annual cash flow}/r \\
 &= ₹ 80 / 0.05 \\
 &= ₹ 1,600.
 \end{aligned}$$

INTERNAL RATE OF RETURN (IRR)

This is the second time adjusted rate of return method for appraising capital expenditure decisions. It is the discount rate at which the aggregate present value of inflows equal the aggregate present value of outflows i.e. the rate at which NPV = 0.

In the NPV method, the discount rate is normally equal to the cost of capital which is external to the project under consideration. But in this method, the discount rate depends on the initial outlay

and cash inflows of the project under consideration. It is therefore, called the Internal Rate of Return. The IRR, once calculated is then compared to the required rate of return known as cut-off rate. The project is accepted if the IRR exceeds the cut-off rate. Otherwise, it is rejected.

Merits:

- (a) It also considers the time value of money.
- (b) It considers the cash flows over the entire life of a project.
- (c) It does not use the cost of capital to determine the present value. It itself provides a rate of return indicative of the profitability of the proposal.
- (d) It would also lead to a rise in share prices and to maximization of shareholder's wealth in the same way as NPV method.

Limitations:

- (a) The procedure for its calculation is complicated and at times tedious.
- (b) Sometimes it leads to multiple rates which further complicate its calculation.
- (c) In case of more than one project, the project with the maximum IRR may be selected which may not turn out to be one which is the most profitable in the long run.
- (d) Projects selected on the basis of higher IRR may not be profitable.
- (e) Unless the life of the project can be accurately estimated, assessment of cash flows cannot be done.

Illustration 41

A company is considering which of two mutually exclusive projects it should undertake. The Finance Director thinks that the project with the higher NPV should be chosen whereas the Managing Director thinks that the one with the higher IRR should be undertaken especially as both projects have the same initial outlay and length of life. The company anticipates a cost of capital of 10% and the net after-tax cash flows of the projects are as follows:

Year	0	1	2	3	4	5
(Cash Flows Fig. '000)						
Protect X	(200)	35	80	90	75	20
Protect Y	(200)	218	10	10	4	3

Required:

- (a) Calculate the NPV and IRR of each project.
- (b) State, with reasons, which project you would recommend.

The discount factors are as follows:

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

Solution:

(a) Calculation of the NPV and IRR of each project:

NPV of Project X

Years	Cash Flows	Discount Factors @ 10%	Discounted Values	Discount Factors @20%	Discounted Values
0	(200)	—	—	—	—
1	35	0.91	31.85	0.83	29.05
2	80	0.83	66.40	0.69	55.20
3	90	0.75	67.50	0.58	52.20
4	75	0.68	51.00	0.48	36.00
5	20	0.62	12.40	0.41	8.20
			229.15		180.65
NPV			+29.15		-19.35

IRR of Project X:

At 20% NPV is -19.35

At 10% NPV is +29.15

$$\begin{aligned}
 \text{IRR} &= 10 + \frac{29.15}{29.15 + 19.35} \times 10 \\
 &= 10 + \frac{29.15}{48.50} \times 10 \\
 &= 16.01\%
 \end{aligned}$$

NPV of Project Y

Years	Cash Flows	Discount Factors @ 10%	Discounted Values	Discount Factors @20%	Discounted Values
0	(200)	—	—	—	—
1	218	0.91	198.38	0.83	180.94
2	10	0.83	8.30	0.69	6.90
3	10	0.75	7.50	0.58	5.80
4	4	0.68	2.72	0.48	1.92
5	3	0.62	1.86	0.41	1.23
			218.76		196.79
NPV			+18.76		-3.21

IRR of Project Y:

At 20% NPV is -3.21

At 10% NPV is +18.76

$$\begin{aligned}
 \text{IRR} &= 10 + \frac{18.76}{18.76 + 3.21} \times 10 \\
 &= 10 + \frac{29.15}{21.97} \times 10 \\
 &= 18.54\%
 \end{aligned}$$

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

INTRODUCTION

Debt instrument include debentures and bonds. These are also included in the investment avenues. These are the instruments usually issued by the companies for borrowing from the market. These instruments are included to suit the investment needs of a risk averter who primarily invested in steady returns with safety of the principal invested.

A debenture is an acknowledgement of a debt of the company. It contains promise to pay a stated rate of interest for a definite period and then repay the principal maturity. In India, debentures are secured against the assets of the company. There are different types of debentures.

DEBT INSTRUMENTS: DEBENTURES AND BONDS

Debentures

Debentures are issued for raising short, medium or long-term finance depending on the period for which they are issued. Debentures are creditorship securities, which provide funds on loan basic. However, they are given more security as regards repayment of capital and regular payments of interest.

Types of Debentures

1. Registered and Bearer.
2. Secured and Unsecured.
3. Cumulative and Non-cumulative.
4. Redeemable and Irredeemable.
5. Convertible and Non-convertible.
6. Participating and Non-participating.

Different types of debentures are issued on different terms and condition in order to satisfy the needs of different categories of investors. The book value of debentures is usually ₹ 100. At

present, debentures are popular. Such debentures are converted into equity shares on maturity as per the terms already notified.

Advantages of Debentures

1. Debentures are popular with the investors and their response is normally positive.
2. It provide capital without managerial control to the debentureholders.
3. It is an economical sources of finance.
4. It facilitate trading on equity by the company.
5. It avoid the possibility of over capitalization.
6. It provide adequate safety to investors particularly to cautious investors.

Bonds

Along with debentures, companies for the collection of medium and long-term capital also issue bonds. It is creditorship security with fixed rate of interest decided at the time of issue of bonds. It is used for transactions in the securities market as they are easily transferred like shares and debentures. Loans can be taken on the security of such bonds. It is issued by financial institutions and even by the RBI. Security and attraction interest rate are the two advantages of bonds.

BOND VALUATION AND PRICING

Bond is an instrument of loan raised by the govt. or a company against a specified interest rate and a promised date of repayment. Debentures are bonds secured by mortgage against company assets as distinguish from fixed deposits, which are unsecured.

The following factors are involved in the valuation of bonds:

1. Face value
2. Redemption
3. Coupon Rate
4. Maturity Date
5. Call Option
6. Put Option
7. Bond Price

BOND YIELD (YIELD TO MATURITY) (YTM)

Yield to maturity is the same as Internal Rate of Return (IRR) of a bond and is the discount rate that is equal to the present value of a bond's cash flow to the bonds current market price. In the case of a bond there is a cash outflow when the bond is purchased and there are cash inflows, when the periodic interest coupons are received. There is also a cash inflow when the

redemptions are made on maturity. Calculating the IRR of these streams of cash flow gives the true returns on the bond, which is known as YTM. The YTM is calculated as follows:

$$\text{YTM} = \frac{\text{Interest} + \frac{(\text{Maturity Value} - \text{Purchase Price})}{\text{No. of years}}}{\frac{\text{Maturity Value} + \text{Purchase Price}}{2}}$$

Illustration 42

You are considering an investment in one of the following bonds:

	Coupon Rate	Maturity	Price/ 100 Par Value
Bond A	12%	10 yrs	` 70
Bond B	10%	6 yrs	` 60

1. What is YTM of each bond?
2. Which bond would you recommend for investment?

(April 2007)

Solution:

1. Calculation of YTM of bond:

$$\text{YTM} = \frac{I + \frac{F - P}{n}}{\frac{F + P}{2}}$$

where, I = Annual Interest Payment

F = Maturity Value

P = Present value of bond/Purchase Price

n = Yrs. of maturity

Bond A:

$$\begin{aligned} \text{YTM} &= \frac{12 + \frac{(100 - 70)}{10}}{\frac{100 + 70}{2}} \\ &= \frac{12 + 3}{85} = 0.1765 \\ &= 17.65\% \end{aligned}$$

Bond B:

$$\text{YTM} = \frac{10 + \frac{(100 - 60)}{6}}{\frac{100 + 60}{2}}$$

$$= \frac{10 + 6.67}{80} = 0.208$$

$$= 20.80\%$$

2. The yield to maturity in case of Bond 'B' is higher than Bond 'A'. Therefore, Bond 'B' is recommended for investment.

Illustration 43

A bond of ₹ 1,000 has a coupon rate of 6% p.a. and maturity period of three years. The bond is currently selling at ₹ 900. What is the yield to maturity in the investment of this bond?

(Nov. 2007)

Solution:

$$YTM = \frac{I + \frac{(F - P)}{n}}{\frac{F + P}{2}}$$

$$= \frac{60 + \frac{1000 - 900}{3}}{\frac{1000 + 900}{2}}$$

$$= \frac{93.33}{950} = 0.098245$$

$$= 9.824\%$$

Illustration 44

A bond of ₹ 1,000 face value carrying an interest rate of 14 per cent is redeemable after six years at a premium of 5%. If the required rate of return is 15%, what is the present value of this bond?

(April 2008)

Solution:

Calculation of present value of bond:

$$PV = I (PVAF) + F (DF)$$

$$= I (PVAF, 15\%, 6 \text{ yrs}) + F (DF 15\%, 6 \text{ yrs})$$

$$= 140 (3.78) + 1050 (0.43)$$

$$= ₹ 529.20 + 451.50$$

$$= ₹ 980.70$$

Illustration 45

Calculate yield to maturity (YTM) of bond I:

Annual interest 12%

Face value ₹ 100

Price of bond ₹ 70

Maturity period 10 yrs

If bond II gives 20% YTM, which is better to invest?

(Oct. 2008)

Solution:

$$\begin{aligned} \text{YTM} &= \frac{I + \frac{F - P}{n}}{\frac{F + P}{2}} \\ &= \frac{12 + \frac{100 - 70}{10}}{\frac{100 + 70}{2}} \\ &= \frac{12 + 3}{85} = 0.1764 \\ &= 17.64\% \end{aligned}$$

If bond II gives 20% YTM, then bond II is better for investment.

Illustration 46

A bond of ₹ 1,000 has a coupon rate of 8% p.a. and maturity period of three years. The bond is currently selling at ₹ 910. What is the yield to maturity in the investment of this bond?

(April 2009)

Solution:

$$\begin{aligned} \text{YTM} &= \frac{I + \frac{F - P}{n}}{\frac{F + P}{2}} \\ &= \frac{80 + \frac{1000 - 910}{3}}{\frac{1000 + 910}{2}} \\ &= \frac{80 + 30}{955} \\ &= \frac{110}{955} = 0.11518 \\ &= 11.52\% \end{aligned}$$

Illustration 47

A bond of ₹ 1,000 has a coupon rate of 6 per cent per annum and maturity period of three years. The bond is currently selling at ₹ 900. What is the yield to maturity in the investment of this bond?

Solution:

$$\begin{aligned}
 \text{YTM} &= \frac{I + \frac{F - P}{n}}{\frac{F + P}{2}} \\
 &= \frac{60 + \frac{1000 - 900}{3}}{\frac{1000 + 900}{2}} \\
 &= \frac{93.33}{950} = 0.098245 \\
 &= 9.8245\%
 \end{aligned}$$

Illustration 48

A bond of ₹ 1,000 face value carrying an interest rate of 15 per cent is redeemable after six years at a premium of 5%. If the required rate of return is 15%, what is the present value of the bond?

Solution:

Calculation of present value of the bond:

$$\begin{aligned}
 \text{PV} &= I (\text{PVAF}) + F (\text{DF}) \\
 \text{PV} &= I (\text{PVAF } 15\%, 5 \text{ years}) + F (\text{DF } 15\%, 5 \text{ years}) \\
 &= 150(3.78) + 1,050(0.43) \\
 &= 567 + 451.50 \\
 &= ₹ 1018.5
 \end{aligned}$$

EXERCISE**I. Fill in the Blanks**

1. The important factors contributing to time value of money are _____, _____ and _____.
2. During periods of inflation, a rupee has a _____ than a rupee in future.
3. As future is characterized by uncertainty, individuals prefer _____ consumption to _____ consumption.
4. There are two methods by which time value of money can be calculated by _____ and _____ techniques.

5. _____ is created out of fixed payments each period to accumulate to a future sum after a specified period.
6. The _____ of a future cash flow is the amount of the current cash that is equivalent to the investor.
7. An annuity for an infinite time period is called _____.
8. The reciprocal of the present value annuity factor is called _____.
9. _____ is the minimum value the company accepts if it sold its business.
10. _____ per share is generally higher than the book value per share for profitable and growing firms.
11. Bonds issued by _____ are secured and those issued by private sector companies may be _____ or _____.
12. _____ is the rate earned by an investor who purchases a bond and holds it till its maturity.
13. When K_d is lesser than the coupon rate, the value of the bond is _____ than its face value.
14. _____ of a share is associated with the earnings (past) and profitability (future) of the company, dividends paid and expected and future definite prospects of the company.
15. The _____ is the net worth of the company divided by the number of outstanding equity shares.

Ans.: 1. Investment opportunities, preference for consumption, risk.; 2. Higher purchasing power; 3. Current and future; 4. Compounding and discounting; 5. Sinking fund; 6. Present Value PV; 7. Perpetuity; 8. Capital Recovery Factor; 9. Liquidation value; 10. Market value; 11. Government agencies, secured or unsecured; 12. Yield to Maturity; 13. Greater; 14. Intrinsic value; 15. Book value per share (BVPS).

II. Multiple Choice Questions

1. When compounding is done more than annually, the effective rate of interest is _____.
 - (a) Greater than the nominal rate of interest
 - (b) Lower than nominal rate of interest
 - (c) Equal to nominal rate of interest
2. Which provides money with its time value?
 - (a) Investment
 - (b) Interest rate
 - (c) Market rates
 - (d) Currency rates

3. When payments are made at the end of each year, it is known as _____ annuity.
 - (a) Annuity due
 - (b) Ordinary annuity
 - (c) Perpetuity
 - (d) Fixed annuity
4. Value of a share depends on
 - (a) dividend only.
 - (b) earning only.
 - (c) both dividend and earnings.
5. Yield to maturity is a bond's
 - (a) IRR.
 - (b) coupon rate.
 - (c) market value.
6. Zero Growth Model assumes that
 - (a) there will be growing dividend stream.
 - (b) there will be non-growing constant dividend stream.
 - (c) none of the above.
7. Constant Growth Model is known as
 - (a) Zero Growth Model.
 - (b) Variable Growth Model.
 - (c) Gordon Model.
8. The model incorporates change in the dividend growth rate
 - (a) Gordon Model.
 - (b) Variable Growth Model;
 - (c) Constant Growth Model.
9. Book value of an asset does not represent
 - (a) liquidation value.
 - (b) current sale value.
 - (c) none of the above.
10. Market value can be applied to
 - (a) tangible assets only.
 - (b) intangible assets only.

- (c) both of the above.
11. Average of the two values is
- (a) fair value.
 - (b) market value,
 - (c) book value.
12. Bonds which do not mature
- (a) perpetual bonds.
 - (b) zero coupon bonds,
 - (c) none of the above.

Ans.: 1. (a); 2. (b); 3. (b); 4. (c); 5.(a); 6.(b);7. (c); 8.(b); 9. (b); 10.(a); 11.(a); 12.(a).

III. State with reasons whether the Following Statements are True or False.

1. The value of a bond is the present value of future interest flow discounted at appropriate discount rate.
2. Bonds do not have a maturity date.
3. An equity share has a face value.
4. Valuation of securities should be made within the risk and return criterion.
5. Valuation of securities is an application of value of money.
6. Goodwill forms a part of liquidation value.
7. The value of a share is equal to the present value of its expected future dividend.
8. Book value represents current sale value.
9. Market value can be applied to tangible assets only.
10. Debentures and bonds are debt instruments.
11. Every investment has some risk.
12. Credit rating helps the investors to make good choice of investment in equity shares.
13. Yield curve considers only the relationship between the maturity and its yield.
14. Interest rate is determined by the RBI.

Ans: True: (1, 3, 4, 5, 7, 9, 10, 11, 13). **False:** (2, 6, 8, 12, 14)

IV. Match the Following.

Group A		Group B	
1.	Preference Shares	(i)	P.V. of future expected dividend
2.	Value of Equity Shares	(ii)	dividend is expected to grow at a constant rate
3.	Constant Growth Model	(iii)	value as per Balance Sheet
4.	Book Value.	(iv)	tangible assets
5.	Market Value	(v)	amount expected to be received on

6.	Liquidation Value		liquidation
		(vi)	average of two values
		(vii)	fixed rate of dividend

Ans: (1-vii), (2-i), (3-ii), (4-iii), (5-iv), (6-v)

Terminal Questions

- Ramesh deposited ₹ 4,000 for 3 years period at 12% interest which is credited at the end of every six months. What will be the total amount credited to Ramesh's account at the end of 3 years?
[Ans. ₹ 5,674]
- Ganesh plans to send his son for higher studies in America after 5 years. He expects the cost of the study to be ₹ 4,00,000. How much should he save annually to have a sum of ₹ 4,00,000 at the end of 5 years, if the interest rate is 9%?
[Ans. ₹ 2,59,976]
- ICICI Bank promises to give you ₹ 5,000 after 10 years in exchange of ₹ 2,000 today. What is the interest rate involved in this offer?
[Ans. 9.50%]
- Arvind wants to invest @ 8% p.a. compound interest, a such amount as will amount to ₹ 50,000 at the end of three years. How much should he invest?
[Ans. ₹ 39,691]
- A company has advertised for deposits from the public. If you deposit ₹ 1,000 now, you receive ₹ 1,464 at the end of 4 years or ₹ 1,611 at the end of 5 years. What rates of interest is the company paying?
[Ans. 10%]
- Four equal annual payments of ₹ 4,000 are made into a deposit account that pays 8 per cent per year. What would be the future value of this annuity at the end of 6 years?[Ans. ₹ 31,640]
- You can save ₹ 20,000 a year for 5 years and ₹ 3,000 a year for 10 years thereafter. What will these savings cumulate to at the end of 15 years if the rate of interest is 10 per cent?[Ans. ₹ 18,690]
- Find out the present value of a debenture from the following:
 Face value of Debenture ₹ 1,000
 Annual Interest Rate 15%
 Expected return 12%
 Maturity Period 5 years
 (Present value of Re. 1 at 12% are, 0.8929, 0.7972, 0.7118, 0.6355, 0.5674)
 [Ans. $PV_d = I (PVAF) + F (DF) = 1,108.12$]
- The share of Ridhi Ltd. (₹ 10) was quoting at ₹ 102 on 1.04.2002 and the price rose to ₹ 132 on 1.04.2005. Dividends were received at 10% on 30th June each year. Cost of Funds was 10% is it worthwhile investment, considering the time value of money.
[Ans. NPV -0.382 is negative, Hence, it is not a wise investment.]

10. The future value of an amount invested or borrowed at a given rate of interest can be calculated if the maturity period is given. Suppose a deposit of ₹ 10,000 gets 10 per cent interest compounded annually for a period of 3 years, the future value will be? [Ans. ₹ 13,310]
11. Satish deposits ₹ 1,00,000 with a bank which pays 8 per cent interest compounded annually, for a period of 2 years how much he will get at maturity ?
[Ans. ₹ 1,16,640]
12. CSK deposits ₹ 10,000 with a bank at 12% interest compounded quarterly .How much amount he will get after a period of 6 years? [Ans. Rs .20,328]
13. Four equal annual payments of ₹ 5,000 are made into a deposit account that pays 8 per cent interest per year. What is the future value of this annuity at the end of 4 years.[Ans. ₹ 22,530.50]
14. A is due to receive ₹ 10,000 at the end of 5 years. Since A is in need of Money Immediately, He wants to sell his Interest to B. B wants a return of 10% per annum on his investment. How much should he pay A? [Ans. ₹ 6,209]
15. Krishnamurthy has inherited ₹ 1,000 a year for the next 20 years. First payment being made in one year's time. However, he is in need of money immediately and would like to sell his income to a buyer who would pay him the right price. Assume that the current market rate of interest is 9%:
 - (a) What should be the right price he should accept
 - (b) How much of his income should he sell if he wants only ₹ 2,500 at present
 - (c) If you were interested in buying the income but, if you had only ₹ 5,000 to invest what would you do?

[Ans. (a) ₹ 9128.50, (b) ₹ 726.13, (c) ₹ 452.26]
16. Suppose you deposit ₹ 1,000 today in a bank, which pays 12% interest, compounded annually, how much will the deposit grow to after 8 years and 12years?
[Ans. ₹ 2,476/3,896]
17. Suppose investments of ₹ 5,000 is made at 13% simple interest rate will in 7 years become:

$$FV = PV [1 + (\text{No. of years} \times \text{Interest rate})] = 5,000 [(1 + 7 \times 0.13)] = ₹ 9,550$$
18. Calculate doubling period for two interest rates, 10% and 15% using rule of 69.
[Ans. 7.25, 4.95]
19. Your company currently has 5,000 employees and this number is expected to grow by 5% per year. How many employees will your company have in 10 years?
[Ans. 8,144.5]
20. What is the present value of ₹ 1,000 receivable after 8 years if the rate of discount 15%. [Ans. 326.90]

21.

Year	Cash inflows `
1	1,000
2	2,000
3	3,000
4	4,000
5	5,000

Present value at 10% discount factor is 0.909, 0.826, 0.751, 0.683, 0.6621 for 1st 2nd 3rd 4th 5th years.

[Ans. 10,651]

Find out the present value of cash flows.

22.

Year	Cash inflows `
1	500
2	1,000
3	1,500
4	2,000
5	2,500

Discount rate = 10%

[Ans. 5,327]

23. Ms. Sushma wants to find out the present value of ₹ 5,000 to be received 5 years from now, at 10% rate of interest. We have to see 10% column of the 5th year in the present value tables the relevant present value factor is 0.61.

[Ans. 3,104.63]

24. You deposit ₹ 1,000 annually in a bank for 3 years and your and your deposits earn a compound interest rate of 10%. What will be an annuity at the end of 3 years?

[Ans. 1,331]

25. You deposit ₹ 3,000 annually in a bank for 8 years and your and your deposits earn a compound interest rate of 12%. What will be an annuity at the end of 8 years?

[Ans. 36,899]

26. Suppose you have decided to deposit ₹ 30,000 per year Public provident fund account for 30 years. What will be accumulated amount in your public provident fund account at the end of 30 years if the interest rate is 11%.

[Ans. 59,70,626]

27. You want to buy a house after 5 years when it is expected to cost of ₹ 50 lakhs how much should you save annually if your savings earn a compound interest of 10%.

[Ans. 31,03,662.32]

28. A finance company advertises that it will pay a lump sum of ₹ 8,000 at the end of 6 years to investors. Who deposit annually ₹ 1,000 for 6 years what interest rate is implicit in this offer?

[Ans. 41.5%]

29. A firm decides to make a deposit of ₹ 10,000 at the end of the each year for the next 10 years at 10% rate of interest. What will be the total cumulative deposit at the end of 10 year from today? The firm may also be interested know the total deposit if the rate of interest is 9% or 11% in the case.

[Ans. 25,940, 23,673, 28,394]

30. You expect to receive ₹ 1,000 annually for 2 years, each receipt occurring at end of the year. What is the present value of this stream of benefits if the discount rate is 10%? [Ans. 1,735]
31. A student is awarded a scholarship and two options are placed before him.
- To receive ₹ 1,100 now.
 - To receive ₹ 100 pm at the end of each of next 12 months. Which option be 1 chosen if the rate of interest is 12% p.a.? [Ans. 2414.66]
32. Find out the present value of an investment, which is expected to give a return ₹ 2,500 p.a. indefinitely, and the rate of interest is 12%. [Ans. 20,833]
33. A finance company makes an offer to deposit a sum ₹ 1,100 and then receive a return of ₹ 80 p.a. perpetually. Should this offer be accepted if the rate of interest is 8%. Will the decision change if the rate of interest is 5%.
34. A company is considering which of two mutually exclusive projects it should undertake. The finance Director thinks that the project with the higher NPV should be chosen whereas the managing director thinks that the one with the higher IRR should be undertaken especially as both projects have the same initial outlay and length of life. The company anticipates a cost of capital of 10% and the net after-tax cash flows of the projects are as follows:

Year	0	1	2	3	4	5
Cash Flows (Fig. '000)						
Project X	(200)	35	80	90	75	20
Project Y	(200)	218	10	10	4	3

Required:

- Calculate the NPV and IRR of each project.
[Ans. X-1.146, y-1.094, X-5.985, y-8.53]
 - State, with reasons, which project you would recommend.
35. Ms. Dipti invests ₹ 10,000 in fixed deposit carrying interest at 10% p.a. compounded annually. What will be the value of ₹ 10,000 after two years? [Ans. ₹ 12,100]
36. Ms. Jigna wants to receive ₹ 10,000 after two years. If the rate of interest is 10% p.a. how much she should invest today? [Ans. ₹ 8,264.50]
37. Find out the present value of ₹ 4,000 received after 7 years if the rate of interest is 15%. [Ans. ₹ 1503.76]
38. A project involves cash inflow as given below:

Year	Cash Inflows
2005	10,000
2006	12,000
2007	15,000
2008	20,000

If rate of interest is 15% find out the present value of cash inflows. [Ans. ₹ 39,120]

39. Ms. Madhavi has decided to purchase machine costing ₹ 1,00,000 as follows ₹ 20,000 initial payment. ₹ 80,000 out of loan taken. The loan is to be repaid in 4 equal annual installments along with interest @ 15% p.a. interest is calculated on the opening outstanding balance. Calculate present value of cash outflow.
40. Mr. Sandeep has undertaken a project which involves cash flow of ₹ 20,000 per year for four years. If the rate of interest is 15% find out the present value of cash inflows.
[Ans. ₹ 57,200]
41. Find out the present value of annuity of ₹ 10,000 over three years when discounted at 10%.
[Ans. ₹ 7,500]
42. Das a principal of the reputed college would like to institute a scholarship of ₹ 1,000 for an outstanding student of T.Y. B.Com every year. She wants to know (present value of investment which would yield 1,000 in perpetuity discounted at 10%). [Ans. ₹ 10,000]
43. Mr. Vikas intends to have a return of ₹ 20,000 p.a. for perpetuity. In case the discount rate is 20%, calculate the present value of this perpetuity ₹ 1,00,000.
[Ans. ₹ 1,00,000]
44. Bank of India pays 12% and compounds interest quarterly. If Ms. Jigna deposits ₹ 1,000 initially, how much shall it grow at the end of 5 years? [Ans. ₹ 1,806]
45. Following details are available for five independent projects:

Projects	Initial Outlay `	Annual Cash Inflows `	Life in Years
K	5,00,000	1,20,000	8
L	1,25,000	12,000	15
M	95,000	16,000	18
N	6,000	2,000	5
O	45,000	7,000	10

If cost of capital is 12% and corporate tax rate is 50% mark the above projects as per the internal rate of return.

46. The project cash flows from two mutually exclusive projects A and B are as under:

Period	Project A	Project B
O (Outflow)	22,000	27,000
1 to 7 (Inflow)	6,000 each year	7,000 each year
Project life	7 years	7 years

- (a) Advice on the project selection with reference to internal rate of return
- (b) Will it make any difference in project selection if the cash flow from project is of 8 years instead of 7 years @ 7,000 each year?

PV Factor at	For 7 Years	For 8 Years
15%	4.16	4.49

16%	4.04	4.334
17%	3.92	4.21
18%	3.81	4.08
19%	3.71	3.95
20%	3.60	3.84

[A - 4.31, B - 7.48]

47. Bright Metals Ltd. is considering two different investment proposals. The details are as under:

	Proposal A `	Proposal B `
Initial outlay	9,500	20,000
Estimated income at the end of		
Year I	4,000	8,000
Year II	4,000	8,000
Year III	4,000	12,000

- (a) Suggest the most attractive proposal on the basis of excess present methods considering that future incomes are discounted at 12%.
- (b) Also find out the internal rate of return of the two proposals.
48. A company has to select one of the two alternative projects, the practical respect of which are give below:

	Proposal A `	Proposal B `
Initial outlay	1,20,000	1,10,000
Net cash flow at the end of year		
1	70,000	20,000
2	50,000	40,000
3	30,000	50,000
4	20,000	40,000
5	10,000	20,000
6	Nil	10,000

The company can arrange funds at 15%.

Compute the Net Present Value and Internal Rate of Return of each project and comment on the result.

[NPV A - 1.125, B - 1.07]

IRR A - 9.55, B - 2.898]

49. Mona Limited had paid dividend at ₹ 2 per share last year. The estimated growth of the dividends from the company is estimated to be 5% p.a.

Determine the estimated market price of the equity share if the estimated growth rate of dividend (i) rises to 8% (ii) falls to 3%. Also find out the present market' price of the share given that the required rate of the equity investor is 15.5%.

[Ans. ₹ 20, ₹ 28.80, ₹ 16.48]

50. Calculate the value of equity share from the following:

Equity Share Capital (₹ 20 each)	₹ 50,00,000
Reserves and Surplus	₹ 5,00,000
15% Secured Loans	₹ 25,00,000
12.5% Unsecured Loans	₹ 10,00,000
Fixed Assets	₹ 30,00,000
Investments	₹ 5,00,000
Operating Profits	₹ 25,00,000
Tax Rate	50%
PIE Ratio	12.5

[Ans: ₹ 50]

51. A limited company has a book value per share of ₹ 137.80. Its return on equity is 15% and it follows a policy of retaining 60% of its earnings. If the opportunity cost of capital is 18% what would be the price of the share today?

[Ans. Expected EPS ₹ 20.67. Expected dividend for the current year ₹ 8.27. Growth rate as per Gordon's Models = 0.09. Price per share as per Gordon's Model = ₹ 91.901]

52. Sigma Limited has been growing @ 15% per year and this trend is expected to continue for 5 more years. Thereafter, it is likely to grow @ 8%. The investors expect a return on 12%. The dividend paid by the firm per share for the last year (D_0) corresponding to period 0 (T_0) is ₹ 5.

Determine the price at which an investor may be ready to buy the shares of the company at the end of T_0 (i.e. now) and T_1, T_2, T_3, T_4 and T_5 .

[Ans. T_5 : ₹ 271.35. T_4 : ₹ 251.29. T_3 : ₹ 232.08. T_2 : ₹ 214.11. T_1 : ₹ 197.15. T_0 : ₹ 180.93]

53. LN Limited is currently paying a dividend of ₹ 2 per share. The dividend is expected to grow at 15% annual rate for three years, then at 10% rate for the next three years, after which is expected to grow at a 5% rate forever.

What is the present value of the share if the capitalisation rate is 9% ?

[Ans. Value of a share at the end of 6 years as per constant growth model ₹ 106.25. This value is discounted @ 9% for 6 years = ₹ 63.33. Therefore, the current price of the share would be ₹ 13.87 (P.V) + 63.33 = ₹ 77.20

54. Tata Chemicals has been expected to grow at 14% per year for the next 4 years and then grow indefinitely at the rate of 5%. The Required Rate of Return on the equity shares is 12%. The company paid dividend of ₹ 2 per share last year.

Determine the market price of the shares today.

[Ans. Price at the end of 4 years ₹ 50.71. If this is discounted at 12% for 4 years

₹ 32.25. Current market price = $8.37 \text{ (PV)} + 32.25 = ₹ 40.62]$

55. Neha Limited has just paid a dividend of ₹ 2 per share. Its earnings and dividends have shown growth rate of 18% and the same is expected to continue for another 4 years after which the growth will fall to 12% for next 4 years. Thereafter, the growth rate is expected to be 6% forever.

Find out the market price of the share if the required rate of return of the investors for this risk is 15%.

[Ans. PV ₹ 16.83. M.P at the beginning of the year 9 ₹ 71.85. PV of the M.P. at

the year 0 is ₹ 23.50. Current market price ₹ $16.83 + 23.50$ i.e. ₹ 40.33]

56. A ₹ 1,000 Bond mature in 20 years and offers a 9% coupon rate. The required rate of return is 11 %. Calculated the value of a Bond.

[Ans. PV of Annuity of interest at 11% and 20 payments ₹ 719.67. PV of ₹ 1,000 for 11% and 20 years ₹ 124. Bond value = $840.67 \text{ (} 719.67 + 124 \text{)}$]

57. ABC Limited has issued ₹ 5,000 bond with a 10% coupon rate maturing in 8 years and currently selling at 97%. Required rate of return is 11 %.

Should the investor go for this bond?

[Ans. PV = ₹ 4743. Current = 97% of 5,000. Price := ₹ 4,850.

The bond is available at a higher price. Hence the investment in this bond is not desirable.]

58. Cocoraj Limited had sold ₹ 1,000 12% Perpetual Debentures 10 years ago. Interest rates have risen since then. Hence, Debentures are now selling at 15% yield basis.

(a) Decide the current market price. Would you buy the Debentures at ₹ 750?

(b) Assume that the Debentures of the company are selling at ₹ 825. If the Debentures have 8 years to run to maturity, calculate the effective yield.

[Ans. (a) Annual interest = ₹ 120. Yield = 15%. Market Price = ₹ 800. If the Debentures are available at ₹ 750, it is advisable to buy.

(b) YTM = 15.55, i.e., 16%]

59. The Elu Company is contemplating a debenture issue on the following terms:

Face Value = ₹ 100 per Debenture

Terms = 7 years

Coupon Rate = years 1-2 8% p.a.

Of interest 3-4 12% p.a.

5-7 15% p.a.

The current market rate of interest on similar Debentures is 15% p.a. The company proposes to price the issue so as to yield a (compound) return of 16% p.a. to the investors.

Determine the issue price. Assume the redemption on debenture at a premium of 5%. The PV interest factors at 16% p.a. for years 1 to 7 are: 0.862, 0.743; 0.641, 0.552, 0.476, 0.410 and 0.354 respectively.

[Ans. PV of redemption amount ₹ 105 is ₹ 37.17 (105 x 0.354). PV of Debenture is ₹ 45.76 + 37.17 = ₹ 82.93). The company should issue debentures at this value in order to yield a return of 16% to the investors.]

60. The Balance Sheet of XYZ Ltd. as on 31st December, 2008 is given below:

(₹ in lakhs)

Liabilities	₹	Assets	₹
Share Capital (1,00,000 Equity Shares of ₹ 100 each)	100	Net Fixed Assets	71
Reserves and Surplus	25	Current Assets:	
Long-term Loans	20	Inventory	70
Sundry Creditors	10	Debtors	12
	155	Cash/Bank	2
			84
			155

Net profits after charging interest and taxes amounted to ₹ 6 lakhs in 2002, ₹ 5 lakhs in 2007 and ₹ 10 lakhs in 2008. For the purpose of share valuation, fixed assets and inventory are to be valued at ₹ 100 lakhs and ₹ 66 lakhs respectively. Goodwill was agreed to be 3 years' purchases of super profits arrived at as the excess of weighted average net profits of past 3 years over 10% of revised net worth. (Assign weights 1, 2 and 3 years 2006, 2007 and 2008 respectively.)

Assign a fair value for the equity shares on the basis of:

- Intrinsic worth and
- Capitalised value of future profits,

which is agreed to be the weighted average net profits of past 3 years (on lines indicated above, capitalization rate being 10%.

61. The Balance Sheet of A Ltd. on 31st December, 2008 was as following:

Liabilities	₹	Assets	₹
2,000 12% Preference Shares of ₹ 100/-	2,00,000	Goodwill	30,000
6,000 Equity Shares of ₹ 100/-	6,00,000	Land and Building	2,00,000
Opening Balance	90,000	Machinery	5,00,000
Profit for 2008	1,50,000	Stock	6,00,000
Creditors	4,50,000	Debtors	1,40,000
		Cash	10,000
		Preliminary expenses	10,000
	14,90,000		14,90,000

Assets were revalued as below:

Land and Building ₹ 2,50,000. Machinery ₹ 6,50,000. Stock ₹ 4,50,000.

Profits during the last 3 years have shown an increase of ₹ 25,000 per year.

Goodwill may be valued at 3 years purchase of super profit with the normal rate of return of 10%.

Similar companies are paying 12% dividend on equity shares.

Find the value of equity shares.

62. From the following information, ascertain the value of shares.

Balance Sheet on 31st December, 2008

Liabilities	₹	Assets	₹
5,000 Equity Shares of 100/-	5,00,000	Goodwill	50,000
8% Debentures	2,00,000	Land and Building	2,20,000
Profit & Loss Account	2,50,000	Machinery	3,00,000
Creditors	1,00,000	Stock	3,00,000
		Debtors	1,50,000
		Cash	30,000
	10,50,000		10,50,000

Profits for the recent years (after taxation) were as follows:

Year ended 31st December	₹
2008	1,50,000
2007	1,20,000
2006	1,15,000
2005 (Strike Year)	40,000 Loss
2004	75,000

The income tax paid so far was @ 50% which is likely to be 60% in future. Profits till 2008 were ascertained after considering directors' remunerations of ₹ 40,000 per year. Now, Government has approved the payment of ₹ 60,000 per year from 1st January, 2009. The company has been able to secure a contract for supply of material which will reduce the cost by ₹ 40,000 per year for the next 5 years.

You may value goodwill at 3 years' purchase of super profits with the average rate of return of 12%.

63. The Balance Sheet as on 31st December, 2008 is as below:

Liabilities	₹	Assets	₹
20,000 Equity Shares of ₹ 100	2,00,000	Building	1,50,000
General Reserve	60,000	Machinery	1,00,000
Profit & Loss Account	35,000	Stock	1,50,000
Bank Overdraft	30,000		
Creditors	40,000		

Provision for tax	50,000	
	4,15,000	4,15,000

Net profits before taxes for the last 5 years were ₹ 41,000; ₹ 64,000; ₹ 70,000; ₹ 85,000 and ₹ 90,000.

Market value of the assets was:

Building ₹ 2,50,000. Machinery ₹ 1,10,000. Stock ₹ 1,40,000.

Taxation may be considered at 50%,

On the basis of above information, find out the net asset value of shares. State assumptions, if any, clearly.

64. Ms. Dipti invests ₹ 10,000 in fixed deposit carrying interest at 10% p.a. compounded annually. What will be the value of ₹ 10,000 after two years? [Ans: ₹ 12, 100]

65. Ms. Jigna wants to receive ₹ 10,000 after two years. If the rate of interest is 10% p.a. how much she should invest today? [Ans: ₹ 8264.46]

66. Find out the present value of ₹ 4,000 received after 7 years if the rate of interest is 15%. [Ans. ₹ 2,052]

67. A project involves cash inflow as given below:

Year	Cash inflows ₹
2005	10,000
2006	12,000
2007	15,000
2008	20,000

If the rate of interest is 15%, find out the present value of cash inflows.

[Ans. ₹ 39.082]

68. Ms Madhavi has decided to purchase machine costing ₹ 1,00,000 as follows:

₹ 20,000 Initial payment. ₹ 80,000 out of loan taken. The loan is to be repaid in 4 equal annual instalments along with interest @ 15% p.a. Interest is calculated on the opening outstanding balance. Calculate present value of cash outflow.

[Ans. ₹ 1.00,0281]

69. Mr. Sandeep has undertaken a project which involves cash flow of ₹ 20,000 per year for four years. If the rate of interest is 15%, find out the present value of cash inflows.

[Ans. ₹ 57,100]

70. Find out the present value of annuity of ₹ 10,000 over three years when discounted at 10%.

[Ans. ₹ 24, 870]

71. Mrs. Das a principal of the reputed college would like to institute a scholarship of ₹ 1,000 for an outstanding students of T.Y. B.Com every year. She wants to know the present value of investment which would yield 1000 in perpetuity discounted at 10%.
[Ans. ₹ 10,000]
72. Mr. Vikas intends to have a return of ₹ 20,000 p.a. for perpetuity. In case the discount rate is 20%. Calculate the present value of this perpetuity.
[Ans. ₹ 1,00,000]
73. Bank of India pays 12% and compounds interest quarterly. If Ms Ligna deposits ₹ 1000 initially, how much shall it grow at the end of 5 years?
[Ans. ₹ 1,806]
74. Following details are available for five independent projects:

Projects	Initial Outlay	Annual Cash Inflows ₹	Life in Years ₹
K	5,00,000	1,20,000	8
L	1,25,000	12,000	15
M	95,000	16,000	18
N	6,000	2,000	5
O	45,000	7,000	10

If cost of capital is 12% and corporate tax rate is 50%, rank the above projects as per the Internal Rate of Return.

75. The project cash flows from two mutually exclusive projects A and B are as under:

Period	Project A	Project B
0 (Outflow)	₹ 22,000	₹ 27,000
1 to 7 (Inflow)	₹ 6,000 each year	₹ 7,000 each year
Project life	7 years	7 years

- (a) Advise on the project selection with reference to Internal Rate of Return.
- (b) Will it make any differences in project selection if the cash flow from Project B is of 8 years instead of 7 years @ ₹ 7,000 each year?

PV Factor at	For 7 years	For 8 years
15%	4.16	4.49
16%	4.04	4.34
17%	3.92	4.21
18%	3.81	4.08
19%	3.71	3.95
20%	3.60	3.84

(C.S.)

76. A debenture of ₹ 10,000 face value carries an interest rate of 9% is redeemable after seven years at a premium of 5%. If the required rate of return is 12%, what should be the present value?
77. A GoI bond of ₹ 1,000 has a coupon rate of 8% per annum and maturity of 10 year, if the current market price is ₹ 1,015. Find YTM.
78. If you deposit ₹ 10,000 today in a bank that offers 8% interest, in how many years will this amount double?

[(Hint: Use rule of 72 and 69) [9 years and 8.98 years]]

79. An employee of a bank deposits ₹ 30,000 into his PF A/c at the end of each year for 20 years. What is the amount he will accumulate in his PF at the end of 20 years, if the rate of interest given by PF authorities is 9%?

$$[\text{Ans.: } 30,000 \times \text{FVIFA}(9\%, 20Y) = 30,000 \times 51.160 = ₹ 15,34,800]$$

80. A person can save _____ annually to accumulate ₹ 4,00,000 by the end of 10 years, if the saving earns 12%.

$$[\text{Ans.: } A \times \text{FVIFA}(12\%, 10y) = 4,00,000 \text{ which is } 4,00,000/17.549 = ₹ 22,795]$$

81. Mr. Vinod has to receive ₹ 20,000 per year for 5 years. Calculate the present value of the annuity assuming he can earn interest on his investment at 10% p.a.

$$[\text{Ans.: } 20,000 \times \text{PVIFA}(10\%, 5y) = 20,000 \times 3.791 = ₹ 75,820]$$

82. Aparna invests ₹ 5,000 at the end of each year at 10% interest p.a. What is the amount she will receive after 4 years?

$$[\text{Ans.: } 5,000 \times \text{FVIFA}(10\%, 4y) = 5,000 \times 6.105 = ₹ 23,205]$$

83. What should be price of a bond which has a par value of ₹ 1,000 carrying a coupon rate of 8% and having a maturity period of 9 years? The required rate of return of the investor is 12%.

$$\begin{aligned} [\text{Ans.: } P &= \text{Int.} \times \text{PVIFA}(12\%, 9y) + \text{Redemption price} \times \text{PVIF}(12\%, 10y) \\ &= 80 \times \text{PVIFA}(12\%, 9) + 1,000 \times \text{PVIF}(12\%, 9y) \\ &= 80 \times 5.328 + 1,000 \times 0.361 \\ &= 426.24 + 361 = ₹ 787.24] \end{aligned}$$

84. A bond of ₹ 1,000 value carries a coupon rate of 10% and has a maturity period of 6 years. Interest is payable semi-annually. If the required rate of return is 12%, calculate the value of the bond.

$$\begin{aligned} [\text{Ans.: } 50 \times \text{PVIFA}(6\% \times 12y) + 1,000 \times \text{PVIF}(6\% \times 12y) \\ = 50 \times 8.384 + 1,000 \times 0.497 = ₹ 916.2] \end{aligned}$$

85. A bond whose par value is ₹ 500 bearing a coupon rate of 10% and has a maturity of 3 years. The required rate of return is 8%. What should be the price of the bond?

$$\begin{aligned} \text{[Ans: } P &= \text{Int.} \times \text{PVIFA}(8\%, 3y) + \text{Redemption price} \times \text{PVIF}(8\%, 3y) \\ &= 50 \times 2.577 + 500 \times 0.794 \\ &= 128.85 + 397 = \text{₹ } 525.85] \end{aligned}$$

86. If the current year's dividend is ₹ 24, growth rate of a company is 10% and the required return on the stock is 16%, what is the intrinsic value of the stock?

$$\text{[Ans.: Intrinsic value} = 24 \{(1 + 0.1)\} / 0.16 - 0.1 = \text{₹ } 440]$$

87. If a stock is purchased for ₹ 120 and held for one year during which time ₹ 15 dividend per share is paid and the price decreases to ₹ 115, what is the nominal return on the share?

$$\begin{aligned} \text{[Ans.: Holding period return} &= (D1 + \text{Price gain/loss}) / \text{purchase price} \\ &= \{15 + (-5)\} / 120 = 8.33\%] \end{aligned}$$

Answer the Following Questions

1. What is debenture? State its types and advantages?
2. What is bond? Discuss various types of bonds in detail.
3. Explain in brief:
Yield to maturity.



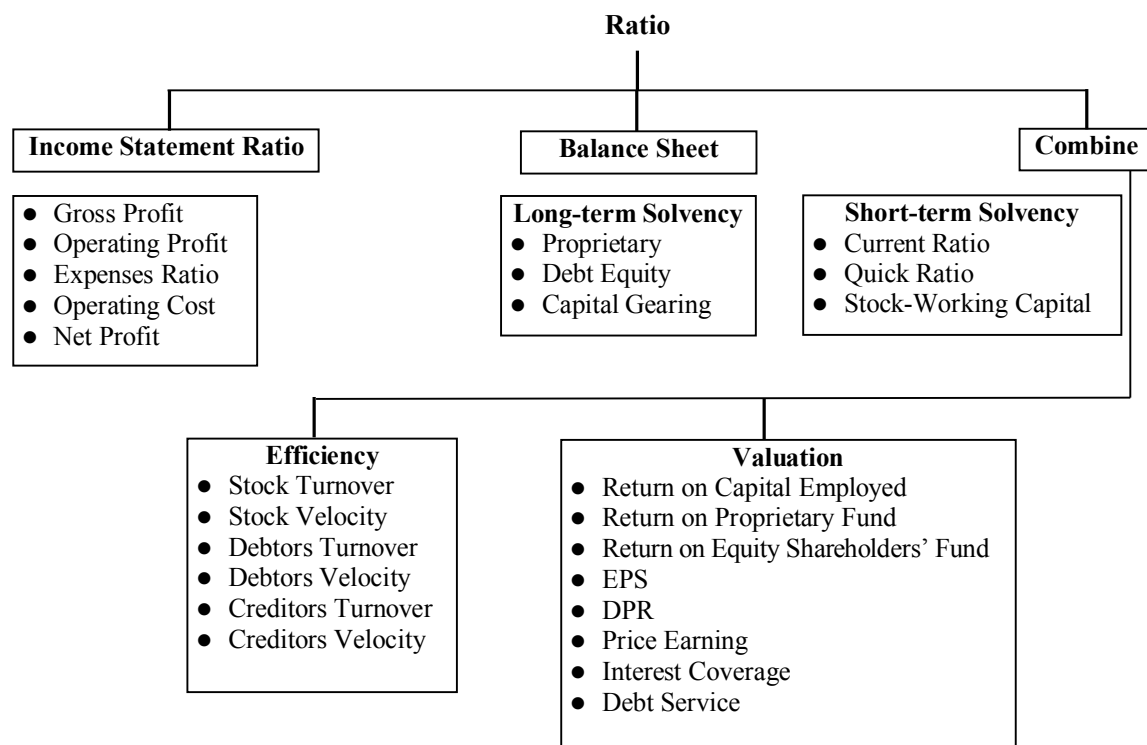
Chapter



Financial Analysis

RATIO ANALYSIS

Ratios are well-known and most widely used tools of financial analysis. A ratio gives the mathematical relationship between one variable and another. Though the computation of a ratio involves only a simple arithmetic operation, its interpretation is a difficult exercise. The analysis of a ratio can disclose relationships as well as bases of comparison that reveal conditions and trends that cannot be detected by going through the individual components of the ratio. The usefulness of ratios is ultimately dependent on their intelligent and skillful interpretation.



Absolute numbers tell very little. Assume that two companies A and B operating within the same industry submit the information:

Particulars	Company A	Company B
Net Profit	10,000	1,00,000

One can easily say that Company B makes the most profit. But which company is most profitable? The answer for this will naturally call for further additional information relating to profit such as size of the company, the total sales it generates or to how much capital is invested in it. Hence, an assessment or a judgement is made based on making some sort of comparison. Extending the example:

Particulars	Company A	Company B
Net Profit	10,000	1,00,000
Sales	2,00,000	5,00,000
Net Worth (Capital Reserve)	1,00,000	2,00,000

If net profit is compared with sales, an assessment can be made on which company generates the most net profit per ₹ 1 received from customers.

Return on Capital Employed:

Particulars	Company A	Company B
Net Profit/Sales $\times 100$	5%	20%
Net Profit/Net Worth $\times 100$	10%	25%

Ratio can be expressed in the following three forms:

1. As proportion
2. As percentage
3. As turnover rate

Simple or pure ratio is merely a quotient arrived by simple division of one number by another. When the current assets of a business firm are ₹ 60,000 and current liabilities is ₹ 15,000.

- The ratio is derived by dividing ₹ 60,000 by ₹ 15,000. It will be expressed as 4 : 1.
- Ratios are expressed as percentage relations when the simple or pure ratios are multiplied by 100 ($4 \times 100 = 400\%$).
- Ratios are expressed as rates which refer to ratios over a period of time. Example: Stock has turned over 6 times a year.

Ratio Analysis is “separation or breaking up of anything into its elements or component parts”. Ratio analysis is, therefore, a technique of analysis and interpreting various ratios for helping in making certain decisions. It involves the methods of calculating and interpreting financial ratios to assess the firm’s performance and status. The ratio analysis is one of the most powerful tools of financial analysis. The analysis is not restricted to any one aspect but takes into account all aspects such as earning capacity of the firm, financial obligation, liquidity and solvency aspects, liquidity and profitability concepts.

Ratios are used by different people for various purposes. As ratio analysis mainly helps in valuing the firm in quantitative terms, two groups of people are interested in the valuation of the firm and they are creditors and shareholders. Creditors are again divided into short-term creditors and long-term creditors.

Short-term creditors hold obligations that will soon mature and they are concerned with the firm's ability to pay its bills promptly. In the short run, the amount of liquid assets determines the ability to clear off current liabilities. These persons are interested in liquidity. Long-term creditors hold bonds or mortgages against the firm and are interested in current payments of interest and eventual repayment of principal. The firm must be sufficiently liquid in the short-term and have adequate profits for the long-term. These persons examine liquidity and profitability.

In addition to liquidity and profitability, the owners of the firm (shareholders) are concerned about the policies of the firm that affect the market price of the firm's stock. Without liquidity, the firm cannot pay cash dividends. Without profits, the firm would not be able to declare dividends. With poor policies, the common stock would trade at low prices in the market.

Considering the above category of users financial ratios fall into three groups:

- Liquidity ratios
- Profitability or efficiency ratios
- Ownership ratios
 - Earnings ratios
 - Dividend ratios
 - Leverage ratios
 - Capital structure ratios
 - Coverage ratios

Steps in Ratio Analysis

Ratio analysis can provide you with this information in three steps:

1. Calculate the firm's ratios for the current or recent period. Ratios are calculated from the firm's income statement or balance sheet. It is helpful and sometimes necessary to have the financial statement independently audited.
2. Compare these ratios to those calculated in past records. The purpose of this comparison is to identify tendencies in the firm's ratios. This is known as trend analysis.
3. Compare the ratios to industry averages to show how the company compares to firms of the same size in its industry. This process is known as cross-sectional analysis.

Illustration 1

The following financial statements of KR Ltd. will be used for computing the different ratios:

Income Statement for the year ending 31-03-2011

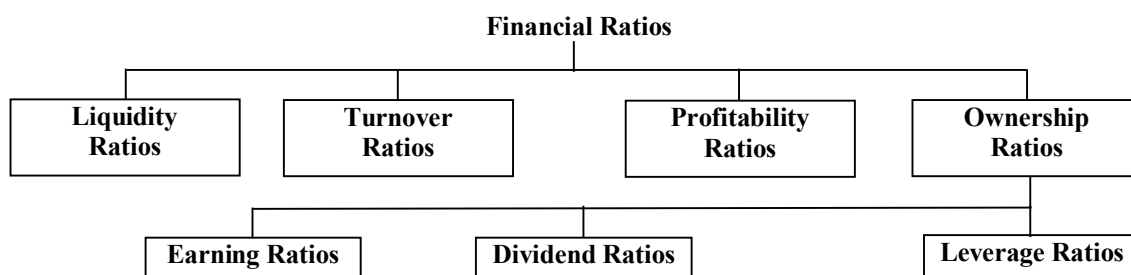
Particulars	₹	₹
Net Sales		
Credit:	7,20,000	
Cash:	4,80,000	12,00,000
Less: Cost of Goods Sold		

Opening Stock	2,00,000	
Add: Purchases	6,00,000	
Less: Closing Stock	2,40,000	
Wages	1,60,000	7,20,000
Gross Profit		4,80,000
Operating Expenses		
Office and Administration Expenses	1,72,000	
Selling and Distribution Expenses	1,50,000	3,12,000
Operating Profit		1,68,000
Interest		8,000
Profit before Tax		1,60,000
Tax		80,000
Profit after Tax		80,000

Balance Sheet of KR Ltd. as on 31-3-2011

Current Liabilities	L/Y	C/Y	Current Assets	L/Y	C/Y
Accounts Payable	1,00,000	1,20,000	Cash	1,20,000	1,60,000
Wages and Taxes Outstanding	60,000	40,000	Accounts receivable	1,20,000	1,20,000
Income Tax Payable	40,000	80,000	Inventories	2,00,000	2,40,000
Long-term Liabilities:			Prepaid Expenses	40,000	40,000
4% Mortgage Debentures	1,60,000	1,60,000	Fixed Assets:		
Share Capital (12,000 shares of ₹ 20 each fully paid)	2,40,000	2,40,000	Land	1,20,000	1,20,000
Retained Earnings	2,40,000	2,80,000	Building and structures	4,80,000	4,80,000
			Less: Accumulated Depreciation on Building and Structures	2,80,000	2,80,000
			Net Buildings and Structures	2,00,000	2,00,000
			Other Assets:		
			Goodwill and Patents	40,000	40,000
Total	8,40,000	8,40,000	Total	8,40,000	8,40,000

Financial Ratios



Financial ratios can be broadly classified into four categories:

- (a) Liquidity ratios
- (b) Turnover ratios

- (c) Profitability ratios
- (d) Ownership ratios.

(a) Liquidity Ratios: It is the ability of a firm to satisfy its short-term obligations as they become due for payment. The liquidity is a prerequisite for the very survival of a firm. It reflects the short-term financial strength or solvency of the firm. The ratios which indicate the liquidity of the firm are:

1. Net Working Capital
2. Current Ratio
3. Acid Test/Quick Ratio
4. Super Quick Ratio
5. Cash Flow from Operations Ratio

1. Net Working Capital: It represents the excess of current assets over current liabilities.

Net Working Capital = Current Assets – Current Liabilities

Although NWC is really not a ratio, it is frequently employed as a measure of a company's liquidity position. The greater is the amount of NWC, the greater is the liquidity of the firm. Inadequate working capital is the first sign of financial problems for a firm.

2. Current Ratio: Current ratio measures the short-term solvency of the firm. It is computed as:

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

$$\text{For KR Ltd., Current Ratio} = \frac{5,60,000}{2,40,000} = 2.33$$

Here, current assets include cash and assets like marketable securities, sundry debtors, inventories, etc. that can be converted into cash within one year. Current liabilities include obligations like sundry creditors, bills payable, accrued expenses, short-term bank loan etc., that have to be repaid within a year.

- The current assets of a firm include cash and bank balances, marketable securities, inventory of raw materials, semi-finished and finished goods, debtors, net of provision for bad and doubtful debts, bills receivable and prepaid expenses.
- The current liabilities include trade creditors, bills payable, bank credit, provision for taxation dividends payable and outstanding expenses.
- As a measure of short-term financial liquidity, it indicates the rupees of current assets available for each rupee of current liability payable.
- Higher ratio, i.e., more than 2 : 1 indicates sound solvency position but at the same time it may be indicative of slack management policies and practices as it might signal excessive inventories or poor credit management.
- Lower ratio, i.e., less than 2 : 1 indicates inadequate working capital. In capital rich countries, where long-term funds from capital market are available in abundance firms dependence on

current liabilities may be less. For public utility companies such as BSNL, MTNL, etc., current ratio is usually very low as they required fewer current assets.

3. Quick Ratio: Quick ratio is also known as liquid ratio or acid test ratio. One defect of the current ratio is that it fails to convey any information on the composition of the current assets of the firm. A rupee of cash is considered equivalent to a rupee of inventory or receivable which may not be so. The acid test ratio is a measure of liquidity designed to overcome this defect by measuring those current assets that can be quickly converted into cash to meet the short-term obligations of current liabilities. In a way, it excludes inventory that are not easily and readily converted into cash.

While computing current ratio, inventory is included as a part of current assets. But inventory normally requires some time for being converted into cash, because of which the true picture of liquidity is not given by current ratio. Quick ratio provides a better measure of liquidity unlike current ratio; it does not take inventories into account. It is computed as:

$$\text{Quick Ratio} = \frac{\text{Current Assets} - \text{Inventories}}{\text{Current Liabilities}}$$

$$\text{For KR Ltd., Quick Ratio} = \frac{3,20,000}{2,40,000} = 1.33$$

- Acid test ratio of 1 : 1 is considered satisfactory. This ratio is a more rigorous and penetrating test of the liquidity position of a firm.
- Higher ratio, i.e., more than 1 : 1 indicates sound financial position.
- Lower ratio, i.e., less than 1 : 1 indicates financial difficulty.

4. Super Quick/Cash Ratio: This ratio is calculated by dividing the super quick assets by the current liabilities of a firm. The super quick current assets are cash and marketable securities. This ratio is the most rigorous and conservative test of a firm's liquidity position.

$$\text{Super Quick Ratio} = \frac{\text{Cash and Marketable Securities}}{\text{Current Liabilities}}$$

5. Cash Flow from Operations Ratio: This ratio measures liquidity of a firm by comparing actual cash flows from operations (in lieu of current and potential cash inflows from current assets) with current liability.

$$\text{Cash Flow from Operations Ratio} = \frac{\text{Operations from Cash Flow}}{\text{Current Liabilities}}$$

6. Bank Finance to Working Capital Gap: Working capital gap is the difference between current assets and current liabilities (other than short-term borrowings). The bank finance to working capital gap ratio indicates the extent to which the firm relies on short-term bank finance for financing its working capital. It is computed as:

$$\text{Bank Finance to Working Capital Gap} = \frac{\text{Short - term Bank Finance}}{\text{Working Capital Gap}}$$

(a) Activity Ratios or Efficiency Ratios: They are concerned with measuring the efficiency in asset management. The efficiency with which the assets are used would be reflected in the speed and rapidity with which assets are converted into sales.

(b) Turnover Ratio: This ratio examines how quickly inventory is converted into cash. This ratio helps the financial manager to evaluate in inventory policy. The ratio reveals the number of times finished stock is turned over during a given accounting period. The three relevant turnover ratios are: (i) Inventory turnover ratio, (ii) Debtors turnover ratio, and (iii) Creditors turnover ratio.

They are also referred to as activity ratios and they indicate the efficiency of the firm in dealing with the current assets. They indicate the pace at which the assets are turned into sales.

1. Average Receivables (Debtors) Turnover Ratio: Accounts receivables indicate the credit sales of the company. The debtors turnover ratio or the receivables turnover ratio gives the number of times receivables are generated and collected during the year. It is computed as:

$$\text{Average Receivables (Debtors) Turnover Ratio} = \frac{\text{Net Credit Sales}}{\text{Average Accounts Receivables}}$$

$$\text{For KR Ltd., Average Receivables Turnover Ratio} = \frac{7,20,000}{(2,00,000 + 2,40,000)/2} = 10$$

- Net Credit Sales consist of gross credit sales minus returns from customers. It also includes bills receivables.
- A high ratio is indicative of shorter time lag between credit sales and cash collection.
- A low ratio indicates that debts are not being collected rapidly.

Debt collection period is calculated by any of the following ratios:

The speed at which accounts receivables are collected can be computed using the receivables turnover ratio in the following manner:

$$\text{Average Collection Period} = \frac{360}{\text{Average Accounts Receivable}} = \frac{360}{10} = 36 \text{ days}$$

The average collection period helps in measuring the creditworthiness of the debtors as it indicates the time by which the debtors pay back their obligation arising on account of credit sales.

The higher the turnover ratio and the shorter the average collection period, indicates better trade credit management and the better the liquidity of debtors.

2. Inventory Turnover Ratio: It indicates the efficiency of the firm in producing and selling its product. It is computed as:

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

where, the average inventory is arrived at by taking the average of opening and closing inventory balances.

$$\text{For KR Ltd., Inventory Turnover Ratio} = \frac{7,20,000}{(2,00,000 + 2,40,000)/2} = 3.27$$

To judge whether the ratio of a firm is satisfactory or not, it should be compared over a time on the basis of trend analysis.

Inventory Holding Period = 12 months/Inventory Turnover Ratio

For KR Ltd., Inventory Holding Period = $12/3.27 = 3.67$ times

3. Creditors Turnover Ratio: It is the ratio between net credit purchase and the average amount of creditors outstanding during the year.

Creditors Turnover Ratio = Net Credit Purchase/Average Creditors

For KR Ltd., Creditor Turnover Ratio = $6,00,00/1,10,000 = 5.45$ times

Creditors Collection Period = 12 months/Creditors Turnover Ratio

A higher ratio shows that the creditors are not paid in time.

A lower ratio shows that the business is not taking the full advantage of credit period allowed by the creditors.

4. Assets Turnover Ratio: It indicates the efficiency with which firm uses all its assets to generate sales. It is based on the relationship between cost of goods sold and assets of a firm.

This ratio indicates the firm's ability in generating sales from all financial resources committed to total assets. It is computed as:

$$\text{Assets Turnover Ratio} = \frac{\text{Sales}}{\text{Average Assets}}$$

$$\text{For KR Ltd., Asset Turnover Ratio} = \frac{12,00,000}{(8,40,000 + 9,20,000)/2} = 1.36$$

Total Assets Turnover = Cost of goods sold/Average total assets

Fixed Asset Turnover = Cost of goods sold/Average fixed assets

The total assets and fixed assets are net of depreciation and the assets are exclusive of fictitious assets. Higher the ratio, greater is the intensive utilization of fixed assets. Lower ratio means under utilization of total and fixed assets.

5. Capital Turnover Ratio: Cost of goods sold/Average capital employed lower ratio shows lower profit and higher ratio shows higher profit.

Illustration 2

Birla Cements Ltd. provides the following:

Stock: Opening ₹ 75,000; Closing ₹ 1,00,000; Credit Sales ₹ 2,00,000; Cash Sales ₹ 50,000. Gross Profit 25%. Calculate the Inventory Turnover Ratio.

Solution:

$$\text{Net Sales} = \text{Cash Sales} + \text{Credit Sales} = 2,00,000 + 50,000 = 2,50,000$$

$$\text{Gross Profit} = 25\% \text{ of } 2,50,000 \text{ (Net Sales)} = 62,500$$

$$\text{COGS} = \text{Net Sales} - \text{Gross Profit} = 2,50,000 - 62,500 = 1,87,500$$

$$\text{Average Inventory} = (\text{Opening Stock} + \text{Closing Stock})/2 = (75,000 + 1,00,000)/2 = 87,500$$

Inventory Turnover Ratio = $\text{COGS}/\text{Average Inventory} = 1,87,500/87,500 = 2.14$ times

Illustration 3

Total sales of a firm ₹ 5,00,000 of which the credit sales are ₹ 3,65,000. Sundry Debtors and Bills receivable are ₹ 50,000 and ₹ 2,000 respectively. Calculate the Debtors Velocity.

Solution:

$$\begin{aligned}\text{Debtors Turnover Ratio} &= \text{Net Credit Sales}/(\text{Debtors} + \text{Bills Receivables}) \\ &= 3,65,000/(50,000 + 2,000) = 7.02 \\ \text{Debtors Velocity} &= \text{No. of Days in a Year}/\text{Debtors Turnover Ratio} \\ \text{Debtors Collection Period} &= 365/7.02 = 52 \text{ days}\end{aligned}$$

Note: No. of days in a year is taken as 365 days.

Illustration 4

Total purchases ₹ 1,00,000. Cash purchases ₹ 20,000. Discount provision on creditors ₹ 1,000. Purchase returns ₹ 2,000. Creditors at close ₹ 30,000. Bills payable at close ₹ 25,000. Calculate Creditors Velocity.

Solution:

$$\begin{aligned}\text{Credit Purchases} &= \text{Total Purchase} - \text{Cash Purchase} - \text{Purchase Return} \\ &= 1,00,000 - 20,000 - 2,000 = ₹ 78,000 \\ \text{Creditors Turnover Ratio} &= \text{Net Credit Purchases}/(\text{Creditors} + \text{Bills Payable}) \\ &= 78,000/(30,000 + 25,000) = 1.42 \\ \text{Creditors Velocity} &= \text{No. of Days in a Year}/\text{Creditors Turnover Ratio} \\ \text{Creditors Collection Period} &= 365/1.42 = 257 \text{ days}\end{aligned}$$

Note: The Reserve for discount on creditors should not be considered for calculating the net credit sales.

Illustration 5

Total sales of a firm ₹ 50,00,000 of which the credit sales are ₹ 36,50,000. Sundry Debtors and Bills receivable are ₹ 5,000 and ₹ 2,000 respectively. Calculate the Debtors Velocity.

Solution:

$$\begin{aligned}\text{Debtors Turnover Ratio} &= \text{Net Credit Sales}/(\text{Debtors} + \text{Bills Receivables}) \\ &= 36,50,000/(5,000 + 2,000) = 70.02 \\ \text{Debtors Velocity} &= \text{No. of days in a year}/\text{Debtors turnover ratio (Debtors collection period)} \\ &= 365/70.02 = 5.2 \text{ days}\end{aligned}$$

Note: No. of days in a year is taken as 365 days.

Illustration 6

Total purchases ₹ 1,00,000. Cash purchases ₹ 20,000. Discount provision on creditors ₹ 1,000. Purchase returns ₹ 2,000. Creditors at close ₹ 25,000. Bills payable at close ₹ 15,000. Calculate Creditors Velocity.

Solution:

$$\begin{aligned}
\text{Credit Purchases} &= \text{Total Purchase} - \text{Cash Purchase} - \text{Purchase Return} \\
&= 1,00,000 - 20,000 - 2,000 = ₹ 78,000 \\
\text{Creditors Turnover Ratio} &= \text{Payable Bills Creditors (Purchases + Bills Payable)} \\
&= 78,000 / (25,000 + 15,000) = 1.95 \\
\text{Creditors Velocity} &= \text{Period Collection Creditors (No. of Days in a Year)} \\
\text{Creditors Collection Period} &= 365 / 1.95 = 187 \text{ days}
\end{aligned}$$

Note: The Reserve for discount on creditors should not be considered for calculating the net credit sales

(c) Profitability Ratios: The management of the firm is interested in the financial soundness of a firm. They are designed to provide answers to questions such as: (i) Is the profit earned by the firm adequate? (ii) What rate of return does it represent? (iii) What is the rate of profit for various divisions and segments of the firm? (iv) What was the amount paid in dividends? (v) What was the amount paid in dividends? (vi) What is the rate of return to equity holders?

Profitability ratios help in measuring the operating efficiency of the firm. Besides the management of the company, creditors, owners and shareholders are also interested in the profitability of the firm. There are two categories of profitability ratios: (a) gross profit margin and (b) net profit margin.

1. Profit in Relation to Sales

Gross Profit Margin: It measures the percentage of each sales rupee remaining after the firm has paid for its goods. The gross profit margin or gross margin measures the relationship between profit and sales. There are two types of margins-gross profit margin and net profit margin. It indicates the efficiency with which the firm produces each unit of the product. It is computed as:

$$\text{Gross Profit Margin} = \frac{\text{Sales} - \text{Cost of Goods Sold}}{\text{Net Sales}} = \text{Gross Profit/Net Sales} \times 100$$

where, Net Sales = Sales – Excise Duty

$$\text{For KR Ltd., Gross Profit Margin} = \frac{4,80,000}{12,00,000} = 0.40, \text{ i.e., } 40\%$$

A high ratio of gross profit to sales is a sign of good management as it implies that the cost of production is relatively low. A relatively low gross margin is definitely a danger signal, a need for careful and detailed analysis of the factors responsible for it.

Net Profit Margin: It indicates the overall efficiency of the firm in manufacturing, administering and selling the product. It is computed as:

$$\text{Net Profit Margin} = \text{Net Profit/Net Sales} \times 100$$

$$\text{For KR Ltd., Net Profit Margin} = \frac{80,000}{12,00,000} = 0.067, \text{ i.e., } 6.7\%$$

This measures the relationship between net profits and sales of a firm. It measures the percentage of each sales rupee remaining after all costs and expenses including interest and taxes have been deducted.

$$\text{Operating Profit Ratio} = \text{EBIT/Net Sales} \times 100$$

$$\text{For KR Ltd., Operating Profit Ratio} = 1,68,000/12,00,000 \times 100 = 14\%$$

$$\text{Net Profit Ratio} = \text{EAT/Net Sales} \times 100$$

The net profit margin is indicative of management's ability to operate the business with sufficient success not only to recover all the cost but also to leave a margin of reasonable compensation to the owners. Higher the ratio of net operating profit to sales better is the operational efficiency of the concern.

Expenses Ratio: These ratios indicate the relationship of various expenses to net sales. It is computed by dividing expenses by sales. Operating expenses include cost of goods sold, administrative expenses, selling, distribution expense and financial expenses but excludes taxes, dividends and extraordinary losses.

$$\text{Operating Ratio} = \text{Cost of Goods Sold} + \text{Operating Expenses/Net Sales} \times 100$$

$$\text{Cost of Goods Sold} = \text{Opening Stock} + \text{Purchase} - \text{Closing Stock}$$

$$\text{Operating Expenses} = \text{Administrative Expenses} + \text{Financial Expenses} + \text{Selling Expenses}$$

The expenses ratio should be compared over a period of time with the industry average. A low ratio is preferable to high one is unfavorable. For manufacturing concern, an operating ratio between 75% and 80% is expected.

$$\text{Expense Ratio} = \frac{\text{Administrative Expenses or Selling and Distribution Expenses or Financial Expenses}}{\text{Net Sales}} \times 100$$

Earning Power: It is a measure of a firm's operating performance. It is equal to:

$$\text{Earning Power} = \frac{\text{Earnings Before Interest and Taxes}}{\text{Average Total Assets}}$$

$$\text{For KR Ltd., earning power} = \frac{1,68,000}{(8,40,000 + 9,20,000)/2} = 0.19$$

Return on Equity (ROE): ROE indicates how well the firm has used the resources of the owners. It is computed as:

$$\text{Return on Equity (ROE)} = \frac{\text{Net Income}}{\text{Average Equity}}$$

A higher return on equity indicates the efficiency of the firm in utilising the shareholder's resources.

$$\text{For KR Ltd., ROE} = \frac{80,000}{(4,80,000 + 5,20,000)/2} = 0.16.$$

Return on Capital Employed: It refers to long-term funds supplied by the lenders and owners of the firm. The capital employed provides a test of profitability related to the source of long-term funds.

A comparison of this ratio with similar firms, with the industry average and over time would provide sufficient insight into how efficiently the long-term funds of owners and lenders are being used.

$$\text{ROCE} = \text{EBIT} / \text{Capital employed} \times 100$$

The higher the ratio, the more efficient use of the capital employed and better is the financial position.

Return on Shareholders' Equity: It measures the return on the total equity funds of ordinary shareholders. This ratio judges whether the firm has earned a satisfactory return for its equity holders or not.

$$\text{ROEF} = \text{Net Profit after Tax} - \text{Preference Dividends} / \text{Shareholders' Equity or Net Worth} \times 100$$

Illustration 7

Ranjandas Ltd. provides the following information:

Cash Sales ₹ 8,00,000; Credit Sales ₹ 10,00,000; COGS ₹ 15,80,000 and Return Inwards ₹ 20,000. Calculate Gross Profit Ratio and ratio of COGS.

Solution:

$$\text{Gross Sales} = \text{Cash Sales} + \text{Credit Sales} = 8,00,000 + 10,00,000 = 18,00,000$$

$$\text{Net Sales} = \text{Gross Sales} - \text{Return Inwards} = 18,00,000 - 20,000 = 17,80,000$$

$$\text{Gross Profit} = \text{Net Sales} - \text{COGS} = 17,80,000 - 15,80,000 = 2,00,000$$

$$1. \text{ Gross Profit Ratio} = (\text{Gross Profit} / \text{Net Sales}) \times 100 = [2,00,000 / 17,80,000] \times 100 = 11.2\%$$

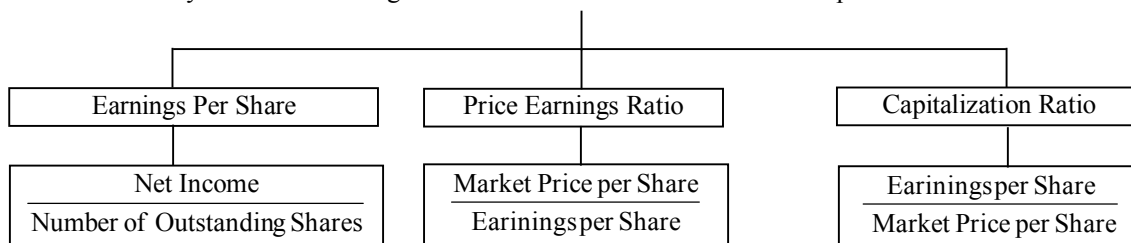
$$2. \text{ Ratio of COGS} = 100 - \text{GP Ratio} = 100 - 11.2 = 88.8\%$$

(d) Ownership Ratios: Ownership ratios help in analyzing the value of the shareholders' investments in the firm. They help in evaluating the firm's value with respect to different aspects like earnings of the firm, dividends declared, debt employed by the firm, market price of the firm, etc. Ownership ratios can be divided into three different categories:

1. Earnings Ratios
2. Leverage Ratios
3. Dividend Ratios

Earnings Ratios

They reflect the earnings of the firm and its affect on the market price of the stock



1. Earnings Ratios: These ratios help in indicating the earnings of the firm and its effect on the price of the share.

Earnings per Share (EPS): EPS helps in computing the profitability of shareholder's investments in the firm. It is computed as:

$$\text{Earnings per Share (EPS)} = \frac{\text{Profit after Tax}}{\text{Number of Outstanding Shares}}$$

$$\text{For KR Ltd., EPS} = \frac{80,000}{12,000} = 6.67$$

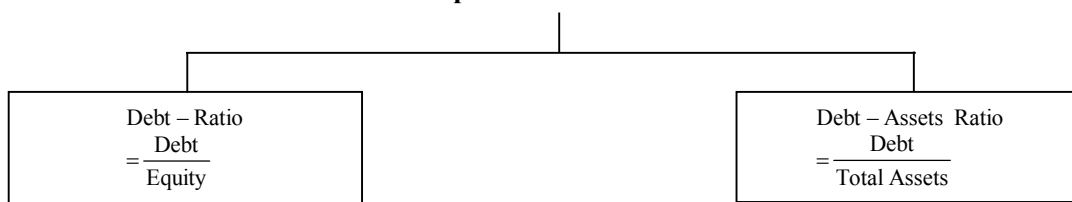
Price-earnings Ratio (P/E Ratio): P/E ratio helps in studying the affect of the earnings of the firm on the market price of the share. It is calculated as:

$$\text{Price-earnings Ratio (P/E Ratio)} = \frac{\text{Market Price of the Share}}{\text{Earnings per Share}}$$

Capitalisation Rate: It is the reciprocal of P/E ratio. It indicates the rate of return expected by the investors.

2. Leverage Ratios: Leverage ratios help in analysing the long-term solvency of the firm. They are divided into two categories: Capital structure ratios and Coverage ratios.

Capital Structure Ratios



Solvency/Capital Structure Ratios: These ratios indicate the proportions of debt and equity in the capital structure of the firm. Debt-equity ratio and Debt-assets ratio fall under this category.

The long-term lenders/creditors would judge the soundness of a firm on the basis of the long-term financial strength measured in terms of its ability to pay the interest regularly as well as repay the installment of the principal on due dates or in one lump sum at the time of maturity. There are two aspects of the long-term solvency of a firm: (i) the ability to repay the principal when due, and (ii) regular payment of the interest. Accordingly, there are two different but mutually dependent and interrelated types of leverage ratios.

Balance Sheet Ratios	Capital Structure Ratios
Debt-equity ratio	Interest coverage ratios
Debt-asset ratio	Dividend coverage ratios
Equity-asset/Proprietors' fund ratio	Total fixed charges coverage ratios
	Cash flow coverage ratios
	Debt service coverage ratios

Debt-equity Ratio: It describes the lender's contribution in the capital structure in relation to that of the owner. It is computed as:

$$\text{Debt-equity Ratio} = \frac{\text{Debt}}{\text{Equity}}$$

In the above ratio, debt in the numerator includes both long-term as well as current liabilities and the denominator is composed of net worth and preference capital that is not redeemable within one year.

$$\text{For KR Ltd., Debt-equity Ratio} = \frac{4,00,000}{5,20,000} = 0.77$$

The D/E ratio is an important tool to appraise the financial structure of a firm. The ratio reflects the relative contribution of creditors and owners of business in its financing. If D/E ratio is 1 : 2 it implies that for every rupee of outside liability (debt) the firm has two rupees of owner's capital or the stake of the creditors is one-half of the owners. Therefore a safety margin of 66.67 per cent is available to the creditors of the firm. A higher debt-equity ratio say 2 : 1 implies low safety margin to the creditors. It would lead to inflexibility in the firm's operation.

Treatment of Preference Share Capital in D/E Ratio: The inclusion or exclusion of preference share capital depends upon the purpose for which the D/E ratio is computed. If the objective is to examine the financial solvency of a firm in terms of its ability to avoid financial risk, preference capital should be clubbed with equity capital. On the other hand, if D/E ratio is calculated to show the effect of the use of fixed-interest/dividend sources of funds on the earnings available to the ordinary shareholders, preference capital should be clubbed with debt.

Trading on Equity: A high debt-equity ratio denotes the use of larger proportion of debt capital in the financial structure of the firm. The debt capital is cheaper to equity capital because interest on debt is a tax deductible expense. The equity shareholders stand to gain for two reasons: (i) Higher returns, (ii) Limited stake would enable them to retain control. Trading on equity or leverage is the use of borrowed funds in expectation of higher returns to equity shareholders.

Debt Assets Ratio: It helps in finding the extent to which the assets of the firm are funded by borrowed funds. Debt Asset Ratio = Total Debt/Total assets.

$$\text{For KR Ltd., Debt Assets Ratio} = \frac{4,00,000}{9,20,000} = 0.43$$

- A low ratio of debt to total assets is desirable from the point of creditors/lenders as there is sufficient margin of safety available to them.
- A high ratio would expose the creditors to high risk. The implications of the ratio of equity capital to total capital are exactly opposite to that of the debt to total assets. A firm should have neither a very high ratio nor a very low ratio.

Proprietary Ratio: This ratio indicates the proportion of total assets financed by the owners.

$$\text{Proprietary Ratio} = \frac{\text{Fund's Proprietor}}{\text{Assets Total}}$$

- Higher ratio, say more than 75% shows lesser dependence on external sources.
- Lower ratio, say less than 60% shows more dependence on external sources.

Capital Gearing Ratio: It shows the mix of finance employed in the firm.

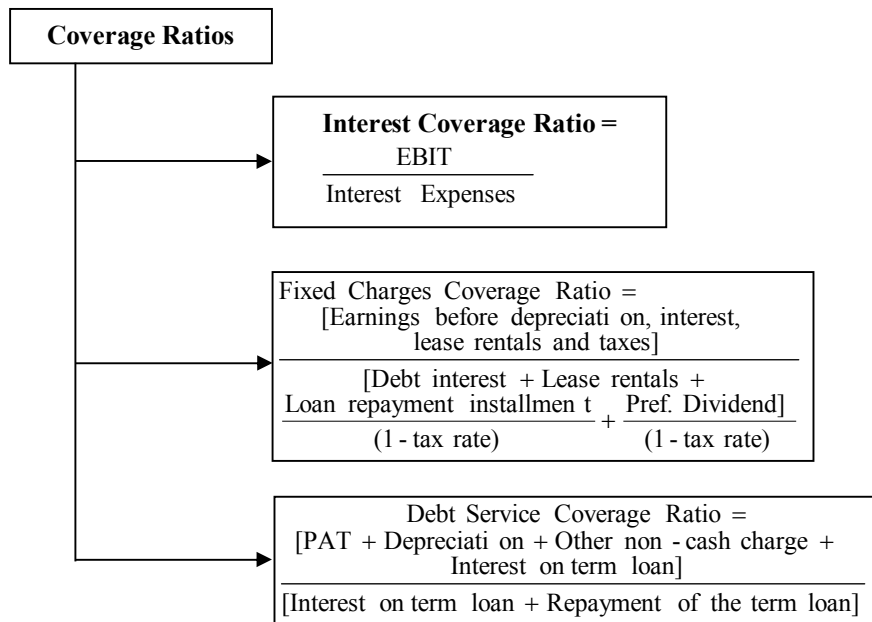
$$\text{Capital Gearing Ratio} = \frac{\text{Fixed Income bearing Securities}}{\text{Total Equity}}$$

Important Concepts

Equity Capital = Loan Capital = Even Gear

Equity Capital > Loan Capital = Low Gear = Overcapitalisation

Equity Capital < Loan Capital = Higher Gear = Undercapitalisation



Coverage Ratios: These ratios help in evaluating the ability of the firm to meet its financial obligations. Interest Coverage Ratio, Fixed Charges Coverage Ratio and Debt Service Coverage Ratio come under this category. These ratios measure the firm's ability to pay certain fixed charges. In the ordinary course of business, the obligations of the creditors are met out of the earnings or operating profits. These claims consist of: (i) interest on loans, (ii) preference dividend, and (iii) amortization of principal or repayment of the installment of loans or redemption of preference capital on maturity. The important coverage ratios are: (i) interest coverage, (ii) dividend coverage, (iii) total coverage, (iv) total cash flow coverage, and (v) debt service coverage ratio.

Interest Coverage Ratio: It indicates the ability of the firm to meet the interest payments associated with debt. It is computed as:

$$\text{Interest Coverage Ratio} = \frac{\text{EBIT}}{\text{Interest Expense}}$$

It can also be computed as:

$$\text{Interest Coverage Ratio} = \frac{\text{Earnings Before Depreciation, Interest and Taxes}}{\text{Interest Expense}}$$

An interest coverage of five times indicates that a fall in EBIT level to one-fifth of the present level, the operating profits available for servicing the interest on loan would still be equivalent to the

claims of the lenders. From the lenders point of view higher the coverage, better is the position of long-term creditors. It also highlights the ability of the firm to raise additional funds in future.

Fixed Charges Coverage Ratio: It is a more comprehensive ratio as it measures the ability of the firm to pay its interest charges as well as principal repayments, lease payments and preference dividends. It is computed as:

Fixed Charges Coverage Ratio =

$$\frac{\text{Earning Before Depreciation, Interest and Taxes}}{\text{Debt Interest} + \text{Lease rentals} + \frac{\text{Loan Repayment Installment}}{(1 - \text{tax rate})} + \frac{\text{Preference Dividends}}{(1 - \text{tax rate})}}$$

Debt Service Coverage Ratio: It is considered a more comprehensive and apt measure to compute debt service capacity of the firm. It is the ability of a firm to make the contractual payments required on a scheduled basis over the life of the debt. It helps in measuring the ability of the post-tax earnings to meet the total obligations of the firm. It is calculated as:

Debt Service Coverage Ratio =

$$\frac{\text{PAT} + \text{Depreciation} + \text{Other Non - cash Charges} + \text{Interest on Term Loan}}{\text{Interest on Term Loan} + \text{Repayment of the Term Loan}}$$

The higher the ratio, the better it is. A ratio of less than one may be taken as a sign of long-term solvency problem as it indicates that the firm does not generate enough cash internally to service debt. Financial Institutions consider 2 : 1 as satisfactory ratio.

3. Dividend Coverage: It measures the ability of a firm to pay dividend on preference shares which carry a stated rate of return. Higher the coverage better is the position.

Dividend Coverage (Preference) = Net Profit after Tax/Preference Dividend

Dividend Coverage (Equity) = EBIT – Preference Dividend/Equity Dividend

Illustration 8

The Balance Sheet of Dravid Ltd. is as follows:

Assets:

Fixed Assets	10,00,000
Current Assets	5,00,000

Represented by:

Liabilities:

Trade Creditors	1,00,000
Reserves and Surplus	1,00,000
10% Debentures	2,00,000
6% Preference Share Capital	3,00,000
Equity Share Capital	8,00,000

Calculate the Debt Ratio and Debt-equity Ratio.

Solution:

1. Debt Ratio = Total Liabilities to Outsiders/Total Assets

$$= (\text{Debentures} + \text{Trade Creditors})/(\text{Fixed Assets} + \text{Current Assets})$$

$$= (2,00,000 + 1,00,000)/(10,00,000 + 5,00,000)$$

$$= 3,00,000/15,00,000 = 1 : 5$$
2. Debt-equity Ratio = Outsiders Funds/Equity Shareholders or

$$= (\text{Debentures} + \text{Trade Creditors})/(\text{Eq. Sh. Capital} + \text{Pref. Sh. Cap.} + \text{Reserves})$$

$$= 3,00,000/12,00,000 = 1 : 4$$

Dividend Ratios: The equity holders of a firm are interested in the dividend policy of the firm. The two dividend ratios, i.e., Dividend Payout ratio (D/P ratio) and the Dividend Yield ratio help the shareholders in evaluating the dividend policy of the firm.

Dividend Payout Ratio: It indicates the proportion of total earnings that are declared as dividends to shareholders. It is computed as:

$$\text{Dividend Payout Ratio} = \frac{\text{Dividend per Share}}{\text{Earnings per Share}}$$

Dividend Yield: This ratio helps in analyzing dividends with respect to the market price of the share. It indicates the current return earned by the shareholder on his investment. It is computed as:

$$\text{Dividend Yield} = \frac{\text{Dividend per Share}}{\text{Market Price of the Share}}.$$

Advantages of Ratio Analysis

The various advantages of ratio analysis are as follows:

- (a) **Financial Forecasting and Planning:** Ratio analysis helps in the financial forecasting and planning activities. Ratios based on the past sales are useful in planning the financial position. Based on these future trends are set.
- (b) **Decision Making:** Ratio analysis throws light on the degree of efficiency. It is also concerned with the management and utilisation of the assets. Thus, it enables for making strategic decisions.
- (c) **Comparison:** With the help of ratio analysis, ideal ratios can be composed. These can be used for comparison in respect of the firm's progress and performance, inter-firm comparison with industry average.
- (d) **Financial Solvency:** It indicates the trends in the financial solvency of the firm. Long-term solvency refers to the financial liability of a firm. It can also evaluate the short-term liquidity position of the firm.
- (e) **Communication:** The financial strength and weaknesses of a firm are communicated in a more easy and understandable manner by the use of ratios. The information contained in the

financial statements is conveyed in a meaningful manner. It thus helps in the communication and enhances the value of the financial statements.

- (f) **Efficiency Evaluation:** It evaluates the overall efficiency of the business entity. Ratio analysis is an effective instrument which, when properly used, is useful to assess important characteristics of business liquidity, solvency, profitability. A critical study of these aspects may enable conclusions relating to capabilities of business.
- (g) **Control:** It helps in making effective control of the business. Actual results can be compared with the established standard and to take corrective action at the right time.
- (h) **Other Uses:** Financial ratios are very helpful in the early and proper diagnosis and financial health of the firm.

Limitations of Ratio Analysis

Undoubtedly, ratios are precious tools in the hands of the analyst. But its significance comes from proper use of these ratios. Misuse or mishandling of these ratios and using them without proper context may lead the analyst or management to a wrong direction. The limiting factors are:

1. The user should possess the practical knowledge about the concerns and the industry in general.
2. Ratios are not an end. They are only means to an end.
3. A single ratio in itself is not important. The trend is more significant in the analysis. Comparison of ratios should be made.
4. For comparative purposes, there should be a standard ratio. There are no such standards prescribed for the ratios.
5. The accuracy and correctness of ratios are totally dependent upon the reliability of the data contained in the financial statement on the basis of which ratios are calculated.
6. To use ratios, first of all there should be uniformity in the accounting plan used by both the firms. In addition. There must be consistency in the preparation of financial statement and recording the transactions from year to year within that concern.
7. Ratios become meaningless if detached from the details from which they are derived. The should be used as supplementary and not substitution of the original absolute figures.
8. Time lag in calculation and communicating the same should not be unnecessarily too much.
9. The method of presentation should be precise and without any ambiguity.
10. Price level changes make the ratio analysis meaningless.
11. Inter-firm comparison should never be undertaken in the case of concerns which are not associated or comparable.
12. All techniques concerning the ratio analysis should be taken into account.

Summary Accounting Ratios

Sr.	Ratios	Formula	Expressed as	Suitability	Purpose	Remarks
REVENUE STATEMENT RATIOS						
1.	Gross Profit Ratio	$\frac{\text{Gross Profit}}{\text{Net Sales}} \times 100$	Percentage	High Ratio	To judge profitability	Operating efficiency of company
2.	Net Profit Ratio	$\frac{\text{Op. Net Profit}}{\text{Net Sales}} \times 100$	Percentage	High Ratio	To judge profitability	
	(a) Operating Net Profit Ratio					
	(b) Net Profit Before Tax Ratio	$\frac{\text{NPBT}}{\text{Net Sales}} \times 100$	Percentage	High Ratio	To judge profitability	
	(c) Net Profit After Tax Ratio	$\frac{\text{NPAT}}{\text{Net Sales}} \times 100$	Percentage	High Ratio	To judge profitability	
3.	Operating Ratio	$\frac{\text{Cos.} + \text{Op. Exp.}}{\text{Net Sales}} \times 100$	Percentage	Low Ratio	To know operating cost and profit	
4.	Expenses Ratio	$\frac{\text{Adm. Exp./S \& D Exp./Fin.Exp./Dep.Exp.}}{\text{Net Sales}} \times 100$	Percentage	Low Ratio	To know operating cost and profit	All operating expenses
		$\frac{\text{Total Op. Exp.}}{\text{Net Sales}} \times 100$	Percentage	Low Ratio	To know operating cost and profit	
5.	Stock T/O Ratio (Stock Velocity Ratio)	$\frac{\text{COS}}{\text{Average RM Stock}}$	Times	High Ratio	To know stock T/O and management	
	(a) Raw Materials T/O Ratio	$\frac{\text{Raw Material Consumed}}{\text{Average RM Stock}}$	Times	High Ratio	To know stock T/O and management	
	(b) Work-in-progress T/O Ratio	$\frac{\text{COP}}{\text{Average WIP Stock}}$	Times	High Ratio	To know stock T/O and management	Cost of production
BALANCE SHEET RATIOS						
6.	Current Ratio	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	Pure Ratio (Std 2 : 1)	High Ratio	To know short-term solvency	
7.	Quick Ratio	$\frac{\text{Quick Assets}}{\text{Quick Liabilities}}$	Pure Ratio (Std 1 : 1)	High Ratio	To know immediate solvency (liquid ratio)	CA – STK – PP EXP – CL – Bank OD – CC

8.	Stock to Working Capital Ratio	$\frac{\text{Closing Stock}}{\text{Working Capital}} \times 100$	Percentage (Std < 100%)	Low Ratio	To know extent of WC invested in stock	WC = CA – CL (net WC)
9.	Proprietary Ratio/Equity Ratio	$\frac{\text{Prop's Funds}}{\text{Total Assets (Excl. Misc. Exp.)}} \times 100$	Percentage (Std > 50%)	High Ratio	To judge long-term solvency and stability of co.	FA + CA + Inv.
10.	Debt-Equity Ratio	$\frac{\text{Debt (Long - term Loans)}}{\text{Equity (Shareholders Funds)}}$	Pure Ratio (Std < 2 : 1)	Low Ratio	To judge long-term solvency and stability of co.	
COMBINED/MISCELLANEOUS RATIOS						
11.	Capital Gearing Ratio	$\frac{\text{Funds with Fix Interest}}{\text{Funds with Fluctuating Interest}}$	Pure Ratio (Std < 1)	Low Ratio	To judge long-term solvency and stability of co.	Fix Int. = Loans + Pref Sh – Non-fix Int = Eq. Sh. – Pref. Sh.
12.	Return on Interest Capital Employed	$\frac{\text{Op Net Profit + Int.}}{\text{Capital Employed (SHF + Long - term Loans)}} \times 100$	Percentage	Low Ratio	To know overall profitability earned compared to T.F.	(Shareholders' Funds + Long-term Loans)
13.	Return on Total Assets/Total Resources	N.P.B.T. + Interest Total Assets (Except Misc. Exp.) (Total Resources)	Percentage	High Ratio	To know overall profitability earned to T.F.	Total Assets = FA + Inv + CA OR SHF + LTR + CL
14.	Return on Prop. Funds	$\frac{\text{NPAT + Interest}}{\text{Shareholders Fund}} \times 100$	Percentage	High Ratio	% of profit earned on prop. funds	
15.	Return on Eq. Shareholders' Fund	$\frac{\text{NPAT – Pref. Dividend}}{\text{Prop. Fund – Pref. Sh. Cap.}} \times 100$	Percentage	High Ratio	% of Profit Earned on Eq. Sh. H. Fund	
16.	Debtors T/O Ratio	$\frac{\text{Net Credit Sales}}{\text{Average Drs. + Bills Rec.}}$	Times	High Ratio	Collection from debtors in year	Op. Drs + CL Drs/2 IF no Op. Drs given, take CL Drs
	Avg. Collection Period/Age of Debtors	$\frac{\text{Avg. Drs. \& B.R}}{\text{Net Credit Sales}} \times 365 \text{ D}$	D/M	Short Period	Credit Period Allowed to Debtors	Or Divide by 12 M/52 Weeks
17.	Creditors T/O Ratio	$\frac{\text{Net Credit Purchases}}{\text{Average Crs. + Bills Pay}}$	Times	High Ratio	Payments to creditors in year	
	Avg. Payment Period/Age of	$\frac{\text{Avg. Drs. \& B.R}}{\text{Net Credit Sales}} \times 365 \text{ D}$	Times	High Ratio	Credit period allowed by	OR Divide by 12 months/52

	Creditors				creditors	weeks
18	Earning Per Share (EPS)	$\frac{\text{NPAT} - \text{Pref. Dividend}}{\text{No of Equity Shares}}$	₹	High Ratio	To know profit and market price of shares	
19	Price Earning Ratio (PE)	$\frac{\text{Market Price of Shares}}{\text{E.P.S}}$	Times	Low Ratio	Provide guidance for investments	
20	Dividend Pay Out Ratio (D/P Ratio)					
	(a)	$\frac{\text{Total Dividend on Eq. \& Pref. Share}}{\text{NPAT}} \times 100$	Percentage	High Ratio	% of NP distributed by way of Dividend High Ratio Liberal Dividend Policy and Low Ratio Conservative Dividend Policy	
	(b)	$\frac{\text{Eq. Dividend per Shares}}{\text{EPS}} \times 100$				
21	Yield Ratio					
	(a) Dividend	$\frac{\text{Eq. Dividend per Shares}}{\text{MKT Price}} \times 100$	Percentage	High Ratio	It gives dividend and earning % on the market price of the shares; also represents the real dividend rate/earning rate	
	(b) Earning Yield Ratio	$\frac{\text{EPS}}{\text{Market Price}} \times 100$				
22	Debt Service Coverage Ratio	NPAT + Dep. and Other Non-cash Expenses + Int. Interest + p.a.	> 1 or < 1	High Ratio	To judge the capacity of borrower to pay interest and loan instalment	
23	Interest Coverage Ratio	$\frac{\text{NPBT} + \text{Interest}}{\text{Interest}}$	Times	High Ratio	To judge profit available for paying interest and instalment	NPBT – Tax and Int = NPAT + Tax Int on Loans

24	FA T/O to Ratio	$\frac{\text{Sales / COS}}{\text{Net FA}}$				
25	Capital Turnover Ratio	$\frac{\text{Sales / COS}}{\text{Capital Employed}}$				
26	Working Capital T/O Ratio	$\frac{\text{Sales / COS}}{\text{Working Capital}}$				
27	Assets T/O Ratio	$\frac{\text{Sales Average}}{\text{Assets}}$				
28	Preference Dividend Coverage Ratio	$\frac{\text{NPAT (before) Preference Dividend}}{\text{Equity Dividend}}$				
29	Equity Dividend Coverage Ratio	$\frac{\text{NPAT - Pref. Div.}}{\text{EQ Dividend}}$				
30	Fixed Assets to Shareholders' Fund Ratio	$\frac{\text{Fixed Assets}}{\text{Shareholders Funds}}$				
31	Debt Assets Ratio	Debt Assets				
32	Return on Assets Ratio	Net Profit Average Assets or Sales				

Illustration 9

The following is the Trading and Profit and Loss Account of a Limited Company for the year ended 31st March, 2014.

Profit and Loss Account

Particulars	₹	Particulars	₹
To Stock	76,250	By Sales	5,00,000
To Purchases	3,15,250	By Stock	98,500
To Carriage and Freight	2,000		
To Wages	5,000		
To Gross Profit	2,00,000		
	5,98,500		5,98,500

Particulars	₹	particulars	₹	₹
To Administrative Expenses	1,00,000	By Gross Profit		2,00,000
To Finance Expenses:		By Non-operating Income:		
Interest	2,200	Interest on Security	1,500	
Discount	2,400	Dividend on Shares	3,750	
Bad Debts	3,400	Profit on Sale of Shares	750	6,000
To Selling and Distribution Expenses	12,000			
To Non-operating Expenses				
Loss on Sale of Securities	350			

Provision for Legal Suit	1,650	2,000			
To Net Profit		84,000			
		2,06,000			2,06,000

Convert the above Profit and Loss A/c into vertical form and calculate following ratios:

- (i) Expenses ratio
- (ii) Gross profit ratio
- (iii) Net profit ratio
- (iv) Operating net profit ratio
- (v) Operating ratio
- (vi) Stock turnover ratio.

Solution:

In the Books of Ltd. Company

Vertical Income Statement for the year 31st March, 2014

Particulars	Amount	Amount
Sales		5,00,000
Less: Cost of Goods Sold		
Opening Stock	76,250	
(+) Purchases	3,15,250	
(+) Carriage and Freight	2,000	
(+) Wages	5,000	
(-) Closing Stock	98,500	3,00,000
Gross Margin		2,00,000
Less: Operating Expenses		
(i) Office Expenses		
Administrative Expenses	1,00,000	
(ii) Selling and Distribution Expenses	12,000	
(iii) Financial Expenses		
Interest	2,200	
Discount	2,400	
Bad Debts	3,400	1,20,000
Operating Profit		80,000
Add: Non-operating Income		
Interest on Security	1,500	
Dividend on Shares	3,750	
Profit on Sale of Shares	750	6,000
		86,000
Less: Non-operating Expenses		
Loss on Sale of Security	350	
Provision for Legal Suit	1,650	2,000
Net Profit before Tax		84,000

Ratios:

(i) Expenses Ratio: (a) $\frac{\text{Cost of Goods Sold}}{\text{Net Sales}} \times 100 = \frac{3,00,000}{5,00,000} \times 100 = 60\%$

$$\text{Expense Ratio} = \frac{\text{Expenses}}{\text{Net Sales}} \times 100$$

$$(b) \text{ Office Expenses Ratio} = \frac{\text{Office Expenses}}{\text{Net Sales}} \times 100 = \frac{1,00,000}{5,00,000} \times 100 = 20\%$$

$$(c) \text{ Selling and Distribution Expenses Ratio} = \frac{\text{Selling \& Distribution}}{\text{Net Sales}} \times 100$$

$$= \frac{12,000}{5,00,000} \times 100 = 2.4\%$$

$$(d) \text{ Financial Expenses Ratio} = \frac{\text{Financial Expenses}}{\text{Net Sales}} \times 100 = \frac{8,000}{5,00,000} \times 100 = 1.6\%$$

$$(ii) \text{ Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100 = \frac{2,00,000}{5,00,000} \times 100 = 40\%$$

$$(iii) \text{ Net Profit Ratio} = \frac{\text{Net Profit Before tax}}{\text{Net Sales}} \times 100 = \frac{84,000}{5,00,000} \times 100 = 16.8\%$$

$$(iv) \text{ Operating Profit Ratio} = \frac{\text{Operating Profit}}{\text{Net Sales}} \times 100 = \frac{80,000}{5,00,000} \times 100 = 16\%$$

$$(v) \text{ Operating Ratio} = \frac{(\text{Cost of Goods sold} + \text{Operating Expenses})}{\text{Net Sales}} \times 100$$

$$\text{Operating Ratio} = 3,00,000 + 1,20,000 = 4,20,000 = \frac{4,20,000}{5,00,000} \times 100 = 84\%$$

$$(vi) \text{ Stock Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Stock}}$$

$$\text{Average Stock} = \frac{\text{Opening Stock} + \text{Closing Stock}}{2} = \frac{76,250 + 98,500}{2} = \frac{1,74,750}{2} = 87,375$$

$$\text{Stock Turnover Ratio} = \frac{3,00,000}{87,375} = 3.43 \text{ times}$$

Illustration 10

From the following Financial Statements of Rimzim Ltd., calculate all the 16 Accounting Ratios and comment on their significance.

Rimzim Ltd.
Manufacturing, Trading and Profit and Loss Account the year ended 31st March, 2014

Particulars	₹	Particulars		₹
To Opening Stock	5,00,000	By Sales:		
To Purchases	11,00,000	Cash	3,00,000	
To Wages	3,00,000	Credit	17,00,000	20,00,000
To Factory Overheads	2,00,000	By Closing Stock		6,00,000
To Gross Profit c/d	5,00,000			

	26,00,000		26,00,000
To Administrative expenses	75,000	By Gross Profit b/d	5,00,000
To Selling and Distribution Expenses	50,000	By Dividend on Investments	10,000
To Debenture Interest	20,000	By Profit on Sale of Furniture	20,000
To Depreciation	60,000		
To Loss on Sale of Motor Car	5,000		
To Net Profit c/d	3,20,000		
	5,30,000		5,30,000
To Pref. Dividend (Net) (Interim)	15,000	By Balance b/d	2,71,000
To Provision for Taxation	1,76,000	By Net Profit	3,20,000
To Balance c/d	4,00,000		
	5,91,000		5,91,000

Balance Sheet as at 31st March, 2014

Liabilities	₹	Assets	₹
Equity Share Capital	10,00,000	Goodwill (at cost)	5,00,000
6% Preference Share Capital	5,00,000	Plant and Machinery	6,00,000
General Reserve	1,00,000	Land and Building	7,00,000
10% Debentures	2,00,000	Furniture and Fixtures	1,00,000
Profit and Loss A/c	4,00,000	Stock in Trade	6,00,000
Provision for Taxation	1,76,000	Bills Receivable	30,000
Bills Payable	1,24,000	Debtors	1,50,000
Bank Overdraft	1,20,000	Bank	2,20,000
Creditors	2,80,000		
	29,00,000		29,00,000

Solution:**Profit and Loss Related Ratios**

$$1. \text{ Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100 = \frac{5,00,000}{20,00,000} \times 100 = 25\%$$

2. Net Profit Ratio

$$(a) \frac{\text{Net Profit before Tax}}{\text{Net Sales}} \times 100 = \frac{3,20,000}{20,00,000} \times 100 = 16\%$$

$$(b) \frac{\text{Net Profit after Tax}}{\text{Net Sales}} \times 100 = \frac{1,44,000}{20,00,000} \times 100 = 7.2\%$$

$$3. \text{ Operating Profit Ratio} = \frac{\text{Operating Profit}}{\text{Net Sales}} \times 100$$

$$\therefore \text{ Operating Profit Ratio} = \frac{2,95,000}{20,00,000} \times 100 = 14.75$$

$$4. \text{ Operating Ratio} = \frac{\text{Operating Cost}}{\text{Net Sales}} \times 100$$

$$\text{Operating Cost} = \text{Cost of Goods Sold} + \text{Operating Expenses}$$

$$= 15,00,000 + 2,05,000 = 17,05,000$$

$$\text{Operating Ratio} = \frac{17,05,000}{20,00,000} \times 100 = 85.25\%$$

5. Expenses Ratio

$$(a) \frac{\text{Administrative Expenses}}{\text{Net Sales}} \times 100 = \frac{1,35,000}{20,00,000} \times 100 = 6.75\%$$

$$(b) \frac{\text{Selling and Distribution Expenses}}{\text{Net Sales}} \times 100 = \frac{50,000}{20,00,000} \times 100 = 2.5\%$$

$$(c) \frac{\text{Finance Expenses}}{\text{Net Sales}} \times 100 = 1\%$$

$$(d) \frac{\text{Cost of Goods Sold}}{\text{Net Sales}} \times 100 = \frac{15,00,000}{20,00,000} \times 100 = 75\%$$

$$6. \text{ Stock Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Stock}}$$

$$\text{Average Stock} = \frac{\text{Opening Stock} + \text{Closing Stock}}{2} = \frac{5,00,000 + 6,00,000}{2} = \frac{11,00,000}{2} = 5,50,000$$

$$\text{Stock Turnover Ratio} = \frac{15,00,000}{5,50,000} = 2.73 \text{ times}$$

Balance Sheet Related Ratios

$$7. \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{10,00,000}{7,00,000} = 1.43 : 1$$

$$8. \text{ Quick Ratio} = \frac{\text{Quick Assets}}{\text{Quick Liabilities}}$$

$$\text{Quick Assets} = \text{CA} - \text{Stock} - \text{Prepaid Expenses} = 10,00,000 - 6,00,000 - \text{Nil} = 4,00,000$$

$$\text{Quick Liabilities} = \text{CL} - \text{Bank OD} = 7,00,000 - 1,20,000 = 5,80,000$$

$$\text{Quick Ratio} = \frac{\text{Quick Assets}}{\text{Quick Liabilities}} = \frac{4,00,000}{5,80,000} = 0.69 : 1$$

$$9. \text{ Proprietary Ratio} = \frac{\text{Owners' Fund}}{\text{Total Assets}} \times 100$$

$$\text{TA} = \text{FA} + \text{CA} = 19,00,000 + 10,00,000 = 29,00,000$$

$$\text{Proprietary Ratio} = \frac{20,00,000}{29,00,000} \times 100 = 68.97\%$$

$$10. \text{ Stock Working Capital Ratio} = \frac{\text{Closing Stock}}{\text{Working Capital}} \times 100$$

$$\text{Working Capital} = \text{Current Assets} - \text{Current Liabilities} = 10,00,000 - 7,00,000 = 3,00,000$$

$$\text{Stock Working Capital Ratio} = \frac{\text{Closing Stock}}{\text{Working Capital}} \times 100 = 200\%$$

$$11. \text{ Debt - equity Ratio} = \frac{\text{Debt}}{\text{Equity}} = \frac{\text{Borrowed Funds}}{\text{Own Funds}} = \frac{2,00,000}{20,00,000} = 0.1 : 1$$

$$12. \text{ Capital Gearing Ratio} = \frac{\text{Borrowed Funds} + \text{Preference Share Capital}}{\text{Equity Capital} + \text{Reserves}}$$

$$= \frac{2,00,000 + 5,00,000}{15,00,000} = \frac{7,00,000}{15,00,000} = 0.47$$

Combined Ratios

13. Debtors Turnover Ratio

$$(a) \text{ No. of Times} = \frac{\text{Credit Sales}}{\text{Average Account Receivable}}$$

$$\text{Average Accounts Receivable} = 1,50,000 + 30,000 = 1,80,000$$

$$\therefore \text{No. of Times} = \frac{17,00,000}{1,80,000} = 9.4 \text{ times}$$

$$(b) \text{ Age of Debtors} = \frac{365 \text{ Days}}{\text{Debtors Turnover Ratio}} = \frac{365}{9.44} = 39 \text{ days approx.}$$

14. Creditors Turnover Ratio

$$(a) \text{ No. of Times} = \frac{\text{Credit Purchases}}{\text{Average Account Payable}}$$

$$\text{Average Accounts Payable} = \text{Creditors} + \text{B/P} = 2,80,000 + 1,24,000 = 4,04,000$$

$$\therefore \text{No. of Times} = \frac{11,00,000}{4,04,000} = 2.72 \text{ times}$$

$$(b) \text{ Average Payment Periods} = \frac{365 \text{ Days}}{\text{Creditors Turnover Ratio}} = \frac{365}{2.72} = 135 \text{ days approx.}$$

$$15. \text{ Return on Total Assets} = \frac{\text{Net Profit Before Interest and Tax}}{\text{Total Assets}} \times 100$$

$$\begin{aligned} \text{Total Assets} &= \text{Fixed Assets} + \text{Investment} + \text{Current Assets} \\ &= 19,00,000 + \text{Nil} + 10,00,000 = 29,00,000 \end{aligned}$$

$$\begin{aligned} \text{Net Profit before Interest and Tax} &= \text{Net Profit After Tax} + \text{Tax} + \text{Interest} \\ &= 1,44,000 + 1,76,000 + 20,000 = 3,40,000 \end{aligned}$$

$$\text{Return on Total Assets} = \frac{3,40,000}{29,00,000} \times 100 = 11.72\%$$

$$16. \text{ Return on Capital Employed} = \frac{\text{Net Profit Before Interest and Tax}}{\text{Capital Employed}} \times 100$$

$$\begin{aligned} \text{Capital Employed} &= \text{Owners' Fund} + \text{Borrowed Fund} \\ &= 20,00,000 + 2,00,000 = 22,00,000 \end{aligned}$$

$$\text{Return on Capital Employed} = \frac{3,40,000}{22,00,000} \times 100 = 15.45\%$$

Illustration 11

The following are abridged accounting reports prepared for P. Ltd.

Revenue Statement for the year ended 30th June, 2014

Particulars	(₹ '000)
Sales (all credit)	300
Less: Cost of Goods Sold	
Opening Inventory	100
Purchases	205
	305
Less: Closing Inventory	80
Gross Margin	75
Operating Expenses	57
Net Profit before Taxation	18
Provision for Taxation	8
Net Profit	10

Balance Sheet as on 30th June, 2014 (₹ '000)

Liabilities	₹	₹	Assets		₹	₹
Current Liabilities			Current Assets			
Accounts Payable	87		Cash		30	
Provision for Taxation	8		Accounts Receivable		60	
Accrued Expenses	5	100	Inventory		80	170
Long-term Liabilities		25	Fixed Assets:			
Long on Mortgage		25	Land and Building		65	
Shareholder's Funds			Plant	40		
Paid-up Capital	80		Less: Provision for Depreciation	25	15	80
Reserves	30					
Unappropriated Profits	15	125				
		250				250

Name and calculate the ratios which indicate:

1. The rapidity with which accounts receivable are collected.
2. The ability of the company to meet its current obligations.
3. What 'mark-up' has been attained.
4. The efficiency with which funds represented by inventories are being utilised and managed;

5. The ability of the company to meet quickly demands for payment of amounts due.
6. The relative importance of proprietorship and liabilities as sources of funds.

Solution:

1. Debtors Turnover Ratio

$$(a) \text{ No. of Times} = \frac{\text{Credit Sales}}{\text{Average Account Receivable}}$$

$$\text{Average Accounts Receivable} = \frac{60,000}{\text{Credit Sales}} = 3,00,000$$

$$\therefore \text{No. of Times} = \frac{3,00,000}{60,000} = 5 \text{ times}$$

$$(b) \text{ No. of Days} = \frac{\text{AverageAccounts Receivable}}{\text{Credit Sales}} \times 365$$

$$= \frac{60,000}{3,00,000} \times 365 = 73 \text{ days}$$

$$2. \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{1,70,000}{1,00,000} = 1.7 : 1$$

$$3. \text{ Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100 = \frac{75,000}{3,00,000} \times 100 = 25\%$$

$$4. (a) \text{ Stock Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Stock}}$$

$$\text{Average Stock} = \frac{\text{Opening Stock} + \text{Closing Stock}}{2} = \frac{1,00,000 + 80,000}{2} = \frac{1,80,000}{2} = 90,000$$

$$\text{Stock Turnover Ratio} = \frac{2,25,000}{90,000} = 2.5 \text{ Times}$$

$$(b) \text{ Stock Working Capital Ratio} = \frac{\text{Closing Stock}}{\text{Working Capital}} \times 100$$

$$\text{Working Capital} = \text{C. Assets} - \text{Current Liabilities} = 1,70,000 - 1,00,00 = 70,000$$

$$\text{Stock Working Capital Ratio} = \frac{80,000}{70,000} \times 100 = 114.29\%$$

$$5. \text{ Quick Ratio} = \frac{\text{Quick Assets}}{\text{Quick Liabilities}}$$

$$\text{Quick Assets} = \text{CA} - \text{Stock} - \text{Prepaid Expenses} = 1,70,000 - 80,000 - \text{Nil} = 90,000$$

$$\text{Quick Liabilities} = \text{CL} - \text{Bank OD} = 1,00,000 - \text{Nil} = 1,00,000$$

$$\text{Quick Ratio} = \frac{\text{Quick Assets}}{\text{Quick Liabilities}} = \frac{90,000}{1,00,000} = 0.9 : 1$$

$$6. \text{ Proprietary Ratio} = \frac{\text{Proprietors' Funds}}{\text{Total Assets}} \times 100$$

$$\text{Total Assets} = \text{Fixed Assets} + \text{Current Assets} = 80,000 + 1,70,000 = 2,50,000$$

Illustration 12

The following is the Balance Sheet of Urmila Limited as on 31st March, 2014.

Liabilities	₹	Assets	₹
Share Capital	3,00,000	Goodwill	80,000
Reserves and Surplus	1,50,000	Land and Building	1,50,000
10% Mortgage Debentures	2,15,000	Plant and Machinery	2,00,000
Sundry Creditors	1,30,000	Patent Right	21,500
Bank Overdraft	40,000	Stock-in-trade	1,43,500
Provision for Tax	35,000	Sundry Debtors	2,40,000
		Cash in Hand	5,000
		Cash at Bank	10,000
		Preliminary Expenses	20,000
Total	8,70,000	Total	8,70,000

Additional Information:

- Stock in Trade as on 1st April, 2013 1,56,500
- Turnover Sales for the year ended 31st March, 2014 10,95,000
- Rate of Gross Profit: 33-1/3%
- Net Profit (before interest and tax) 99,000
- Net Profit (after interest and tax) 43,000
 - Present the balance sheet in vertical form.
 - Calculate the following ratios:
 - Capital Gearing
 - Stock Turnover Ratio
 - Return on Total Resources
 - Return on Proprietors' Funds
 - Return on Ordinary Capital
 - Turnover of Debtors.

Solution:**Vertical Balance Sheet as on 31st March, 2014**

Particulars	Amount	Amount
Source of Funds		
I. Owners' Fund		
(a) Share Capital	3,00,000	
(b) Add: Reserves and Surplus	1,50,000	
(c) Less: Miscellaneous Expenses		
Preliminary Expenses	20,000	4,30,000
II. Borrowed Fund		
(a) Secured Loan		
10% Mortgage Debentures		2,15,000
Capital Employed		6,45,000
Application of Funds		
I. Fixed Assets		
(a) Tangible Assets		
Land and Building	1,50,000	

Plant and Machinery	2,00,000	
(b) Intangible Assets		
Goodwill	80,000	
Patent Rights	21,500	4,51,500
II. Working Capital		
(a) Current Assets		
Cash in Hand	5,000	
Cash at Bank	10,000	
Debtors	2,40,000	
Quick Assets	2,55,000	
Stock	1,43,500	
	(a)	3,98,500
(b) Less: Current Liabilities		
Creditor	1,30,000	
Provision for Tax	35,000	
Quick Liabilities		
Bank Overdraft	40,000	1,93,500
Working Capital	(b)	2,05,000
Total Assets	(a – b)	6,45,000

$$1. \text{ Quick Gearing Ratio} = \frac{\text{Borrowed Funds} + \text{Preference Share Capital}}{\text{Equity Holders' Funds}}$$

$$= \frac{2,15,000 + \text{Nil}}{4,30,000 - \text{Nil}} = 0.50 : 1$$

$$2. \text{ Stock Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Stock}}$$

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

$$= \frac{1,56,500 + 1,43,500}{2} = \frac{3,00,000}{2} = 1,50,000$$

Gross Profit is 33-1/3%

If Sales is 100 > 10,95,000

Gross Profit 33-1/3 > ?

Cost of Goods Sold 66-2/3 > ?

$$\text{Gross Profit} = \frac{33 - 1/3 \times 10,95,000}{100} = \frac{100 \times 10,95,000}{300} = 3,65,000$$

Sales 10,95,500

(-) GP 3,65,000

COGS 7,30,000

$$\therefore \text{Stock Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Stock}} = \frac{7,30,000}{1,50,000} = 4.87 \text{ times}$$

$$3. \text{ Return on Total Resources} = \frac{\text{Net Profit Before Interest and Tax}}{\text{Total Assets}} \times 100$$

$$\text{Total Assets} = \text{Fixed Assets} + \text{Current Assets} = 4,51,500 + 3,98,500 = 8,50,000$$

$$\text{Return on Total Resource} = \frac{99,000}{8,50,000} \times 100 = 11.65\%$$

$$4. \text{ Return on Proprietors' Fund}$$

$$\text{Return on Proprietors' Fund} = \frac{\text{Profit after Tax}}{\text{Proprietors' Funds}} \times 100 = \frac{43,000}{4,30,000} \times 100 = 10\%$$

$$5. \text{ Return on Ordinary Capital} = \frac{\text{PAT} - \text{Preference Dividend}}{\text{Ordinary Capital}} = \frac{43,000 - \text{Nil}}{3,00,000} \times 100 = 14.33\%$$

$$6. \text{ Turnover of Debtors}$$

$$\text{Debtors Turnover Ratio}$$

$$(a) \text{ No. of Times} = \frac{\text{Credit Sales}}{\text{Average Accounts Receivable}} = \frac{10,95,000}{2,40,000} = 4.56 \text{ times}$$

$$(b) \text{ No. of Days} = \frac{\text{Average Accounts Receivable}}{\text{Credit Sales}} \times 365$$

$$= \frac{2,40,000}{10,95,000} \times 365 = 80.04 = 81 \text{ days approx.}$$

Illustration 13

The summarised balance sheet of D Ltd. as on 30th September, 2014 is as follows:

Liabilities	₹	Assets	₹
Equity Share Capital	60,000	Fixed Assets	90,000
Reserves	20,000	Inventory	30,000
6% Debentures	50,000	Marketable Investments	10,000
Current Liabilities	30,000	Debtors	15,000
		Cash and Bank Balances	10,000
		Preliminary Expenses	5,000
	1,60,000		1,60,000

The Net Profit before tax for the year was ₹ 7,500.

Prepare a Statement suitable for analysis and indicate the soundness of the financial position of the company by calculating the following ratios together with your comments on the same:

(i) Current Ratio	(ii) Liquid Ratio
(iii) Proprietary Ratio	(iv) Return on Total Resources
(v) Return on Proprietors' Fund	(vi) Return on Equity Share Capital.

Solution:

1. Current Ratio = $\frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{65,000}{30,000} = 2.17 : 1$
2. Quick Ratio = $\frac{\text{Quick Assets}}{\text{Quick Liabilities}} = \frac{\text{Current Assets} - \text{Stock}}{\text{Current Liabilities} - \text{Bank O/D}} = \frac{35,000}{30,000} = 1.17 : 1$
3. Proprietary Ratio = $\frac{\text{Proprietary Funds}}{\text{Total Assets}} \times 100 = \frac{75,000}{1,55,000} \times 100 = 48.39\%$
4. Return on Total Assets = $\frac{\text{Net Profit Before Interest Tax}}{\text{Total Assets}} \times 100$

Net Profit Before Interest Tax = Net Profit Tax + Interest = 7,500 + 3,000 = 10,500

$$\therefore \text{Return on Total Assets} = \frac{10,500}{1,55,000} \times 100 = 6.77\%$$

5. Return on Proprietor s' Fund = $\frac{\text{PAT}}{\text{Proprietors' Funds}} \times 100$

Net Profit after Tax = Net Profit before Tax – Tax = 7,500 – 50% = 3,750

$$\therefore \text{Return on Proprietor s' Fund} = \frac{3,750}{75,000} \times 100 = 5\%$$

6. Return on Equity Share Capital = $\frac{\text{Net Profit after Tax} - \text{Preference Dividend}}{\text{Equity Share Capital}} \times 100$

$$= \frac{3,750 - \text{Nil}}{60,000} \times 100 = 6.25\%$$

Note: It is assumed that tax rate is 50% for the given company.

Illustration 14

Following are the extracts from the financial statement of M/s Urmi Ltd. as on 31st December, 2013 and 2014.

Particulars	31.12.2014 ₹	31.12.2013 ₹
Closing Stock	20,000	50,000
Debtors	40,000	40,000
Bills Receivable	20,000	10,000
Advance Receivable in Cash or Kind	4,000	10,000
Creditors	50,000	60,000
Bills Payable	30,000	40,000
Bank Overdraft	–	4,000
Cash on Hand	36,000	30,000
9% Debentures (1988)	10,00,000	10,00,000
Sales for the Year	7,00,000	6,00,000
Gross Profit	1,40,000	1,00,000

Bills Receivable	21,000
Plant and Machinery	5,44,000
12% Debentures	2,50,000
Loan from a Director	52,000
Equity Share Capital	10,00,000
Profit and Loss Account	2,17,000
Trade Investments	20,000
Proposed Dividend	86,000
Advance Tax	1,00,000
Provision for Taxation	2,64,000
Bills Payable	18,000
General Reserve	1,00,000

(T.Y. B.Com., Modified)

Solution:**Vertical Balance Sheet**

Particulars	Amount	Amount
Source of Funds		
I. Owners' Fund		
(a) Share Capital		
Equity Share Capital	10,00,000	
(b) <i>Add:</i> Reserves and Surplus	1,00,000	
Profit & loss	2,17,000	
(c) Miscellaneous Expenses	–	13,17,000
II. Borrowed Fund		
(a) Secured Loan		
12% Debentures	2,50,000	
(b) Unsecured Loan		
Loan from Directors	52,000	3,02,000
Capital Employed		16,19,000
Application of Funds		
I. Fixed Assets		
Land and Building	8,00,000	
Plant and Machinery	5,44,000	
Investment	20,000	13,64,000
II. Working Capital		
(a) Current Assets:		
Advance Payments	62,000	
Bank Balance	50,000	
Debtors	5,23,000	
Bill Receivable	21,000	
<i>Add:</i> Stock	2,73,000	
<i>Add:</i> Prepaid Expenses Advance Tax	1,00,000	
Total Current Asset	10,29,000	
(b) <i>Less:</i> Current Liabilities:		
Creditors	4,06,000	
Proposed Dividend	86,000	
Provision for Tax	2,64,000	
Bill Payable	18,000	
	7,74,000	
∴ Working Capital		2,55,000
		16,19,000

(b) <i>Add:</i> Reserves and Surplus			
General Reserve	2,00,000		
Profit and Loss Account	28,000	2,28,000	
(c) <i>Less:</i> Miscellaneous Expenditure and Fictitious Assets			
Preliminary Expenses		25,000	8,03,000
(II) Borrowed Fund			
(a) Secured Loan			
12% Debentures		3,00,000	
(b) Unsecured Loan			
Capital Employed		–	3,00,000
			11,03,000
Applications of Fund			
(I) Fixed Assets			
(a) Tangible Assets			
Building	3,00,000		
Machinery	2,60,000	5,60,000	
(b) Intangible Assets			
Goodwill		30,000	
(c) Capital W.I.P.		–	5,90,000
(II) Working Capital			
(a) Current Assets:			
Bank	1,000		
Debtors	4,00,000		
Quick Assets	4,01,000		
<i>Add:</i> Stock	3,89,000		
<i>Add:</i> Prepaid Expenses	5,000	7,95,000	
(b) <i>Less:</i> Current Liabilities:			
Creditors	78,000		
Income Tax Provision	30,000		
Proposed Dividend	60,000		
Quick Liabilities	1,68,000		
<i>Add:</i> Bank OD	1,14,000	2,82,000	
Working Capital			5,13,000
Total Assets			11,03,000

$$(i) \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{7,95,000}{2,82,000} = 2.82 : 1$$

$$(ii) \text{ Liquid Ratio} = \frac{\text{Quick Assets}}{\text{Quick Liabilities}} = \frac{4,01,000}{1,68,000} = 2.39 : 1$$

$$(iii) \text{ Capital Gearing Ratio} = \frac{\text{Borrowed Funds} + \text{Preference Share Capital}}{\text{Equity Holders Funds}} = \frac{3,00,000 + 2,00,000}{8,03,000 - 2,00,000}$$

$$= \frac{5,00,000}{6,03,000} = 0.829 : 1$$

$$(iv) \text{ Proprietary Ratio} = \frac{\text{Owners' Funds}}{\text{Total Assets}} \times 100$$

$$\text{Total Assets} = \text{Fixed Assets} + \text{Current Assets} = 5,90,000 + \text{Nil} + 7,95,000 = 13,85,000$$

$$\text{Proprietary Ratio} = \frac{8,03,000}{13,85,000} \times 100 = 57.98\%$$

Illustration 17

The following is the incomplete Trading Account of M/s Sameena Ltd. for the year ended 31st March, 2011.

Dr.		Trading Account		Cr.	
Particulars	₹	Particulars	₹		
To Opening Stock	?	By Sales:			
To Purchases:		Cash	?		
Cash	?	Credit	?		?
Credit	?	By Goods Destroyed by Fire		50,000	
To Gross Profit c/f	?	By Closing Stock		?	
	?			?	

The following information is available:

- (i) Creditors ₹ 3,00,000, Bills payable ₹ 2,00,000 and Debtors ₹ 2,00,000.
- (ii) Debtors Turnover Ratio 30 days (360 days in a year).
- (iii) Total Sales ₹ 32,00,000.
- (iv) Gross Profit Ratio 25%
- (v) Creditors Turnover Ratio 4 times.
- (vi) Stock Turnover Ratio 4.8 times.
- (vii) Opening Stock is ₹ 50,000 higher than the closing stock.

You are required to complete the above Trading Account.

Solution: Trading A/c

Particulars	₹	₹	Particulars	₹	₹
To Opening Stock		5,25,000	By Sales		
To Purchases			Cash	8,00,000	
Cash	4,00,000		Credit	24,00,000	32,00,000
Credit	20,00,000	24,00,000	By Goods Destroyed by Fire		50,000
To Gross Profit c/d		8,00,000	By Closing Stock		4,75,000
		37,25,000			37,28,000

- (i) Total Sales = 32,00,000
Gross Profit = 25%
= 8,00,000
- (ii) Debtors Turnover = $\frac{2,30,000}{30} \times 360$
Credit Sales = 24,00,000
Total Sales = 32,00,000
– Credit Sales = 24,00,000

Cash Sales 8,00,000

(iii) Creditors Turnover = 4

$$4 = \frac{\text{Credit Purchases}}{5,00,000}$$

Credit Purchases = 20,00,000

$$\text{Stock TO} = \frac{\text{Cost of Goods Sold}}{\text{Average Stock}}$$

$$\begin{aligned} \text{Cost of Goods Sold} &= \text{Sales} - \text{Gross Profit} \\ &= 32,00,000 - 8,00,000 \\ &= 24,00,000 \\ &= \frac{24,00,000}{\text{Average Stock}} = 4.8 \end{aligned}$$

$$\text{Average Stock} = \frac{24,00,000}{4.8}$$

$$= 5,00,000$$

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

$$5,00,000 = \frac{50,000 + x + x}{2}$$

$$10,00,000 = 50,000 + x + x$$

$$10,00,000 = 50,000 + 2x$$

$$2x = 10,000 - 50,000$$

$$= 9,50,000$$

$$x = \frac{9,50,000}{2}$$

$$= 4,75,000$$

$$\text{Opening Stock} = 4,75,000 + 50,000$$

$$= 5,25,000$$

Illustration 18

Complete the following Balance Sheet of ABC Ltd. with the help of accounting ratios:

Balance Sheet as on 31st March, 2010

Liabilities	₹	Assets	₹
Share Capital	?	Fixed Assets	?
Reserve and Surplus	80,000	Current Assets:	
Sundry Creditors	?	Stock	?

Bank Overdraft	?	Debtors	?
		Cash Balance	?

- (a) Cash Balance is 10% of total current assets.
 (b) Fixed Assets to working capital 3 : 1
 (c) Current Ratio 2.5 : 1
 (d) Quick Ratio 1.5 : 1
 (e) Working Capital is ₹ 60,000/-
 (f) Working Capital/Bank Overdraft 6 : 1

Solution:**ABC Ltd.****Balance Sheet as on 31st March 2010**

Liabilities	₹	Assets	₹
Share Capital	1,60,000	Fixed Assets	1,80,000
Reserves and Surplus	80,000	Current Assets:	
Current Liabilities:		Stock	55,000
Sundry Creditors	30,000	Debtors	35,000
Bank Overdraft	10,000	Cash	10,000
	2,80,000		2,80,000

Working Note:

- Current Ratio = 2.5 : 1 = CA – CL = WC = 2.5 – 1 = 1.5 = ₹ 60,000
 CA = ₹ 1,00,000 and CL = ₹ 40,000
- Cash Balance = 10% of ₹ 1,00,000. = ₹ 10,000
- Bank Overdraft = $\frac{\text{Working Capital}}{\text{BOD}} = 6 : 1 = \frac{60,000}{1} = ₹ 10,000$
- Creditors = CL – BOD = 40,000 – 10,000 = ₹ 30,000
- Fixed Assets = $\frac{\text{Fixed Assets}}{\text{Working Capital}} = 3 : 1 = 60,000 \times 3 = ₹ 1,80,000$
- Debtors = Quick Ratio = 1.5 : 1 = 30,000 × 1.5 = 45,000 – 10,000 = 35,000
- Stock = 1,00,000 – 10,000 – 35,000 = 55,000
- Share Capital = Total of Balance Sheet = 2,80,000 – 10,000 – 30,000 – 80,000 = 1,60,000

Illustration 19

Complete the following Balance Sheet of XYZ Ltd. with the help of accounting ratios:

Balance Sheet as on 31-3-2010

Liabilities	₹	Assets	₹
Equity Share Capital	?	Fixed Assets	?
General Reserve	20,000	Investment	1,00,000
Loan Fund	?	Current Assets:	

Current Liabilities	?	Stock	?	
	—	Debtors	?	
	?	Cash Balance	?	?
				?

1. Debtors Turnover 8 times
2. Stock Turnover 8 times
3. Debt/Net Worth 0.6
4. Fixed Assets/Shareholder's Fund 0.6
5. Total Sales (Credit)/General Reserve 32 times
6. Gross Profit Ratio 25%
7. Current Ratio 2
8. General Reserve/Net Worth 0.1
9. Bank Balance is 30% of Total Current Assets

Solution: XYZ Ltd. Balance Sheet as on 31-03-2010

Liabilities	₹	₹	Assets	₹	₹
Equity Share Capital (W.N. 1)		1,80,000	Fixed Assets (W.N. 5)		1,20,000
General Reserve		20,000	Investment		1,00,000
Current Liabilities:			Current Liabilities:		
Loan Fund (W.N. 2)		1,20,000	Stock (W.N. 3)	60,000	
Current Liabilities (W.N. 7)		1,00,000	Debtors (W.N. 4)	80,000	
		—	Bank Balance (W.N. 6)	60,000	2,00,000
		4,20,000			4,20,000

Working Note:

$$1. \frac{\text{General Reserve}}{\text{Net Worth}} = \frac{1}{10}$$

$$\text{Net Worth} = 20,000 \times 10 = 2,00,000$$

$$\text{Net Worth} = \text{Equity Share Capital} + \text{General Reserve}$$

$$\text{Equity Capital} = \text{Net Worth} - \text{General Reserve}$$

$$= 2,00,000 - 20,000$$

$$= 1,80,000$$

$$2. \frac{\text{Debt}}{\text{Net Worth}} = \frac{6}{10}$$

$$\text{Debt} = \frac{6}{10} \times \text{Net Worth}$$

$$= \frac{6}{10} \times 2,00,000$$

- $$= 1,20,000$$
3. $\frac{\text{Total Sales}}{\text{General Reserve}} = 32$
- $$\begin{aligned}\text{Total Sales} &= 32 \times \text{General Reserve} \\ &= 32 \times 20,000 \\ &= 6,40,000\end{aligned}$$
- $$\begin{aligned}\text{Gross Profit Ratio} &= \frac{\text{COGS}}{\text{Closing Stock}} \\ &= \frac{4,80,000}{\text{Closing Stock}} \\ &= 8\end{aligned}$$
- $$\begin{aligned}\text{Closing Stock} &= \frac{4,80,000}{8} \\ &= 60,000\end{aligned}$$
4. Debtors Turnover $= \frac{\text{Credit Sales}}{\text{Debtors}}$
- $$= \frac{6,40,000}{\text{Debtors}} = 8$$
- $$\text{Debtors} = 80,000$$
5. $\frac{\text{Fixed Assets}}{\text{Shareholders' Fund}} = \frac{6}{10}$
- $$\begin{aligned}\text{Fixed Assets} &= \frac{6}{10} \times \text{Shareholders' Fund} \\ &= \frac{6}{10} \times 2,00,000 \\ &= 1,20,000\end{aligned}$$
6. Current Assets = Stock + Debtors + Bank Balance
- Let Current Assets = $100 \times \text{Bank Balance} = 30x$ and Stock + Debtors = $70x$
- $$\begin{aligned}\text{Stock} + \text{Debtors} &= 60,000 + 80,000 \\ &= 1,40,000 = 70x \\ x &= 20,000 \\ 30x &= 60,000 = \text{Bank Balance}\end{aligned}$$
7. $\frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{2}{1}$

$$\begin{aligned}
 \text{Current Liabilities} &= \frac{\text{Current Assets}}{2} \\
 &= \frac{2,00,000}{2} \\
 &= 1,00,000
 \end{aligned}$$

Illustration 20

The following financial information of Prasad Ltd. is available for the year ended 31st March, 2010.

Current Ratio	2.5
Quick Ratio	1.5
Fixed Assets to Proprietor's Fund	0.6
Gross Profit Ratio	25%
Stock Turnover Ratio	5 times
Debtors Collection Period (360 days in a year)	45 days
Net Profit Ratio (NPAT)	15%
Equity Share Capital (₹ 10 each)	₹ 2,00,000
Working Capital	₹ 1,56,000
Bank Overdraft	24,000
Fictitious Assets and Loan Fund	Nil
Fixed Assets	₹ 2,34,000

There were also free reserve bought forward from earlier year. Current Assets included stock, debtors and cash only.

Closing stock was 25% higher than opening stock.

All the Purchases and Sales are on credit basis.

Prepare Balance Sheet from the above information.

Solution:**Prasad Ltd.****Balance Sheet as on 31st March, 2010**

Liabilities	₹	Assets	₹
Share Capital (given)	2,00,000	Fixed Assets (given)	2,34,000
Reserve (Balance Figure)	64,000	Stock	1,40,000
Profit and Loss A/c	1,26,000	Debtors	1,05,000
Quick Liabilities	80,000	Cash-in-hand	15,000
Bank Overdraft (given)	24,000		—
	4,94,000		4,94,000

Working Note

$$1. \text{ Current Ratio} = \frac{\text{C.A.}}{\text{C.L.}} = \frac{2.50}{1} \text{ C.A.} = 2.5 \times \text{C.L.}$$

$$\text{Working Capital} = \text{C.A.} - \text{C.L.} = 2.5 \text{ C.L.} - \text{C.L.} = 1.5 \text{ C.L.} = 1,56,000$$

$$\text{Current Liabilities} = \frac{1,56,000}{1.5} = ₹ 1,04,000$$

$$\text{Quick Liabilities} = \text{C.L.} - \text{Bank Overdraft} = 1,04,000 - 24,000 = ₹ 80,000$$

$$\text{Current Assets} = 2.5 \times \text{C.L.} = 2.5 \times 1,04,000 = ₹ 2,60,000$$

$$2. \text{ Quick Ratio} = \frac{\text{Q.A.}}{\text{Q.L.}} = \frac{1.5}{1} \text{ Quick Assets} = 1.5 \times \text{Q.L.} = 1.5 \times 80,000 = ₹ 1,20,000$$

$$\text{Closing Stock} = \text{Current Assets} - \text{Quick Assets} = 2,60,000 - 1,20,000 = ₹ 1,40,000$$

$$\text{Opening Stock} = 1,40,000 \times \frac{100}{125} = ₹ 1,12,000$$

$$\text{Average Stock} = \frac{1,12,000 + 1,40,000}{2} = ₹ 1,26,000$$

$$\text{Stock Turnover Ratio} = \text{C.O.G.S./Average Stock} = 5$$

$$\text{C.O.G.S} = 5 \times \text{Average Stock} = 5 \times 1,26,000 = ₹ 6,30,000$$

$$\text{Gross Profit Ratio} = 25\%, \text{ C.O.G.S./Sales} \times 100 = 75\%,$$

$$\text{Total Sales} = 6,30,000/75 \times 100 = ₹ 8,40,000$$

$$\text{Debt Collection Period} = 360/\text{Credit Sales} \times \text{Debtors} = 45$$

$$\text{Debt} = 45 \times \frac{8,40,000}{360} = ₹ 1,05,000$$

$$\text{Current Assets} = \text{Closing Stock} + \text{Debt} + \text{Cash Balance}$$

$$2,60,000 = 1,40,000 + 1,05,000 + \text{Cash Balance} \quad \text{Cash Balance} = ₹ 15,000$$

$$3. \text{ Net Profit Ratio} = 15\% = 8,40,000 \times 15\% \quad \text{Net Profit} = ₹ 1,26,000$$

$$4. \text{ Fixed Assets/Proprietor's Fund} = 0.6 : 1 \quad \text{Proprietor's Fund} = \text{Fixed Assets} \times 0.60$$

$$= 2,34,000 \times 0.60$$

$$= ₹ 3,90,000$$

$$\text{Proprietor's Fund} = \text{Share Capital} + \text{Reserves} + \text{Profit and Loss A/c Balance}$$

$$3,90,000 = 2,00,000 + \text{Reserve} + 1,26,000$$

$$\text{Reserve} = ₹ 64,000$$

Illustration 21

From the following information for the year ended 31st March, 2010 of M/s Nitin Ltd., prepare Balance Sheet with as many details as possible.

Current Ratio	2
Gross Profit Ratio	25%
Debtors Turnover	4 times
Cost of Goods Sold to Creditors (COGS/Creditors)	6
Stock Turnover (Cost of Goods Sold/Closing Stock)	6 times
Cash Balance is 10% of Total Current Asset (Including Cash)	
Fixed Asset at cost	₹ 6,00,000

Financial Analysis

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Accumulated Depreciation on Fixed Assets
 Current Liabilities
 Reserve and Surplus is 25% of Equity Share Capital
 Debt Equity Ratio (Debt/Equity)

1/4th of cost
 ₹ 1,25,000

2:3

All purchases and sales are on credit basis.

Current liabilities include only Creditors and Bills Payable.

Solution:

- Let Sales = 100x
 C.O.G.S. = $\frac{75x}{4}$
 G.P. = 25x
- Current Liabilities = 1,25,000 Current Ratio = 2: 1
 Current Assets = 1,25,000 × 2 = 2,50,000
 Cash Balance = 10% × 2,50,000 = 25,000
- Debtors Turnover Ratio = $\frac{\text{Total Credit Sales}}{\text{Dr.s}} = 4 \frac{100x}{4} = \text{Debtors}$
 Debtors = 25x
- Stock Turnover Ratio = $\frac{\text{C.O.G.S.}}{\text{Closing Stock}} = 6 \frac{75x}{6} = \text{Closing Stock}$
 Closing Stock = 12.5x

Illustration 22

Complete the Income statement and the Balance Sheet given below with the help of the following ratios and further information given.

Income Statement as on 31st March, 2008

Particulars	Amount ₹	Amount ₹
Sales		?
Less: Cost of Sales:		
Opening Stock	?	
Purchases	?	
	?	
Less: Closing Stock	?	
Cost of Sales		?
Gross Profit		?
Less: Expenses		?
Net Profit before Tax		?
Less: Income Tax Provision (@ 50 on NPBT)		?
Net Profit after Tax		?
Add: Opening Balance		10,000
Less: Appropriation		
Proposed Dividends		60,000

Balance transferred to Balance Sheet		?

Balance Sheet as at 31st March, 2008

Funds Available		
Shareholders' Fund		
Share Capital		?
Add: Reserves and Surplus (including P & L A/c balance)		2,00,000
		5,00,000
Borrowed Fund		
Secured Loans		?
Total Funds		?
Funds Applied		
Fixed Assets		2,00,000
Working Capital		
Current Assets		
Closing Stock	1,00,000	
Debtors	?	
Other Current Assets	?	
Total Current Assets		?
Less: Current Liabilities		
Creditors	?	
Provision for Income Tax (Current Year)	?	
Provision Dividend (Current Year)	?	
Total Current Liabilities		?
Working Capital		?
Total Funds		?

Other Information:

1. Gross Profit Ratio	30%
2. Net Profit after Tax Ratio	12.50%
3. Stock Turnover Ratio (on Average Stock)	10
4. Debtors Turnover Ratio	2
5. Net Profit after Tax/Shareholders' Fund * 100	20%
6. Current Ratio	2
7. Creditors Turnover Ratio	2.5

Solution: Income Statement for the year ended 31st March, 2008

Particulars	Amount ₹	Amount ₹
Sales		8,00,000
Less: Cost of sales:		
Opening Stock	12,000	
Purchases	6,48,000	
Less: Closing Stock	6,60,000	
Gross Profit	1,00,000	5,60,000

		2,40,000
Less: Expenses		40,000
Net Profit before Tax		2,00,000
Less: Income Tax Provision		1,00,000
Net Profit after Tax		1,00,000
Add: Opening Balance		10,000
		1,10,000
Less: Appropriation		
Proposed Dividends		60,000
Balance carried to Balance Sheet		50,000

Balance Sheet as on 31st March, 2008

Particulars	₹	₹	₹
Funds Available:			
Shareholders' Fund:			
Share Capital		3,00,000	
Add: Reserves and Surplus		2,00,000	5,00,000
Loan Fund			
Secured Loans			1,19,200
Total			6,19,200
Funds Applied			
Fixed Assets			2,00,000
Working Capital			
Current Assets:			
Closing Stock	1,00,000		
Debtors	4,00,000		
Other Current Assets	3,38,400	8,38,400	
Total Current Assets			
Less: Current Liabilities			
Creditors		2,59,200	
Provision for Income Tax	1,00,000		
Provision for Dividend	60,000		
Total Current Liabilities		4,19,200	
Working Capital			4,19,200
Total			6,19,200

Working Note:

1. N.P. after Tax to Shareholders' Fund = 20% Shareholders' Fund ₹ 5,00,000.

$$\begin{aligned} \text{N.P.} &= 20\% \text{ of ₹ } 5,00,000 \\ &= 1,00,000 \end{aligned}$$

2. Share Capital = 5,00,000 – 2,00,000
= 3,00,000

3. N.P. before Tax = N.P. after Tax + Provision for Tax
100 = 50 + 50

Provision for Tax	=	N.P. after Tax
	=	1,00,000
N.P. before Tax	=	1,00,000 + 1,00,000
	=	2,00,000
4. G.P. Ratio	=	30% of Sales
Sales	=	100
G.P.	=	30
COGS	=	70
5. N.P. after Tax Ratio	=	12.50%
N.P. after Tax	=	₹ 1,00,000
Sales	=	$\frac{100}{12.50} \times 1,00,000$
	=	8,00,000
G.P.	=	30% of Sales
	=	30% of 8,00,000
	=	2,40,000
COGS	=	Sales – GP
	=	8,00,000 – 2,40,000
	=	5,60,000
6. Creditors Turnover	=	$\frac{\text{Purchases}}{\text{Creditors}} = 2.5$
	=	$\frac{6,48,000}{\text{Creditors}} = 2.5$
Creditors	=	$\frac{6,48,000}{2.5} = 2,59,200$
7. Debtors Turnover Ratio	=	$\frac{\text{Sales}}{\text{Debtors}}$
	=	$\frac{8,00,000}{\text{Debtors}} = 2$
Debtors	=	$\frac{8,00,000}{2}$
	=	4,00,000
Stock Turnover	=	$\frac{\text{Cost of Goods Sold}}{\text{Average Stock}}$

$$\begin{aligned}
 &= \frac{5,60,000}{\text{Average Stock}} = 10 \\
 \text{Average Stock} &= \frac{5,60,000}{10} \\
 &= 56,000 \\
 \text{Average Stock} &= \frac{\text{Opening Stock} + \text{Closing Stock}}{2} \\
 56,000 &= \frac{\text{Opening Stock} + 1,00,000}{2} \\
 1,12,000 &= \text{Opening Stock} + 1,00,000 \\
 \text{Opening Stock} &= 1,12,000 - 1,00,000 \\
 &= 12,000 \\
 8. \quad 6,60,000 &= \text{Opening Stock} + \text{Purchases} \\
 \text{Purchases} &= 6,60,000 - 12,000 \\
 &= 6,48,000 \\
 \text{Current Liabilities} &= \text{Creditors} + \text{Provision for Tax} + \text{Provision for Dividend} \\
 &= 2,59,200 + 1,00,000 + 60,000 \\
 &= 4,19,200 \\
 9. \quad \text{Current Ratio} &= 2 \\
 \text{Current Liabilities} &= 4,19,200 \\
 \text{Current Ratio} &= \frac{\text{Current Assets}}{\text{Current Liabilities}} \\
 &= \frac{\text{Current Assets}}{4,19,200} = 2 \\
 \text{Current Assets} &= 8,38,400 \\
 10. \quad \text{Other Current Assets} &= \text{Total Current Assets} - \text{Closing Stock} - \text{Debtors} \\
 &= 8,38,400 - 1,00,000 - 4,00,000 \\
 &= 3,38,400 \\
 11. \quad \text{Working Capital} &= \text{Current Assets} - \text{Current Liabilities} \\
 &= 8,38,400 - 4,19,200 \\
 &= 4,19,200 \\
 12. \quad \text{Total Fund} &= \text{Fixed Assets} + \text{Working Capital} \\
 &= 2,00,000 + 4,19,200 \\
 &= 6,19,200
 \end{aligned}$$

$$\begin{aligned}
 13. \text{ Loan Fund} &= \text{Total Fund} - \text{Shareholders' Fund} \\
 &= 6,19,200 - 5,00,000 \\
 &= 1,19,200
 \end{aligned}$$

Illustration 23

From the following information, find out missing and rewrite the Balance Sheet.

Current Ratio 2 : 1

Acid Test Ratio 5 : 3

Reserves and Surplus are 50% of Equity Share Capital

Long-term Debts are 60% of Equity

Stock Turnover Ratio 10 times

Gross Profit Ratio on Sales 20%

Sales are ₹ 15,62,500 (25% Cash sales and balance on credit)

Closing stock is ₹ 50,000 more than Opening Stock

Accumulated depreciation is 1/6th of original Cost of Fixed Assets.

Balance Sheet as at March, 2007

Liabilities	₹	Assets	₹
Equity Share Capital	?	Fixed Assets (at cost)	?
Reserves and Surplus	?	Less: Accumulated Depreciation	?
Long-term Loans	9,00,000	Stock	?
Bank Overdraft	50,000	Debtors	2,00,000
Creditors	?	Cash	?
	?		?

Solution:

Liabilities	W.N.	₹	Assets	W.N.	₹
Equity Share Capital	5	10,00,000	Fixed Assets (at Cost)		26,40,000
Reserves and Surplus	5	5,00,000	Less: Accumulated Depreciation		
Long-term Loans		9,00,000	(1/6th on Cost)		4,40,000
Bank Overdraft		50,000			22,00,000
Creditors	4	1,50,000	Stock	3	1,50,000
		—	Debtors		2,00,000
			Cash	4	50,000
		26,00,000			26,00,000

Working Note:

$$\begin{aligned}
 1. \text{ Cost of Goods Sold} &= \text{Sales} - \text{G.P.} \\
 &= 15,62,500 - 3,12,500 \\
 &= 12,50,000
 \end{aligned}$$

$$2. \text{ Stock Turnover} = \frac{\text{Cost of Goods Sold}}{\text{Average Stock}} = 10 \text{ times}$$

$$\text{Average Stock} = \frac{12,50,000}{10} = 1,25,000$$

$$3. \text{ Average Stock} = \frac{\text{Opening Stock} + \text{Closing Stock}}{2}$$

Closing Stock is 50,000 more than Opening Stock.

$$\text{Average Stock} = \frac{\text{Opening Stock} + \text{Opening Stock} + 50,000}{2}$$

$$1,25,000 = \frac{2 \text{ Opening Stock} + 50,000}{2}$$

$$\text{Opening Stock} = \frac{2,50,000 - 50,000}{2} = 1,00,000$$

$$\text{Closing Stock} = 1,00,000 + 50,000 = 1,50,000$$

$$4. \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = 2$$

$$\text{Acid Test Ratio} = \frac{\text{Q.A.}}{\text{Q.L.}} = \frac{\text{C.A.} - \text{Stock}}{\text{C.L.} - \text{Bank Overdraft}} = \frac{5}{3}$$

$$\frac{\text{C.A.} - 1,50,000}{\text{C.L.} - 50,000} = \frac{5}{3}$$

$$3 (\text{C.A.} - 1,50,000) = 5 (\text{C.L.} - 50,000)$$

C.A. are two times of C.L.

$$\text{C.A.} = 2 \text{ C.L.}$$

$$3 (2 \text{ C.L.} - 1,50,000) = 5 (\text{C.L.} - 50,000)$$

$$6 \text{ C.L.} - 4,50,000 = 5 \text{ C.L.} - 2,50,000$$

$$\text{C.L.} = 4,50,000 - 2,50,000$$

$$\text{C.L.} = 2,00,000$$

$$\text{Q.L.} = \text{Creditors}$$

$$\text{Creditors} = \text{C.L.} - \text{Bank OD} = 2,00,000 - 50,000$$

$$\text{Q.L.} = 1,50,000$$

$$\text{Q.A.} : \text{Q.L.}$$

$$5 : 3$$

$$\text{Q.A.} = \frac{5}{3} \times 1,50,000$$

$$= 2,50,000$$

$$\text{Cash} = \text{Q.A.} - \text{Debtors} = 2,50,000 - 2,00,000 = 50,000$$

5. Long-term Debts are 60% of Equity

Long-term Loans are ₹ 9,00,000

$$\text{Equity} = \frac{9,00,000}{60} \times \frac{100}{1} = 15,00,000$$

Equity = Equity Share Capital + Reserves and Surplus

Reserves and Surplus are 50% of Equity share Capital

Equity Capital	100
Add: Reserves and Surplus (50%)	50
Equity	150

$$\text{Equity Share Capital} = \frac{15,00,000}{150} \times \frac{100}{1} = 10,00,000$$

R & S = Equity – Equity Capital

$$= 15,00,000 - 10,00,000$$

$$= 5,00,000$$

Total Liabilities = Equity + Loan + Bank OD + Creditors

$$= 15,00,000 + 9,00,000 + 50,000 + 1,50,000$$

$$= 26,00,000$$

6. Total Liabilities – C.A. = W.D.V. of Fixed Assets

$$26,00,000 - 4,00,000 = 22,00,000$$

Accumulated Depreciation is 1/6th of Cost

If cost is 6. Depreciation is 1 and W.D.V. is 5,

$$\text{Cost of F.A.} = \frac{22,00,000}{5} \times \frac{6}{1} = 26,40,000$$

$$\text{Accumulated Depreciation} = \frac{1}{6} \times 26,40,000 = 4,40,000$$

Illustration 24

While preparing the financial statements for the year ended 31-3-2009 of XYZ Ltd., it was discovered that a substantial portion of the records were missing. However, the account was able to gather the following data:

Liabilities	₹	₹	Assets	₹	₹
Paid-up Share Capital Shares of ₹ 10 each)		6,00,000	Land		3,60,000
Reserves and Surplus:			Plant & Machinery:		
Balance on 1-4-2008	1,80,000		Cost	9,00,000	
Add: Transfer during the	1,20,000	3,00,000	Less: Depreciation	3,60,000	5,40,000
			Current Assets:		

year					
10% Loan		6,00,000	Stock	?	
Current Liabilities:			Debtors	?	
Proposed Dividend	?		Cash and Bank	?	?
Provision for Tax	?				
Creditors	?	6,00,000			—
		?			?

The following other information is available:

Current Ratio	2 : 1
Cash and Bank	30% of Total Current Assets
Debtors Turnover (Sales/Debtors)	12 Times
Stock Turnover (Cost of Goods Sold/Stock)	12 Times
Creditors Turnover (Cost Goods Sold/Creditors)	12 Times
Gross Profit Ratio on Sales	25
Proposed Dividend	20%

You are required to complete the balance sheet as on 31-3-2009 with available information. Working notes shall form part of your answer.

Solution:**Balance Sheet as on 31st March, 2009**

Liabilities	₹	₹	Assets	₹	₹
Paid-up Share Capital (60,000 Equity Shares of ₹ 10 each)		6,00,000	Land		3,60,000
Reserves and Surplus:			Plant & Machinery		
Balance on 1-4-2008	1,80,000		Cost	9,00,000	
Add: Transfer during the year	1,20,000	3,00,000	Less: Depreciation	3,60,000	5,40,000
10% Loan		6,00,000	Current Assets:		
Current Liabilities:			Stock (WN 5)	3,60,000	
Proposed Dividend (WN 7)	1,20,000		Debtors (WN 5)	4,80,000	
Provision for Tax (WN 8)	1,20,000		Cash & Bank (WN 2)	3,60,000	
Creditors (WN 6)	3,60,000	6,00,000	Total (WN 1)		12,00,000
		21,00,000			—
					21,00,000

Working Note:

$$\begin{aligned}
 1. \text{ Current Ratio} &= \frac{\text{Current Assets}}{\text{Current Liabilities}} \\
 &= \frac{2}{1} = \frac{\text{Current Assets}}{6,00,000} \\
 \therefore \text{Current Assets} &= 6,00,000 \times 2 = 12,00,000 \\
 2. \text{ Cash/Bank} &= 30\% \text{ Total Current Assets} \\
 &= 30\% 12,00,000
 \end{aligned}$$

$$\begin{aligned}
 \text{Cash/Bank} &= 3,60,000 \\
 3. \text{ Gross Profit Ratio on Sales} &= 25\% \text{ on Sales} = 25x \\
 \therefore \text{Cost of Goods Sold} &= \text{Sales} - \text{Gross Profit} \\
 &= 100x - 25x \\
 \therefore \text{Cost of Goods Sold} &= 75x \\
 4. \text{ Stock Turnover} &= \frac{\text{Cost of Goods Sold}}{\text{Stock}} \\
 12 &= \frac{75x}{\text{Stock}} \\
 \therefore \text{Stock} &= \frac{75x}{12} \\
 5. \text{ Debtors Turnover} &= \frac{\text{Sales}}{\text{Debtors}} \text{ (Let Sales}=100x) \\
 12 &= \frac{100x}{\text{Debtors}} \\
 \therefore \text{Debtors} &= \frac{100x}{12} = \text{Stock} = \frac{75x}{12} \\
 \therefore \text{Debtors} &= 100x \\
 \text{Stock} &= 75x \\
 \text{But, Debtors} + \text{Stock} + \text{Cash} &= \text{Current Assets} \\
 \text{Debtors} + \text{Stock} + 3,60,000 &= 12,00,000 \\
 \therefore \text{Debtors} + \text{Stock} &= 12,00,000 - 3,60,000 \\
 100x + 75x &= 8,40,000 \\
 175x &= 8,40,000 \\
 x &= \frac{8,40,000}{175} = 4,800 \\
 \therefore \text{Debtors} = 100x &= 100 \times 4,800 = ₹ 4,80,000 \\
 \text{Stock} = 75x &= 75 \times 4,800 = ₹ 3,60,000 \\
 6. \text{ Creditors Turnover} &= \frac{\text{Cost of Goods Sold}}{\text{Creditors}} \\
 12 &= \frac{75x}{\text{Creditors}} \\
 \therefore \text{Creditors} &= \frac{75x}{12} = \text{Stock (See 4th working)} \\
 \therefore \text{Creditors} &= \text{Stock}
 \end{aligned}$$

- $\therefore$ Creditors = 3,60,000
 7. Proposed Dividend = 20% (Share Capital)
 = 20% (6,00,000) = ₹ 1,20,000
 8. Provision for Tax = Current Liabilities – Creditors – Proposed Dividend
 = 6,00,000 – 3,60,000 – 1,20,000
 = ₹ 1,20,000

Illustration 25

From the following information, calculate inventory turnover ratios.

Particulars	₹
Opening Stock:	
Raw Material	12,000
WIP	20,000
Finished Goods	30,000
	62,000
Raw Material Purchased	1,00,000
Direct Wages – Paid	70,000
Outstanding	20,000
Production Expenses – Paid	10,000
Outstanding	10,000
Depreciation	50,000
	2,60,000
Closing Stock:	
Raw Material	24,000
WIP	10,000
Finished Goods	20,000
	54,000

(T.Y. B.Com., Modified)

Solution: Working Note:**Cost of Goods Sold**

Opening Stock	62,000
Add: Purchases	1,00,000
Add: Wages (70,000 + 20,000)	90,000
Add: Production Expenses	70,000
Less: Closing Stock	54,000
Cost of Goods Sold	2,68,000

$$\begin{aligned}
 \text{(a) Average Stock of Finished Good} &= \frac{\text{Opening Stock} + \text{Closing Stock}}{2} = \frac{30,000 + 20,000}{2} \\
 &= \frac{50,000}{2} = 25,000
 \end{aligned}$$

$$\text{Inventory Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Stock}} = \frac{2,68,000}{25,000} = 10.7 \text{ times}$$

Illustration 26

The following information are available for a firm for the year ended 31.01.2009:

(a) Gross Profit Ratio	25%
(b) Net Profit Ratio	20%
(c) Stock Turnover Ratio	10 times
(d) Net Profit/Capital	1/5
(e) Capital/Other Liabilities	1/2
(f) Fixed Asset/Capital	5/4
(g) Fixed Asset/Current Assets	5/7
(h) Fixed Assets	₹ 5,00,000
(i) Stock at the end	₹ 40,000 more than the stock in the beginning

Find out:

(a) Cost of Goods Sold	(b) Gross Profit
(c) Net Profit	(d) Current Assets
(e) Capital	(f) Total Liabilities
(g) Closing Stock	(h) Total Assets

Solution:

Fixed assets (Given) = ₹ 5,00,000

- $$\frac{\text{Fixed assets}}{\text{Capital}} = \frac{5}{4} \therefore \frac{5,00,000}{\text{Capital}} = \frac{5}{4} \therefore \text{Capital} = \frac{5,00,000 \times 4}{5} = 4,00,000$$
- $$\frac{\text{Fixed assets}}{\text{Current assets}} = \frac{5}{7} \therefore \frac{5,00,000}{\text{Current assets}} = \frac{5}{7} \therefore \text{Current assets} = \frac{5,00,000 \times 7}{5} = 7,00,000$$
- $$\frac{\text{Capital}}{\text{Other liabilities}} = \frac{1}{2} \therefore \frac{4,00,000}{\text{Other liabilities}} = \frac{1}{2} \therefore \text{Other liabilities} = \frac{4,00,000 \times 2}{1} = 8,00,000$$
- $$\frac{\text{Net profit}}{\text{Capital}} = \frac{1}{5} \therefore \frac{\text{Net profit}}{4,00,000} = \frac{1}{5} \therefore \text{Net profit} = \frac{4,00,000 \times 1}{5} = 80,000$$
- Net profit ratio = 20%

$$\text{Net Profit Ratio} = \frac{\text{Net Profit}}{\text{Net Sales}} \times 100 \therefore 0.20 = \frac{80,000}{\text{Net Sales}} \therefore \text{Net Sales} = \frac{80,000}{0.20} = 4,00,000$$
- $$\text{G.P. Ratio} = 25\% \text{ on sales} = \frac{25}{100} \times 4,00,000 = 1,00,000$$
- $$\text{Cost of goods sold} = \text{Sales} - \text{GP} = 4,00,000 - 1,00,000 = 3,00,000$$

Illustration 27

From the following information, determine Debtors Turnover and Average Collection Period.

Particulars	₹
Sales (40% Cash Sales) during 2013-14	6,00,000
Debtors as on 1.4.2013	50,000
Cash Collections	3,20,000
Discount	5,000
Bad Debt	5,000
Return	10,000
Take 1 year = 360 days	

(T.Y. B.Com., Modified)

Solution:**Debtors Accounts**

Particulars	₹	Particulars	₹
To Opening Balance b/d	50,000	By Cash	3,20,000
To Credit Sales (60% of 6,00,000)	3,60,000	By Discount	5,000
		By Bad Debts	5,000
		By Sales Return	10,000
		By Closing Balance	70,000
	4,10,000		4,10,000

Debtors Turnover Ratio

$$(a) \text{ No. of times} = \frac{\text{Credit Sales}}{\text{Average Accounts Receivable}}$$

$$\begin{aligned} \text{Average Accounts Receivable} &= \frac{\text{Opening Debtors} + \text{Closing Debtors}}{2} = \frac{50,000 + 70,000}{2} \\ &= \frac{1,20,000}{2} = 60,000 \end{aligned}$$

$$\text{No. of times} = \frac{3,60,000}{60,000} = 6 \text{ times}$$

$$(b) \text{ No. of days} = \frac{\text{Average Accounts Receivable}}{\text{Credit Sales}} \times 360 = \frac{60,000}{3,60,000} \times 360 = 60 \text{ days}$$

Illustration 28

(a) From the following details, prepare statement of working capital with as many details as possible:

1. Stock Turnover Ratio	6
2. Gross Profit Ratio	20%
3. Debtors Turnover Ratio	2 months
4. Creditors Turnover Ratio	73 days
5. Gross Profit	₹ 60,000/-
6. Closing Stock was ₹ 5,000/- in excess of opening stock	

(b) Calculate detailed working capital from following information:

1. Current Ratio	2.5

2. Liquid Ratio	1.5
3. Stock Turnover Ratio (Cost of Sales/Closing Stock)	6 times
4. Debtors Collection Period	2 months
5. Gross Profit Ratio	20%
6. Net Working Capital	₹ 3,00,000/-

(There is no bank overdraft or prepaid expenses).

Solution: **Statement of Working Capital**

Particulars	W.N.	₹
Current Assets		
Stock	(2)	42,500
Debtors		50,000
Gross Working Capital		92,500
Less: Creditors		49,000
Working Capital		43,500

Working Note:

(a)

- Total Sales = $60,000 \times \frac{100}{20} = 3,00,000$
- Cost of Sales = $3,00,000 - 20\% = 2,40,000$
($\therefore$ Debtors for 2 months = ₹ 50,000/-) (3)
- Average Stock = $2,40,000 \div 6 = 40,000$
Closing Stock = $40,000 + \frac{5,000}{2} = (1) 42,500$
- Creditors = Cost of Sales + Increase in Stock = Purchase
= $2,40,000 + 5,000 = 2,45,000$
Creditors : 73 days purchases = $2,45,000 \times \frac{73}{365} = (2) 49,000$

(b) Working Capital

Particulars	₹
Current Assets = Stock	2,00,000
Debtors	2,50,000
Cash	50,000
Liquid Assets	3,00,000
Gross Working Capital	5,00,000
Less: Current Liabilities	2,00,000
Net Working Capital	3,00,000

Working Note

- If current liabilities are 1 and current assets are 2.5, Working Capital is 1.5

Working Capital is 3,00,000

$$\therefore \text{Current Liabilities} = 2,00,000 \quad (1)$$

$$\text{Current Assets} = 5,00,000 \quad (2)$$

2. Liquid Ratio is 1.5

$$\therefore \text{Liquid Assets are } 3,00,000$$

3. Stock = Current Assets – Liquid Assets (4)

$$5,00,000 - 3,00,000 = 2,00,000 \quad (3)$$

4. Cost Sales = 2,00,000 × 6 = 12,00,000

5. Sales = Cost of Sales + G.P.

$$12,00,000 + 3,00,000 = 15,00,000$$

$$6. \text{Debtors} = \frac{15,00,000}{12} \times 2 = 2,50,000 \quad (5)$$

7. Cash = Quick Assets – Debtors

$$= 3,00,000 - 2,50,000 = 50,000$$

Illustration 29

(a) From the following Profit and Loss A/c, calculate three profitability ratio.

Profit and Loss A/c

Particulars	000 ₹	000 ₹
Sales		40,00
Less: Cost of Goods Sold:		
Raw Material Consumed	10,00	
Wages	15,00	
Production Expenses	2,50	27,50
		12,50
Less: Indirect Expenses:		
Administrative Expenses		
Selling Expenses	2,00	
Distribution Expenses	1,00	
Finance Charge	50	
Tax Charge	4,00	
Tax Provision	2,00	9,50
		3,00
Less: Non-operational Adjustment		30
Net Profit		2,70

(b) From the figures given question no. (a) and the following balance sheet, calculate:

- (i) Return on Capital Employed (ii) EPS
(iii) Yield (Dividend and Earning) (iv) Dividend Payout Ratio

Balance Sheet

Particulars	₹ '000
Liabilities:	
Equity Share Capital (Shares of ₹ 100 each)	8,00

10% Preference Share Capital	1,00
General Reserve	50
14% Debentures	1,00
16% Term Loan	1,00
Cash Credit	50
Sundry Creditors	20
Tax Provision (Net of Advance Tax)	150
Proposed Dividend:	
Preference	10
Equity	1,60
	15,40
Assets:	
Fixed Assets less Depreciation	
Investments	8,00
Inventories	3,00
Sundry Debtors	1,00
Cash and Bank	2,20
Profit and Loss A/c	20
	15,40

Note: Closing market price of equity shares was ₹ 150.

(T.Y. B.Com., Modified)

Solution:

(a) The three profitability ratios are:

(i) Gross Profit Ratio

(ii) Net Profit Ratio

(iii) Operating Profit Ratio

$$(i) \text{ Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100 = \frac{12,50,000}{40,00,000} \times 100 = 31.25\%$$

(ii) Net Profit Ratio

$$= \frac{\text{Net Profit before Tax}}{\text{Net Sales}} \times 100$$

$$= \frac{\text{Net Profit after Tax}}{\text{Net Sales}} \times 100$$

Here Net Profit after Tax is 2,70,000 and Tax is ₹ 2,00,000

∴ Net Profit before Tax is 4,70,000

$$= \frac{4,70,000}{40,00,000} \times 100 = 11.75\%$$

$$= \frac{2,70,000}{40,00,000} \times 100 = 6.75\%$$

$$(iii) \text{ Operating Profit Ratio} = \frac{\text{Operating Profit}}{\text{Net Sales}} \times 100$$

$$\text{Operating Profit} = \text{Gross Profit} - \text{Operating Expenses} = 12,50,000 - 7,50,000 = 5,00,000$$

$$\text{Operating Profit Ratio} = \frac{5,00,000}{40,00,000} \times 100 = 12.5\%$$

(b)

$$(i) \text{ Return on Capital Employed} = \frac{\text{Net Profit before Interest Tax}}{\text{Capital Employed}} \times 100$$

Net Profit after Tax	2,70,000
Add: Tax	2,00,000
Net Profit before Tax	4,70,000
Add: Interest and Financial Expenses	4,00,000
Net Profit before Interest and Tax	8,70,000
Capital Employed:	
Owners' Fund	
Equity Share Capital	8,00,000
Add: Preference Share Capital	1,00,000
Add: General Reserve	50,000
Less: Profit and Loss A/c	20,000
	9,30,000
Borrowed Fund:	
Debentures	2,00,000
Add: Term Loan + Cash Credit	50,000
	11,80,000

$$\text{Return on Capital Employed} = \frac{8,70,000}{11,80,000} \times 100 = 73.73\%$$

$$(ii) \text{ Earnings Per Share} = \frac{\text{Net Profit after Tax} - \text{Preference Dividend}}{\text{No. of Equity Shares}}$$

$$= \frac{2,70,000 - 10,000}{8,000} = ₹ 32.5 \text{ per share}$$

(iii) Yield (Dividend and Earning)

$$(a) \text{ Dividend Yield Ratio} = \frac{\text{Dividend per Share}}{\text{Marketing Price per Share}} \times 100 = \frac{20}{150} = 13.33\%$$

$$(iv) \text{ Dividend Payout Ratio} = \frac{\text{Equity Dividend} + \text{Preference Dividend}}{\text{Profit after Tax}} \times 100$$

$$= \frac{1,60,000 + 10,000}{2,70,000} \times 100 = 62.9\%$$

OR

$$= \frac{\text{Dividend per share}}{\text{Earning per share}} = \frac{20}{32.50} = 0.62 : 1$$

Illustration 30

The Balance Sheet of Ganga Ltd. as on 31st December, 2014 is as follows:

Liabilities	₹	Assets	₹
Equity Share Capital	80,000	Goodwill	30,000
Capital Reserve	16,000	Fixed Assets	1,20,000
8% Loan on Mortgage	44,000	Stock	24,000
Unsecured Loans	20,000	Debtors	28,000
Creditors	30,000	Investments (Trade)	8,000
Bank Overdraft	10,000	Cash on Hand	20,000
Taxation: Current	8,000	Miscellaneous Expenditure	10,000
Future	8,000		
Profit and Loss A/c			
Profit of 2014 after Taxation and			
Interest on Loan	48,000		
Less: Transfer to Reserve	16,000		
Dividend	8,000		
	24,000		
	2,40,000		2,40,000

The stock on 1.1.2014 was ₹ 40,000. Total Sales and Gross Profit for the year ended was ₹ 4,80,00 and 1,60,000. Calculate the following ratios:

1. Gross Profit Ratio
2. Current Ratio
3. Liquidity Ratio
4. Return on Capital Employed
5. Stock Turnover Ratio
6. Debtors Ratio

(360 days to be considered for the year).

(T.Y. B.Com., Modified)

Solution: In the Book of Ganga Ltd.

$$(i) \text{ Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100 = \frac{1,60,000}{4,80,000} \times 100 = 33.33\%$$

$$(ii) \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{72,000}{56,000} = 1.28 : 1$$

$$(iii) \text{ Liquidity Ratio} = \frac{\text{Quick Assets}}{\text{Quick Liabilities}} = \frac{48,000}{46,000} = 1.04 : 1$$

$\begin{aligned} \text{Quick Liabilities} &= \text{Current Liabilities} - \text{Bank OD} \\ &= 56,000 - 10,000 = 46,000 \end{aligned}$

$$(iv) \text{ Return on Capital Employed} = \frac{\text{Net Profit before Interest and Tax}}{\text{Capital Employed}} \times 100$$

Note:

Net Profit after Tax	48,000
Add: Provision for Tax	8,000
Add: Interest on Mortgage Loan (8% on 44,000)	<u>3,520</u>
Net Profit before Interest and Tax	<u>59,520</u>

$$\therefore \text{Return on Capital Employed} = \frac{59,520}{1,74,000} \times 100 = 34.21\%$$

Capital Employed = Total Assets – Current Liabilities

$$(v) \text{ Stock Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Stock}}$$

Note: Cost of Goods Sold = Net Sales – Gross Profit
 $= 4,80,000 - 1,60,000 = 3,20,000$

$$\text{Average Stock} = \frac{\text{Operating Stock} + \text{Closing Stock}}{2} = \frac{40,000 + 24,000}{2} = \frac{64,000}{2} = 32,000$$

$$\therefore \text{Stock Turnover Ratio} = \frac{3,20,000}{32,000} = 10 \text{ times}$$

Debtors Turnover Ratio

$$(a) \text{ No. of Times} = \frac{\text{Credit Sales}}{\text{Average Accounts Receivable}}$$

$$\text{No. of Days} = \frac{\text{Average Accounts Receivable}}{\text{Credit Sales}} \times 100$$

Credit Sales = ₹ 3,60,000 (given)

$$\text{Average Accounts Receivable} = \frac{\text{Operating [Debtors + B/R]} + \text{Closing Debtors [Debtors + B/R]}}{2}$$

$$= 28,000 \text{ (since only closing debtors given)}$$

Debtors Ratio

$$(a) \text{ No. of Times} = \frac{3,60,000}{28,000} = 12.86 \text{ times}$$

$$(b) \text{ No. of Days} = \frac{28,000}{3,60,000} \times 360 = 28 \text{ days approx.}$$

Illustration 31

From the following figures of RKR Ltd., prepare Vertical Revenue Statement and Vertical Balance Sheet and calculate the following ratios:

(a) Operating Ratio	(b) Debtors Turnover Ratio
(c) Stock Turnover Ratio	(d) Current Ratio
(e) Liquid Ratio	

Particulars	2013 ₹	2014 ₹
Sales (Credit)	12,00,000	15,00,000
Fixed Assets (Net)	5,00,000	8,00,000
Debtors	2,00,000	2,95,000

Creditors	1,00,000	2,00,000
Bank Balance	50,000	20,000
Closing Stock	2,00,000	4,00,000
Bank Overdraft	1,00,000	2,50,000
Purchase	9,00,000	12,00,000
Depreciation	75,000	1,20,000
Expenses	1,00,000	1,50,000
Interest on Overdraft	15,000	40,000
Loan		2,00,000
Interest on Loan		35,000
Equity Share Capital	3,00,000	3,00,000
8% Preference Capital	1,00,000	1,00,000
Reserves and Surplus	1,90,000	2,08,500
Income Tax Provision	1,20,000	1,98,500
Proposed Dividend	40,000	60,000

Further information:

- (i) Stock 1.1.2013 ₹ 1,80,000
- (ii) Income Tax Provision 1.1.2013 ₹ 55,000
- (iii) Tax Provision for 2013 and 2014 should be made 50% of Net Profit.

Solution:

In the Book of RKT Ltd.
Vertical Revenue Statement

Particulars	2013		2014		
	₹	₹	₹	₹	₹
SOURCE OF FUNDS:					
Sales					
Less: Cost of Goods Sold					
Operating Stock	1,80,000			2,00,000	
(+) Purchases	9,00,000			12,00,000	
	10,80,000			14,00,000	
(–) Closing Stock	2,00,000	8,80,000		4,00,000	10,00,000
GROSS PROFIT		3,20,000			5,00,000
Less: Operating Expenses					
(A) Administration Expenses	1,00,000			1,50,000	
(B) Financial Expenses					
Interest on Overdraft	15,000		40,000		
Interest on Loans	–	15,000	35,000	75,000	
(C) Depreciation	75,000	1,90,000		1,20,000	3,45,000
NPBT/NET Operating Profit		1,30,000			1,55,000
Less: Provision for tax		65,000			77,500
NET PROFIT AFTER TAX		65,000			77,500

Vertical Balance Sheet as on

Particulars	2013	2014
SOURCE OF FUNDS		
(A) Shareholders' Fund		
Share Capital (Eq. Sh. 3,00,000)		3,00,000

Capital)						
Pref. Sh. Capital 8%	1,00,000	4,00,000		1,00,000	4,00,000	
Add: Reserves and Surplus		1,90,000	5,90,000		2,07,500	6,07,5000
(B) Loan Funds			—			2,00,000
TOTAL SOURCES			5,90,000			8,07,500
(A) Fixed Assets:						
Gross Block						
Less: Depreciation						
Net Block			5,00,000			8,00,000
Investment						
Working Capital						
Total Current Assets:						
Bank	50,000			20,000		
Debtors		2,00,000			2,95,000	
Closing Stock	2,00,000	4,50,000		4,00,000	7,15,000	
Less: Total Current Liabilities:						
Creditors	1,00,000			2,00,000		
Bank OD	1,00,000			2,50,000		
Income Tax Prov.	1,20,000			1,97,500		
Proposed Dividend	40,000	3,60,000	90,000	60,000	7,07,500	7,500
TOTAL APPLICATIONS			5,90,000			8,07,500

Working Note:

	2013	2014
1. Operating Ratio		
$= \frac{\text{Cost of Goods Sold} + \text{Operating Expenses}}{\text{Sales}} \times 100$	$= \frac{8,80,000 + 1,90,000}{12,00,000} \times 100$ = 89.17%	$= \frac{10,00,000 + 3,45,000}{15,00,000} \times 100$ = 89.67%
2. Debtors Turnover Ratio		
$= \frac{\text{Credit Sales}}{\text{Debtor} + \text{Bills Receivable}}$	$= \frac{12,00,000}{2,00,000} \times 100$ = 6 times	$= \frac{15,00,000}{2,95,000} \times 100$ = 5 times
In the Second Year, Average Debtors may be taken.		
3. Stock Turnover Ratio		
$= \frac{\text{Cost of Goods Sold}}{\text{Average Stock}}$		
$= \text{Average Stock} = \frac{\text{Op. Stock} + \text{Cl. Stock}}{2}$	$= \frac{1,80,000 + 2,00,000}{2}$ = 1,90,000 $= \frac{8,80,000}{1,90,000}$ = 4.63 times = 5 times	$= \frac{2,00,000 + 4,00,000}{2}$ = 3,00,000 $= \frac{10,00,000}{3,00,000}$ = 3.33 times = 3 times

4. Current Ratio = $\frac{\text{Current Assets}}{\text{Current Liabilities}}$	= $\frac{4,50,000}{3,60,000} = 1.25 : 1$	= $\frac{7,15,000}{7,07,500} = 1.01 : 1$
5. Liquid Ratio = $\frac{\text{Liquid Assets}}{\text{Liquid Liabilities}}$	= $\frac{2,50,000}{2,60,000} = 0.96 : 1$	= $\frac{3,15,000}{4,57,500} = 0.69 : 1$
Liquid Assets = Current Assets – (Closing Stock + Prepaid Expenses)	= 4,50,000 – 2,00,000 = 2,50,000	= 7,15,000 – 4,00,000 = 3,15,000
Liquid Liabilities = Current Liabilities – Bank Overdraft	= 3,60,000 – 1,00,000 = 2,60,000	= 7,06,500 – 2,50,000 = 4,56,500

Illustration 32

The following are the Balance Sheets of Krishna Limited for the two years 2013 and 2014.

Particulars	2013 ₹	2014 ₹
Sources of Funds:		
1. Proprietary Funds:		
(A) Equity Share Capital	4,00,000	5,00,000
(B) 10% Preference Share Capital	2,00,000	2,00,000
(C) Reserves	2,50,000	3,50,000
	8,50,000	10,50,000
2. Loan Funds:		
13.5% Debentures	2,50,000	2,50,000
Capital Employed	11,00,000	13,00,000
Application of Funds:		
1. Fixed Assets		
2. Investments		
3. Current Assets:	2013 ₹	2014 ₹
(A) Stock	1,00,000	1,20,000
(B) Debtors	1,50,000	2,00,000
(C) Cash and Bank	50,000	80,000
	3,00,000	4,00,000
Less: Current Liabilities:		
(A) Creditors	90,000	1,20,000
(B) Bank Overdraft	70,000	80,000
	1,60,000	2,00,000
Net Current Assets	1,40,000	2,00,000
	₹ 11,00,000	₹ 13,00,000

Additional Information:

	2013 ₹	2014 ₹
1. Total Sales (Cash Sales are 20% of Total Sales)	40,00,000	30,00,000
2. Gross Profit	8,00,000	11,00,000
3. Net Profit before Interest and Taxes (Rate of tax is 50%)	3,30,000	4,55,000
4. Opening Stock	90,000	1,00,000

From the above information, calculate the following ratios for both the years:

1. Current Ratio	2. Debtors Turnover Ratio
3. Return on Capital Employed	4. Return on Proprietors' Funds
5. Proprietary Ratio	6. Stock Turnover Ratio
7. Gross Profit Ratio	8. Net Profit (after Tax) Ratio

(T.Y. B.Com., Modified)

Solution:

	2013	2014
1. Current Ratio $= \frac{\text{Current Assets}}{\text{Current Liabilities}}$	$= \frac{3,00,000}{1,60,000} = 1.875 : 1$	$= \frac{4,00,000}{2,00,000} = 2 : 1$
2. Debtors Turnover Ratio $= \frac{\text{Credit Sales}}{\text{B/Rec. + Drs.}}$	$= \frac{24,00,000}{1,50,000} = 16 \text{ times}$	$= \frac{32,00,000}{2,00,000} = 16 \text{ times}$
3. Return on capital Employed $= \frac{\text{Net Profit before Tax \& Int.}}{\text{Capital Employed}} \times 100$	$= \frac{3,30,000}{11,00,000} \times 100 = 30\%$	$= \frac{4,55,000}{33,00,000} \times 100 = 35\%$
4. Return on Proprietor's Fund $= \frac{\text{Net Profit after Tax}}{\text{Shareholders' Fund}} \times 100$	$= \frac{1,48,125}{8,50,000} \times 100 = 17.43\%$	$= \frac{2,10,625}{10,50,000} \times 100 = 20.06\%$
5. Proprietary Ratio $= \frac{\text{Shareholders' Fund}}{\text{Total Assets}} \times 100$	$= \frac{8,50,125}{12,60,000} \times 100 = 67.46\%$	$= \frac{10,50,000}{15,00,000} \times 100 = 70\%$
6. Stock Turnover Ratio $= \frac{\text{Cost of Goods Sold}}{\text{Average Stock}}$ $\text{Average Stock} = \frac{\text{Op. Stock} + \text{Cl. Stock}}{2}$	$= \frac{22,00,000}{95,000} = 23.16 \text{ times}$ $= \frac{90,000 + 1,00,000}{2} = 95,000$	$= \frac{29,00,000}{1,10,000} = 26.3 \text{ times}$ $= \frac{1,00,000 + 1,20,000}{2} = 1,10,000$
7. Gross Profit Ratio $= \frac{\text{Gross Profit}}{\text{Sales}} \times 100$	$= \frac{8,00,000}{30,00,000} \times 100 = 26.67\%$	$= \frac{11,00,000}{40,00,000} \times 100 = 27.5\%$
8. Net Profit After Tax Ratio $= \frac{\text{Net Profit after Tax}}{\text{Sales}} \times 100$	$= \frac{1,48,125}{30,00,000} \times 100 = 4.94\%$	$= \frac{2,10,625}{40,00,000} \times 100 = 5.27\%$

Illustration 33

You have been supplied financial information for the Kaveri Ltd. and its industry average ratios. Calculate the indicated accounting ratios and make brief comment on each.

Balance Sheet as on 31st March, 2014

Liabilities	₹	Assets	₹
Equity Share Capital, ₹ 10 each	20,00,000	Land and Building	19,00,000
12% Preference Share Capital	6,00,000	Machinery	6,00,000

Retained Earnings	3,00,000	Furniture	50,000
15% Debentures	5,00,000	Stock	7,50,000
Public Fixed Deposits	1,00,000	Debtors	6,00,000
Creditors	5,00,000	Cash and Bank	1,50,000
Bills Payable	80,000	Other Current Assets	1,00,000
Unpaid Expenses	20,000	Preliminary Expenses	50,000
Bank Overdraft	1,00,000		
	42,00,000		42,00,000

Statement of Profit for the year ended on 31st March, 2014

	₹	₹
Total Sales (out of which 90% are Credit Sales)		48,00,000
Less: Cost of Goods Sold	28,80,000	
Operating Expenses	7,80,000	36,60,000
Net Profit		11,40,000
Less: Taxes @ 50%		5,70,000
		5,70,000

Stock in the beginning of the year was ₹ 5,50,000.

Industry's Average

1. Current ratio	2.4
2. Stock turnover	4
3. Debtor's ratio (360 days to the taken for the year)	60 days
4. Debt-equity ratio	0.4 : 1
5. Net profit ratio	72%
6. Rate of return of proprietors' fund.	10.5%
7. Rate of return of proprietors' fund.	(T.Y. B.Com., Modified)

Solution:

**In the Book of Kaveri Ltd.
Vertical Balance as on 31st March, 2014**

Particulars	Amount	Amount	Amount
SOURCES OF FUNDS			
(A) Shareholders' Fund			
Share Capital			
Equity Share Capital	20,00,000		
12% Preference Share Capital	6,00,000	26,00,000	
Add: Reserves and Surplus		3,00,000	
Retained Earnings		29,00,000	
Less: Miscellaneous Expenses			
Preliminary Expenses		50,000	28,50,000
(B) Loan Funds			
Secured Loans – 15% Debentures		5,00,000	
Unsecured Loans – Public Fixed Deposits		1,00,000	6,00,000
TOTAL SOURCES			34,50,000

APPLICATION OF FUNDS			
(A) Fixed Assets			
Gross Block		25,50,000	
Less: Depreciation		—	
Net Block			25,50,000
(B) Investment			Nil
(C) Working Capital			
Total Current Assets			
Stock	7,50,000		
Debtors	6,00,000		
Cash and Bank	1,50,000		
Other Current Assets	1,00,000	16,00,000	
Less: Total Current Liabilities			
Creditors	5,00,000		
Bills Payable	80,000		
Unpaid Expenses	20,000		
Bank Overdraft	1,00,000	7,00,000	9,00,000
TOTAL APPLICATIONS			34,50,000

Working Note:

Gross Block	
Land and Building	19,00,000
Machinery	6,00,000
Furniture	50,000
	<u>25,50,000</u>

$$1. \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{16,00,000}{7,00,000} = 8.28 : 1$$

$$2. \text{ Stock Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Stock}}$$

$$\text{Average Stock} = \frac{\text{Opening Stock} + \text{Closing Stock}}{2} = \frac{5,50,000 + 7,50,000}{2} = \frac{13,00,000}{2} = 6,50,000$$

$$\text{Stock Turnover Ratio} = \frac{28,80,000}{6,50,000} = 4.43 \text{ times}$$

$$3. \text{ Debtors' Ratio} = \frac{\text{Debtors} + \text{Bills Rec.}}{\text{Credit Sales}} \times 360 = \frac{6,00,000}{43,20,000} \times 360 = 49.99 = 50 \text{ days}$$

$$4. \text{ Debt - equity Ratio} = \frac{\text{Loan Funds}}{\text{Shareholders' Fund}} = \frac{6,00,000}{28,50,000} = 0.21 : 1$$

$$5. \text{ Proprietary Ratio} = \frac{\text{Shareholders' Funds}}{\text{Total Assets}} \times 100 = \frac{28,50,000}{41,50,000} \times 100 = 68.67\%$$

$$6. \text{ Net Profit Ratio} = \frac{\text{Net Profit after Tax}}{\text{Sales}} \times 100 = \frac{5,70,000}{48,00,000} \times 100 = 11.87\%$$

$$7. \text{ Rate of Return of Proprietor's Funds} = \frac{\text{Net Profit after Tax}}{\text{Shareholders' Fund}} \times 100 = \frac{5,70,000}{28,50,000} \times 100 = 20\%$$

Particulars	Industry Ratio	K Ltd.
1. Current Ratio	2.4 : 1	2.28 : 1
2. Stock Turnover	4 times	4.43 times
3. Average Collection Period	60 days	50 days
4. Debit-equity Ratio	40%	21%
5. Proprietary Ratio	72%	68.67%
6. Net Profit Ratio (NPAT)	10.5%	11.87%
7. Rate of Return of Proprietor's Fund	—	20%

Standard Ratio for the industry on given in the problems and actual ratios of K Ltd. we have calculated. It is necessary to compare term with each other.

- 1. Current Ratio:** Standard Ratio available for this 2.4 : 1, whereas actual Ratios of K Ltd. is 2.28 : 1 which is short by 0.12. It is necessary for the company to improve its financial position in respect of current liabilities.
- 2. Stock Turnover Ratio:** Appropriately Actual Ratio is equal to the standard Ratio. It is more by 0.43 which includes better position of the company.
- 3. Average Collection Period:** Recovery from the debtors is to be made within a period of 60% days but K Ltd. is able to recover amount from debtors within 50 days which indicated efficiency of its credit department.
- 4. Debit-equity Ratio:** It indicates proportion in between own funds and loan funds for every ₹ 100/- as ₹ 40. But K Ltd. having loan funds only of ₹ 21. It means company can utilise more outside funds and can expand the business.

Illustration 34

The summarised final accounts of two companies are as follows:

Liabilities	X Ltd.	Y Ltd.	Assets	X Ltd.	Y Ltd.
Share Capital	88,000	88,000	Fixed Assets	1,21,000	96,800
Reserves	42,900	35,200	Current Assets	1,25,400	1,03,400
8% Debentures	22,000	22,000	Less: Current Liabilities	93,500	31,900
	1,52,900	1,45,200		1,52,900	1,45,200

Revenue Statement for the year

Income	X Ltd. ₹	Y Ltd. ₹
Sales	3,30,000	2,64,000
Less: Cost of Sales	2,37,600	1,98,000
Gross Profit	92,400	66,000
Operating Expenses	63,800	44,000
Net Profit before Tax	28,600	22,000
Tax	12,100	9,240
Profit after Tax	16,500	12,760

Dividend	8,800	6,600
Retained Earning	7,700	6,160

You are required to calculate the following ratios and comment

1. Proprietary Ratio
2. Capital Gearing Ratio
3. Gross Profit Ratio
4. Operating Ratio
5. Return on Total Resources Ratio
6. Return on Proprietors' Equity Ratio
7. Expenses Ratio
8. Net Profit Ratio.

(T.Y. B.Com., Modified)

Solution:

$$(i) \text{ Proprietary Ratio} = \frac{\text{Shareholders' Funds}}{\text{Total Assets}} \times 100$$

$$= \frac{\text{Equity Share Capital} + \text{Preference Capital} + \text{R \& S} - \text{ME}}{\text{FA} + \text{CA}} \times 100$$

$$\text{For 'X' Ltd.} = \frac{88,000 + 42,900 - \text{Nil}}{1,21,000 + 1,25,400} \times 100 = \frac{1,30,900}{2,46,400} \times 100 = 53.13\%$$

$$\text{For 'Y' Ltd.} = \frac{88,000 + 35,200 - \text{Nil}}{96,800 + 1,03,400} \times 100 = \frac{1,23,200}{2,00,200} \times 100 = 61.54\%$$

$$(ii) \text{ Capital Gearing Ratio} = \frac{\text{Long - term Borrowing} + \text{Preference Capital}}{\text{Shareholders' Fund}}$$

$$\text{For 'X' Ltd.} = \frac{22,000}{1,30,900} = 0.17 : 1$$

$$\text{For 'Y' Ltd.} = \frac{22,000}{1,23,200} = 0.18 : 1$$

$$(iii) \text{ Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100$$

$$\text{For 'X' Ltd.} = \frac{92,400}{3,30,900} \times 100 = 28\%$$

$$\text{For 'Y' Ltd.} = \frac{66,000}{2,64,000} \times 100 = 25\%$$

$$(iv) \text{ Operating Ratio} = \frac{\text{COGS} + \text{Other Operating Expenses}}{\text{Sales}} \times 100$$

$$\text{For 'X' Ltd.} = \frac{2,37,600 + 63,800}{3,30,000} \times 100 = \frac{3,01,400}{3,30,000} \times 100 = 91.33\%$$

$$\text{For 'Y' Ltd.} = \frac{1,98,000 + 44,000}{2,64,000} \times 100 = \frac{2,42,000}{2,64,000} \times 100 = 91.67\%$$

$$(v) \text{ Return on Total Resources Ratio} = \frac{\text{Net Profit before Tax and Interest}}{\text{Total Assets}} \times 100$$

$$\text{For 'X' Ltd.} = \frac{28,600 + 1,760}{2,46,400} \times 100 = \frac{30,360}{2,46,400} \times 100 = 12.32\%$$

$$\text{For 'Y' Ltd.} = \frac{22,000 + 1,760}{2,00,200} \times 100 = \frac{23,760}{2,00,200} \times 100 = 11.87\%$$

$$(vi) \text{ Return on Prop. Equity Ratio} = \frac{\text{Net Profit after Tax} - \text{Pref. Share Dividend}}{\text{Equity Share Capital} + \text{Reserves and Surplus}} \times 100$$

$$\text{For 'X' Ltd.} = \frac{16,500 - \text{Nil}}{1,23,200} \times 100 = 12.61\%$$

$$\text{For 'Y' Ltd.} = \frac{12,760 - \text{Nil}}{1,23,200} \times 100 = 10.36\%$$

$$(vii) \text{ Expenses Ratio} = \frac{\text{Operating Expenses}}{\text{Sales}} \times 100$$

$$\text{For 'X' Ltd.} = \frac{63,800}{3,30,000} \times 100 = 19.33\%$$

$$\text{For 'Y' Ltd.} = \frac{44,000}{2,64,000} \times 100 = 16.67\%$$

$$(viii) (a) \text{ Net Profit Ratio} = \frac{\text{Net Profit before Tax}}{\text{Sales}} \times 100$$

$$\text{For 'X' Ltd.} = \frac{28,600}{3,30,000} \times 100 = 8.67\%$$

$$\text{For 'Y' Ltd.} = \frac{22,000}{2,64,000} \times 100 = 8.33\%$$

$$(b) \frac{\text{Net Profit after Tax}}{\text{Sales}} \times 100$$

$$\text{For 'X' Ltd.} = \frac{16,500}{3,30,000} \times 100 = 5\%$$

$$\text{For 'Y' Ltd.} = \frac{13,760}{2,64,000} \times 100 = 4.83\%$$

Illustration 35

Current Liabilities and Current Assets of D.K. Ltd. were as under:

Current Liabilities	₹	Current Assets	₹
Creditors	1,00,000	Stock (at Cost)	75,000
Bank Overdraft	25,000	Debtors	1,25,000
Total Current Liabilities	1,25,000	Total Current Assets	2,00,000

Notes:

The company can avail the overdraft facility upto ₹ 75,000.

Explain in detail the effects of the following transactions on Current Ratio and Working Capital of the company.

Consider each transaction separately. (Do not give cumulative effects of the transactions).

1. Purchased Goods worth ₹ 25,000 and issued a cheque of ₹ 25,000 against the said purchases.
2. Received a cheque of ₹ 30,000 from one of the customers and deposited the same into bank in overdraft A/c.
3. Sold Goods costing ₹ 25,000 for ₹ 35,000 on credit.
4. Bills Receivable of ₹ 15,000 which was discounted in the Bank is now dishonoured.

Solution:

$$\text{A. Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{2,00,000}{1,25,000} = 1.6 : 1$$

$$\begin{aligned} \text{Working Capital} &= \text{Current Assets} - \text{Current Liabilities} \\ &= 2,00,000 - 1,25,000 = ₹ 75,000 \end{aligned}$$

1. Purchase of goods of ₹ 25,000**(a) Effect on Current Ratio**

Purchase of goods increases Stock by ₹ 25,000

$$\text{Current Assets} = 2,00,000 + 25,000 = ₹ 2,25,000$$

Issue of cheque increases the Bank Overdraft by ₹ 25,000

$$\text{Current Liabilities} = 1,25,000 + 25,000 = ₹ 1,50,000$$

$$\text{Revised Current Ratio} = \frac{2,25,000}{1,50,000} = 1.5 : 1$$

Thus, the transaction will decrease the Current Ratio.

(b) Effect on Working Capital

This transaction will increase the Current Assets and Current Liabilities by the same amount of ₹ 25,000. Hence, Working Capital will not change.

2. Receipt of ₹ 25,000 from the customer and deposited in the bank.**(a) Effect on Current Ratio**

Receipt of ₹ 25,000 reduces Debtors by ₹ 25,000

$$\text{Current Assets} = 2,00,000 - 25,000 = ₹ 1,75,000$$

Depositing the cheque in the Bank reduces the Bank Overdraft by ₹ 25,000

$$\text{Current Liabilities} = 1,25,000 - 25,000 = ₹ 1,00,000$$

$$\text{Revised Current Ratio} = \frac{1,75,000}{1,00,000} = 1.75 : 1$$

Thus, the transaction will increase the Current Ratio.

(b) Effect on Working Capital

This transaction will decrease the Current Assets and Current Liabilities by the same amount of ₹ 25,000. So, Working Capital will not change.

3. Sale of goods costing ₹ 25,000 for ₹ 35,000 on credit.

(a) Effect on Current Ratio

Sale of goods costing ₹ 25,000 reduces Stock by ₹ 25,000

$$\text{Stock} = 75,000 - 25,000 = ₹ 50,000$$

It increase the debtors by ₹ 35,000 as Sale is for ₹ 35,000

$$\text{Debtors} = 1,25,000 + 35,000 = ₹ 1,60,000$$

$$\text{Revised Current Assets} = 50,000 + 1,60,000 = ₹ 2,10,000$$

(Increase in Current Assets of ₹ 10,000)

Current Liabilities remain same at ₹ 1,25,000

$$\text{Revised Current Ratio} = \frac{2,10,000}{1,25,000} = 1.68 : 1$$

Thus, the transaction will increase the Current Ratio.

(b) Effect on Working Capital

This transaction will increase the Current Assets only by ₹ 10,000. So, Working Capital will increase from ₹ 75,000 to ₹ 85,000.

4. Discounted bills receivable of ₹ 15,000 dishonoured.

(a) Effect on Current Ratio

Dishonour of discounted bill receivable increases Debtors by ₹ 15,000.

$$\text{Current Assets} = 2,00,000 + 15,000 = ₹ 2,15,000$$

It also increases the Bank Overdraft by ₹ 15,000

$$\text{Current Liabilities} = 1,25,000 + 15,000 = ₹ 1,40,000$$

$$\text{Revised Current Ratio} = \frac{2,15,000}{1,40,000} = 1.54 : 1$$

Thus, the transaction will decrease the Current Ratio.

(b) Effect on Working Capital

This transaction will increase the Current Assets and Current Liabilities by the same amount of ₹ 15,000. So, Working Capital will remain unchanged.

EXERCISE**Fill in the Blanks**

1. _____ is a proportion between two figures.
2. One figure is divided by another figure to get _____ ratio.
3. Turnover ratios are expressed in _____.
4. Balance sheet ratio is a ratio between two figures from _____.
5. Combined ratio is a ratio between one figure from _____ and another figure from _____.
6. Current Ratio = _____.
7. Current Ratio shows _____ financial position.
8. Liquid ratio is a relationship between Liquid assets and _____.
9. _____ are near cash assets.
10. Working capital is an excess of current assets over _____.
11. Debt-equity ratio shows proportion between _____ and _____.
12. Proprietary Ratio = _____.
13. Cost of goods sold is divided by average stock to get _____.
14. _____ shows trading efficiency.
15. _____ shows operating efficiency.
16. _____ capital employed shows overall profitability of the organisation.
17. Dividend payment is calculated by dividing dividend of share by _____.
18. Stock _____ shows the speed of movement of stock.
19. _____ ratio shows ability of a firm to service.
20. _____ shows the period for which amount of sales remains invested in debtors.
21. NP ratio is a relationship between NP and _____.
22. Standard Current Ratio is _____.
23. Standard Liquid Ratio is _____.
24. Capital Gearing Ratio is also called as _____.
25. Operating Cost = _____.
26. Operating ratio is a relationship between operating profit and _____.
27. Quick ratio is also known as _____ ratio.
28. Net Profit Ratio is an indicator of _____.
29. Quick Ratio indicates _____.
30. Current Ratio indicates _____.
31. Standard stock turnover rate is _____ times.
32. Stock turnover indicates _____.
33. Proprietary Ratio indicates _____.
34. _____ Period indicates time taken to collect dues from customers.
35. Marketable securities is _____ Assets.
36. Return on capital employed = _____ $\times$ 16.
37. Stock to working capital ratio indicates relationship between stock and _____ capital.
38. Standard debt-equity ratio is _____.

39. Average stock = _____.
40. Prepaid expenses are not _____ assets.

Ans.: 1. Ratio; 2. Pure; 3. No. of times; 4. Balance Sheet; 5. Balance Sheet, Profit and Loss A/c; 6. Current Assets; 7. Short-term; 8. Current Liabilities; 9. Liquid Assets; 10. Current Liabilities; 11. Long-term debt-equity; 12. Proprietors' Fund; 13. Stock Turnover; 14. Gross Profit; 15. Operating Ratio; 16. EPS; 17. Turnover; 18. Turnover; 19. Debt Service; 20. Collection Period; 21. Net Sales; 22. 1 : 1; 23. 1 : 1; 24. Capital Structure Ratio; 25. Cost of Goods Sold + Operating Expenses; 26. Sales; 27. Liquid; 28. Profitability; 29. Liquidity; 30. Short-term solvency; 31. 6; 32. Stock Velocity; 33. Financial Stability; 34. Collection; 35. Liquid; 36. NPBIT; 37. Working; 38. 2 : 1; 39. closing stock; 40. Liquid.

Multiple Choice Questions

- A very high current ratio will
 - Increase profitability
 - Decrease profitability
 - Not affect profitability
 - None of the above
- A very high current ratio may be due to
 - Overvaluation of inventory
 - Inefficiency in collection of debt
 - Cash and bank balance without
 - All the above investment
- Current ratio shows
 - Short-term financial position
 - Inefficiency in collection of debt
 - Collection efficiency
 - Higher profitability
- One of the following is not an absolute liquid asset.
 - Cash balance
 - Bank balance
 - Bills receivable
 - Marketable securities
- Liquid ratio which is equal to the following is favourable.
 - 2 : 1
 - 1 : 1
 - 1 : 3
 - 2 : 5
- Proprietary ratio shows
 - Long-term financial position
 - Short-term financial position
 - Liquidity position
 - All of the above
- Higher proprietary ratio shows that
 - Small portion of assets is financed by the proprietors
 - Larger portion of assets is financed by the proprietors
 - Longer portion of assets is finance by loans
 - None of the above
- Higher gearing means
 - Capital structure is high geared
 - Capital structure is low geared
 - Capital structure is optimum
 - None of the above
- High geared company exposes to
 - Business risk
 - Financial risk
 - Inflation risk
 - Interest risk
- Shareholders' equity includes
 - Equity share capital
 - Preference share capital

- (c) Reserves and surplus (d) All of the above
- 11. Fixed interest bearing funds do not include one of the following.
 - (a) Debenture (b) Long-term investment
 - (c) Preference capital (d) Public deposit
- 12. Loan fund does not include one of the following.
 - (a) Debentures (b) Loans
 - (c) Provision for taxation (d) Public deposits
- 13. The ratio that indicates ability of the company to pay urgent obligations immediately is
 - (a) Current ratio (b) Debt-equity ratio
 - (c) Liquidity ratio (d) Proprietary ratio
- 14. A low inventory turnover ratio indicates
 - (a) Investment tied up in stock (b) Absolute goods on hand
 - (c) Adverse liquidity (d) All of the above
- 15. Higher turnover ratio as compared to indicates that
 - (a) The stock is moving fast in the market (b) Buying and selling policies are effective
 - (c) Inventory management is efficient (d) All of the above
- 16. A longer payment period indicates that
 - (a) Suppliers are prepared to allow longer period of credit
 - (b) Operations are being financed by suppliers
 - (c) Damages credit standing of the company
 - (d) Spoils relationship with suppliers
- 17. Longer collection period indicates that
 - (a) Debtors are not prompt in payment
 - (b) Creditors are allowing longer period of credit
 - (c) Short-term financial position is good
 - (d) Long-term position is good
- 18. Higher GP Ratio may be due to
 - (a) Higher rate of profitability (b) Strict control over cost of goods sold
 - (c) Sales and working capital (d) All of the above
- 19. Stock to working capital ratio is a proportion between
 - (a) Closing stock and working capital (b) Opening stock and wrong capital
 - (c) Sales and working capital (d) Sales and current assets
- 20. One of the reasons responsible for decrease in gross profit ratio is
 - (a) Undervaluation of closing inventory (b) Overvaluation of closing inventory
 - (c) Excess depreciation on fixed assets (d) Additional interest on loan
- 21. Return on capital employed is a relationship between
 - (a) Net operating profit and loan (b) Net operating profit and capital employed
 - (c) Gross profit and sales (d) Gross profit and total assets
- 22. Return on capital employed is also known as
 - (a) Return on total assets (b) Return on fixed assets
 - (c) Return on investment (d) Return on shareholders' fund
- 23. Debt-equity ratio is a relationship between
 - (a) Short-term debt and equity (b) Long-term debt and equity

- (c) Current liabilities and share capital (d) Preference capital and equity capital
24. Debt service ratio shows
(a) Short-term financial position of the company
(b) Financial stability
(c) Debt servicing ability
(d) Liquidity position
25. Dividend payout ratio is a proportion between
(a) Dividend per share and earning per share (b) Preference dividend and equity capital
(c) Equity dividend and equity capital (d) Total dividend and capital employed
26. Operating ratio is a proportion between
(a) Operating cost and purchases (b) Operating cost and sales
(c) Total cost and sales (d) Net profit and sales
27. Shareholders' equity does not include
(a) Equity capital (b) Reserves and surplus
(c) Debentures (d) Preliminary expenses
28. Net profit ratio indicates
(a) Overall profitability (b) Profitability
(c) Trading efficiency (d) Liquidity
29. Proprietary ratio is a proportion between
(a) Proprietary and equity capital (b) Proprietary fund and sales
(c) Proprietors' fund and total assets (d) Proprietors' fund and sales
30. Return on proprietors' fund indicates
(a) Utilisation of capital employed (b) Utilisation of assets
(c) Utilisation of proprietors fund (d) Utilisation of total resources
31. Operating performance is best measured by
(a) Operating profit ratio (b) Return on capital
(c) Return on fixed assets (d) Return on equity
32. Current ratio is 2.5 working capital is ₹ 60,000. Current assets will be.
(a) ₹ 1,00,000 (b) ₹ 1,40,000
(c) ₹ 50,000 (d) ₹ 1,25,000
33. Refer to Q. No. 32 current liabilities will be
(a) ₹ 60,000 (b) ₹ 40,000
(c) ₹ 75,000 (d) ₹ 40,000
34. G.P. ₹ 1,00,000, Total sales ₹ 5,25,000 sales return ₹ 25,000. GP ratio will be
(a) 25% (b) 21%
(c) 20% (d) 28%
35. Proprietary ratio is a
(a) Balance sheet ratio (b) Revenue statement ratio
(c) Combined ratio (d) None of the above
36. Debt-equity ratio is a
(a) Revenue statement Ratio (b) Balance sheet ratio
(c) Combined ratio (d) None of the above

37. Stock to working capital ratio is a
 - (a) Revenue statement ratio
 - (b) Balance sheet ratio
 - (c) Combined ratio
 - (d) None of the above
38. Administrative expense ratio is a
 - (a) Revenue statement ratio
 - (b) Balance sheet ratio
 - (c) Combined ratio
 - (d) None of the above
39. Net operating profit ratio is a
 - (a) Balance sheet ratio
 - (b) Revenue statement ratio
 - (c) Combined ratio
 - (d) None of the above
40. Operating ratio is a
 - (a) Balance sheet ratio
 - (b) Revenue statement ratio
 - (c) Combined ratio
 - (d) None of the above
41. ROI is a
 - (a) Balance sheet ratio
 - (b) Revenue statement ratio
 - (c) Combined ratio
 - (d) None of the above
42. Creditors turnover ratio is a
 - (a) Balance sheet ratio
 - (b) Revenue statement ratio
 - (c) Combined ratio
 - (d) None of the above
43. Debtors turnover ratio is a
 - (a) Balance sheet ratio
 - (b) Revenue statement ratio
 - (c) Combined ratio
 - (d) None of the above
44. Liquidity ratios include
 - (a) Current ratio and Liquidity ratio
 - (b) P/E, EPS, Dividend payout ratio
 - (c) ROI, Net profit ratio, Operating ratio
 - (d) None of the above
45. Profitability ratios include
 - (a) Debt-equity ratio
 - (b) Current ratio
 - (c) Liquid ratio
 - (d) None of the above
46. 2 : 1 is a standard
 - (a) Debt-equity ratio
 - (b) Current ratio
 - (c) Liquid ratio
 - (d) None of the above
47. 1 : 1 is a standard
 - (a) Debt-equity ratio
 - (b) Current ratio
 - (c) Liquid ratio
 - (d) None of the above

Ans.: 1. (b), 2. (d), 3. (a), 4. (c), 5. (b), 6. (a), 7. (b), 8. (a), 9. (b), 10. (d), 11. (b), 12. (c), 13. (c), 14. (d), 15. (d), 16. (a), 17. (a), 18. (d), 19. (a), 20. (a), 21. (b), 22. (c), 23. (b), 24. (c), 25. (a), 26. (b), 27. (c), 28. (b), 29. (c), 30. (c), 31. (a), 32. (a), 33. (b), 34. (c), 35. (a), 36. (b), 37. (b), 38. (a), 39. (b), 40. (b), 41. (c), 42. (c), 43. (c), 44. (a), 45. (b), 46. (b), 47. (c).

State Whether the Following Statements are True or False

1. Current ratio and acid test ratio are the same.
2. Acid test ratio test the acid.
3. Short-term solvency ratio measures the ability of the firm to pay current liabilities.
4. Equity fund includes debentures.
5. In general, low turnover ratio is desirable.
6. It is conceptually correct to decide stock turnover ratio by dividing cost of goods sold by average stock.

7. Excess of sales over cost of goods sold is gross profit.
8. Proprietary ratio examines short-term solvency position.
9. Capital gearing ratio shows the speed of capital.
10. Debt-equity is a proportion between short-term debt and equity.
11. Operating ratio must be higher for measurement of profitability.
12. Net profit ratio is a measure of profitability.
13. Capital employed is equal to fixed assets.
14. Preference share capital is a loan capital.
15. Dividend payout ratio shows dividend paying ability of the firm.
16. Debt service ratio shows the servicing of debt.
17. Debt collection period shows the period taken by debtors to pay.
18. Stock to working capital ratio is a relationship between stock and working capital.
19. Activity of the management is judged by debtors turnover ratio.
20. Expense ratio is a relationship between expenses and sales.
21. Higher GP ratio shows higher trading efficiency of an organisation.
22. Liquid ratio indicates liquidity position.
23. Public Deposit is unsecured loans.
24. Interest coverage ratio indicates firm's ability to meet interest.
25. Debt collection period indicates time taken by debtors to settle the account.
26. Net worth means capital employed.
27. All current liabilities are quick liabilities.
28. Stock is a liquid asset.
29. Prepaid expenses are included in liquid assets.
30. Contingent liabilities appear in the Balance Sheet.
31. Overvaluation of closing stock increases gross profit.
32. Overvaluation of opening stock increases gross profit.
33. Undervaluation of closing stock increases gross profit.
34. Current ratio is also known as working capital ratio.
35. Stock turnover ratio indicates the speed of collection of debt.
36. Bank overdraft is a liquid liability.
37. Net Assets means working capital.
38. Preference share capital is a part of own fund.
39. Working capital is lifeblood of an organisation.
40. Return on Investment shows overall profitability of the organisation.
41. EPS shows managerial efficiency in use of resource.
42. Proprietary ratio indicates short-term financial position.
43. Higher capital gearing shows lower commitment on account of interest.
44. Higher stock turnover means higher cost of goods sold.
45. Higher stock to working capital ratio indicates higher incidence of inventory in working capital.

Ans.: True: 3, 6, 7, 12, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 31, 34, 38, 39, 40, 41, 45

False: 1, 2, 4, 5, 8, 9, 10, 11, 13, 14, 26, 27, 28, 29, 30, 32, 33, 35, 36, 37, 42, 43, 44

Match the Columns**(A) Group A**

1. Ratio
2. Current ratio
3. Liquid ratio
4. Stock to working capital ratio
5. Proprietary ratio
6. Debt-equity ratio
7. Capital gearing ratio
8. Gross profit ratio
9. Expenses ratio
10. Operating ratio
11. Net profit ratio
12. Net operating profit ratio

Group B

- (a) Short-term position
- (b) Liquidity position
- (c) Investment of stock in working capital
- (d) Long-term financial position
- (e) Dependence on debt and equity
- (f) Gearing of capital structure
- (g) Trading efficiency
- (h) % of expenses to sales
- (i) Operating efficiency
- (j) Profitability position
- (k) Operating profitability
- (l) Financial stability
- (m) Proportion between two figures
- (n) Overall profitability

Ans.: 1. (m), 2. (a), 3. (b), 4. (c), 5. (d), 6. (e), 7. (f), 8. (g), 9. (h), 10. (i), 11. (j), 12. (k)

(B) Group A

1. Return on capital employed
2. Return on proprietor's fund
3. Return on equity capital
4. Dividend payout
5. Debt service ratio
6. Debtors turnover

Group B

- (a) Utilisation of proprietors' fund
- (b) Utilisation of equity capital
- (c) Dividend paying ability
- (d) Overall profitability
- (e) Debt service ability
- (f) Efficiency in collection from debtors
- (g) Promptness in payment

Ans.: 1. (d), 2. (a), 3. (b), 4. (c), 5. (e), 6. (f).

(C) Group A

1. Liquid ratio
2. Debt equity ratio
3. Operating ratio
4. Stock to working capital ratio
5. Net profit ratio
6. Dividend payout

Group B

- (a) $\text{Liquid assets} \div \text{Current liabilities}$
- (b) $\text{Operating cost} \div \text{Sales}$
- (c) $\text{Stock} \div \text{Working capital}$
- (d) $\text{Long-term Debt} \div \text{Equity}$
- (e) $\text{Dividend per share} \div \text{EPS}$
- (f) $\text{NP} \div \text{Capital employed}$

7. Return on equity capital	(g) $NP \div \text{Proprietors' fund}$
8. Return on capital employed	(h) $NP \div \text{Equity capital}$
9. Return on proprietor's fund	(i) $NP \div \text{Sales}$

Ans.: 1. (a), 2. (d), 3. (b), 4. (c), 5. (i), 6. (e), 7. (h), 8. (f), 9. (g)

Answer in One Sentence

1. What is ratio?
2. What is the objective of ratio analysis?
3. what is a current ratio?
4. What is quick ratio?
5. What is proprietary ratio?
6. What is stock to working capital ratio?
7. What is capital gearing ?
8. What is debt-equity ratio?
9. What is a gross profit ratio?
10. What is operating ratio?
11. What is net profit ratio?
12. What is stock turnover ratio?
13. What is return on capital?
14. What is a earning per share?
15. What is a price earning ratio?
16. What is debt service ratio?
17. What is collection period?
18. What is a creditors turnover?
19. What is the purpose of quick ratio?
20. What is the purpose of current ratio?
21. What is the purpose of gross profit?
22. What is the importance of stock turnover ratio?
23. What is the purpose of stock to working capital ratio?
24. Debtors Turnover Ratio
25. Creditors Turnover Ratio
26. Limitations of Ratio Analysis

PRACTICAL QUESTIONS

1. Calculate from the following details furnished by Swaraj Ltd.: (a) Current Ratio, (b) Liquid Ratio, (c) Creditors Turnover Ratio and Average Credit Period, (d) Debtors Turnover Ratio and Average Credit Period and (e) Stock Turnover Ratio.

Particulars	₹
Stock	8,00,000
Debtors	1,70,000
Cash	30,000

Creditors	3,00,000
Bank Overdraft	40,000
Outstanding Expenses	60,000
Total Purchases	9,30,000
Cash Purchases	30,000
Gross Profit Rates	25%

Offer your comments on short-term credit position of the company. Comments on individual ratio are not desirable. **(T.Y. B.Com., Modified)**

2. Calculate from the following details furnished by Pardeshi Ltd.: (a) Current Ratio, (b) Liquid Ratio, (c) Credit Turnover Ratio and Average Credit Period, (d) Debtors Turnover Ratio and Average Credit Period and (e) Turnover Ratio.

Particulars	₹
Stock	1,00,000
Debtors	1,40,000
Cash	60,000
Creditors	1,60,000
Bank Overdraft	30,000
Outstanding Expenses	10,000
Total Purchases	6,60,000
Cash Purchases	20,000
Gross Profit Ratio	33 1/3%

Offer your comments on short-term credit position of the company. Comment on individual ratio is not desirable. **(T.Y. B.Com., Modified)**

3. Following financial statements of 'JAY Ltd.' are given to you. Rearrange them into vertical form and compute following ratios: (a) Operating ratio, (b) Net profit ratio, (c) Liquid ratio, (d) Proprietary ratio and (e) Capital gearing ratio.

Trading and Profit and Loss A/c for the year ended 31.3.2014

Particulars	Amt. ₹	Particulars	Amt. ₹
To Opening Stock	45,000	By Sales	4,00,000
To Purchases less Returns	2,20,000	By Closing Stock	95,000
To Wages	1,00,000	By Non-operating income	12,000
To Salaries	40,000		
To Office Rent	17,000		
To Interest	3,000		
To Non-operating Expenses	2,000		
To Advertisement	6,000		
To Transport on Sales	4,000		
To Net Profit	70,000		
₹	5,07,000	₹	5,07,000

Balance Sheet as on 31.3.2014

Liabilities	Amt. ₹	Assets	Amt. ₹
12% Preference Share Capital	40,000	Fixed Assets:	
Equity Share Capital	1,90,000	Original Cost	2,30,000
Capital Reserve	15,000	(-) Depreciation	40,000
General Reserve	45,000	Investments (Short-term)	50,000
Profit and Loss A/c	10,000	Stock	95,000
15% Debentures	30,000	Debtors	85,000
Bank Loan	15,000	Prepaid Expenses	20,000
Creditors	70,000		
Bills Payables	5,000		
Bank Overdraft	20,000		
₹	4,40,000	₹	4,40,000

4. Following is the Balance Sheet of 'EVER GROWTH LTD.' as on 31.3.2014:

Liabilities	Amt. ₹	Assets	Amt. ₹
Equity Share Capital	4,50,000	Goodwill	35,000
Share Premium	45,000	Land and Buildings	2,75,000
General Reserve	1,60,500	Plant and Machinery	3,60,800
Profit and Loss A/c	1,28,500	Furniture and Fixtures	1,28,200
12% Debentures	2,60,000	Long-term investments	1,75,000
M.S.F.C. Loan	1,50,000	Short-term investments	48,500
Bank Overdraft	49,800	Sundry Debtors	1,69,700
Creditors	68,000	Bills Receivable	12,500
Bills Payable	5,400	Closing Stock	98,000
Provisions for Tax	35,800	Prepaid Expenses	27,500
Outstanding Expenses	17,000	Cash Balance	29,300
		Preliminary Expenses	10,500
₹	13,70,000	₹	13,70,000

You are required to:

- Rearrange the above Balance Sheet in vertical form to show following: (i) Proprietors' funds, (ii) Borrowed funds, (iii) Fictitious assets, (iv) Intangible assets, (v) Quick liabilities and (vi) Working capital.
 - Comment on long-term stability of the company by calculating two relevant ratios.
5. Given below are extracts of Financial Statements of M/s Kiran Ltd.

Particulars	31-3-2014 ₹
Stock	2,60,000
Debtors	1,00,000
Cash	1,40,000
Bills Receivable	1,00,000
Creditors	1,00,000
Bank Balance (Cr.)	30,000

Outstanding Expenses	10,000
Bills Payable	50,000
Total Purchases	8,00,000
Cash Purchases	2,00,000
Cash Sales	3,00,000
Credit Sales	12,00,000
Credit Allowed to Customers	11/2 months
Credit Allowed by Suppliers	3 months

From the above find out the following ratios and give your comment for the year ended 31.3-2014:
 (a) Current Ratio, (b) Liquid Ratio, (c) Debtors Turnover Ratios and Age of Debtors and (d) Creditors Turnover Ratios and Age of Creditors.
(T.Y. B.Com., Modified)

6. Following Balance Sheet of Roland Ltd.

Liabilities	Amt. ₹	Assets	Amt. ₹
Equity Share Capital	1,00,000	Cash in Hand	2,000
6% Preference Share Capital	1,00,000	Cash at Bank	10,000
7% Debentures	40,000	Bills Receivable	30,000
8% Public Deposits	20,000	Debtors	70,000
Bank Overdraft	40,000	Stock	40,000
Creditors	60,000	Loose Tools	20,000
Proposed Dividend	10,000	Furniture	30,000
Proposed Expense	7,000	Machinery	1,00,000
Reserves	1,50,000	Land and Building	2,20,000
Provision for Tax	20,000	Goodwill	30,000
Profit and Loss Account	20,000	Preliminary Expenses	10,000
		Cash in Arrears in Equity Shares	5,000
₹	5,67,000	₹	5,67,000

Convert the above Balance Sheet in vertical form and calculate: (i) Current Ratio, (ii) Quick Ratio, (iii) Proprietary Ratio, (iv) Capital Gearing Ratio and (v) Stock to Working Capital Ratio. Given your comments.

7. The following is the Trading and Profit and Loss A/c and Balance Sheet of Sunder Mumbai Ltd.

Trading and Profit and Loss Account as on 31st March, 2014

Liabilities	Amount	Assets	Amount
To Opening Stock	10,000	By Sales	1,50,000
To Purchases	55,000	By Closing Stock	15,000
To Wages	20,000		
To Power and Fuel	10,000		
To Gross Profit c/d	70,000		
	1,65,000		1,65,000
To Administration Expenses	15,000	By Gross Profit b/d	70,000
To Interest	3,000	By Rent Received	1,500
To Depreciation on Machinery	5,000		

To Selling Expenses	12,000		
To Loss by Fire	2,000		
To Provision for Tax	14,500		
To Net Profit	20,000		
	71,500		71,500
To Interim Dividend	10,000	By Opening Balance	15,000
To Closing Balance	25,000	By Net Profit	20,000
₹	35,000	₹	35,000

Balance Sheet as on 31st March, 2014

Liabilities	₹	Assets	₹
Equity Share Capital	1,00,000	Land and Buildings	50,000
Profit and Loss A/c	25,000	Plant and Machinery	30,000
Creditors	15,000	Furniture	20,000
Secured Loans	10,000	Stock	15,000
Bank Overdraft	25,000	Debtors	15,000
Provision for Tax	5,000	Investments	12,500
Outstanding Expenses	5,000	Cash	17,500
		Goodwill	20,000
		Miscellaneous Expenditure	5,000
₹	1,85,000	₹	1,85,000

Calculate the following ratios after converting above financial statements in vertical form: (a) Inventory Turnover Ratio, (b) Current Ratio, (c) Gross Profit Ratio, (d) Proprietary Ratio, (e) Operating Ratio and (f) Liquid Ratio. (T.Y. B.Com., Modified)

8. The following are balance sheets as on 31st March, 2014 of two different companies.

Liabilities	Tiny ₹	Giant ₹	Assets	Tiny ₹	Giant ₹
Equity Share Capital	1,000	2,000	Trade Marks and Copyright	200	500
General Reserve	200	500	Building	500	1,000
Profit and Loss A/c	300	600	Machinery	400	900
Preference Share Capital	400	800	Furniture	10	50
Secured Loan	250	600	Stock	700	1,500
Provision for Income Tax	100	200	Trade Investment	100	150
Bank Overdraft	50	100	Debtors	600	1,400
Creditors	400	1,000	Bills Receivable	100	200
Provision for Doubtful Debts	10	20	Goods with Consignee	10	20
			Share Issue Expenses	90	100
₹	2,710	5,820	₹	2,710	5,820

Investment depreciated by 10% which effect is required to be given. Prepare Common Size Balance Sheet in vertical form. Also compute following ratios and give your comments: (a) Debt-equity Ratio and (b) Stock to Working Capital Ratio.

9. The following is the Balance Sheet of Arjun Ltd. as on 31st March 2014.

Liabilities	Amount	Assets	Amount
Equity Share Capital	2,00,000	Building	2,00,000
Preference Share Capital	1,00,000	Machinery	1,00,000

10% Debentures	2,00,000	Intangible Assets	1,00,000
General Reserves	1,50,000	Marketable Investment	50,000
Profit and Loss A/c	1,00,000	Debtors	1,50,000
Bank Overdraft	60,000	Stock	1,10,000
Provision for Tax	80,000	Bank Balance	1,50,000
Creditors	1,20,000	Advance for Goods	1,00,000
		Preliminary Expenses	50,000
	₹ 10,10,000		₹ 10,10,000

Other information for the year ended 31st March, 2014:

- Sales ₹ 40,00,000 cost of goods sold was 92.5% of sales.
- Total operating expenses were ₹ 1,50,000 out of which finance expenses were ₹ 30,000 and balance office expenses and selling expenses were in the ratio of 2 : 3.
- Non-operating income was 2.5 times the amount of non-operating expenses, total non-operating expenses were ₹ 20,000 incurred during the year.
- Income tax provision ₹ 40,000 transferred to general reserve ₹ 40,000.
- Contingent liabilities on 31st March, 2001 was ₹ 1,50,000 not provided for.
- Closing Stock on 31st March, 2001 was more than opening stock by ₹ 10,000.
- Debtors on 1st April, 2000 were ₹ 2,50,000. Assume 360 days in a year.

Arrange the Balance Sheets and Profit and Loss A/c in a vertical form and calculate the following ratios: (a) Current ratio, (b) Liquid ratio, (c) Stock turnover ratio, (d) Debtors turnover ratio and Collection period, (e) Capital gearing ratio and (f) Proprietary ratio. **(T.Y. B.Com., Modified)**

10. Following is the Balance Sheets of Bharat Ltd. for the year ended 31st December, 2013 and 2014.

Liabilities	2013 ₹	2014 ₹	Assets	2013 ₹	2014 ₹
Equity Capital	1,00,000	1,00,000	Fixed Assets (Cost)	1,60,000	2,30,000
8% Preference Share Capital	—	65,000	Stock	20,000	25,000
Reserves	10,000	15,000	Debtors	50,000	62,500
Profit and Loss A/c	7,500	10,000	Bills Receivable	—	30,000
10% Debentures	50,000	75,000	Prepaid Expenses	5,000	6,000
Bank Overdraft	25,000	25,000	Cash at Bank	21,000	13,000
Creditors	20,000	25,000	Cash in Hand	5,000	15,000
Provision for Taxation	10,000	12,500	Calls in Arrears	4,000	3,000
Proposed Dividend	7,500	12,500	Share Issue Expenses	5,000	10,500
Depreciation Provision	40,000	55,000			
₹	2,70,000	3,95,000	₹	2,70,000	3,95,000

Prepare a Comparative Balance Sheet in vertical form and interpret the same after calculating following ratios: (i) Capital Gearing Ratio, (ii) Stock to Working Capital Ratio, (iii) Liquid Ratio and (iv) Debt-equity Ratio.

11. X Ltd and Y Ltd. are in the same line of business. Followings are their Balance Sheets as on 31st December, 2014:

Balance Sheet as on 31st December, 2014

Liabilities	X Ltd. ₹	Y Ltd. ₹	Assets	X Ltd. ₹	X Ltd. ₹
Equity Share Capital	7,00,000	2,00,000	Land	1,00,000	80,000
Reserve and Surplus	1,00,000	1,00,000	Building	2,50,000	2,00,000
12% Debentures	2,00,000	5,00,000	Plant and Machinery	5,00,000	3,00,000
Creditors	1,20,000	70,000	Debtors	2,10,000	1,10,000
Bills Payable	40,000	20,000	Stock	1,00,000	2,00,000
Proposed Dividend	20,000	20,000	Cash and Bank	55,000	40,000
Provision for Tax	35,000	20,000			
₹	12,15,000	9,30,000	₹	12,15,000	9,30,000

You are required to rearrange the Balance Sheets (in vertical form) and calculate the following ratios for both the companies and comment thereon (any three): (a) Proprietary ratio, (b) Capital-Gearing ratio, (c) Current ratio or (d) Stock to Working Capital ratio. **(T.Y. B.Com., Modified)**

12. The summarized Balance Sheet of Good Luck Ltd. as on 31st March, 2010 is as follows:

Liabilities	₹ in lakhs	Assets	₹ in lakhs
Equity Share Capital (₹ 100 each)	150	Fixed Assets (at cost)	420
10% Preference Share Capital	80	Less: Depreciation	50
Reserve and Surplus	90	Stock	50
Profit and Loss A/c	40	Debtors	60
10% Debentures	50	Cash at Bank	30
Provision for Taxation	20		
Sundry Creditors	80		
	510		510

The following particulars are also given for the year.

	in lakhs
Net Sales (Credit)	240
Profit before Interest and Tax	65
Net Profit after tax	40
Market Price per Equity Share is ₹ 150	

Calculate the following ratios: (i) Acid Test Ratio, (ii) Debtors Turnover Ratio (360 days in a year), (iii) Capital Gearing Ratio, (iv) Debt Service Ratio and (v) Return on Proprietor's Fund.

Give your comments on Acid Test Ratio only.

Note: Preparing balance sheet in vertical form is not required.

13. "Cosmos India Ltd."

Balance Sheet as on 31st December, 2014

Liabilities	₹	Assets	₹
Capital Reserve	1,26,000	Copyright	1,00,000
General Reserve	1,20,000	Cash	21,000
Provision for Tax	50,000	Calls in Arrears	9,575

Commission received in Advance	10,875	Plant and Machinery	4,20,000
15% Debentures	1,60,000	Debtors	3,00,425
12% Bank Loan	40,000	Prepaid Insurance	15,375
6% Preference Share Capital	2,00,000	Land and Building	5,00,000
Equity Share Capital	10,00,000	Fixtures	25,000
Bills Payable	49,125	Furniture	75,000
Profit and Loss A/c	9,000	Preliminary Expenses	18,625
Bank Overdraft	10,740	Goodwill	1,00,000
Share Premium	15,000	Investments (Long-term)	1,75,000
Sundry Creditors	1,89,260	Stock	2,00,700
		Market Investments	19,300
	19,80,000		19,80,000

You are required to rearrange above Balance Sheet in vertical form and compute the following ratios: (a) Current Ratio, (b) Proprietary Ratio and (c) Capital Gearing Ratio. (T.Y. B.Com., Modified)

14. Following financial statements are of XYZ Ltd. for 2014:

Trading and Profit and Loss A/c for the year ended 31st March, 2014

Liabilities	₹	Assets	₹
To Opening Stock	70,000	By Sales	16,60,000
To Purchases	15,00,000	By Closing Stock	1,60,000
To Gross Profit	2,50,000		
	18,20,000		18,20,000
To Depreciation	36,000	By Gross Profit	2,50,000
To Other Expenses	74,000	By Commission	10,000
To Tax Provision	40,000		
To Proposed Dividend	16,000		
To Net Profit	94,000		
	2,60,000		2,60,000

Balance Sheet as at 31st March, 2014

Liabilities	₹	Assets	₹
Share Capital	3,00,000	Cash	48,000
Bank Overdraft	38,000	Stock	1,60,000
Creditors	34,000	Debtors	1,38,400
Provision for Depreciation	54,000	Land and Building	92,000
Provision for Tax	40,000	Machinery	1,28,600
Proposed Dividend	16,000	Goodwill	20,000
Profit and Loss A/c	1,80,000	Loan and Advance	60,000
		Preliminary Expenses	15,000
	6,62,000		6,62,000

Rearrange the above in a vertical form and also calculate: (a) Stock Turnover Ratio, (b) Debtors Turnover Ratio and (c) Creditors Turnover Ratio. (T.Y. B.Com., Modified)

15. Given below are some of the information of Parekar Ltd. as on 31st March, 2014:

₹

Debtors

30,000

Outstanding Manufacturing Expenses	17,000
Cash Balance	23,000
Bills Payable and Creditors	38,000
Machinery (Imported)	30,000
Income Earned but not Received	6,000
Bank Overdraft	15,000
Bills Receivable	7,000
Prepaid Travelling Expenses	4,000

Using above data, calculate current ratio and liquid ratio and comment on it.

16. Calculate Return on Capital Employed and Return on Proprietors' Fund from following information:

	₹
Equity Capital	3,00,000
General Reserves	4,00,000
Profit and Loss A/c	1,50,000 (Cr.)
Sundry Creditors	2,00,000
Operating Profit	3,50,00 (before Interest and Tax)
Long-term Loan	3,50,000 (at 12% p.a. Interest)
Tax Rate is 30%	

17. The following items appear in the financial statements of M Ltd. as on 31st December, 2014.

Particulars	₹	Particulars	₹
Cash	45,000	Land and Buildings	8,00,000
Bills Receivable	60,000	Stock	2,75,000
Creditors	4,00,000	Prepaid Expenses	60,000
General Reserve	1,00,000	Debtors	5,00,000
Plant and Machinery	5,50,000	Debentures	3,00,000
Bank Overdraft	50,000	Equity Share Capital	10,00,000
Profit and Loss A/c (Credit)	2,25,000	Proposed Dividend	90,000
Long Term Investments	20,000	Advance Tax	1,00,000
Provision for Tax	2,00,000	Bills Payable	45,000
Preliminary Expenses not yet w/off	25,000	Unclaimed Dividend	25,000

You are required to arrange the above items in the form of vertical (columnar) Balance Sheet and determine: (a) Current Assets, (b) Fixed Assets, (c) Current Liabilities, (d) Proprietary Funds, (e) Quick Assets and (f) Quick Liabilities.

18. From the following data, prepare the Balance Sheet of ABC Co. Ltd. as at 31st March, 2009:

Current Ratio	1.75
Liquid Ratio (Current Assets less Stock to Current Liabilities Ratio)	1.25
Gross Profit Ratio	25%
Debt Collection Period	1.5 months
Sales for the Year	₹ 12,00,000
Stock Turnover Ratio (Based on Closing Stock)	9
Capital Gearing Ratio (Long-term Debt/Share Capital)	0.60
Fixed Assets to Net Worth	1.25
Cost of Sales to Fixed Assets	1.20
Reserves and Surplus to Share Capital	0.20
(Assume all sales are on credit, and the year is of 360 operating days)	

19. Following are the Balance Sheet of X Ltd. and A Ltd. as on 31st March, 2014 together with supplementary information for the year ended on that date:

Balance Sheet as on 31st March, 2014

Liabilities	X Ltd. ₹	Y Ltd. ₹	Assets	X Ltd. ₹	X Ltd. ₹
Paid up Share Capital	2,00,000	3,50,000	Goodwill	30,000	50,000
Reserves	50,500	60,000	Building	1,20,000	2,40,000
Profit and Loss A/c	12,250	1,02,200	Plant and Machinery	29,000	42,000
Bank Overdraft	11,250	14,800	Stock	66,000	93,000
Sundry Creditors	36,000	58,000	Debtors	85,000	1,75,000
Provisions for Taxation	20,000	15,000			
	3,30,000	6,00,000		3,30,000	6,00,000

Additional Information:

	X Ltd.	A Ltd.
Sales for the year	8,40,000	10,50,000
Stock on 31st March, 2003	60,000	1,07,000
Gross Profit	2,10,000	2,50,000

You are required to compute the following ratios of both companies: (a) Current Ratio, (b) Liquid Ratio, (c) Proprietary Ratio, (d) Stock Turnover Ratio and (e) Debtors Turnover Ratio in number of times.

Also give your opinion on short-term and immediate financial solvency. All sales are on credit basis.

20. Classify the following accounts and state whether it is: (i) Current Assets, (ii) Fixed Assets, (iii) Current Liability, (iv) Long-term Liability, (v) Shareholders' Fund and (vi) None of these:

(a) Delivery truck	(g) Trade mark
(b) Accounts payable	(h) Short-term investment
(c) Bills payable (90 days)	(i) Income tax payable
(d) Delivery expenses	(j) Debenture redeemable after seven years
(e) Equity capital	(k) Tsunami relief fund deducted from employee's salary

(f) Prepaid insurance

(l) Depreciation

21. From the information given below, prepare Balance Sheet in a vertical form, suitable for analysis and calculate the following ratios: (a) Capital Gearing Ratio, (b) Proprietary Ratio, (c) Current Ratio, (d) Liquid Ratio and (e) Stock of Working Capital.

Liabilities	₹	Assets	₹
Cash at Bank	12,500	Land and Building	2,00,000
Expenses Paid in Advance	15,500	Stock	68,250
Creditors	1,01,500	Debtors	1,30,750
Bills Receivable	5,250	Plant and Machinery	1,36,000
12% Debentures	62,500	Loan from Director	1,00,000
Equity Share Capital	2,50,000	(Repayable after three years)	
Profit and Loss A/c	54,250		

22. Complete the following balance sheet from the information given below:

Liabilities	₹	Assets	₹
Equity Share Capital (₹ 10 each)	?	Fixed Assets	?
Reserve and Surplus	?	Current Assets:	
20% Debentures	5,00,000	Stock	?
Current Liabilities:		Debtors	?
Sundry Creditors	?	Bank/Cash Balance	?
Provision for Tax (Current Year)	?		—
	?		?

Following information is available:

- Gross profit ratio is 25% and G.P. is ₹ 12,00,000.
- Operating expenses (including debentures interest) ₹ 8,00,000.
- Rate of Income tax is 50%.
- Purchases and sales are on credit basis.
- Debtors turnover ratio (Sales/Debtors) = 12 times.
- Creditors turnover ratio (Cost of Sales/Creditors) = 12 times.
- Earning per share ₹ 20.
- Stock turnover ratio = 10 times.
- Debt-equity ratio 0.25 : 1.
- Current ratio 2 : 1.

23. Following is the Profit and Loss A/c and Balance Sheet of Adhiraj Ltd.:

Profit and Loss A/c for the year ended 31st December, 2014

Particulars	₹	Particulars	₹
To Opening Stock	20,000	By Sales	4,50,000
To Purchases	2,00,000	By Closing Stock	80,000
To Wages	50,000		
To Factory Expenses	70,000		
To Gross Profit c/d	1,90,000		

	5,30,000		5,30,000
To Administration Expenses	60,000	By Gross Profit b/d	1,90,000
To Selling Expenses	40,000	By Interest Received	5,000
To Interest on Loan	5,000		
To Debenture Interest	8,000		
To Net Profit	82,000		
	1,95,000		1,95,000
To Tax Provision	20,000	By Net Profit	82,000
To Proposed Dividend	20,000		
To Balance Profit	42,000		
	82,000		82,000

Balance Sheet as on 31st December, 2014

Liabilities	₹	Liabilities	₹
Equity Share Capital (₹ 10)	2,00,000	Land and Building	1,75,000
9% Preference Share Capital	1,50,000	Machinery	1,50,000
8% Debentures	1,00,000	Furniture	1,00,000
Reserve	50,000	Goodwill	50,000
Profit and Loss A/c	30,000	Patents	50,000
Short-term Loan (Repaid within one year)	1,00,000	Vehicles	1,40,000
Bank Overdraft	75,000	Investment	50,000
Sundry Creditors	1,40,000	Stock	80,000
Bills Payable	30,000	Debtors	90,000
Provision for Tax	20,000	Bills Receivable	30,000
Proposed Dividend	20,000		
	9,15,000		9,15,000

Market price of equity share is ₹ 7.

Calculate the following ratios:

(a) Acid Test Ratio	(b) Capital Gearing Ratio
(c) Stock Turnover Ratio	(d) Debtors Turnover Ratio
(e) Creditors Turnover Ratio	(f) Return on Capital Employed Ratio
(g) Stock to Working Capital Ratio	(h) Operating Ratio.

Note: Vertical final accounts need not be prepared.

24. Following are the financial statements of two similar companies:

Balance Sheet as at 31st December, 2014

Liabilities	X Ltd. ₹	Y Ltd. ₹	Assets	X Ltd. ₹	Y Ltd. ₹
Share Capital			Land and Building	1,400	1,200
Equity Shares of ₹ 10 each	4,000	4,000	Plant	4,100	3,200
Revenue Reserve	1,950	1,000	Stock	2,850	2,100
8% Debentures	1,000	1,000	Debtors	2,600	1,900
Trade Creditors	2,800	1,400	Investment (Long-term)	—	300
Other Creditors	250	200	Bank	100	300

Provision for Tax	900	700	Deposits	150	100
Proposed Dividend	300	200			
	11,200	9,100		11,200	9,100

Income Statement for 2014

Particulars	X Ltd.	Y Ltd.	Particulars	X Ltd.	X Ltd.
Cost of Sales	10,800	9,000	Sales	15,000	12,000
Operating Expenses	2,900	2,000			
Taxation	550	410			
Net Profit after Tax	750	590			
	15,000	12,000		15,000	12,000

On the basis of above information, you are required to compute separately the following ratios: (a) Capital Gearing Ratio, (b) Current Ratio, (c) Debtors Turnover Ratio and (d) Return on Proprietary Fund.

Note: Vertical final accounts need not be prepared

(T.Y. B.Com., Modified)

25. From the following information, calculate:

- (a) Return on Capital Employed (b) Debtors Turnover Ratio (in times)
(c) Stock to Working Capital Ratio (d) Current Ratio
(e) Proprietary Ratio (on the basis of Total Fund)

Some of relevant balances as on 31st March, 2014 are given below:

Particulars	₹
Equity Share Capital (of ₹ 10each)	2,00,000
6% Preference Share Capital	1,00,000
8% Debentures	1,50,000
Debtors	18,000
Creditors	15,000
Cash in Hand	20,000
Bills Receivable	12,000
Bank Overdraft	8,000
Reserves and Surplus	43,000
Closing Stock	32,500
Provision for Taxation	35,000
Proposed Dividend	10,000

Other information for the year 2013-14:

Particulars	₹
Sales	10,00,000
Cost of Sales	7,50,000
Net Profit before Tax	1,00,000

26. Pawan Ltd. has the following Trading and Profit and Loss Account for the year ended 31st December, 2014 and Balance Sheet as at that date.

Trading and Profit and Loss Account for the year ended 31st December, 2014

Particulars	₹	₹	Particulars	₹	₹
To Opening Stock		3,50,000	By Sales		
To Purchases – Credit		16,50,000	Cash	6,00,000	
To Carriage – Inward		5,00,000	Credit	24,00,000	30,00,000
To Gross Profit c/d		8,00,000	By Closing Stock		3,00,000
Total		33,00,000	Total		33,00,000
To Administrative Expenses		1,92,000	By Gross Profit b/d		8,00,000
To Selling Expense		50,000	By Other Income		18,000
To Depreciation		1,00,000			
To Interest		94,000			
To Income Tax		1,30,000			
To Net Profit c/d		2,52,000			
Total		8,18,000	Total		8,18,000

Balance Sheet as on 31st December, 2014

Liabilities	₹	Assets	₹	₹
Equity Share Capital (₹ 10)	7,00,000	Plant and Machinery	20,00,000	
10% Preference Share Capital	4,00,000	Less: Depreciation	5,00,000	
Reserve and Surplus	4,00,000			15,00,000
Long-term Loan	1,00,000	Goodwill		2,80,000
Debentures	6,00,000	Stock		3,00,000
Creditors	1,20,000	Debtors		2,00,000
Bills Payable	40,000	Prepaid Expenses		50,000
Accrued Expenses	40,000	Marketable Securities		1,50,000
Provision for Tax	1,30,000	Cash		50,000
Total	25,30,000	Total		25,30,000

The market price of the share of the company on 31st December, 2014 was ₹ 9.25.

Particulars	₹	₹
Reserves at the beginning	2,93,000	
Net Profit during the year	2,52,000	5,45,000
Interim Dividend		1,45,000
Reserves at the close of the year		4,00,000

Calculate the following ratios: (a) Return on Proprietors' Fund, (b) Acid Test Ratio, (c) Inventory Net Current Asset Ratio, (d) Capital Gearing Ratio, (e) Debt Service Ratio, (f) Creditors Turnover Ratio, (g) Opening Ratio and (h) Stock Turnover Ratio.

Note: No need to convert the statements into vertical form.

(T.Y.B.Com., Modified)

27. Following are the Balance Sheets of X Ltd. as on 31st March, 2014 and 31st March, 2015.

Liabilities	31-3-2014 ₹	31-3-2015 ₹
Share Capital	4,50,000	6,60,000
Retained Earnings	2,31,000	2,00,000
Provision for Income	84,000	—
Debentures	2,20,000	1,80,000
Accounts Payable	58,000	64,000

Other Current Liabilities	21,000	33,000
	10,64,000	11,37,000
Assets		
Building and Equipments	4,50,000	5,00,000
Land	80,000	80,000
Patents	55,000	65,000
Accounts Receivables	54,000	46,000
Inventories	3,00,000	3,12,000
Prepaid Expenses	6,000	4,000
Cash	1,19,000	1,30,000
	10,64,000	11,37,000

Calculate following ratios for two years and make comparison: (i) Debt-equity Ratio, (ii) Quick Ratio, (iii) Stock to Working Capital Ratio and (iv) Proprietary Ratio.

28. Following is the Balance Sheet of Star Products Ltd.

Liabilities	As on 31/03/2014 (₹)	Assets	As on 31/03/2014 (₹)
Equity Share Capital	5,00,000	Fixed Assets	13,00,000
General Reserve	3,00,000	Investments	4,00,000
Securities Premium	25,000	Stock	8,50,000
10% Debentures	7,50,000	Sundry Debtors	5,00,000
Profit and Loss A/c	7,40,000	Prepaid Expenses	40,000
Sundry Creditors	2,30,000	Advance Income Tax	78,000
Bank Overdraft	3,95,000	Cash and Bank Balances	62,000
Provision for Taxation	1,80,000	Share Issue Expenses	10,000
Proposed Equity Dividend	1,50,000	Preliminary Expenses	30,000
Total	32,70,000	Total	32,70,000

You are required to compute the following ratios and give your comments on each ratio with reference to standard ratio: (i) Current Ratio, (ii) Liquid Ratio, (iii) Proprietary Ratio and (iv) Stock to Working Capital Ratio.

Preparing Balance Sheet in vertical form is not required.

(T.Y. B.Com., Modified)

29. Following is the Revenue statement of PRODENT LTD.:

Trading, Profit and Loss Account for the year ended 31st March, 2014

Particulars	₹	Particulars	₹
To Opening Stock	27,150	By Sales	2,55,000
To Purchases	1,63,575	By Closing Stock	42,000
To Carriage Inward	4,275	By Interest Received on Investment	2,700
To Office Expenses	45,000		
To Sales Expenses	13,500		
To Loss on Sale of Fixed Assets	1,200		
To Net Profit c/d	45,000		
Total	2,99,700	Total	2,99,700

Calculate the following ratios: (a) Gross Profit Ratio, (b) Operating Ratio, (c) Stock Turnover Ratio, (d) Office Expenses Ratio and (e) Net Profit before Tax Ratio.

Note: Vertical revenue statement need not be prepared.

(T.Y. B.Com., Modified)

30. M/s. MILIND PRODUCT LTD. furnishes you their Profit and Loss Account for year ending 31st March, 2014 and Balance Sheet as on that date.

Dr.		Profit and Loss Account		Cr.
Particulars	₹	Particulars	₹	
To Cost of Goods Sold	9,50,000	By Sales	16,00,000	
To Opening Expenses	2,57,000			
To Interest	43,000			
To Provision for Taxation	1,75,000			
To Net Profit c/d	1,75,000			
	16,00,000		16,00,000	
To Provision for dividend	70,000	By Balance b/f	50,000	
To Balance c/f	1,55,000	By Net Profit b/d	1,75,000	
Total	2,25,000	Total	2,25,000	

Balance Sheet

Liabilities	₹	Assets	₹
Equity Share Capital (₹ 10 each)	2,50,000	Land and Building	5,00,000
10% Preference Share Capital (₹ 100 each)	2,00,000	Plant and Machinery	3,50,000
General Reserves	2,50,000	Cop Rights	1,00,000
Profit and Loss A/c	1,55,000	Furniture	2,00,000
Securities Premium	50,000	Stock	3,00,000
9% Debentures	2,00,000	Debtors	2,00,000
Public Deposits	2,50,000	Bills Receivables	1,00,000
Accounts Payable	2,50,000	Cash and Bank	50,000
Bank Overdraft	50,000	Advance Tax	1,00,000
Provision for Taxation	1,75,000		
Provision for Dividend	70,000		
Total	19,00,000	Total	19,00,000

Market price per Equity Share ₹ 25.

Closing Stock is ₹ 1,00,000 less than the opening stock.

Calculate following ratios:

- (a) Opening Ratio (b) Stock Turnover Ratio
 (c) Stock to Working Capital Ratio (d) Dividend Payment Ratio
 (e) Return on Equity Share Capital.

Vertical statement of account not expected.

(T.Y. B.Com., Modified)

31. Calculate Stock Turnover Ratio from the following:

Particulars	₹	Particulars	₹
To Opening Stock	1,75,000	By Sales	25,00,000
To Purchases	16,50,000	By Closing Stock	1,50,000
To Wages	3,00,000		
To Carriage Inward	25,000		
To Gross Profit	5,00,000		
	26,50,000		26,50,000

32. Following is the Balance Sheet of Bills and Happiness Ltd. as at 31st March, 2014.

Liabilities	₹	Liabilities	₹
Equity Share Capital	1,00,000	Machinery	2,96,000
General Reserve	70,000	Investment	1,12,000
10% Preference Capital	1,80,000	Stock in Trade	1,01,000
15% Debentures	1,20,000	Bills Receivable	20,000
Trade Payables	1,22,000	Trade Receivable Cash and Bank	49,000
Bank Overdraft	20,000	Profit and Loss A/c	38,000
Provision for Tax	18,000		14,000
Total	6,30,000	Total	6,30,000

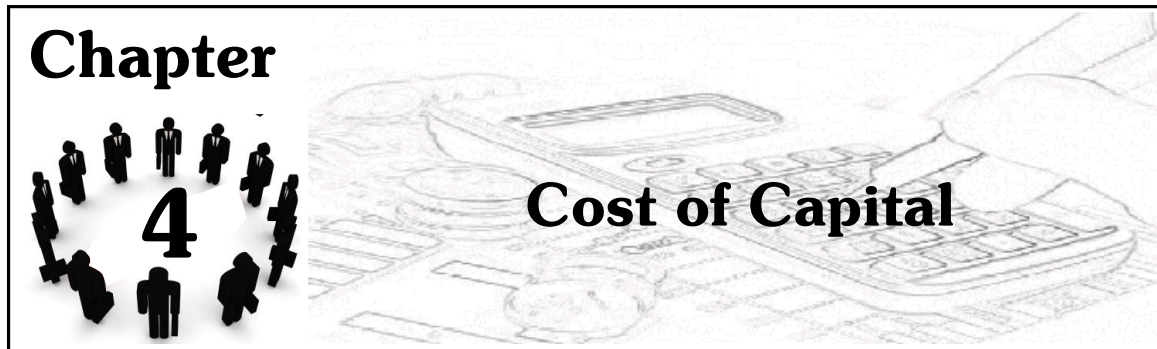
Sales for the year ₹ 7,00,000; Gross profit Rate – 25% and opening stock is ₹ 1,09,000. Profit before Tax for the year ending 31st March, 2014 is ₹ 2,10,000.

You are required to compute the following and comment on:

- (i) Current Ratio
- (ii) Acid Test Ratio
- (iii) Stock Turnover Ratio
- (iv) Capital Gearing Ratio
- (v) Proprietary Ratio
- (vi) Debt-equity Ratio (Debt/Net Worth)
- (vii) Return on Capital Employed

Redrafting the given Balance Sheet in vertical format is not expected. (T.Y. B.Com., Modified)





INTRODUCTION

Capital structure is the mix of long-term sources of funds like debentures, loans, preference shares, equity shares and retained earnings in different ratios. It is always advisable for companies to plan their capital structure. Decisions taken by not assessing things in a correct manner may jeopardize the very existence of the company. Firms may prosper in the short-run by not indulging in proper planning but ultimately may face problems in future. With unplanned capital structure, they may also fail to economize the use of their funds and adapt to the changing conditions.

Designing an Ideal Capital Structure

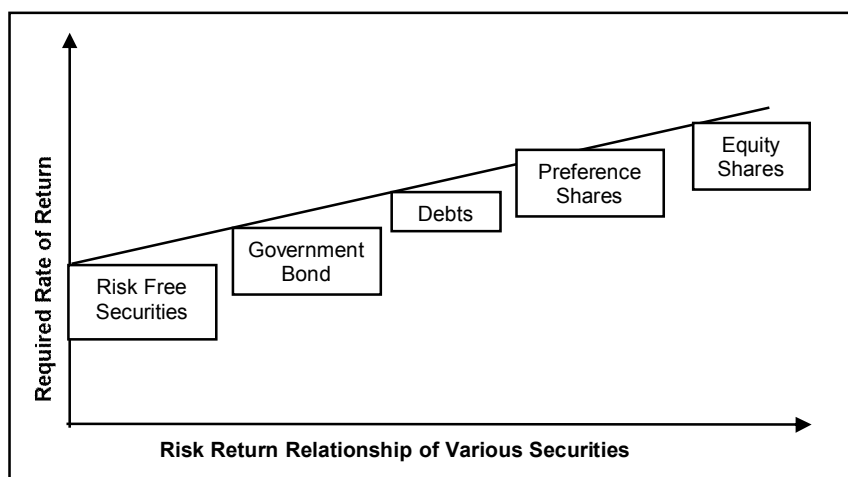
It requires a number of factors to be considered such as:

- **Return:** The capital structure of a company should be most advantageous. It should generate maximum returns to the shareholders for a considerable period of time and such returns should keep increasing.
- **Risk:** As already discussed in the previous chapter on leverage, use of excessive debt funds may threaten the company's survival. Debt does increase equity holders' returns and this can be done till such time that no risk is involved.
- **Flexibility:** The company should be able to adapt itself to situations warranting changed circumstances with minimum cost and delay.
- **Capacity:** The capital structure of the company should be within the debt capacity. Debt capacity depends on the ability for funds to be generated. Revenues earned should be sufficient enough to pay creditors' interests, principal and also to shareholders to some extent.
- **Control:** An ideal capital structure should involve minimum risk of loss of control to the company. Dilution of control by indulging in excessive debt financing is undesirable.

With the above points on ideal capital structure, raising funds at the appropriate time to finance firm's investment activities is an important activity of the Finance Manager. Golden opportunities may be lost for delaying decisions to this effect. A combination of debt and equity is used to fund the activities. What should be the proportion of debt and equity? This depends on the costs associated

with raising various sources of funds. The cost of capital is the minimum rate of return a company must earn to meet the expenses of the various categories of investors who have made investment in the form of loans, debentures, equity and preference shares. A company not being able to meet these demands may face the risk of investors taking back their investments thus leading to bankruptcy. Loans and debentures come with a pre-determined interest rate, preference shares also have a fixed rate of dividend while equity holders expect a minimum return of dividend based on their risk perception and the company's past performance in terms of pay-out of dividends.

The following graph on risk-return relationship of various securities summarizes the above discussion.



Now that we are familiar with the different sources of long-term finance, let us find out what it costs the company to raise these various types of finance. The cost of capital to a company is the minimum rate of return that it must earn on its investments in order to satisfy the various categories of investors who have made investments in the form of shares, debentures or term loans. Unless the company earns this minimum rate, the investors will be tempted to pull out of the company, leave alone participate in any further capital investment in that company. For example, equity investors expect a minimum return as dividend on their perception of the risk undertaken based on the company's past performance, or on the returns they are getting from shares they have of other companies.

The weighted arithmetic average of the cost of different financial resources that a company uses is termed as its cost of capital. Let us look at a simple example. A company has a total capital base of ₹ 500 lakh in the ratio of 1:1 of debt-equity i.e., divided equally between debt and equity; ₹ 250 lakh of debt and ₹ 250 lakh of equity. If the post-tax costs of debt and equity are 7% and 18% respectively, the cost of capital to the company will be equal to the weighted average cost i.e.,

$$\frac{250}{500} \times 7\% + \frac{250}{500} \times 18\% = 12.5\%.$$

Assumptions

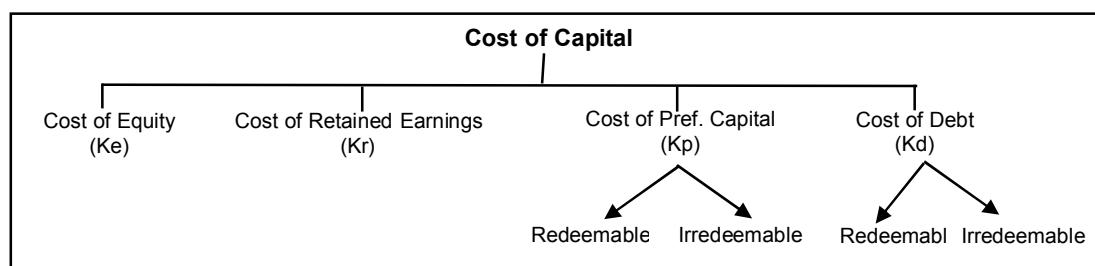
Given this definition of cost of capital, it must be noted that the use of this measure for appraising new investments will depend upon two important assumptions:

- the risk characterizing the new project under consideration is not significantly different from the risk characterizing the existing investments of the firm, and
- the firm will continue to pursue the same financing policies. Put differently, there will be no deviation from the debt-equity mix presently adopted by the firm.

For calculating the cost of capital of the firm, we have to first define the cost of various sources of finance used by it. The sources of finance that are typically tapped by a firm are:

(a) debentures, (b) term loans, (c) preference capital, (d) equity capital, and (e) retained earnings. The mechanics involved in computing the costs of these sources of finance are discussed in the following section.

COSTS OF DIFFERENT SOURCES OF FINANCE



Cost of Debentures: The cost of a debenture is defined as the discount rate which equates the net proceeds from issue of debentures to the expected cash outflows in the form of interest and principal repayments, i.e.,

$$P = \sum_{t=1}^n \frac{I(1-t)}{(1+k_d)^t} + \frac{F}{(1+K_d)^n} \quad \dots (1)$$

where,

- k_d = Post-tax cost of debenture capital
- I = Annual interest payment per debenture capital
- t = Corporate tax rate
- F = Redemption price per debenture
- P = Net amount realized per debenture and
- n = Maturity period.

The interest payment (I) is multiplied by the factor $(1 - t)$ because interest on debt is a tax-deductible expense and only post-tax costs are considered. An approximation formula as given below can also be used.

$$k_d = \frac{I(1-t) + \frac{F-P}{n}}{\frac{F+P}{2}} \quad \dots (2)$$

Note: When the difference between the redemption price and the net amount realized can be written off evenly over the life of the debentures and the amount so written-off is allowed as a tax-deductible expense, the above two equations can be changed as follows:

Equation (1) becomes

$$P = \frac{I(1-t) - \frac{(F-P)t}{n}}{\frac{F+P}{2}} + \frac{F}{(1+k_d)^n}$$

Equation (2) becomes

$$k_d = \frac{I(1-t) + \frac{F-P}{n}}{\frac{F+P}{2}}$$

The following illustration illustrates the application of this formula.

Illustration 1: Ajax Limited has recently made an issue of non-convertible debentures for ₹ 400 lakh. The terms of the issue are as follows: each debenture has a face value of ₹ 100 and carries a rate of interest of 14 per cent. The interest is payable annually and the debenture is redeemable at a premium of 5 per cent after 10 years.

If Ajax Limited realizes ₹ 97 per debenture and the corporate tax rate is 50 per cent, what is the cost of the debenture to the company?

Solution: Given $I = ₹ 14$, $t = 0.5$, $P = ₹ 97$, and $n = 10$ years, $F = ₹ 105$, the cost per debenture (k_d) will be:

$$k_d = \frac{14(1-0.5) + \frac{105-97}{10}}{\frac{105+97}{2}} = 7.7 \text{ per cent}$$

Illustration 2. Lakshmi Enterprise wants to have an issue of non-convertible debentures for ₹ 10 Cr. Each debenture is of a par value of ₹ 100 having an interest rate of 15%. Interest is payable annually and they are redeemable after 8 years at a premium of 5%. The company is planning to issue the NCD at a discount of 3% to help in quick subscription. If the corporate tax rate is 50%, what is the cost of debenture to the company?

Solution:

$$K_d = \frac{I(1-T) + \{(F-P)/n\}}{(F+P)/2}$$

$$\begin{aligned}
 &= \frac{15(1 - 0.5) + (105 - 97)/8}{(15 + 97)/2} \\
 &= \frac{7.5 + 1}{101} \\
 &= 0.084 \text{ or } 8.4\%
 \end{aligned}$$

Cost of Term Loans: The cost of the term loans will be simply equal to the interest rate multiplied by $(1 - \text{tax rate})$. The interest rate to be used here will be the interest rate applicable to the new term loan. The interest is multiplied by $(1 - \text{tax rate})$ as interest on term loans is also tax deductible.

$$k_t = I(1 - t)$$

Where,

I = Interest rate

t = Tax rate.

Illustration 3: Yes Ltd. has taken a loan of ₹ 50,00,000 from Canara Bank at 9% interest. What is the cost of term loan if the tax rate is 40%?

Solution: $K_t = I(1 - T) = 9(1 - 0.4) = 5.4\%$

Cost of Preference Capital: The cost of a redeemable preference share (k_p) is defined as that discount rate which equates the proceeds from preference capital issue to the payments associated with the same i.e. dividend payment and principal payments, which can be.

$$P = \sum_{t=1}^n \frac{D}{(1 + k_p)^t} + \frac{F}{(1 + k_p)^n} \quad \dots (3)$$

where,

k_p = Cost of preference capital

D = Preference dividend per share payable annually

F = Redemption price

P = Net amount realized per share and

n = Maturity period

An approximation formula as given below can also be used.

$$k_p = \frac{D + \frac{F - P}{n}}{\frac{F + P}{2}} \quad \dots (4)$$

Illustration 4: The terms of the preference share issue made by Color-Dye-Chem are as follows: Each preference share has a face value of ₹ 100 and carries a dividend rate of 14 per cent payable

annually. The share is redeemable after 12 years at par. If the net amount realized per share is ₹ 95, what is the cost of the preference capital?

Solution:

Given that $D = 14$, $F = 100$, $P = 95$ and $n = 12$

$$k_p = 14 + \frac{\frac{100 - 95}{2}}{\frac{100 + 95}{2}} = 0.148 \text{ or } 14.8 \text{ per cent}$$

Illustration 5: C2C Ltd. has recently come out with a preference share issue to the tune of ₹ 100 lakhs. Each preference share has a face value of 100 and a dividend of 12% payable. The shares are redeemable after 10 years at a premium of ₹ 4 per share. The company hopes to realize ₹ 98 per share now. Calculate the cost of preference capital.

Solution:

$$\begin{aligned} k_p &= \frac{D + \{(F - P)/n\}}{(F + P)/2} \\ &= \frac{12 + (104 - 98)/10}{(104 + 98)/2} \\ &= \frac{126}{101} \\ k_p &= 0.1247 \text{ or } 12.47\% \end{aligned}$$

Cost of irredeemable preference share capital (k_p) = $D/NP \times 100$

Where, D = Dividend

NP = Net Proceed

Is Equity Capital free of Cost?

Some people are of the opinion that equity capital is free of cost for the reason that a company is not legally bound to pay dividends and also the rate of equity dividend is not fixed like preference dividends. This is not a correct view as equity shareholders buy shares with the expectation of dividends and capital appreciation. Dividends enhance the market value of shares and therefore equity capital is not free of cost.

Cost of Equity Capital: Measuring the rate of return required by the equity shareholders is a difficult and complex exercise because the dividend stream receivable by the equity shareholders is not specified by any legal contract (unlike in the case of debenture holders). Several approaches are adopted for estimating this rate of return like the dividend forecast approach, capital asset pricing approach, realized yield approach, earnings-price ratio approach, and the bond yield plus risk premium approach.

According to the dividend forecast approach, the intrinsic value of an equity stock is equal to the sum of the present values of the dividends associated with it, i.e.

$$P_e = \sum_{t=1}^n \frac{D_t}{(1 + k_e)^t} \quad \dots (5)$$

where,

P_e = Price per equity share

D_t = Expected dividend per share at the end of year one, and

k_e = Rate of return required by the equity shareholders.

If we know the current market price (P_e) and can forecast the future stream of dividends, we can determine the rate of return required by the equity shareholders (k_e) from equation (5) which is nothing but the cost of equity capital. In practice, the model suggested by equation (5) cannot be used in its present form because it is not possible to forecast the dividend stream completely and accurately over the life of the company. Therefore the growth in dividends can be categorized as nil or constant growth or super normal growth and the equation (5) can be modified accordingly. How to value a security given the required rate of return and pattern of growth, has already been discussed in the chapter 'Valuation of Securities'. Cost of equity from the company's point of view is nothing but the rate at which the intrinsic value of the market price of the share is equal to the discounted value of the dividends. For instance, assume a constant growth rate (g) in DPS. Assuming a constant growth rate in dividends, the equation (5) can be simplified as follows:

$$P_e = \sum_{t=1}^n \frac{D_1}{K_e - g} \quad \dots (6)$$

If the current market price of the share is given (P_e), and the values of D_1 and g are known, then the equation (6) can be rewritten as $k_e = \frac{D_1}{P_e} + g$

The following illustration illustrates the application of this formula.

Illustration 6: The market price per share of Mobile Glycols Limited is ₹ 125. The dividend expected per share a year hence is ₹ 12 and the DPS is expected to grow at a constant rate of 8 per cent per annum. What is the cost of the equity capital to the company?

Solution:

The cost of equity capital (k_e) will be:

$$k_e = \frac{D_1}{P_e} + g = \frac{12}{125} + 0.08 = 17.6 \text{ per cent}$$

Illustration 7: Suraj Metals are expected to declare a dividend of ₹ 5 per share and the growth rate in dividends is expected to grow @ 10% p.a. The price of one share is currently at ₹ 110 in the market. What is the cost of equity capital to the company?

Solution:

$$\begin{aligned} k_e &= (D_1/P_e) + g \\ &= (5/110) + 0.10 \\ &= 0.1454 \text{ or } 14.54\% \end{aligned}$$

Realized Yield Approach: According to this approach, the past returns on a security are taken as a proxy for the return required in the future by the investors. The assumptions behind this approach are that (a) the actual returns have been in line with the expected returns, and (b) the investors will continue to have the same expectations from the security. As these assumptions generally do not hold good in real life, the results of this approach are normally taken as a starting point for the estimation of the required return. The realized return over a n-year period is calculated as $(W_1 \times W_2 \times \dots \times W_n)^{1/n} - 1$

Where W_t , referred to as the wealth ratio, is calculated as $\frac{D_t + P_t}{P_{t-1}}$ and $t = 1, 2, \dots, n$.

D_t = Dividend per share for year t payable at the end of year

P_t = Price per share at the end of year t.

Illustration 8:

Year	1	2	3
DPS(₹)	1.50	2.00	1.50
Price per share at the end of the year	12.00	11.00	12.00

The wealth ratios are:

If the price per share at the beginning of the year 1 is ₹ 10.

Year	1	2	3
Wealth ratio	1.35	1.08	1.23

Realized yield = $(1.35 \times 1.08 \times 1.23)^{1/3} - 1$
 = 0.2149 or 21.5%

Capital Assets Pricing Model Approach: This model establishes a relationship between the required rate of return of a security and its systematic risks expressed as β . According to this approach, the cost of equity is reflected by the following equation:

$$k_i = R_f + \beta_i (R_m - R_f) \quad \dots (7)$$

where,

k_i = Rate of return required on security i

R_f = Risk-free rate of return

β_i = Beta of security i

R_m = Rate of return on market portfolio.

The CAPM model is based on some assumptions, some of which are:

- Investors are risk-averse.
- Investors make their investment decisions on a single-period horizon.
- Transaction costs are low and therefore can be ignored. This translates to assets being bought and sold in any quantity desired. The only considerations mattering are the price and amount of money at the investor's disposal.
- All investors agree on the nature of return and risk associated with each investment.

Illustration 9: What is the rate of return for a company if its β is 1.5, risk free rate of return is 8% and the market rate of return is 20%.

Solution:

$$\begin{aligned}k_e &= R_f + \beta(R_m - R_f) \\&= 0.08 + 1.5(0.2 - 0.08) \\&= 0.08 + 0.18 \\&= 0.26 \text{ or } 26\%\end{aligned}$$

Bond Yield Plus Risk Premium Approach: The logic behind this approach is that the return required by the investors is directly based on the risk profile of a company. This risk profile is adequately reflected in the return earned by the bondholders. Yet, since the risk borne by the equity investors is higher than that by the bondholders, the return earned by them should also be higher. Hence this return is calculated as:

Yield on the long-term bonds of the company + Risk premium.

This risk premium is a very subjective figure which is arrived at after considering the various operating and financial risks faced by the firm. Though these risks are already factored in the bond yield, since by nature equity investment is riskier than investments in bonds and is exposed to a higher degree of the firm's risks, they also have an impact on the risk-premium. For example, let us take two companies A and B, A having a net profit margin of 5% and B of 10% with other things being equal. Since company B faces less downside risk compared to company A, it will have to pay less interest to its bondholders. Hence, the risk of a company is already accounted for in the bondholders' return. Yet, when it comes to estimating the equityholders' risk premium, these risks are considered all over again because the equityholders are going to bear a larger part of these risks. In fact, these risks being taken into account for fixing the bondholders' return will result in a multiple increase in the equityholders' risk. Hence, the equityholders of company A will receive a higher risk premium than those of company B.

Earnings Price Ratio Approach: According to this approach, the cost of equity can be calculated as:

$$k_e = E_1/P$$

where,

E_1 = Expected EPS for the next year

P = Current market price per share

E_1 can be arrived at by multiplying the current EPS by $(1 + \text{growth rate})$.

This ratio assumes that the EPS will remain constant from the next year onwards.

There are two parameters which have to be analyzed to see if this approach will provide an accurate result or not. They are dividend payout ratio and the rate of return the firm is capable of earning on the retained earnings. The results are accurate in the following two scenarios:

- When all the earnings are paid out as dividends. Here the rate of return the firm is capable of earning becomes irrelevant. or,
- The dividend payout ratio is less than 100 per cent and retained earnings are expected to earn a rate of return equal to the cost of equity.

In all other cases there is scope for this approach not giving an accurate estimate. The option (a) is not normally seen in real life situations, while it is difficult to foresee the option (b). This approach should hence be used with caution.

Cost of Retained Earnings: Earnings of a firm can be reinvested or paid as a dividend to the shareholder. If the firm retained part of its earnings for future growth of the firm, the shareholder will demand compensation from the firm for using that money. As a result, the cost of retained earnings simply represents a shareholder's expected return from the firm's common stock. Viewing retained earnings as fully subscribed issued of additional common stock we can set the firm's cost of retained earnings k_r to the cost of equity capital.

$$\text{i.e., } k_r = k_e$$

The cost of retained earnings is always less than the cost of new issue of common stock due to absence of floating costs when projects with retained earnings.

Cost of External Equity: Cost of external equity comes into the picture when there are certain flotation costs involved in the process of raising equity from the market. It is the rate of return that the company must earn on the net funds raised, in order to satisfy the equityholders' demand for return. Under the dividend capitalization model, the following formula can be used for calculating the cost of external equity:

$$K'_e = \frac{D_1}{P_0(1-f)} + g$$

where,

K'_e = cost of external equity

D_1 = dividend expected at the end of year 1

P_0 = current market price per share

g = constant growth rate applicable to dividends

f = flotation costs as a percentage of the current market price.

For all other approaches, there is no particular method for accounting for the flotation costs. The following formula can be used as an approximation in such cases:

$$K'_e = k_e / (1 - f)$$

where,

K_e = rate of return required by the equity investors

K'_e = cost of external equity

f = flotation costs as a percentage of the current market price.

Illustration 10: Asbestos Limited has got ₹ 100 lakh of retained earnings and ₹ 100 lakh of external equity through a fresh issue, in its capital structure. The equity investors expect a rate of return of 18%. The cost of issuing external equity is 5%. The cost of retained earnings and the cost of external equity can be determined as follows: Cost of retained earnings:

$$k_r = k_e \text{ i.e., } 18\%$$

Cost of external equity raised by the company:

$$\text{Now } K'_e = \frac{k_e}{1-f} = \frac{0.18}{1-0.05} = 18.95\%$$

Illustration 11: Alpha Ltd. requires ₹ 400 Cr to expand its activities in the southern zone of India. The company's CFO is planning to get ₹ 250 Cr through a fresh issue of equity shares to the general public and for the balance amount he proposes to use ½ of the reserves which are currently to the tune of ₹ 300 Cr. The equity investors' expectations of returns are 16%. The cost of procuring external equity is 4%. What is the cost of external equity?

Solution:

We know that $k_e = k_r$, that is k_r is 16%

Cost of external equity is:

$$\begin{aligned} K'_e &= k_e / (1 - f) \\ &= 0.16 / (1 - 0.04) = 0.1667 \text{ or } 16.67\% \end{aligned}$$

Weighted Average Cost of Capital: In the previous section we have calculated the cost of each component in the overall capital of the company. The term cost of capital refers to the overall composite cost of cap or the weighted average cost of each specific type of fund. The purpose of using weighted average is to consider each component in proportion of their contribution to the total fund available. Use of weighted average is preferable to simple average method for the reason that firms do not procure funds equally from various sources and therefore simple average method is not used. The following steps are involved to calculate the WACC.

Step I: Calculate the cost of each specific source of fund, that of debt, equity, preference capital and term loans.

Step II: Determine the weights associated with each source.

Step III: Multiply the cost of each source by the appropriate weights.

Step IV: $WACC = W_e k_e + W_r k_r + W_p k_p + W_d k_d + W_t k_t$

Assignment of Weights: Weights can be assigned based on any of the below mentioned methods:

1. The book values of the sources of funds in the capital structure,
2. Present market value of the funds in the capital structure and
3. In the proportion of financing planned for the capital budget to be adopted for the next period.

As per the book value approach, weights assigned would be equal to each source's proportion in the overall funds. The book value method is preferable. The market value approach uses the market values of each source and the disadvantage in this method is that these values change very frequently.

Illustration 12: Prakash Packers Ltd. has the following capital structure:

	₹ in lakhs
Equity Capital (₹ 10 par value)	200
14% Preference Share Capital ₹ 100 each	100
Retained Earnings	100
12% Debentures (₹ 100 each)	300
11% Term loan from ICICI Bank	50
Total	750

The market price per equity share is ₹ 32. The company is expected to declare a dividend per share of ₹ 2 per share and there will be a growth of 10% in the dividends for the next 5 years. The preference shares are redeemable at a premium of ₹ 5 per share after 8 years and are currently traded at ₹ 84 in the market. Debenture redemption will take place after 7 years at a premium of ₹ 5 per debenture and their current market price is ₹ 90 per unit. The corporate tax rate is 40%. Calculate the WACC.

Solution:

Step I: is to determine the cost of each component.

$$k_e = (D_1/P_0) + g$$

$$= (2/32) + 0.1$$

$$= 0.1625 \text{ or } 16.25\%$$

$$k_p = [D + \{(F - P)/n\}]/(F + P)/2$$

$$= [14 + (105 - 84)/8]/(105 + 84)/2$$

$$= 16.625/94.5$$

$$= 0.1759 \text{ or } 17.59\%$$

$$k_r = k_e \text{ which is } 16.25\%$$

$$k_d = [I(1 - T) + \{(F - P)/n\}]/\{F + P\}/2$$

$$= [12(1 - 0.4) + (105 - 90)/7]/(105 + 90)/2$$

$$= [7.2 + 2.14]/97.5$$

$$= 0.096 \text{ or } 9.6\%$$

$$k_t = I(1 - T)$$

$$= 0.11(1 - 0.4)$$

$$= 0.066 \text{ or } 6.6\%$$

Step II: is to calculate the weights of each source.

$$W_e = 200/750 = 0.267$$

$$W_p = 100/750 = 0.133$$

$$W_r = 100/750 = 0.133$$

$$W_d = 300/750 = 0.4$$

$$W_t = 50/750 = 0.06$$

Step III: Multiply the costs of various sources of finance with corresponding weights and WACC calculated by adding all these components.

$$\begin{aligned} \text{WACC} &= W_e k_e + W_p k_p + W_r k_r + W_d k_d + W_t k_t \\ &= (0.267 \times 0.1625) + (0.133 \times 0.1759) + (0.133 \times 0.1625) + (0.4 \times 0.092) + (0.06 \times 0.066) \\ &= 0.043 + 0.023 + 0.022 + 0.0384 + 0.004 \\ &= 0.1304 \text{ or } 13.04\% \end{aligned}$$

Illustration 13: Johnson Cool Air Ltd., would like to know the WACC. The following information is made available to you in this regard.

The after tax cost of capital are:

- Cost of debt 9%
- Cost of preference shares 15%
- Cost of equity funds 18%

The capital structure is as follows:

- Debt ₹ 6,00,000
- Preference capital ₹ 4,00,000
- Equity capital ₹ 10,00,000

Solution:

Fund source	Amount	Ratio	Cost	Weighted cost
Debt	₹ 6,00,000	0.3	0.09	0.027
Preference capital	₹ 4,00,000	0.2	0.15	0.03
Equity capital	₹ 10,00,000	0.5	0.18	0.09
Total	₹ 20,00,000	1.0		0.147

WACC is 14.7%

Illustration 14: Manikyam Plastics Ltd. wants to enter into the arena of plastic moulds next year for which it requires ₹ 20 Cr. to purchase new equipment. The CFO has made available the following details based on which you are required to compute the weighted marginal cost of capital.

- The amount required will be raised in equal proportions by way of debt and equity (new issue and retained earnings put together account for 50%).

- The company expects to earn ₹ 4 Cr as profits by the end of year of which it will retain 50% and pay off the rest to the shareholders.
- The debt will be raised equally from two sources – loans from IOB costing 14% and from the IDBI costing 15%.
- The current market price per equity share is ₹ 24 and dividend pay out one year hence will be ₹ 2.40.

Solution:

Source of Funds	Weights	After Tax Cost	Weighted Cost
Equity Capital	0.4	0.1	0.04
Retained Earnings	0.1	0.1	0.01
14% loan from IOB	0.25	0.07	0.0175
15% IDBI loan	0.25	0.075	0.01875
Total			0.0863 or 8.63%

$$k_e = (D_1/P_0) + g$$

$$= (2.40/24) = 0.1 \text{ or } 10\%$$

$$k_t = I(1 - T)$$

$$= 0.14(1 - 0.5) = 0.07 \text{ or } 7\%$$

$$k_t = I(1 - T)$$

$$= 0.15(1 - 0.5) = 0.075 \text{ or } 7.5\%$$

Illustration 15: Canara Paints has paid a dividend of 40% on its share of ₹ 10 in the current year. The dividends are growing @ 6% p.a. The cost of equity capital is 16%. The Company's top Finance Managers of various zones recently met to take stock of the competitors' growth and dividend policies and came out with the following suggestions to maximize the wealth of the shareholders. As the CFO of the company you are required to analyze each suggestion and take a suitable course keeping the shareholders' interests in mind.

Alternative 1: Increase the dividend growth rate to 7% and lower k_e to 15%

Alternative 2: Increase the dividend growth rate to 7% and increase k_e to 17%

Alternative 3: Lower the dividend growth rate to 4% and lower k_e to 15%

Alternative 4: Lower the dividend growth rate to 4% and increase k_e to 17%

Alternative 5: increase the dividend growth rate to 7% and lower k_e to 14%

Solution:

We all know that $P_0 = D_1/(k_e - g)$

Present case = $4/(0.16 - 0.06) = ₹ 40$

Alternative 1 = $4.28/(0.15 - 0.07) = ₹ 53.5$

Alternative 2 = $4.28/(0.17 - 0.07) = ₹ 42.8$

$$\text{Alternative 3} = 4.16 / (0.15 - 0.04) = ₹ 37.8$$

$$\text{Alternative 4} = 4.16 / (0.17 - 0.04) = ₹ 32$$

$$\text{Alternative 5} = 4.28 / (0.14 - 0.07) = ₹ 61.14$$

Recommendation: The last alternative is likely to fetch the maximum price per equity share thereby increasing their wealth.

Illustration 16: Ventura Home Appliances Ltd. has the following capital structure:

	₹ in lakhs
Equity Capital (10 lakh shares at par value)	100
12 per cent preference capital (10,000 shares at par value)	10
Retained earnings	120
14% Non-convertible Debentures (70,000 debentures at par value)	70
14% term loan from APSFC	100
Total	400

The market price per equity share is ₹ 25. The next expected dividend per share (DPS) is ₹ 2.00 and the DPS is expected to grow at a constant rate of 8 per cent. The preference shares are redeemable after 7 years at par and are currently quoted at ₹ 75 per share on the stock exchange. The debentures are redeemable after 6 years at par and their current market quotation is ₹ 90 per share. The tax rate applicable to the firm is 50 per cent. Calculate the weighted average cost of capital.

Solution: We will adopt a three-step procedure to solve this problem.

Step I: Determine the costs of the various sources of finance. We shall define the symbols k_e , k_r , k_p , k_d and k_i to denote the costs of equity, retained earnings, preference capital, debentures, and term loans respectively.

Note: Market price can be taken as a close substitute of the net amount realizable per share or debenture.

Step II: Determine the weights associated with the various sources of finance. One issue to be resolved before concluding this section relates to the system of weighting that must be adopted for determining the weighted average cost of capital. The weights can be used on: (i) book values of the sources of finance included in the present capital structure, (ii) present market value weights of the sources of finance included in the capital structure and (iii) proportions of financing planned for the capital budget to be adopted for the forthcoming period. Let us assume the book value approach and the weights of a source of fund, according to book value approach is equal to the book value of that particular source divided by the total of the book values of all sources i.e., weight given to equity would be equal to book value of equity divided by book value of equity, retained earnings, debt, preference shares (if any). Similarly the weights according to the market value approach is equal to the market value of a particular source divided by the market value of all sources. For instance, weight attached to equity is equal to the market value of equity divided by the market value of equity, debt, preference shares, if any. We shall define the symbols W_e , W_r , W_p , W_d and W_i to denote the weights of the various sources of finance.

$$W_e = \frac{100}{400} = 0.25$$

$$W_r = \frac{120}{400} = 0.30$$

$$W_p = \frac{10}{400} = 0.025$$

$$W_d = \frac{70}{400} = 0.175$$

$$W_i = \frac{100}{400} = 0.25$$

Step III: Multiply the costs of the various sources of finance with the corresponding weights and add these weighted costs to determine the weighted average cost of capital (WAC). Therefore,

$$\begin{aligned} \text{WAC} &= W_e k_e + W_r k_r + W_p k_p + W_d k_d + W_i k_i \\ &= (0.25 \times 0.16) + (0.30 \times 0.16) + (0.025 \times 0.1780) + (0.175 \times 0.0912) + (0.25 \times 0.07) \\ &= 0.1259 \text{ or } 12.59 \text{ per cent.} \end{aligned}$$

Illustration 17: Deepak steel has issued non-convertible debentures for ₹ 5 Cr. Each debenture is of a par value of ₹ 100 carrying a coupon rate of 14%. Interest is payable annually and they are redeemable after 7 years at a premium of 5%. The company issued the NCD at a discount of 3%. What is the cost of debenture to the company? Tax rate is 40%.

Solution:

$$\begin{aligned} k_d &= \frac{I(1-T) + \{(F-P)/n\}}{(F-P)/2} \\ &= \frac{14(1-0.40) + (105-97)/7}{(105+97)/2} \\ &= \frac{8.4 + 1.14}{101} \\ &= 0.094 \text{ or } 9.4\% \end{aligned}$$

Illustration 18: Supersonic industries Ltd. has entered into an agreement with Indian Overseas Bank for a loan of ₹ 10 Cr with an interest rate of 10%. What is the cost of the loan if the tax rate is 45%?

Solution:

$$\begin{aligned} k_t &= I(1-T) \\ &= 10(1-0.45) \\ &= 5.5\% \end{aligned}$$

Illustration 19: Prime group issued preference shares with a maturity premium of 10% and a coupon rate of 9%. The shares have a face value of ₹ 100. and are redeemable after 8 years. The company is planning to issue these shares at a discount of 3% now. Calculate the cost of preference capital.

Solution:

$$\begin{aligned}
 k_p &= \frac{D + \{(F - P)/n\}}{(F + P)/2} \\
 &= \frac{-9 + (110 - 97)/8}{(110 + 97)/2} \\
 &= \frac{-9 + 1.625}{103.5} = 10.27\%
 \end{aligned}$$

Illustration 20:

S Ltd. has the following Capital Structure:

		(₹ in Lakhs)
Equity	2,00,000 Shares	40.00
6% Preference	1,00,000 Shares	10.00
8% Debentures	3,00,000 Shares	30.00
		<u>80.00</u>

It proposes to borrow ₹ 20.00 lakhs with interest at 10% p.a. The dividend on equity will increase from ₹ 2 to ₹ 3 per share. You are required to ascertain the change in the Weighted Average Cost of Capital consequent to proposed borrowings.

Solution:

Amount	Dividend	Cost	Proportion	Cost
(₹ in lakhs)		%	%	
40 Equity	4,00,000	10	50.0	5.00
10 Preference	60,000	6	12.5	0.75
30 Debentures	2,40,000	8	37.5	3.00
	7,00,000		100.0	8.75

Weighted Average Cost = 8.75%.

Proposal

	(₹ in lakhs)	Proportion %	Cost %	Weighted Average Cost
Equity	40	40	15	6.00
Preference	10	10	6	0.60
8% Debentures	30	30	8	2.40
10% Debentures	20	20	10	2.00
	100	W.A. Cost		11.00%

There will be a net increase of 2.25% p.a.

Illustration 21: A company has on its books the following amounts and specific costs of each type of capital:

Type of Capital	B.V. ₹	M.V. ₹	Specific Cost %
Debt	4,00,000	3,80,000	5
Preference	1,00,000	1,10,000	8
Equity	6,00,000	12,00,000	13
Retained Earnings	2,00,000	—	9
	13,00,000	16,90,000	

Determine the Weighted Average Cost of Capital using:

1. B.V. Weights.
2. Market Value Weights.

Solution:

Type of Capital	B.V. ₹	Specific Cost %	Proportion %	Cost
Debt	4,00,000	5	30.77	1.54
Preference Capital	1,00,000	8	7.69	0.62
Equity Capital	6,00,000	13	46.15	6.00
Retained Earnings	2,00,000	9	15.3	1.18
	13,00,000	W.A.Cost		9.54

Type of Capital	M.V. ₹	Specific Cost %	Proportion %	Cost
Debt	3,80,000	5	22.49	1.12
Preference Capital	1,10,000	8	6.50	0.52
Equity Capital	12,00,000	13	71.00	9.23
Retained Earnings	—	9	—	—
	16,90,000	W.A.Cost		10.87

Illustration 22: Three companies A, B and C are in the same type of business and hence have similar operating risks. However, the capital structure of each of them is different and the following are the details:

		A	B	C
Equity Share Capital [Face Value A 10 per Share]	₹	4,00,000	2,50,000	5,00,000
Market Value per Share	₹	15	20	12
Dividend per Share	₹	2.70	4	2.88
Debentures [Face Value per Debenture A 100]	₹	Nil	1,00,000	2,50,000
Market Value per Debenture	₹	—	125	80
Interest rate		—	10%	8%

Assume that the current levels of dividends are generally expected to continue indefinitely and the income-tax rate at 50%.

You are required to compute weighted average cost of capital of each company.

Solution:

Cost of Equity:

$$K_E = \frac{\text{Dividend}}{\text{Market Value}} \times 100$$

$$\text{Company A} = \left(\frac{2.70}{15} \right) \times 100 = 18\%$$

$$\text{Company B} = \left(\frac{4}{20} \right) \times 100 = 20\%$$

$$\text{Company C} = \left(\frac{2.88}{15} \right) \times 100 = 24\%$$

Cost of Debt:

$$K_D = \frac{\text{Interest}(1 - \text{Tax})}{\text{Market Value}} \times 100$$

$$\text{Company B} = \frac{\text{₹}10(1 - 0.50)}{\text{₹}125} \times 100 = 4\%$$

$$\text{Company C} = \frac{\text{₹}8(1 - 0.50)}{\text{₹}80} \times 100 = 5\%$$

(at Market Value)

Name of Company	Equity		Debt	
	₹	%	₹	%
A	6,00,000	100	—	—
B	5,00,000	80	1,25,000	20
C	6,00,000	75	2,00,000	25

WACC (at Market Values of Debt and Equity)

$$= (\text{Cost of Equity} \times \% \text{ of Equity}) + (\text{Cost of Debt} \times \% \text{ of Debt})$$

$$A = (18\% \times 1.00) = 18\%$$

$$B = (20\% \times 0.80) + (4\% \times 0.20) = 16.8\%$$

$$C = (24\% \times 0.75) + (5\% \times 0.25) = 19.25\%$$

Illustration 23: The following is an extract from the financial statements of KPN Ltd.:

(₹ lakhs)

Operating Profit	₹ 105

Less: Interest on Debentures	33
Less: Income-tax	72
Net Profit	36
Equity Share Capital (Shares of ₹ 10 each)	200
Reserves and Surplus	100
15% Non-convertible Debentures (of ₹ 100 each)	220
	520

The market price per equity share is ₹ 12 and per debenture ₹ 93.75.

1. What is the Earning per Share?
2. What is the Percentage Cost of Capital to the company for the Debenture Funds and the Equity?

Solution:

1. Earning per Share

$$\begin{aligned}
 \text{EPS} &= \frac{\text{Net Profit after Tax}}{\text{No. of Equity Shares}} \\
 &= \frac{\text{₹ } 36,00,000}{20,00,000 \text{ Shares}} \\
 &= \text{₹ } 1.80
 \end{aligned}$$

2. Calculation of Cost of Equity and Cost of Debt

(a) Cost of Equity (based on Earnings per Share)

$$K_E = \frac{E}{MV}$$

Where, E = Expected Earnings per Share

MV = Market Value per Share

$$\begin{aligned}
 K_E &= \frac{\text{₹ } 1.8}{\text{₹ } 12} \times 100 \\
 &= 15\%
 \end{aligned}$$

(b) Cost of Debt (based on its Market Value)

$$\begin{aligned}
 K_D &= \frac{\text{Annual Interest}(1 - \text{Tax Rate})}{\text{Market Value of Debentures}} \times 100 \\
 &= \frac{\text{₹ } 33,00,000(1 - 0.50)}{\text{₹ } 2,06,25,000} \times 100 \\
 &= 8\%
 \end{aligned}$$

Illustration 24: The following information has Fashions Ltd. as on 31st March, 2009 been extracted from the Balance Sheet of Fashions Ltd. as on 31st March, 2009.

(₹ lakhs)

Equity	400
12% Debentures	400
Term loan (Interest 18%)	1,200
	2,000

1. Determine the weighted average cost of capital of the company. It had been paying dividends at a consistent rate of 20% p.a.
2. What difference will it make if the current price of the A 100 share is A 160?
3. Determine the effect of Income-tax on the cost of capital under both premises.

Solution:

1. Calculation of Weighted Average Cost of Capital of Fashions Ltd. based on Book Value and before consideration of tax shield on interest:

Sources of Capital	Amount (₹ lakhs)	Proportion to Total Capital %	Cost of Capital %	Weighted Cost of Capital
Equity	400	0.20	20	4.00
12% Debentures	400	0.20	12	2.40
Term Loan (18%)	1,200	0.60	18	10.80
Total	2,000	1.00		17.20

The Weighted Average Cost of Capital of the company is 17.2% based on the book value of equity,

2. Calculation of Weighted Average Cost of Capital based on Market Price but before considering tax shield on interest:

Source of Capital	Proportion to Total Capital %	Cost of Capital %	Weighted Cost of Capital %
Equity	0.20	12.5*	02.5
12% Debentures	0.20	12	02.4
Term Loan 18%	0.60	18	10.8
Total	1.00		15.7

*Cost of Equity Capital based on Market Price of Equity Share.

$$= \frac{20}{160} \times 100 = 12.5\% \text{ p.a}$$

3. Calculation of Weighted Average Cost of Capital based on Book Value and after considering tax shields (Assumption Tax rate @ 50%).

Sources of Capital	Cost of Capital %	Tax Shield %	Net Cost of Capital	Proportion of Capital	Weighted Cost
Equity	20	—	20	0.20	4.00

12% Debentures	12	0.5	6	0.20	1.20
Term Loan (18%)	18	0.5	9	0.60	5.40
Weighted Average Cost of Capital					10.60

Calculation of Weighted Average Cost of Capital based on Market Price of Equity Shares and after considering tax shields (Assumption Tax rate @ 50%).

Sources of Capital	Cost of Capital %	Tax Shield %	Net Cost of Capital	Proportion of Capital	Weighted Cost
Equity	12.5	—	12.5	0.20	2.50
12% Debentures	12	0.5	6.0	0.20	1.20
Term Loan (18%)	18	0.5	9.0	0.60	5.40
Weighted Average Cost of Capital					9.10

Illustration 25: (Computation of Cost of Equity Capital, Cost of Debentures, Cost of Preference Shares and Weighted Average Cost of Capital)

You are required to determine the Weighted Average Cost of Capital (K_o) of the K.C. Ltd. using:

1. Book Value Weights; and
2. Market Value Weights.

The following information is available for your perusal.

The K.C. Ltd.'s present book value capital structure is:

(₹ lakhs)

	₹
Debentures (₹ 100 per Debenture)	8,00,000
Preference Shares (₹ 100 per Share)	2,00,000
Equity Shares (₹ 10 per Share)	10,00,000
	20,00,000

All these securities are traded in the capital markets. Recent prices are debentures @

₹ 110, preference shares @ ₹ 120 and equity shares @ ₹ 22. Anticipated external financing opportunities are:

- (i) ₹ 100 per Debenture redeemable at par:
20-year Maturity, 8% Coupon Rate, 4% Flotation Cost, Sale Price ₹ 100.
- (ii) ₹ 100 Preference Share Redeemable at par:
15-year Maturity, 10% Dividend Rate, 5% Flotation Costs, Sale Price ₹ 100.
- (iii) Equity Shares ₹ 2 per Share Flotation Costs, Sale Price ₹ 22.

In addition, the Dividend expected on the Equity Share at the end of the year ₹ 2 per Share; the anticipated growth rate in Dividends is 5% and the company has the practice of paying all its earning in the form of Dividends. The corporate tax rate is 50%.

Solution:**Calculation of Weighted Average Cost of Capital (WACC)**(i) Cost of Equity Capital (K_e)

$$K_e = \frac{D_1}{P_0(1-f)} + g$$

Where K_e = Cost of Equity Capital D_1 = Expected Dividend $P_0(1-f)$ = Sale Price – Flotation Cost g = Growth Rate in Dividend

By substituting, we get;

$$\begin{aligned} K_e &= \frac{\text{₹ } 2}{\text{₹ } 22 - \text{₹ } 2} + 0.05 + 0.05 \\ &= \frac{\text{₹ } 2}{\text{₹ } 22 - \text{₹ } 2} + 0.05 \\ &= 0.15 \text{ or } 15\% \end{aligned}$$

(ii) Cost of Debentures (K_d)

$$K_d = \frac{\left[1 + \left(\frac{RV - SV}{N} \right) \right] (1 - T)}{\left(\frac{RV + SV}{2} \right)}$$

Where K_d = Cost of Debentures I = Annual Interest Payment RV = Redeemable Value of Debentures at the time of Maturity SV = Out Sale Value from the issue of Debentures
(Less of Discount and Flotation Expenses) N = Term of Maturity Period of Debenture T = Tax Rate

By substituting, we get,

$$\begin{aligned} K_d &= \frac{\left[\text{₹ } 8 \left(\frac{\text{₹ } 100 - 96}{20} \right) \right] (1 - 0.50)}{\left(\frac{\text{₹ } 100 - 96}{2} \right)} \\ &= \frac{(\text{₹ } 820)(\text{₹ } 0.50)}{(\text{₹ } 98)} \end{aligned}$$

$$\begin{aligned}
 &= \frac{(\text{₹}4.10)}{\text{₹}98} \\
 &= 0.0418 \\
 &= 4.18\%
 \end{aligned}$$

(iii) Cost of Preference Shares (K_p)

$$K_p = \frac{\left[D + \left(\frac{RV - SV}{N} \right) \right]}{\left(\frac{RV + SV}{2} \right)}$$

Where K_p = Cost of Preference Shares

D = Constant Annual Dividend Payment

N = Maturity Period Preference Shares

By substituting we get

$$\begin{aligned}
 &= \frac{\left[\text{₹}10 + \left(\frac{\text{₹}100 - \text{₹}95}{15} \right) \right]}{\left(\frac{\text{₹}100 + \text{₹}95}{2} \right)} \\
 &= \frac{\text{₹}10.44}{\text{₹}97.5} \\
 &= 0.1059 \text{ or } 10.59\%
 \end{aligned}$$

1. Weighted Average Cost of Capital (K_o) based on Book Value of Weights:

Sources of Capital	Book Value ₹	%	Cost of Capital	Total Cost
Equity Capital	10,00,000	0.50	0.1500	0.0750
Preference Capital	2,00,000	0.10	0.1059	0.0106
Debentures	8,00,000	0.40	0.0418	0.0167
Total	20,00,000	1.00		0.1023

$K_o = 10.23\%$

2. Weighted Average Cost of Capital (K_o) based on Market Value of Weights:

Sources of Capital	Market Value ₹	%	Cost of Capital	Total Cost
Equity Share Capital	22,00,000	0.6626	0.1500	0.09939
Preference Share Capital	2,40,000	0.0723	0.1059	0.00766
Debentures	8,80,000	0.2651	0.0418	0.01108
Total	33,20,000	1.0000		0.11813

$K_o = 11.81\%$

Illustration 26: A company has various alternatives of capital debt mix and cost thereof as under:

Debt as % of Total Capital	Cost of Debt %	Cost of Equity %
0	5.0	12.00
10	5.0	12.00
20	5.0	12.50
30	5.50	13.00
40	5.50	13.00
50	6.00	13.50
60	6.00	14.00
70	7.00	14.50
80	7.00	15.00
90	7.50	15.00
100	7.50	15.00

Suggest optimal debt equity mix.

A company has cost of debt at 6% and cost of equity is 14%. The Debt Equity proportion is 3%.

Calculate weighted average cost of capital.

Solution:

Statement of Composite Cost of Capital

Debt as % Total Capital	Cost of Debt	Cost of Equity	Composite Cost of Capital				
0	5.00	12.00	(5×0)	+	(12×1)	=	12.00
10	5.00	12.00	(5×0.10)	+	(12×0.90)	=	11.30
20	5.00	12.50	(5×0.20)	+	(12.5×0.80)	=	11.00
30	5.50	13.00	(5.5×0.30)	+	(13×0.70)	=	10.75
40	5.50	13.00	(5.5×0.40)	+	(13×0.60)	=	10.00
50	6.00	13.50	(6×0.50)	+	(13.5×0.50)	=	9.75
60	6.00	14.00	(6×0.60)	+	(14×0.40)	=	9.20
70	7.00	14.50	(7×0.70)	+	(14.5×0.30)	=	9.25
80	7.00	15.00	(7×0.80)	+	(15×0.20)	=	8.65
90	7.50	15.00	(7.5×0.90)	+	(15×0.10)	=	8.25
100	7.50	15.00	(7.50×1.00)	+	(15×0)	=	7.50

Optimal Debt Equity Mix for company is 100% Debt.

0% Capital.

100% Total Capital Employed.

The composite cost of capital will be the least i.e. 7.50%.

Source	Cost (After tax)	Weights Capital	Weighted Cost
Debt	0.06	0.03	0.0018

Equity	0.14	0.97	0.1358
Total		1.00	0.1376

Weighted Average cost of capital = 0.1376 or 13.76%.

Illustration 27: A Ltd. share is quoted in the market at ₹ 20 currently. The company paid a dividend of ₹ 2 per share and the investor expect a growth rate of 5 per cent per year.

Compute:

- The Company's equity cost of capital.
- If the anticipated growth rate is 8%. What would be the indicated market price of the share?
- If the company's cost of capital is 12% and the anticipated growth rate is 5% p.a. What would be the indicated market price if the dividend of ₹ 2 per share is to be maintained?

B Ltd. has the following capital structure:

	₹
Equity shares	60 lakhs
12% Preference Shares	10 lakhs
14% Debentures	30 lakhs
Total	100 lakhs

The market price of the company's share is ₹ 20. It is expected that the company will pay next year a dividend of ₹ 2 per share which will grow at 8 percent for ever. Assume 40% tax rate.

You are required to:

- Compute weighted average cost of capital based on existing capital structure.
- Compute the new weighted average cost of capital if the company raises an, additional ₹ 20 lakhs debt by issuing 15% debentures.

This would result in increasing the expected dividend to ₹ 3 per share and leave the growth rate unchanged but the price of the share will fall to ₹ 16.

Solution:

I. In the books of A Ltd.

$$\begin{aligned}
 \text{(i) Cost of Equity Capital} &= \left(\frac{\text{Dividend}}{\text{Price}} \times 100 \right) + \text{Growth Rate \%} \\
 &= \left(\frac{\text{₹ 2}}{\text{₹ 20}} \times 100 \right) + 4\%
 \end{aligned}$$

$$\begin{aligned}
 \text{2. Market Price} &= \frac{\text{Dividend}}{\text{Cost of Equity} - \text{Growth Rate \%}} \\
 &= \frac{2}{12\% - 8\%} \\
 &= \text{₹ 28.57}
 \end{aligned}$$

$$\begin{aligned}
 \text{(iii) Market Price} &= \frac{2}{12\% - 5\%} \\
 &= 28.57
 \end{aligned}$$

2. Weighted Average Cost of Capital on Existing Capital Structure

Source	Amount ₹	After Tax Cost	Weights	Weighted Cost
Equity Share Capital	60,00,000	0.18	0.60	0.108
12% Preference Share Capital	10,00,000	0.12	0.10	0.012
14% Debentures	30,00,000	0.084	0.30	0.0252
Weighted Average				—
Cost of Capital				0.1452

$$\text{Cost of Equity Capital} = \left(\frac{2}{20} \times 100 \right) + 8\% = 18\%$$

$$\text{Weighted Average Cost of Capital} = 14.52\%$$

New Weighted. Average Cost of Capital

Source	Amount ₹	After Tax Cost	Weights	Weighted Cost
Equity Share Capital	60,00,000	0.2675	0.60	0.13375
12% Preference Share Capital	10,00,000	0.12	0.083	0.00996
14% Debentures	30,00,000	0.084	0.25	0.021
15% Debentures	20,00,000	0.09	0.167	0.01503
Weighted Average				0.17974

Cost of Capital Weighted

$$\text{Cost of Equity Capital} = \left(\frac{3}{16} \times 100 \right) + 8\% = 26.75\%$$

$$\text{New Weighted Average Cost of Capital} = 17.97\%$$

Illustration 28: From the following capital structure of a Ltd., company you are required to calculate over all cost of capital using:

1. Book value weights.
2. Market value weights.

Source	Book Value ₹	Market Value ₹
Equity Share Capital (₹ 10/- Shares)	45,000	90,000
Retained Earnings	15,000	—
Preference Share Capital	10,000	10,000
Debentures	30,000	30,000

The after Tax cost of different sources is as follows:

Equity Share Capital	14%
Retained Earnings	13%
Preference Share Capital	10%
Debentures	5%

Solution:

Calculation of Weighted Average Cost of Capital (Book Value)

Source	₹	Cost %	Total Cost ₹
Equity Share Capital	45,000	14	6,300
Retained Earnings	15,000	13	1,950
Preference Share Capital	10,000	10	1,000
Debentures	30,000	05	1,500
Total	1,00,000		10,750

$$\text{Weighted Average Cost} = \frac{10,750}{1,00,000} \times 100 = 10.75\%$$

Weighted Average Cost (at Market Value)

Source	₹	Cost %	Total Cost ₹
Equity Share Capital	90,000	14	12,600
Retained Earnings	—	13	—
Preference Share Capital	10,000	10	1,000
Debentures	30,000	5	1,500
Total	1,30,000		15,100

$$\text{Weighted Average Cost} = \frac{10,750}{1,00,000} \times 100 = 11.62\%$$

Illustration 29: Three companies A, B and C are in the Same type of business and hence have similar operating risks. However, the capital structure of each of them is different and following are the details:

	A	B	C
Equity Share Capital	4,00,000	2,50,000	5,00,000
[Face Value A 10]			
Market Value per share	15	20	12
Dividend per Share	2.70	4	2.88
Debentures	Nil	1,00,000	2,50,000
[Face Value A 100]			
Market Value per Debenture	—	125	80
Interest rate	—	10%	8%

Assume that the current levels of dividend are generally expected to continue indefinitely and tax rate is 50%.

Prepare weighted average cost of capital of each company.

Solution:

$$\text{Cost of Equity} = \frac{\text{Dividend}}{\text{Market Value}} \times 100$$

$$\text{Company A} = \frac{2.70}{15} \times 100 = 18\%$$

$$\text{Company B} = \frac{4}{20} \times 100 = 20\%$$

$$\text{Company C} = \frac{2.88}{12} \times 100 = 24\%$$

$$\text{Cost of Debentures} = \frac{\text{Interest}(1 - \text{tax})}{\text{Market Value}} \times 100$$

$$\text{Company B} = \frac{10(1 - 0.50)}{125} \times 100 = 4\%$$

$$\text{Company C} = \frac{8(1 - 0.50)}{80} \times 100 = 5\%$$

Company	Equity		At Market Value			
			Debentures			
	₹	%	₹	%	₹	%
A	6,00,000	100	—	—	6,00,000	100
B	5,00,000	80	1,25,000	20	6,25,000	100
C	6,00,000	75	2,00,000	25	8,00,000	100

Weighted Average Cost of Capital (at Market Value of Equity and Debentures)

$$= (\text{Cost of Equity} \times \% \text{ of Equity}) + (\text{Cost of Debt} \times \% \text{ of Debt})$$

$$A = (18\% \times 1.00) = 18\%$$

$$B = (20\% \times 0.80) + (4\% \times 0.20) = 16.8\%$$

$$C = (24\% \times 0.75) + (5\% \times 0.25) = 19.25\%$$

Illustration 30: A The capital structure of H Ltd. as on 31st December, 2008 is as follows:

Equity Capital: 10 lakhs shares of ₹ 10 each = ₹ 1 crore

Reserves = ₹ 20 lakhs

14% Debentures of ₹ 100 each = ₹ 30 lakhs

For the year ended 31st December, 2008; the company has paid equity dividend at 20%. As the company is a market leader with good future, dividend is likely to grow by 5% every year. The equity shares are now traded at ₹ 80 per share in the stock exchange.

Income tax rate applicable to the company is 40%. You are required to calculate:

- A The current weighted average cost of capital.
- B The company has plans to raise a further ₹ 50 lakhs by way of long-term loan at 15% interest. When this takes place, the market value of the equity shares is expected to fall to ₹ 50 per share. What will be the new weighted average cost of capital of the company?

B. 'L' Ltd. is considering raising of funds of ₹ 100 lakhs with anyone of the alternatives. First is 14% institutional term loan and second is 13% NCD's would involve cost of issue of ₹ 1 lakh. Advise the company as to the better option based on the effective cost of capital in each case. Assume a tax rate of 40%.

Solution:

A. Current Weighted Average Cost of Capital:

$$\text{Cost of 14\% Debentures} = 14 (1 - 0.4) = 8.40\%$$

$$\text{Cost of Equity Capital} = \left\{ \frac{2}{80} \times 100 \right\} + 5\% = 7.5\%$$

$$\text{Dividend per share 20\% of ₹ 10} = ₹ 2$$

Weighted Average Cost of Capital

Sources	Amount ₹ in lakhs	Proportion	Cost of Capital	Weighted Cost
Equity Capital	100	2/3	7.5%	5.00%
Reserves	20	2/15	7.5%	1.00%
14% Debentures	30	1/5	8.4%	1.68%
Total	150			7.68%

Weighted Average Cost of Capital after further long-term loan:

$$\text{Cost of 14\% Debentures} = 14 (1 - 0.4) = 8.40\%$$

$$\text{Cost of 15\% Long term Loan} = 15(1 - 0.4) = 9\%$$

$$\text{Cost of Equity Capital} = \left[\frac{2}{50} \times 100 \right] + 5\% = 9\%$$

Weighted Average Cost of Capital

Sources	Amount ₹ in lakhs	Proportion	Cost	Weighted Cost
Equity Capital	100	1/2	9%	4.50%
Reserves	20	1/10	9%	0.90%
14% Debentures	30	3/20	8.4%	1.26%
15% Long-term Loan	50	1/4	9%	2.25%
Total	200			8.91%

B. L Ltd.**Cost of Debt of 14 % term loan:**

$$= 14 (1 - 0.40)$$

$$= 8.40\%$$

Cost of Capital of 13% NCD's:

NCD's amount	100	lakhs
Less: Discount 2.5%	2.5	lakhs
Less: Cost of issue	1.0	lakhs
Net proceeds of issue	96.5	lakhs

$$\text{Cost of Debt} = \frac{13,00,000(1 - 0.04)}{96,50,000} \times 100$$

$$= 8.08\%$$

Therefore, 13% NCDs is the better option.

Illustration 31: 'A' Ltd. has following capital structure as on 31st December, 2008:

	₹
10% Debentures	6,00,000
9% Preference Shares	4,00,000
5,000 Equity Shares of A 100 each	5,00,000
	15,00,000

The Equity Shares of the Company are quoted at ₹ 100 and the Company expected to declare a dividend of ₹ 9 per share for 2008. The company has registered dividend growth rate of 5% which is expected to be maintained. The tax rate applicable to the company is 40%.

Calculate:

1. The weighted average cost of capital
2. The revised weighted average cost of capital, if the company raises additional term loan of ₹ 5,00,000 at 12% for expansion. In such a situation the company can increase the dividend from ₹ 9 to ₹ 10 per share but the market price of the share would go down to ₹ 90.

'B' Ltd. is a widely held company. It is considering a major expansion of its production facilities and the following alternatives are available:

Capital	(i)	(ii)	(iii)
Share capital (₹ in Lakhs)	50	20	10
14% Debentures (₹ in Lakhs)	—	20	15
15% Term loan (₹ in Lakhs)	—	10	25
Total	20	50	50

The Company's Earnings Before Interest and Taxes (EBIT) is 25%. The rate of dividend of the Company is not less than 20%. The Company at present has low debt. Corporate taxation is 40%. Which of the alternatives would you choose?

Solution:**Weighted Average Cost of Capital**

Source	Proportion	Cost of Funds %	Weighted Cost
10% Debentures	$\frac{6}{15}$	6	$6 \times \frac{6}{15} = 2.40$
9% Preference Shares	$\frac{4}{15}$	9	$9 \times \frac{4}{15} = 2.40$
Equity Shares	$\frac{5}{15}$	14	$14 \times \frac{5}{15} = 4.67$
Weighted Average Cost			9.47

$$\begin{aligned}
 \text{Cost of Debentures} &= \text{Rate of Interest} - \text{Tax Savings} \\
 &= 10\% - (10\% \times 4\%) \\
 \text{Cost of Equity Shares} &= \frac{\text{Dividend}}{\text{Market Value}} + \text{Growth} \\
 &= \frac{9}{100} + 0.05 \\
 &= 14\%
 \end{aligned}$$

Weighted Average Cost after Additional Loan of ₹ 5,00,000

Source	Proportion	Cost of Funds %	Weighted Cost
10% Debentures	$\frac{6}{20}$	6	$6 \times \frac{6}{20} = 1.80$
12% Loan	$\frac{5}{20}$	$12 - 4.8 = 7.20$	$7.20 \times \frac{5}{20} = 1.80$
9% Preference Shares	$\frac{4}{20}$	9	$9 \times \frac{4}{20} = 1.80$
Equity Shares	$\frac{5}{20}$	16.11	$16.11 \times \frac{5}{20} = 4.03$
Weighted Average Cost			9.43

$$\begin{aligned}
 \text{Cost of Equity Shares} &= \frac{\text{Dividend}}{\text{Market Value}} + \text{Growth} \\
 &= \frac{10}{90} + 0.05 \\
 &= 16.11\%
 \end{aligned}$$

Statement of Profitability

(₹ in lakhs)

	I	II	III
Earnings Before Interest & Tax (50 × 25%)	12.50	12.50	12.50
Less: Interest			
on 14% Deb.	—	2.80	2.10
on 15% Loan	—	1.50	3.75
Earning Before Tax	12.50	8.20	6.65
Less: Tax @ 40%	5.00	3.28	2.66
Earning After Tax	7.50	4.92	3.99
Earning per share (Equity Share of ₹ 10)	1.50	2.46	3.99

Earning per share is maximum in alternative (iii). Therefore, alternative (iii) is better.

Illustration 32: Saryug Times Marketing Ltd. is currently quoted at ₹ 32. The company paid dividend of ₹ 4 per share of ₹ 10. The investor expects a growth rate of 6% p.a.

Compute:

1. Company's cost of Equity Capital.
2. If the anticipated growth rate is 8% p.a., what would be the indicated market price of the share if the dividend of ₹ 4 per share is to be maintained, at the same cost of Equity Capital.
3. If the company's cost of capital is 15% and the anticipated growth rate is 7%. What would be the indicated market price if the dividend would be ₹ 5 per share?

Peace Forever Ltd. has the following capital structure:

	₹ in lakhs
Equity Shares	80
9% 'A' Preference Shares	25
12% Debentures	5.5
Total	160

The market price of the company's equity share is ₹ 40/-. It is expected that the company would next year pay a dividend of ₹ 3 per share on the face value of ₹ 10. The company's growth prospects are 7% per annum. Assuming corporate taxation @ 35%, you are required to:

1. Compute weighted average cost of capital based on the existing capital structure.
2. Compute new weighted average cost of capital if the company raises additional capital of ₹ 50 lakhs as under:

	₹ in lakhs
Equity shares	15
10% 'B' Preference Shares	20
12% Debentures	15
Additional Total	50

This would result in increasing the expected dividend to ₹ 3.50 per equity share and leave the growth rate unchanged at 7% but the anticipated market price of the equity shares would fall to ₹ 35/-.

Solution:

$$\begin{aligned}
 1. \quad K_e &= \frac{D_1}{P_0} + g \\
 \text{and } D_1 &= D_0(1 + g) \\
 D_0 &= 4 \\
 P_0 &= 32 \\
 g &= 6\% = 0.06 \\
 D_1 &= 4(1 + 0.06) = 4.24 \\
 K_e &= \frac{4.24}{32} + 0.06 \\
 &= 0.1325 + 0.06 \\
 &= 0.1925
 \end{aligned}$$

Note: The question mentions that the company paid dividend of ₹ 4 per share, so $D_0 = 4$.

If the question mentions that “the company expects to pay dividend of ₹ 4 per share, next year”, then $D_1 = 4$.

$$2. D_0 = 4, g = 0.08, \text{ and } K_e = 19.25\%$$

$$\begin{aligned}
 D_1 &= 4(1.08) = 4.32 \\
 K_e &= \frac{D_1}{P_0} + g \\
 0.1925 &= \frac{4.32}{P_0} + 0.08 \\
 \frac{4.32}{P_0} + 0.08 &= 0.1925 \\
 \frac{4.32}{P_0} &= 0.1925 - 0.08 \\
 \frac{4.32}{P_0} &= 0.1125 \\
 P_0 &= \frac{4.32}{0.1125} = 38.40
 \end{aligned}$$

$$3. K_e = 0.15, g = 0.07, D_1 = 5.$$

$$K_e = \frac{D_1}{P_0} + g$$

$$0.15 = \frac{5}{P_0} + 0.07$$

$$\frac{5}{P_0} + 0.07 = 0.15$$

$$\frac{5}{P_0} = 0.15 - 0.07$$

$$= 0.08$$

$$P_0 = \frac{5}{0.08} = 62.50$$

Note: Dividend would be ₹ 5 per share, means that expected dividend for next year would be ₹ 5 per share, so $D_1 = 5$.

$$\begin{aligned} \text{(i)} \quad K_e &= \frac{D_1}{P_0} + g \\ &= \frac{3}{40} + 0.07 \\ &= 0.075 + 0.07 = 0.145 \\ K_p &= 9\% = 0.09 \\ K_d &= (1 - t) \cdot I \\ &= (1 - 0.35) (0.12) \\ &= (0.65) (0.12) = 0.0780 \\ &= 7.80\% \end{aligned}$$

Source	Amount	Cost in %	Interest/Dividend
			Amount
Equity Shares	80,00,000	14.5%	11,60,000
10% Equity Pref. Shares	25,00,000	9%	2,25,000
12% Debentures	55,00,000	7.8%	4,29,000
	1,60,00,000		18,14,000

$$\text{Weighted Average Cost} = \frac{18,14,000}{160,00,000} \times 100$$

$$= 11.3375\%$$

$$= 11.34\%$$

$$\begin{aligned} \text{(ii)} \quad K_e &= \frac{3.5}{35} + 0.07 \\ &= 0.10 + 0.07 = 0.17 = 17\% \end{aligned}$$

$$K_p (\text{'A' Pref. Shares}) = 9\%$$

$$K_p \text{ ('B' Pref. Shares)} = 10\%$$

$$K_d = (1 - 0.35) (12\%) = 7.8\%$$

Source	Amount ₹	Cost in %	Interest/Dividend Amount ₹
Equity Shares	95,00,000	17%	16,15,000
9% A Preference Shares	25,00,000	9%	2,25,000
10% B Preference Shares	20,00,000	10%	2,00,000
12% Debentures	70,00,000	7.8%	5,46,000
	2,10,00,000		25,86,000

$$\begin{aligned} \text{Weighted Average Cost} &= \frac{25,86,000}{2,10,00,000} \times 100 \\ &= 12.3134\% \\ &= 12.31\% \end{aligned}$$

Illustration 33: The capital structure of Alpha Co. Ltd., comprising 12% debentures, 9% preference shares and equity shares of ₹ 100 each, is in the ratio of 3: 2 : 5.

The company is contemplating introduction of further capital to meet the expansion needs by seeking 14% term loan from financial institution. As a result of this proposal, the proportion of debentures, preference shares and equity shares would get reduced by 1/10, 1/15 and 1/6, respectively. In the light of above proposal, calculate the impact on weighted average cost of capital, assuming 35% tax rate expected dividend ₹ 9 per share at the end of the year, the growth rate of equity dividend at 5%. No change in the dividend, dividend growth rate and market price of share is expected after availing the proposed term loan.

Solution:

Alpha Co. Ltd.

Before Term Loan

Source	Cost	Proportion	Weighted Cost
Debentures	12% (1 - 0.35) 7.8%	0.3	2.34%
Preference Shares	9%	0.2	1.80%
Equity Shares	14% (9/100 + 0.05)	0.5	7.00%
		1.00	11.14%

After Term Loan

Source	Cost	Proportion	Weighted Cost
Debentures	7.8%	$\frac{3}{10} - \frac{1}{10} = \frac{2}{10} = \frac{6}{30}$	1.56%
Preference Shares	9%	$\frac{2}{10} - \frac{1}{15} = \frac{4}{30}$	1.20%

Equity Shares	14%	$\frac{5}{10} - \frac{1}{6} = \frac{10}{30}$	4.67%
Term Loan	9.1% (1-0.35)	$\frac{10}{30}$	3.03%
		1	10.46%

Because of taking 14% Term loan weighted Average cost of Capital is reduced from 11.14% to 10.46%.

Illustration 34:

- Big Bang Marketing Ltd. is currently quoted at ₹ 35/-. Next year the company would pay dividend of ₹ 3.50 per share of ₹ 10. The investor expects a growth rate of 5% p.a. Compute:
 - Company's cost of Equity Capital.
 - If the anticipated growth rate is 6% p.a., what would be the indicated market price of the share if the dividend of ₹ 4/- per share is to be declared at the same cost of Equity Capital.
- Law and Order Ltd. has the following capital structure:

	₹ in Lakhs
Equity Shares	25
6% 'A' Preference Shares	35
7% Debentures	30
Total	90

The market price of the company's equity share is ₹ 30/-. It is expected that the company would next year pay a dividend of ₹ 3/- per share on the face value of ₹ 10/-. The company's growth prospects are 4% per annum.

Assuming corporate taxation @ 35% you are required to:

- Compute weighted average cost of Capital based on the existing capital structure.
- Compute the new weighted average cost of capital if the company raises additional capital of ₹ 40 lakhs as under:

	₹ in Lakhs
Equity Shares	10
7% 'B' Preference Shares	15
9% Debentures	15
Total	40

This would result in increasing the expected dividend to ₹ 4.50 per equity share and leave the growth rate unchanged at 4% but the anticipated market price of the equity shares would fall to ₹ 25/-.

Solution:

1. Big Bank Marketing Ltd.

$$(i) \text{ Cost of Equity Capital} = \left[\frac{\text{Dividend}}{\text{Marked Price}} \times 100 \right] + \text{Growth Rate}$$

$$= \left(\frac{3.50}{35} \times 100 \right) + 5$$

$$= 10 + 5$$

$$= 15\%$$

$$(ii) \text{ Cost} = \left[\frac{\text{Dividend}}{\text{Marked Price}} \times 100 \right] + \text{Growth Rate}$$

$$15 = \left(\frac{400}{\text{Marked Price}} \right) + 6$$

$$9 = \left(\frac{400}{\text{Marked Price}} \right) + 6 \quad \therefore \text{Market Price} =$$

$$= ₹ 44.44$$

2. Law and Order Ltd.

$$K_e = \left[\frac{\text{Dividend}}{\text{Marked Price}} \times 100 \right] + \text{Growth Rate}$$

$$\text{Cost of Equity} = \left(\frac{3}{10} \times 100 \right) + 4$$

$$= 10 + 4$$

$$= 14\%$$

$$K_{pa} = 6\% = \text{Cost of 'A' Pref. Shares}$$

$$K_d = \text{Cost of Debentures (After tax)}$$

$$= \frac{65}{100} \times 7$$

$$= 4.55\%$$

Weighted Average Cost of Existing Capital

Type	Capital (₹ in lakhs)	Cost Rate	Weighted Cost (₹ in lakhs)	Weighted Cost
Equity	25	14%	3.50	$\frac{6.965}{90} \times 100$ = 7.74%
6% Preference	35	6%	2.10	
7% Debentures	30	4.55%	1.365	
Total	90		6.965	

$$\begin{aligned}
 \text{Now } K_p &= \left[\frac{\text{Dividend}}{\text{Marked Price}} \times 100 \right] + \text{Growth Rate} \\
 &= \left(\frac{4.50}{25} \times 100 \right) + 4 \\
 &= 18 + 4 \\
 &= 22\%
 \end{aligned}$$

$$\begin{aligned}
 9\% \text{ Debentures (After Tax Cost)} &= 0.65 \times 9 \\
 &= 5.85\%
 \end{aligned}$$

Computation of New Weighted Average Cost of Capital

Type	Capital (₹ in lakhs)	Cost Rate	Weighted Cost (₹ in lakhs)
Equity	35	22%	7.70
6% A Preference Shares	35	6%	2.10
7% B Preference Shares	15	7%	1.05
7% Debentures	30	4.55%	1.365
9% Debentures	15	5.85%	0.878
Total	130		13.093

$$\begin{aligned}
 \text{Weighted Average cost of New Capital} &= \frac{13.093}{130} \times 100 \\
 &= 10.07\%
 \end{aligned}$$

EXERCISE

I. Fill in the Blanks

- _____ of Capital is the cost of retaining funds in business.
- Cost Of capital is important in _____ decisions.
- Cost of debts depends on the _____.
- Cost of pref. share capital depends on _____.
- Cost of Debt = $\frac{\text{Interest}(1 - \text{Taxrate})}{\text{_____}}$.
- Dividend distribution tax affects the cost of _____.
- Explicit cost of pref. share = Fixed dividend + $\frac{\text{_____}}{\text{DDT}}$.
- Pref. dividend is not allowed as a 'charge against _____'.
- Cost of equity depends on the _____.
- Cost of equity is the _____ return.
- Risk premium is the premium for _____.

12. Zero Beta indicates _____.
13. _____ is the mix of long-term sources of funds like debentures, loans, preference shares, equity shares and retained earnings in different ratios.
14. The capital structure of a company should generate _____ to the shareholders.
15. The capital structure of the company should be within the _____.
16. An ideal capital structure should involve _____ to the company.
17. _____ do not have a fixed rate of return on their investment.
18. According to Dividend Forecast Approach, the intrinsic value of an equity share is the sum of _____ associated with it.

[Ans.: (1) Cost, (2) Financial, (3) Rate of interest, (4) Rate of dividend, (5) Net proceeds, (6) Pref. Capital, (7) Dividend Distribution Tax, (8) Revenue, (9) Rate of dividend, (10) Minimum Regarded Rate of Return, (11) Systematic Risk, (12) No. Volatility, (13) Capital structure, (14) Maximum returns, (15) Debt capacity, (16) Minimum risk of loss of control, (17) Equity shareholders, (18) Present values of dividends]

II. Multiple Choice Questions

1. Cost of capital represents
 - (a) minimum rate of return.
 - (b) maximum rate of return.
 - (c) average rate of return.
2. Financial decisions are based on
 - (a) cost of capital.
 - (b) capital.
 - (c) fixed assets.
3. Cost incurred for financing the project is
 - (a) historical cost.
 - (b) future cost.
 - (c) specific cost.
4. Cost of a specific source of capital is
 - (a) specific cost.
 - (b) composite cost.
 - (c) historical cost.
5. The cost which equates the PV of cash inflow with the PV of cash outflow is
 - (a) explicit cost.
 - (b) historical cost.

- (c) future cost.
- 6. Cost of obtaining another rupee of new capital is
 - (a) marginal cost.
 - (b) average cost.
 - (c) specific cost.
- 7. Combined cost of various sources of capital is
 - (a) composite cost.
 - (b) marginal cost.
 - (c) specific cost:
- 8. Cost of equity shares is influenced by
 - (a) growth rate of dividend only.
 - (b) growth rate of earning only.
 - (c) both of the above.
- 9. Cost of preference shares is
 - (a) treated for taxes.
 - (b) not treated for taxes.
 - (c) occasionally treated for taxes.

[Ans.: 1. (a), 2.(a), 3.(a), 4. (a), 5 (a), 6 (a), 7 (a), 8.(c), 9 (b)]

III. State with reasons whether the following statements are True/False.

1. Cost of retained earning is separately calculated.
2. Dividend on preference shares is adjusted for taxes to get their cost.
3. Cost of a share is higher if it sells at a premium.
4. Interest on debentures is the basis of ascertaining the cost of equity shares.
5. Debt is cheaper than equity.
6. Cost of new equity and existing equity is the same.
7. All sources of capital have the same cost.
8. Dividend to equity shareholders reduce tax liability.
9. Interest on debentures reduces tax liability.
10. Historical weights are used to calculate WACC.
11. Debentures and bonds are debt instruments.
12. Every investment has some risk.
13. Credit rating helps the investors to make good choice of investment in equity shares

14. Yield curve considers only the relationship between the maturity and its yield
 15. Interest rate is determined by the RBI

[Ans.: True: (4, 5, 9, 10, 11, 12, 14). False: (1, 2, 3, 6, 7, 8, 13, 15)]

IV. Match the following

	Group A		Group B
1.	Cost of Capital	(a)	cost which has been incurred
2.	Historical Cost	(b)	internal rate of return
3.	Future Cost "	(c)	cost of a specific source of capital
4.	Impliit Cost	(d)	weighted average cost of capital
5.	Specific Cost	(e)	cost of obtaining additional fund
		(f)	expected cost
		(g)	important for capital budgeting decisions

[Ans.: (1 – g), (2 – a), (3 – f), (4 – b), (5 – c), (6 – d)]

Terminal Questions

1. The following data is available in respect of a company:
 Equity ₹ 10 lakhs, cost of capital 18%
 Debt ₹ 5 lakhs, cost of debt 13%
 Calculate the weighted average cost of funds taking market values as weights assuming tax rate is 40%.

[Ans.: $WACC = W_e k_e + W_p k_p + W_r k_r + W_d k_d + W_t k_t$]

2. Bharat Chemicals has the following capital structure:

₹ 10 face value equity shares	₹ 4,00,000
Term loan @ 13%	₹ 1,50,000
9% Preference shares of ₹ 100, currently traded at ₹ 95 with 6 years maturity period	₹ 1,00,000
Total	₹ 6,50,000

The company is expected to declare a dividend of ₹ 5 next year and the growth rate of dividends is expected to be 8%. Equity shares are currently traded at ₹ 27 in the market. Assume tax rate of 50%. What is W.A.C.C?

[Hint:: $WACC = W_e k_e + W_p k_p + W_r k_r + W_d k_d + W_t k_t$]

3. The market value of debt of a firm is ₹ 30 lakhs, which of equity is ₹ 60 lakhs. The cost of equity and debt are 15% and 12%. What is the W.A.C.C?

[Hint:: $WACC = W_e k_e + W_p k_p + W_r k_r + W_d k_d + W_t k_t$]

4. A company has 3 divisions – X, Y and Z. Each division has a capital structure with debt, preference shares and equity shares in the ratio 3:4:3 respectively. The company is planning to raise debt, preference shares and equity for all the 3 divisions together. Further, it is

planning to take a bank loan @ 12% interest. The preference shares have a face value of ₹ 100, dividend @ 12%, 6 years maturity and currently priced at ₹ 88. Calculate the cost of preference shares and debt if taxes applicable are 45%

$$[\text{Hint: Apply the formula } k_p = \frac{D + \{(F - P)/n\}}{(F - P)/2}]$$

5. Tanishk Industries issues partially convertible debentures of face value of ₹ 100 each and realizes ₹ 96 per share. The debentures are redeemable after 9 years at a premium of 4%, taxes applicable are 40%. What is the cost of debt?

$$[\text{Hint: Apply the formula } k_d = \frac{1(1 - T) + \{(F - P)/n\}}{(F - P)/2}]$$

6. Bharat Ltd. paid dividend of ₹ 2.50 p.a. in the last yr. Dividends is expected to grow at 10% p.a. for indefinite future. What would be the value of stock if the required rate of return is 15%? Is it worth investing in the share at current market price of ₹ 60?
7. BSES paid ₹ 2.50 as dividend per share on its equity shares for the last year. Dividends are expected to grow at 10 per cent per year for an indefinite future. What is its expected rate of return if its current market price is ₹ 20? If the required rate of return is 12% , what would be the value of stock? Is it worth investing in the share?
8. RIL paid ₹ 3 as dividend per share on its equity shares for last yr. It is expected that it will grow at 10% per yr. for indefinite future.
- What is the expected rate of return if current market price is ₹ 15?
 - If the required rate of return is 15%, then what would be the value of stock?
 - Is it investing in RIL worth?
9. A debenture of ₹ 10,000 face value carries an interest rate of 9 per cent is redeemable after 7 years at a premium of 5%. If the required rate of return is 12% what should be the present value?
10. A GOI bond of ₹ 1,000 has a coupon rate of 8 % per annum and maturity of 10 years. If the current market price is ₹ 1,015. Find YTM?
11. A Bond of ₹ 1,000 face value carrying an interest rate of ₹ 15 per cent is redeemable after 6 years at a premium of 5 % if the required rate of return is 15 % what is the present value of the bond?
12. A bond of ₹ 1,000 has a coupon rate of 6 per cent per annum and maturity period of 3 years . The bond is currently selling at ₹ 900. what is the yield to maturity in the investment of this bond?
13. A bond of ₹ 1,000 has a coupon rate of 8 p.a. & maturity period of 3 yrs. The bond is currently selling at ₹ 910. What is the yield to maturity in the investment of this bond?

14. A bond of ₹ 1,000 face value carrying an interest rate of ₹ 14 per cent is redeemable after 6yrs. at a premium of 5% if the required rate of return is 15% what is the present value of bond?
15. A Bond of ₹ 1,000 has a coupon Rate of 6 p.a. & maturity period of 3 yr. The bond is currently selling at ₹ 900. What is the yield to maturity in the investment of this bond?
16. Following is the Capital Structure of XCEL Ltd.:

	Amount ₹	Proportion %	Cost %
Equity shares	18,00,000	30	12
Retained earnings	15,00,000	25	11
Pref. Shares	12,00,000	20	10
Debt	15,00,000	25	5

Calculate Weighted Avg. Cost of Capital

17. S Ltd. Has the following capital structure:

(₹ in Lacs)

Equity	2,00,000 Shares	40.00	20/Share
6% Preference	1,00,000 Share	10.00	10
8% Debentures	3,00,000 Shares	30.00	10

It proposes to borrow loan of ₹ 20.00 lakhs with interest at 10% p.a. The dividend on equity will increase from ₹ 2 to ₹ 3 per share. You are required to ascertain the change in then WACC. Consequent to proposed borrowings.

[Ans.: Current WACC = 7.25, New WACC = 8.8]

18. A company has on its books the following amounts and specific costs of each type of capital:

Type of Capital	Book Value ₹	Market Value ₹	Specific Cost %
Debt.	4,00,000	3,80,000	5
Preference	1,00,000	1,10,000	8
Equity	6,00,000	12,00,000	13
Retained earnings	2,00,000		9
	13,00,000	16,90,000	

Determine the WACC using: (a) B.V. weights, (b) Market value weights

19. Three companies A, B and C are in same type of business and hence have similar operating risks. However, the capital structure of each of them is diff. and the following are the details:

	A	B	C
Equity share capital ₹ (face value ₹ 10 per share)	4,00,000	2,50,000	5,00,000
Market value per share	15	20	12
Dividend per share ₹	-2.70	4	2.88
Debentures ₹ (face value per debenture is ₹ 100)	Nil	1,00,000	2,50,000

Market value per Debenture ₹	—	125	80
Interest rate	—	10%	8%

Assume that the current levels of dividends are generally expected to continue indefinitely and the income-tax rate at 50%.

You are reqd. To compute WACC at market value of each company.

[Ans.: Company A = WACC-18, Company B = WACC-15.42, Company, C = WACC-17.66]

20. The following info has been extracted from the balance sheet of fashions Ltd.

As on 31st March, 2003

	(₹ in lakhs)
12% debentures	400
Eq. Shares	400
Term loan (interest 18%)	1,200
	2,000

- (a) Determine the WACC of the company. It had been paying dividends at a consistent rate of 20% p.s.
- (b) What difference will it make if the current price of equity share of the ₹ 100 share is ₹ 160?
- Whenever income tax rate is not given assume 50%.

[Ans.: Current WACC = 10.6, New WACC = 9.1]

21. Computation of cost of equity capital, cost of debentures, cost of preference share and weighted avg. Cost of capital. You are required to determine the WACC (Ko) of the K.C. Ltd. Using: (a) B.V. weights, and (b) Market value weights.

The foll information is available for you perusal.

The K.C. Ltd's present book value capital structure is:

	₹
Debentures (₹ 100 per debenture)	8,00,000
Equity Shares (₹ 10 per share)	10,00,000
Preference Shares (₹ 100 per share)	2,00,000
	20,00,000

All these securities are trade in the capital markets. Recent prices are debentures @ ₹ 110, pref. shares @ ₹ 120 and eq. Shares @ ₹ 22. Anticipated external financing opportunities are:

- (a) ₹ 100 per debenture redeemable at par: 20-yr maturity, 8% interest rate, 4% flotation cost, sale price ₹ 100
- (b) ₹ 100 pref. Sh redeemable at par: 15-yr maturity, 10% dividend rate, 5% flotation cost, sale price ₹ 100
- (c) Eq. Shares ₹ 2 per sh. Flotation costs, sales price ₹ 22.

In addition, the dividend expected on the equity share at the end of the year ₹ 2 per share: the anticipated growth rate in dividends is 5% and the company has the practice of paying all its earnings in the form of dividends. The corporate tax is 50%.

[Ans.: Book Value- $K_e = 15\%$, $K_d = 4.18$, $K_p = 10.59$, WACC = 10.23, Market Value WACC = 11.81]

22. From the foll. capital structures of a Ltd., Co. You are reqd. to calculate overall cost of capital using:

- (a) B.V. weights and
(b) Market value weights

Source	Book Value ₹	Market Value (₹)
Eq. Sh. Capital (₹ 10 shares)	45,000	90,000
Retained Earnings	15,000	—
Pref. Sh. Capital	10,000	10,000
Debentures	30,000	30,000

The after tax cost of diff. Source is as follows:

Eq. Sh. Capital	14%
Retained earnings	13%
Pref. Sh. Capital	10%
Debentures	5%

23. The capital structure of H Ltd. as on 31st Dec. 2002 is as follows:

Eq. Sh. Capital: 10 lakhs of shares of ₹ 10 each.	= ₹ 1 crore
Reserves	= ₹ 20 lakhs
14% debentures of ₹ 100 each	= ₹ 30 lakhs

For the year ended 31st December, 2002, the company has paid equity dividend at 20%. As the company is a market leader with good future, dividend is likely to grow by 5% every year. The equity shares are now traded at ₹ 80 per share in the stock exchange. Income tax rate is applicable to the company is 40%. You are reqd. To calculate:

- (a) The current WACC
(b) The Company has plans to raise a further ₹ 50 lakhs by way of long-term loan at 15% interest. When this takes place, the market value of the equity shares is expected to fall to ₹ 50 per share. What will be the new WACC of the company?
24. Calculate the weighted avg. cost of capital from the foll. Data of Blazing Arrow Co. Ltd. Ignore taxation.

	₹
7% Debentures	1,30,000
8% Pref. Shares	70,000

Eq. Shares (of ₹ 100 fv)	6,00,000
	8,00,000

(There are no retained profits or securities premium)

A dividend of 10% a yr. has been paid on the eq. shares in recent years. All of the company's securities are quoted on the local stock exchange. The prices of these securities have recently been at par (i.e. market or issue price same).

25. The Aarooha company has the following capital structure:

	₹
Common Shares (4,00,000 Sh.)	80,00,000
6% Pref. Sh.	20,00,000
8% Deb.	60,00,000
	1,60,00,000

The share of the Co. sells at ₹ 20. It is expected that the company will pay next year a dividend of ₹ 2 per sh. which will grow at 7%. Assume a 35% tax rate.

- (a) Compute a weighted avg. cost of capital based on existing capital structure.
- (b) Compute the new weighted avg. Cost of capital if the co. Raises an additional ₹ 40,00,000 debt by issuing 10% deb. This would result in increasing the expected dividend to ₹ 3 and leave growth rate unchanged, but the price of share will fall at ₹ 15 per sh. [Ans. Current WACC = 11.2, New WACC = 14.26]
26. Present Glory Co. Ltd. Is considering raising funds of about ₹ 400 lakhs by one of two alternative methods, viz, 16% institutional term loan and 13% non-convertible debentures, the term option would attract no major incidental cost. The debentures would have to be issued at a disc. Of 2.5% and would involve cost of issue of ₹ 2 lacs. Advise the co. As to better option based on the effective cost of capital in each case. Assume tax rate of 50%.
27. The following is the capital structure of Sweeping Success Co. Ltd.

	₹	Proportion
Eq. Sh. Capital	4,50,000	45%
Retained Earning	1,00,000	10%
Pref. Sh. Capital	1,00,000	10%
Term Loan	3,50,000	35%
	10,00,000	100%

The firms after tax component costs of the various sources of finance are as follows:

Source	Cost
Eq. Capital	15%
Retained Earnings	13%
Preference Capital	11%
Term Loan	75%

You are reqd. to calculate weighted avg. cost of capital of the firm.

28. G. Ltd., has the following capital structures as on 31st March 2002.

	₹
Ordinary shares	80,00,000
10% Pref. Shares	20,00,000
14% Debentures	60,00,000

The shares of the company are presently selling at ₹ 20 per sh. It is expected that the co. will pay next yr. dividend of ₹ 2 per sh. which will grow @ 7%. Assume tax rate of 40%. You are reqd. to:

- Compute the weighted avg. cost of capital based on existing capital structure.
 - If the company raises an additional ₹ 40 lakhs debt by issuing 15% debentures, the expected dividend at year end will be ₹ 3, the market price per share will fall to ₹ 15 per share, the growth rate remaining unchanged. Calculate the new weighted avg. cost of capital.
29. Calculate the marginal cost of capital from the foll:

	₹ lakhs
Equity Capital	400
Internal Generation	200
12% Pref. Shares	100
13% Debentures	800
12% Cash cr. from Banks	700
Current Liabilities	300
	2,500

The required after tax rate of return on equity is 18% and on internal cash generation is 15%. The tax rate is 40%.

30. EXE Ltd., has the following capital structure as an 31st March, 2000.

	₹
10% debentures	3,00,000
9% pref. Shares	2,00,000
Eq. Shares of ₹ 100 each	5,00,000
Total	10,00,000

The eq. shares of the Co. are quoted at ₹ 102 and the Co. is expected to declare a dividend of ₹ 9 per share for the year.

Required:

- Assuming the tax rate applicable to the Co. to be 50%, calculate the cost of capital. State clearly the assumptions you make.
- Assuming that the company can raise additional term loan at 12% for ₹ 5,00,000 to finance an expansion, calculate the revised weighted cost of capital. The company's

assessment is that it will be in a position to increase the dividend from ₹ 9 per sh. to ₹ 10 per sh., but the business risk associated with new financing may bring down the market price from ₹ 102 to ₹ 96 per sh.

31. From the following capital structure of Perfect Ltd. calculate overall cost of capital, using: (a) book value weights and (b) market value weights.

	Book Value	Market Value
Equity capital	4,50,000	9,00,000
Retained earnings	1,50,000	-
Pref. Share capital	1,00,000	1,00,000
Debentures	3,00,000	3,00,000

The after tax cost of different sources of finance are equity share capital 14%, retained earnings 13%, pref. shares 10% and debentures 5%.

32. Hopeful Ltd. issues 50,000 8% Debentures of ₹ 1 each at a premium of 10%. The cost of flotation is 2%. The rate of tax is 60%.

Calculate the cost of debentures. [Ans. 2.96%]

33. Faithful Ltd. issues 5000 12% Debentures of ₹ 100 each at a discount of 5%. The commission payable to underwriter and brokers is ₹ 25000. The debentures are redeemable after 5 years. Tax rate is 50%.

Calculate after tax cost of debentures.

[Ans.: 7.36%]

34. Delightful Ltd. issues 1000 10% preference shares of ₹ 100 each at a discount of 5%. Cost of raising capital is ₹ 2,000.

Calculate cost of preference share capital.

[Ans.: 10.75%]

35. Jolly Ltd.'s share is quoted in the market at ₹ 20. The company pays a dividend of Re. 1 per share. The investors expect a growth rate of 5% per year.

Compute the cost of equity capital.

[Ans.: 10%]

36. X Ltd has the following capital structure:

Equity Shares (200000 Shares)	₹ 40,00,000
8% Preference Shares	₹ 10,00,000
8% Debentures	₹ 30,00,000
	₹ 80,00,000

The shares of the company sell for ₹ 20. It is expected that the company will pay next year a dividend of ₹ 2 per share which will grow to 7% for ever. Assume tax rate of 50%.

Calculate the weighted average.

Cost of capital based on the existing capital structure.

[Ans.: 10.75%]

37. M/s Chitra Gupta Ltd. provides you the following specific cost of capital along with indicated B.V. and M.V. weights.

Capital Type	Weights		
	Cost	B.V.	M.V.
Equity Shares	18%	0.5	0.58
15% Preference Shares	?	0.2	0.17
14% Debentures	?	0.3	0.25

- (a) Calculate the weighted average cost of capital using Book Value and Market Value Weights.
- (b) Calculate the weighted average cost of capital if the company intended to raise the needed funds using 50% long term debt 15% through equity shares and retained earnings and balance by way of preference shares. Assume tax at 50%.

[Ans.: (a) 14.1%; 14.7%. (b) 11.45%]

38. Jigna Ltd. issues 10% redeemable debentures of ₹ 1,00,000. The company is in 55% tax bracket.

Calculate cost of debt before and after tax if the debentures are issued at par, at 10% discount and at 10% premium.

[Ans.: At par 4.5%. At discount 5%. At premium 4.1%]

39. Excel Industries has assets of ₹ 1,60,000 which have been financed with ₹ 52,000 of debt and ₹ 90,000 of equity and a general reserve of ₹ 18,000. The firm's total profits after interest and taxes for the year ended 31st March, 2002 were ₹ 13,500. It pays 8% interest on borrowed funds and is in 50% tax bracket. It has 900 equity shares of ₹ 100 each selling at a market price of ₹ 120 per share.

What is the weighted average cost of capital.

[Ans.: Cost of debt 4%. Cost of equity 12.5%. Weighted average cost of capital 9.74%]

40. M Ltd. is a dynamic growth firm which pays no dividends, anticipates a long run level of future earning of ₹ 7 per share. The current price of M Ltd.'s shares is ₹ 55.45, floating cost for the sales of equity shares would average about 10% of the price of the shares.

What is the cost of new equity capital of M. Ltd.

[Ans.: 14.03%]

41. Shruti Ltd. has the following capital structure:

Equity Capital	₹	10,00,000
10% Preference Share Capital	₹	5,00,000
8% Bank Loan	₹	15,00,000

You are required to calculate the weighted average cost of capital assuming 50% as the rate of income tax, before and after tax.

[Ans.: Before tax 9.66%, after tax 7.67%]

42. The following items have been extracted from the Balance Sheet of Sujan Ltd. as on 31st December, 2008:

4,00,000 Equity Shares of A 10 each	₹	40,00,000
Reserves and Surplus	₹	60,000
15% Debentures	₹	20,00,000
14% IDBI Loans	₹	60,00,000

Other Information:

Year ended 31st December	Dividend per Share ₹	Earnings per Share ₹	Average Market Price per Share ₹
2006	4	7.50	50
2007	3	6.00	40
2008	4	4.50	30

Calculate weighted average cost of capital using book values as weights and earning price ratio as the basis of cost of equity. Assume 50% tax rate. [Ans.: 11.5%]

43. A firm has the following structure and after tax cost for different sources of funds:

Sources of Funds	Amount ₹	Proportion %	After Tax Cost %
Debts	15,00,000	25	5
Preference Share Capital	12,00,000	20	10
Equity Share Capital	18,00,000	30	12
Retained Earnings	15,00,000	25	11
	60,00,000	100	

Calculate weighted average cost of capital. [Ans.: 9.60%]

44. The equity of SG Ltd. are traded in the market at ₹ 90 each. The current year dividend per share is ₹ 18. The growth expected in dividend is at 6%.

Calculate the cost of equity capital. [Ans.: 26%]

45. Ambuja Cements Ltd. has the following capital structure:

	Market Value ₹	Book Value ₹	Cost %
Equity Share Capital	80	120	18
Preference Share Capital	30	20	15
Fully Secured Debentures	40	40	14

Calculate weighted average cost of capital.

[Ans.: Based on Market Value: 16.33%. Based on Book Value: 16.78%]

46. Zed Ltd. is presently financed entirely by equity shares. The current market value is ₹ 6,00,000. A dividend of ₹ 1,20,000 has just been paid. This level of dividend is expected to be paid indefinitely. The company is thinking of investing in a new project involving an

outlay of ₹ 5,00,000 now and is expected to generate net cash receipts of ₹ 1,05,000 p.a. indefinitely. The project would be financed by issuing ₹ 5,00,000 debentures at the market interest rate of 18%. Ignore taxation.

Calculate the value of equity shares and the gain made if the cost of equity raises to 21.6% and also calculate weighted average cost of capital. [Ans.: 20%]

Answer the Following Questions

1. (a) What is Cost of Capital?
(b) What is the importance of Cost of Capital?
2. How would you classify Cost of Capital?
3. How would you calculate specific Cost of Sources of Finance?
4. What do you mean by Weighted Average Cost of Capital? What is the procedure of calculation of Weighted Average Cost of Capital?

PRACTICAL QUESTIONS

1. Hopeful Ltd. Issues 50,000 8% Debentures of ₹ 1 each at a premium of 10%. The cost of flotation is 2%. The rate of tax is 60%.

Calculate the cost of debentures.

[Ans.: 2.96%]

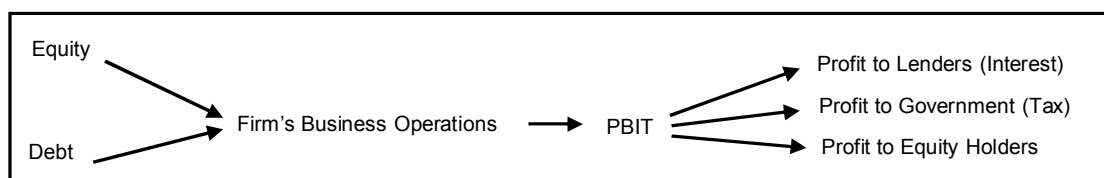


Chapter



Capital Structure Decision

SOURCES OF FUNDS



CAPITAL STRUCTURE

(The means of capital by which a firm is financed)

Capital Structure is a part of Financial Structure and is the mix of the various types of long-term sources of funds, *i.e.*, debt/equity.

Examples:

1. Common Stock, *i.e.*, Equity Share Capital
2. Preferred Stock, *i.e.*, Preference Share Capital
3. Retained Earnings (profit the company makes, but does not give to the shareholders in the form of dividends)
4. Bonds (debt)

The Target Capital Structure

Capital Structure: The combination of debt and equity used to finance a firm.

Target Capital Structure: The ideal mix of debt, preferred stock, and common equity with which the firm plans to finance its investments.

FACTORS/DETERMINANTS FOR CAPITAL STRUCTURE PLANNING

Following are the important factors to be considered while planning a capital structure:

1. **Financial Leverage:** The financial manager should take advantage of debt capital as much as possible because use of debt capital increases the earnings on equity since interest

payments give a tax shield. However, an important fact to be kept in view is that beyond a particular point of leverage, weighted average cost of capital may go up. Also higher financial leverage results into higher financial risk.

2. **Operating Leverage:** This leverage depends on the operating fixed cost of the firm. If a higher percentage of a firm's total costs are fixed operating costs, the firm is said to have a high degree of operating leverage. Operating leverage measures the operating risk of a firm. Operating risk is the variability of operating profit or EBIT to sales. A financial manager should attempt at an appropriate combination of the two leverages.
3. **EBIT/EPS Analysis:** This analysis is an important tool of measuring a company's performance. Normally, a financial plan which will give maximum value of EPS will be selected as the most desirable mix. The greater the level of EBIT, the more beneficial it is to employ debt capital in capital structure. However, EPS analysis ignores risk.
4. **Cost of Capital:** The financial manager aims to select a combination of debt and equity, that maximizes the value of the firm and minimizes the overall cost of capital. It should always be borne in mind that overall cost of capital is an important variable in the decision-making relating to selection of debt-equity mix.
5. **Growth and Stability of Sales:** The growth and stability of sales is an important factor in selection of desired mix of debt and equity. The firms with stable sales are likely to employ high degree of leverage, for *e.g.*, the sale of consumer goods show wide fluctuations. Therefore, they do not employ large amount of debt. On the other hand, sales of public utilities are comparatively stable and predictable. Therefore, it is observed that public utilities services relatively employ higher debt in their capital structure.
6. **Cash Flow Analysis:** The capital structure of a firm should be so planned that it should be able to service its fixed charges of interest and principal under any reasonable predictable adverse circumstances. The companies expecting larger and stable cash inflows in future can employ a large amount of debt in their capital structure. If companies having unstable cash inflows in future employ sources of finance with fixed charges, it will be risky. In planning the capital structure, financial manager must consider coverage ratios. The greater the coverage, the greater will be the amount of debt capital that a firm may use.
7. **Flexibility:** It means the ability of the company to adapt its capital structure in response to changing conditions. The main point is that company should be able to raise funds without undue delay and cost whenever needed to finance the profitable investment. Debt capital is more flexible than equity capital, because it can be redeemed when circumstances are favourable. Equity does not enjoy flexibility as equity shares cannot be redeemed except on liquidation or buyback which is an expensive exercise. Preference shares can be redeemed under certain circumstances.
8. **Control:** Ordinary or equity shareholders have the legal right to vote. In fact, they are the real owners and they can exercise the control over the overall affairs. In the event of issuing fresh equity shares, there remains a risk of loss of control for promoters. When a choice is

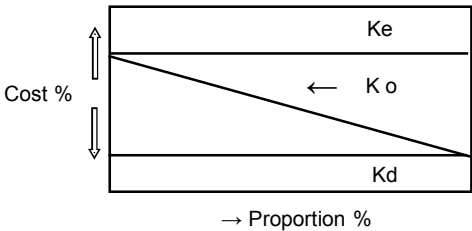
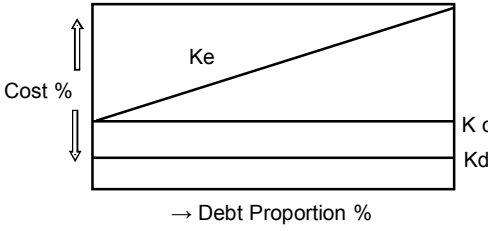
made between debt and equity to raise additional funds, normally debt is preferred to equity in order to avoid loss of controlling stake. However, now banks and FIs introduced a lot of restrictions (restrictive covenants) in the loan agreement to protect their interest. At times, the loan agreement includes the right to nominate a director to oversee the activities of the firm.

9. **Size and Nature of the Company:** It is also an important consideration in the selection of sources of finance. A small firm finds it extremely difficult to raise long-term loans and normally small companies depend on share capital and retained earnings for long-term capital. A large company relatively enjoys greater degree of flexibility in designing its capital structure. A firm should make best use of its size in planning its capital structure. Nature of industry is also an important consideration in designing the capital structure. For *e.g.*, Real Estate Industry or IT Industry or Power Sector Industry or Telecom Industry *etc.*, have different capital structure requirement.
10. **Marketability/Capital Market Conditions:** The conditions in capital market are continuously changing. At one time, the capital market favours the debenture issue and at other time it readily accept share issues. Based on the changing market sentiments, decision should be taken regarding raising the funds through debt or equity.
11. **Flotation Costs (Cost of Raising Finance):** Flotation costs are incurred only when the funds are raised. Normally, cost of floating a debt is less than the cost of floating an equity issue. It is not a very significant factor, but it should be considered in designing a capital structure. QIP floating cost is less than public issue floating cost.
12. **Legal Constraints:** In a regulated economy, a firm has to comply with legal requirements in this respect. For *e.g.*, Dual listing not allowed in India, Capital A/c convertibility not allowed in India, FDI investment cap in certain sectors (*e.g.*, Retail, Banking, Telecom, Aviation *etc.*)

Features of Optimum Capital Structure

1. **Profitability:** It is that capital structure which minimizes cost of financing and maximizes earning per equity share.
2. **Solvency:** A firm should plan the capital structure in such a way that it does not run the risk of becoming insolvent. Excess use of debt threatens the solvency of the company.
3. **Flexibility:** It should be such that it can provide funds whenever the company needs it, to finance for profitable activities.
4. **Conservatism:** Debt content in capital structure should be in limits so that the company can service the debt comfortably.
5. **Control:** It should be such that it involves minimum risk of loss of control of the company for the promoters.

THEORY OF CAPITAL STRUCTURE

1. Net Income (NI) Approach	2. Net Operating Income (NOI) Approach
As per NI Approach, we calculate WACC and use it as a benchmark to compare with ROI of proposed investment. If $ROI > WACC$, we accept the proposal.	As per NOI Approach, we estimate ROI of proposed investment. We deduct the cost of debt and cost of preference if any) from ROI to get K_e , (ROE). If K_e , $[ROE] > \text{Expectation of shareholders}$, we accept the proposal.
	
Equation: $K_o = W_e K_e + W_d K_d$	$K_e = K_o + (K_o - K_d) \times \text{Debt/Equity}$
Assumptions: Cost of debt can be calculated and is constant. → Cost of Equity (Net income to equity shareholders) is estimable and is calculated. → Overall cost (WACC) is weighted average of K_e and K_d . → K_e and K_d are independent variables and k_o is dependent.	→ Cost of Debt can be calculated and is constant. → Overall Return (ROI), i.e., PBIT or Net Operating Income) is estimable and is constant. → K_e is residual value after deducting K_d from WACC. → K_o and K_d are independent variables and K_e is dependent.

3. Traditional Approach: According to the traditional financial structure theory, the cost of capital is not independent of the capital structure of the firm and that there is an optimal capital structure. There are two types of risks:

- (a) **Business Risk:** Business risks includes factors such as market fluctuations, availability of material, etc. and it will always be there more or less in the same measure.

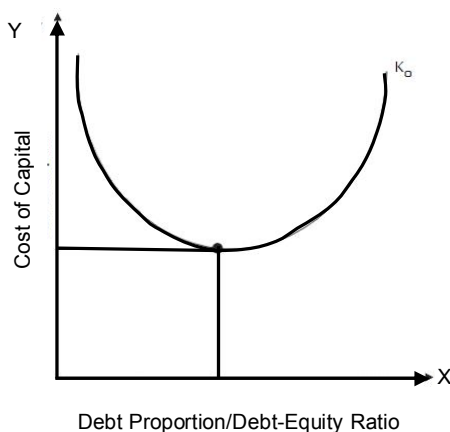


Fig. 6.1: Traditional Approach Indicating Interrelationship between Cost of Capital and Capital Structure

- (b) **Financial Risk:** Financial risks keeps on increasing after a certain stage as more and more debt capital commitments are undertaken.

This theory states that there exists a correlation between the Weighted Average Cost of Capital and the Debt-equity Ratio. The relation between the two when presented graphically takes the form of an U-shaped curve. Cost of Capital will be very high if the Debt-equity ratio is zero. When debt is injected into the capital structure step-by-step, the weighted average cost of capital will progressively come down only upto the lowest (optimum) point and then the cost of capital will go up with the further introduction of debt; since the debenture holders have to be offered a higher rate of interest, to compensate higher risk.

4. Modigliani-Miller Approach: The Franco Modigliani and Merton H. Miller (MM) Approach on cost of capital states that there is no correlation between cost of capital and debt-equity ratio. This approach states that the average cost of capital of any firm is independent of its capital structure and equal to the capitalization rate of pure equity stream of its class. The value of the firm and cost of capital is the same for all the firms irrespective of the proportion of debt included in a firm's capital structure.

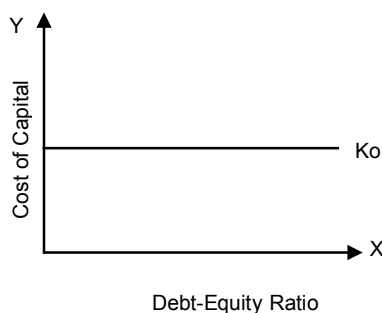


Fig. 6.2: Modigliani-Miller Approach to Cost of Capital and Capital Structure

Assumptions

- (i) Perfect capital market.
- (ii) Rational investors and managers.
- (iii) Homogeneous expectations.
- (iv) Equivalent risk classes.
- (v) Absence of taxes.

“The value of a firm is equal to its expected operating income divided by the discount rate appropriate to its risk class. It is independent of its capital structure.”

In symbols,

$$V = D + E = O/r$$

where, V is the market value of the firm, D is the market value of debt, E is the market value of equity, O is the expected operating income, and r is the discount rate applicable to the risk class which

the firm belongs. Hence, the value of the firm will be independent of its capital structure, as per MM theory.

PROBLEMS AND SOLUTIONS

Illustration 1

Your friend approaches you with a proposal to set up a manufacturing unit having gestation period of 50 to 55 months and funds requirement of around ₹ 15 crores. Explain to him the various sources to raise the fund for the project.

Solution:

Observations:

- (a) Individual Promoter.
- (b) Manufacturing unit, good asset base.
- (c) Funds requirement ₹ 150 million (₹ 15 crores).
- (d) Gestation period 50-55 months (4-5 years)

Possible Sources of Capital – Equity, Debt.

→ **Equity:** It is owner's capital with claim on profits after paying external liabilities.

Merits (to issuing firm):

- 1. No legal obligation to pay dividend.
- 2. No charge on assets.
- 3. Improves borrowing capacity.
- 4. Improves Debt-equity ratio (comfortable to lenders).

Demerits:

- 1. Voting rights.
- 2. Dilution of control.
- 3. Tax not saved on dividend paid.

Ways to Raise Equity:

- (a) **Promoters:** Promoters should invest to the extent possible, as it does not dilute control. Limited fund availability with the promoters, however, should not hamper growth.
- (b) **Private Placements:** Equity can be placed with business associates, friends and other such network. Advantage of control is diluted, but to known people. Also they not only bring money, but also bring business contacts/community. This improves business. Disadvantage is they really use voting rights and dilution of control is real. Nominee on board is common.
- (c) **Public Issue:** IPO offer can fetch virtually unlimited money. Advantage is that, public is not interested in control. They do not vote. Practically, no dilution of control. Disadvantage is

people are passive, they bring only funds and no other value addition. Also public issue is time-consuming and costly.

- (d) **Venture Capital:** It is a risk capital invested at very early stage of business. It is suitable for technology/new upcoming areas of ventures.
- (e) **Retained Earnings:** Reinvestment of profits is always good. It is low cost and less time-consuming. It does not dilute control of the existing shareholders/promoters.
- (f) **Debt:** It is borrowed capital.

Merits:

- (i) Fixed interest.
- (ii) Saves tax.
- (iii) Offers leverage benefits.
- (iv) No loss of controlling stake/voting power.

Demerits:

- (i) Charge on assets.
- (ii) Interest to be paid irrespective of profits/loss.

Ways to Raise Debt:

- (i) **Term Loan:** From banks (negotiated).
- (ii) **Debentures:** By public issue.

Factors Determining Capital Structure in Given Case:

- (a) **Business Track Record:** Appears to be a new business, so external funds will have limitation.
- (b) **Nature of Business:** Manufacturing Unit doesn't seem to be a high technology unit. Not suitable for venture capital. Offers good asset backup and good for borrowing.
- (c) **Quantum of Investment:** ₹ 15 crores – Small size. Not suitable for public issue.

Suggested Capital Structure

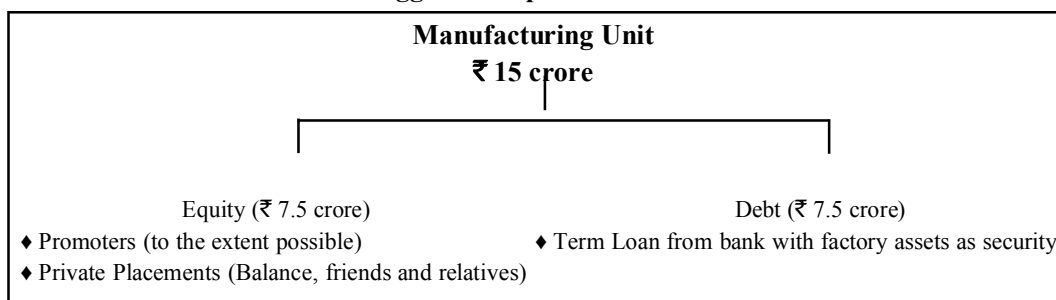


Illustration 2

X Ltd., a widely held company, is considering a major expansion of its production facilities and the following alternatives are available:

(₹ in crores)

Particulars	Alternative		
	A	B	C
Share capital (₹ 10)	50	20	10
14% debentures	–	20	15
Loan from financial institution @ 18 p.a. rate of interest	–	10	25

Expected rate of return before tax is 25%. The company at present has low debt. Corporate taxation 50%.

Which of the alternatives would you choose?

Solution:**Evaluation of Financing Alternative**

Particulars	A	B	C
EBIT	12.5	12.5	12.5
Less: Interest	–	4.6	6.6
$[(20 \times 14\%) + (10 \times 18\%)] = 4.6$			
$[(15 \times 14\%) + (25 \times 18\%)] = 6.6$			
EBT	12.5	7.9	5.9
Less: Tax @ 50%	6.25	3.95	2.95
EAT	6.25	3.95	2.95
Less: Preference dividend	–	–	–
Earnings for ESH (a)	6.25	3.95	2.95
No. of Equity Shares (b)	5	2	1
∴ EPS (a ÷ b) (₹)	1.25	1.98	2.95

Recommendation:

On the basis of EPS, it is advised to select Alternative C.

Illustration 3

One-up Ltd. has equity share capital of ₹ 5,00,000 divided into shares of ₹ 100 each. It wishes to raise further ₹ 3,00,000 for expansion-cum-modernization scheme. The company plans the following financing alternatives:

- (i) By issuing equity shares only.
- (i) ₹ 1,00,000 by issuing equity shares and ₹ 2,00,000 through debentures or term loan @ 10% per annum.
- (iii) By raising term loan only at 10% per annum.
- (iv) ₹ 1,00,000 by issuing equity shares and ₹ 2,00,000 by issuing 8% preference shares.

You are required to suggest the best alternative giving your comment assuming that the estimated earning before interest and taxes (EBIT) after expansion is ₹ 1,50,000 and corporate of tax is 35%.

Solution:

Evaluation of Financing Alternatives

Particulars	Alternatives			
	1	2	3	4
EBIT	1,50,000	1,50,000	1,50,000	1,50,000
Less: Interest	–	20,000 (10% × 2L)	30,000 (10% × 3L)	–
EBT/PBT	1,50,000	1,30,000	1,20,000	1,50,000
Less: Tax @ 35%	52,500	45,500	42,000	52,500
EAT/PAT/NPAT	97,500	84,500	78,000	97,500
Less: Preference dividend	–	–	–	16,000
Earnings for ESH (a)...	97,500	84,500	78,000	81,500
No. of equity shares – Existing	5,000	5,000	5,000	5,000
– New	3,000	1,000	–	1,000
(b)....	8,000	6,000	5,000	6,000
EPS (a/b)	₹ 12.19	₹ 14.08	₹ 15.60	₹ 13.58

Recommendation:

The company is advised to select alternative 3, *i.e.*, 10% term loan since it results into highest EPS, *i.e.*, ₹ 15.60.

Illustration 4

The existing capital structure of Gerrad Ltd. is as follows:

	₹
Equity shares of ₹ 100 each	40,00,000
Retained Earnings	10,00,000
9% Preference shares	25,00,000
7% Debentures	25,00,000

Company earns a return of 12% and the tax on income is 50%.

Company wants to raise ₹ 25,00,000 for its expansion project for which it is considering following alternatives:

- Issue of 20,000 Equity shares at a premium of ₹ 25 per share.
- Issue of 10% Preference shares.
- Issue of 9% Debentures.
- Projected that the Price Earning ratios in the case of Equity, Preference and Debentures financing is 20, 17 and 16 respectively.

Which alternative would you consider to be the best? Give reason for your choice.

(M.U., BMS, May 2008)

Solution:**Evaluation of Financing Alternatives**

Particulars	Alternatives		
	1	2	3
EBIT	15,00,000	15,00,000	15,00,000
Less: Interest – Existing	(1,75,000)	(1,75,000)	(1,75,000)
– New	–	–	(2,25,000)
EBT/PBT	13,25,000	13,25,000	11,00,000
Less: Tax @ 50%	6,62,500	6,62,500	5,50,000
EAT/PAT/NPAT	6,62,500	6,62,500	5,50,000
Preference dividend – Existing	(2,25,000)	(2,25,000)	(2,25,000)
– New	–	(2,50,000)	–
Capital Structure	185		
Equity Earnings (a). . .	4,37,500	1,87,500	3,25,000
No. of equity shares – Existing	40,000	40,000	40,000
– New	20,000	–	–
(b). . .	60,000	40,000	40,000
EPS (a/b)	7.29	4.69	8.13
MPS = PE × EPS	₹ 145.8	₹ 79.73	₹ 130.08
	(29 × 7.29)	(17 × 4.69)	(16 × 8.13)

$$\begin{aligned}
 \text{Capital Employed} &= \text{Existing} + \text{New} \\
 &= 100,00,000 + 25,00,000 \\
 &= 125,00,000
 \end{aligned}$$

$$\text{ROI} = \frac{\text{PBIT}}{\text{Capital Employed}} \times 100$$

$$\therefore \text{PBIT} = \text{Capital Employed} \times \frac{\text{ROI}}{100}$$

$$= 1,25,00,000 \times \frac{12}{100}$$

$$= ₹ 15,00,000$$

Recommendation:

Select Alternative 1, *i.e.*, issue of ₹ 20,000 Equity shares, since it results into highest MPS, *i.e.*, ₹ 145.8.

Illustration 5

The Rooney Chemicals Ltd. requires ₹ 25,00,000 for a new plant. This plant is expected to yield earnings before interest and taxes of ₹ 5,00,000. While deciding about the financial plan, the company considers the objectives of maximizing earnings per share. It has three alternatives to finance the

project — by raising debt of ₹ 2,50,000 or ₹ 10,00,000 or ₹ 15,00,000 and the balance in each case, by issuing equity shares. The company's shares are currently selling at ₹ 150, but it is expected to decline to ₹ 125 in case the funds are borrowed in excess of ₹ 10,00,000. The funds can be borrowed as under upto ₹ 2,50,000 10% p.a. between ₹ 2,50,001 to ₹ 10,00,000 15% p.a. between ₹ 10,00,001 and above 20% p.a. The tax rate applicable to the company is 50%. Which form of financing should the company choose?

Solution:

Modern Chemicals Ltd.
Selection of Financing Alternatives

Particulars	Alternatives		
	1	2	3
Debt	2,50,000	10,00,000	15,00,000
Equity Share Capital (i)	*22,50,000	15,00,000	10,00,000
Total Capital	25,00,000	25,00,000	25,00,000
Issue price (ii)	150	150	125
∴ No. of Equity shares (i ÷ ii)	15,000	10,000	8,000
EBIT	5,00,000	5,00,000	5,00,000
Less: Interest			
250000 × 10%	25,000	25,000	25,000
Bal. 750000 × 15%	—	1,12,500	1,12,500
Bal. 500000 × 20%	—	—	1,00,000
EBT	4,75,000	3,62,500	2,62,500
Less: Tax @ 50%	1,90,000	1,45,000	105,000
EAT	2,85,000	2,17,500	1,57,500
Less: Preference dividend	—	—	—
Earnings for ESH (a)	2,85,000	2,17,500	1,57,500
No. of Equity shares (b)	15,000	10,000	8,000
∴ EPS (a ÷ b)	₹ 19	₹ 21.75	₹ 19.69

Recommendation:

Select Alternative 2, *i.e.*, debt ₹ 10,00,000 since it results into highest EPS ₹ 21.75.

Illustration 6

Excel Ltd. is considering three financing plans. The key information is as follows:

- Total investment to be raised ₹ 2,00,000.
- Plan of financing proportion:

Plan	Equity	Debt	Preference Shares
A	100%	—	—
B	50%	50%	—
C	50%	—	50%

- (c) Cost of Debt 8%. Cost of Preference Shares 8%.
 (d) Tax rate 50%.
 (e) Equity Shares of the face value of ₹ 10 each will be issued at a premium of ₹ 10 per share.
 (f) Expected PBIT is ₹ 80,000.

Determine for each plan:

- (i) Earnings per share (EPS) and
 (ii) The financial break-even point.

Solution:

(i) Computation of EPS

Particulars	Plan A (₹)	Plan B (₹)	Plan C (₹)
EBIT	80,000	80,000	80,000
Less: Interest	—	8,000	—
EBT	80,000	72,000	80,000
Less: Tax @ 50%	40,000	36,000	40,000
EAT	40,000	36,000	40,000
Less: Preference Dividend	—	—	8,000
Amount Available to Equity Shareholders	40,000	36,000	32,000
EPS = $\frac{\text{Amount Available to Equity Shareholders}}{\text{Number of Equity Share's}}$	$= \frac{40,000}{10,000}$	$= \frac{36,000}{5,000}$	$= \frac{32,000}{5,000}$
	= ₹ 4.0	= ₹ 7.2	= ₹ 6.4

Recommendation:

Plan B, i.e., to raise ₹ 1 lakh by equity capital and ₹ 1 lakh by 8% debt is recommended since it gives the highest EPS.

Working Notes:

(1) Capital Structure

Source	Plan A		Plan B		Plan C	
	%	₹	%	₹	%	₹
(i) Equity Share Capital	100	2,00,000	50	1,00,000	50	1,00,000
(ii) 8% Debt	—	—	50	1,00,000	—	—
(iii) 8% Preference Share Capital	—	—	—	—	50	1,00,000
Total	100	2,00,000	100	2,00,000	100	2,00,000

(2) Number of Equity Shares

$$\text{Number of Equity Shares} = \frac{\text{Equity Capital Amount}}{\text{Issued Price per Share}}$$

Plan A	Plan B	Plan C
$= \frac{₹ 2,00,000}{20}$	$= \frac{₹ 1,00,000}{20}$	$= \frac{₹ 1,00,000}{20}$
= 10,000 Shares	= 5,000 Shares	= 5,000 Shares

Issue Price Share = Face Value Per Share + Premium Per Share

= ₹ 10 + ₹ 10

= ₹ 20 per share

(ii) Calculation of Financial Break-even Point

At financial break-even level of EBIT; EPS = Zero, i.e., Amount available to ESH is Zero.

Particulars		Plan A ₹	Plan B ₹	Plan C ₹
Financial Break-even Level of EBIT	↑	Zero	8,000	16,000
Less: Interest	↑	—	8,000	—
EBT	↑	—	—	16,000
Less: Tax @ 50%	↑	—	—	8,000
EAT	↑	—	—	8,000
Less: Preference Dividend	↑	—	—	8,000
Amount Available to Equity Shareholders		Zero	Zero	Zero

Financial break-even level of EBIT:

for Plan A = Zero

for Plan B = ₹ 8,000

for Plan C = ₹ 16,000

Illustration 7

Expected PBIT ₹ 20 lakhs

Options of capital structure:

Particulars	A	B	C
Equity	20	20	40
10% Debt	80	60	40
15% Preference	—	20	20

Tax @ 40%. Equity divided into shares of face value ₹ 10/-. Which option is preferred?

Solution:

Particulars	A	B	C
PBIT	20	20	20
Less: Interest	8	6	4
PBT	12	14	16
Less: Tax	4.8	5.6	6.4

PAT	(a)	7.2	8.4	9.6
Less: Preference dividend		–	3	3
Equity earnings		7.2	5.4	6.6
No. of shares	(b)	2	2	4
EPS	(a ÷ b)	3.6	2.7	1.65

Recommendation:

Select option A, since it results into highest EPS.

Illustration 8

The following financial information pertains to VX Ltd. as at 31st March, 2010.

Balance Sheet	(₹ in lakhs)
Fixed Assets (at cost less depreciation)	200
Net Current Assets	60
Total Assets	260
Less: Long-term debt	215
Net Assets	45
Represented by: Equity capital	40
Retained earnings	5
	45

Profit and Loss Account	(₹ in lakhs)
Net Profit before interest and tax	52
Interest paid	20
Tax paid	12
Dividends declared	18

The company has identified a profitable investment opportunity and requires funds to the tune of ₹ 20 lakhs for fixed assets purchase and ₹ 5 lakhs for working capital.

You are required to state the sources of funds that are available to company and also discuss the problem to choose debt to fund the new project.

Solution:

Fixed asset is a long-term asset. Hence, ₹ 20 lakhs required for fixed assets should be raised through long-term sources of finance.

For example:

- (i) Shares: (a) Equity Shares and (b) Preference Shares
- (ii) Debentures
- (iii) Retained Earnings
- (iv) Public Deposits
- (v) Term loan from banks

- (vi) Loan from financial institutions
- (vii) ADR
- (viii) GDR
- (ix) Lease financing
- (x) Hire purchase
- (xi) Venture capital
- (xii) ECB
- (xiii) Euro bond and Foreign bond
- (xiv) Government subsidies
- (xv) Securitization, etc.

Working capital is a short-term assets. Hence, ₹ 5 lakhs required for working capital should be preferably raised through short-term sources of finance.

Eight example:

- (i) Trade Credit
- (ii) Cash Credit/Overdraft
- (iii) Loans repayable in 1 year
- (iv) Discount of bills
- (v) Letter of credit
- (vi) Inter-corporate deposit
- (vii) Short-term loan from financial institutions
- (viii) Commercial papers

The problem if the company chooses debt as an option:

Demerits:

1. Interest got to be paid at predetermined rates. It becomes problematic in year of losses.
2. It increases financial leverage/risk and reduces solvency/flexibility to raise debt in future.
3. Increase of default of interest/loan installment then the company may be liquidated and proceeds will first be used to meet debt obligations., etc. [*e.g., Zenith Infotech/SUZION etc.*]

Illustration 9

Ravi Ltd. has a capital structure exclusively of ordinary shares of ₹ 10 each, amounting to ₹ 5,00,000. The company desires to raise additional funds of ₹ 5,00,000 for financing its extension programme. The company can raise 50% as equity capital at par and balance in 5% debentures. The existing EBIT is ₹ 60,000 which will rise by 75% on expansion. The market price per share is ₹ 100 and tax rate 30%. Calculate EPS after expansion.

(M.U., BMS, Mar., 2011)

Solution:

New EBIT = 60,000 + 75%, i.e., 45,000 = 1,05,000

Particulars	₹
Equity (50%)	2,50,000
5% Debentures *	2,50,000
Total	5,00,000
Issue Price	100
No. of New Shares	2,500
No. of Existing Shares (5,00,000 ÷ 10%)	50,000
Total (a)	52,500
EBIT	1,05,000
Less: Int.	12,500
EBT	92,500
Less: Tax	27,750
EAT	64,750
Less: Pref. Dividend	Nil
Earning for ESH (b)	64,750
EPS (a ÷ b)	1.23

Illustration 10

A new project under consideration require a capital outlay of ₹ 300 lakhs. The required funds can be raised either fully by equity shares of ₹ 100 each or by equity shares of the value of ₹ 200 lakhs and by loan of ₹ 100 lakhs @ 15% interest assuming a tax rate of 50%.

Calculate the figures of profit before interest and tax that would keep the equity investors indifferent to the two options. Verify your answer by calculating the EPS.

Solution:**Working Notes:**

(a) Capital Structure

(₹ in lakhs)

Source	Option 1	Option 2
I. Equity (₹ 100 each)	300	200
II. 15% Loan	—	100
Total	300	300

(b) Number of Equity Shares:

$$\text{Number of Equity Shares} = \frac{\text{Equity Amount}}{\text{Issue Price Per Share}}$$

Option 1	Option 2
$= \frac{\text{₹ 300 lakhs}}{\text{₹ 100 per share}} = 3 \text{ lakh share}$	$= \frac{\text{₹ 200 lakhs}}{\text{₹ 100 per share}} = 2 \text{ lakh share}$

Calculation of indifference level of EBIT: Equity Shareholders will be indifferent between the competing plans only when EPS is the same in both the cases.

EPS Option 1 = EPS Option 2

$$\frac{(\text{EBIT} - I)(1 - t) - \text{PD}}{\text{Number of shares}} = \frac{(\text{EBIT} - I)(1 - t) - \text{PD}}{\text{Number of shares}}$$

Let the difference level of EBIT = x

$$\frac{(x - 0)(1 - 0.5) - 0}{3} = \frac{(x - 15)(1 - 0.5) - 0}{2}$$

$$\frac{(x \times 0.5)}{3} = \frac{0.5(x - 15)}{2}$$

$$\frac{0.5x}{3} = \frac{0.5x - 7.5}{2}$$

$$2 \times 0.5x = 3(0.5x - 7.5)$$

$$x = 0.5x - 22.5$$

$$22.5 = 1.5x - 1x$$

$$22.5 = 0.5x$$

$$x = \frac{22.5}{0.5}$$

$$x = 45$$

x = Indifference level of EBIT = ₹ 45 lakhs

Verification:

(All Figures ₹ in lakhs)

Particulars	Option 1 ₹	Option 2 ₹
EBIT	45.0	45
Less: Interest	—	15
EBT	45.0	30
Less: Tax @ 50%	22.5	15
EAT	22.5	10
Less: Preference Dividend	—	—
Amount Available to Equity Shareholders	22.5	15
EPS = $\frac{\text{Amount Available to Equity Shareholder}}{\text{Number of Equity Shares}}$	= $\frac{22.5}{3}$	= $\frac{15}{2}$
	= ₹ 7.5 per share	₹ 7.5 per share

Note: At indifference level of EBIT, EPS amongst the financing option will always be the same.

PRACTICE PROBLEMS

Q.1 AB Company needs ₹ 5,00,00,000 for the construction of a new plant. The following three financial plans are feasible:

- (a) the company may issue ₹ 50,00,000 ordinary shares of ₹ 10 each.
- (b) the company may issue ₹ 25,00,000 ordinary shares @ ₹ 10 each and remaining amount may be collected by issue of ₹ 25,000. Debentures of ₹ 100 each bearing an 8% rate of dividend.

If the expected EBIT, which the company may earn is ₹ 40,00,000, then suggest which Capital Structure alternative the company should select.

Assume tax rate to be 50%?

(MU, BMS, Apr., 2012)

Q.2 XYZ Ltd. has equity share capital of ₹ 5,00,000 divided into shares of ₹ 100 each. It wishes to raise further ₹ 3,00,000 for expansion-cum-modernization scheme.

The company plans the following financing alternatives:

- (a) By issuing equity shares only.
- (b) ₹ 1,00,000 by issuing equity shares and ₹ 2,00,000 through debentures or term loan @10% per annum.
- (c) By raising term loan only at 10% per annum.
- (d) ₹ 1,00,000 by issuing equity shares and ₹ 2,00,000 by issuing 8% preference shares.

You are required to suggest the best alternative giving your comments assuming that the estimated 'Earning Before Interest and Taxes (EBIT)' after expansion is ₹ 1,50,000 and corporate rate of tax is 35%.

Solution:

XYZ Ltd.
Calculation of EPS

Particulars	Financing Alternative			₹
	I	II	III	IV
Equity – Existing	5,00,000	5,00,000	5,00,000	5,00,000
– New	3,00,000	1,00,000	–	1,00,000
8% Preference Shares	–	–	–	2,00,000
10% Term Loan/Debentures	2,00,000	3,00,000	–	–
	8,00,000	8,00,000	8,00,000	8,00,000

Calculation of EPS

Particulars	Financing Alternative			₹
	I	II	III	IV
Preference Dividend	–	–	–	16,000
Interest on Term Loan or Debentures	–	20,000	30,000	–
No. of Equity Shares (i)	8,000	6,000	5,000	6,000
EBIT	1,50,000	1,50,000	1,50,000	1,50,000
Less: Interest	–	20,000	30,000	–

EBT	1,50,000	1,30,000	1,20,000	1,50,000
Less: Tax @ 30%	52,500	45,500	42,000	52,500
EAT	97,500	84,500	78,000	97,500
Less: Preference Dividend	—	—	—	16,000
Earning available for equity shareholders (ii)	97,500	84,500	78,000	81,500
EPS (ii/i)	12.19	14.08	15.60	13.58

Analysis: From the above analysis, it is observed that EPS is highest with the 3rd alternative, i.e., further financing of ₹ 3,00,000 can be done by raising term loan only at 10% per annum.

Q.3 The existing capital structure of ABC Ltd. is as follows:

	₹
Equity shares of ₹ 100 each	40,00,000
Retaining Earnings	10,00,000
9% Preference Shares	25,00,000
7% Debentures	25,00,000

The company earns a return before interest and tax at 12% and the tax on income is 50%. Company wants to raise ₹ 25,00,000 for its expansion programme, for which it is considering following alternatives:

- Issue of 20,000 Equity Shares at a premium of ₹ 25 per share.
- Issue of 10% Preference Shares
- Issue of 9% Debenture.

It is forecasted that the price-earning ratio is case of these alternatives are: (a) 20, (b) 17 and (c) 16.

Which alternative would you consider to be the best?

Give reasons for your choice.

Also calculate expected market price in case of three alternative financing proposals.

Solution:

Capital Structure

Sources of Finance	Alternative			
	Existing ₹	(a) ₹	(b) ₹	(c) ₹
Equity Shares	40,00,000	60,00,000	40,00,000	40,00,000
Securities Premium	—	5,00,000	—	—
Returned Earnings	10,00,000	10,00,000	10,00,000	10,00,000
9% Preferences Shares	25,00,000	25,00,000	25,00,000	25,00,000
10% Preferences Shares	—	—	25,00,000	—
7% Debentures	25,00,000	25,00,000	25,00,000	25,00,000
9% Debentures	—	—	—	25,00,000
Total	1,00,00,000	1,25,00,000	1,25,00,000	1,25,00,000

Calculation of EPS and Market Price Per Share

Sources of Finance	Alternative			
	Existing ₹	(a) ₹	(b) ₹	(c) ₹
EBIT (@ 12%)	12,00,000	15,00,000	15,00,000	15,00,000
Less: Interest on Deb.	1,75,000	1,75,000	1,75,000	4,00,000
EBT	10,25,000	13,25,000	13,25,000	11,00,000
Less: Tax @ 50%	5,12,500	6,62,500	6,62,500	5,50,000
EAT	5,12,500	6,62,500	6,62,500	5,50,000
Less: Preference Dividend	2,25,000	2,25,000	4,75,000	2,25,000
(i) Earnings available to Equity Shareholders	2,87,500	4,37,500	1,87,500	3,25,000
(ii) No. of Equity Shares (No.)	40,000	60,000	40,000	40,000
(iii) EPS (i ÷ ii)	₹ 7.19	₹ 7.29	₹ 4.69	₹ 8.12
(iv) P/E Ratio Precasted	—	20	17	16
Expected Market Price per Equity Share (iii) × (iv)	—	₹ 145.80	₹ 79.73	₹ 129.92

Alternative 'a' financing is the best because market value per share of equity shares is the highest.

EXERCISE

I Fill in the Blanks

- Capital structure is made up of _____.
- Capital structure includes ownership securities and _____ securities.
- Equity consists of equity share capital and _____.
- Debt consists of _____ funds.
- Capital structure refers to sources of _____ funds.
- The structure which maximizes the value of the firm is _____.
- The optimum capital structure minimizes the _____ of capital.
- Optimum capital structure is also known as _____ structure.
- If the company is unable to repay the debt within the scheduled period it will affect the _____ of the company.
- Equity shareholders are the real _____ of the company.
- In capital structure decisions the risks considered included _____ and _____.
- Risk is influenced by demand, price, input cost, fixed cost etc.
- _____ risk represents risk from financial leverage.
- Shares make the capital structure rigid.
- A highly profitable company will have lower reliance on _____.
- Capital structure decisions are taken in view of the purpose of _____.

17. Standard debt equity ratio is_____.
18. _____is the minimum level of EBIT needed to satisfy all fixed financial charges.
19. The situation in which two alternative financial plans produce the level of EBIT where EPS is the same is known as _____.
20. Net Income approach is given by_____.
21. Traditionally optimal capital structure is assumed as a point where W ACC is_____.

[Ans.: (1) Capitalisation, (2) Creditor ship, (3) Reserves & Surplus, (4) Loan Fund, (5) Long term, (6) Optimum Capital Structure, (7) Cost, (8) Sound, (9) Goodwill, (10) Owners, (11) Business, Financial, (12) Business, (13) Financial, (14) Equity; (15) Debt, (16) Financing, (17) 2 : 1, (18) – Financial Break Even, (19) Financial Indifference Point, (20) Durand David, (21) Minimum.]

II. Multiple Choice Questions

1. Optimum Capital structure implies a ratio debt and equity at when _____ would be least and market value of the firm would be highest.
 - (a) Marginal Cost of Capital
 - (b) WACC
 - (c) Cost of Debt
 - (d) Opportunity cost
2. One of the following is not an assumption of capital structure theories:
 - (a) These are capital structure sources of funds, i.e. Debt and equity.
 - (b) There are no corporate taxes.
 - (c) Dividend Payout ratio varies between 0% and 100%
 - (d) Firm's business risk is constant overtime.
3. The factor which is not relevant for determination of debt equity mix.
 - (a) Taxation
 - (b) Nature of Asset base
 - (c) Industry Norms
 - (d) Viability of Cashflows
4. Ability of a firm with high gearing to meet fixed interest payment out of current earnings.
 - (a) Taxation
 - (b) Nature of Asset base
 - (c) Industry Norms
 - (d) Viability of Cashflows
5. Capital Structure decision should always aim at having debt component in order to
 - (a) Gain Tax Sayings
 - (b) Balance the Capital Structure
 - (c) Gain Control
 - (d) Increase EPS
6. The non-produce projects should be finance by
 - (a) Debt and Equity
 - (b) Debt
 - (c) Equity
 - (d) Retained Earnings

7. If EBIT is less than financial break even point then
 - (a) EPS will be Positive
 - (b) EPS will be Negative
 - (c) No effect on EPS
 - (d) Cash of Debt Increases
8. If the expected level of EBIT exceeds the indifference point.
 - (a) Debt financing will be advantages
 - (b) Equity financing will be advantages
 - (c) EPS will reduce
 - (d) None of the above.
9. An appropriate capital structure is
 - (a) Flexible
 - (b) Conservator
 - (c) Minimum risk of loss of control
 - (d) (a), (b), (c)
10. Financial Risk involves
 - (a) Risk of cash insolvency
 - (b) Risk of variation in expected earning
 - (c) Both (a) and (b)
 - (d) None of the above
11. If ROI is more than cost of Debt.
 - (a) EPS Increase
 - (b) Financial Risk Increases
 - (c) Both (a) and (b)
 - (d) None of the above
12. Net Income approach assumes.
 - (a) No change in risk
 - (b) No corporate taxes
 - (c) Both (a) and (b)
 - (d) None of the above
13. The effect of increase in leverage
 - (a) Increase equity capitalisation rate
 - (b) WACC remains constant
 - (c) Total value of the firm remains constant
 - (d) All of the above.
14. The effect of decrease in leverage
 - (a) Decreases equity capitalisation rate
 - (b) WACC remains constant
 - (c) Total value of the firm remains constant
 - (d) All of the above.
15. Following is not an assumption of NOI approach.
 - (a) Debt capitalisation rate changes
 - (b) Constant WACC

- (c) No corporate taxes
- (d) Split between debt & equity is not important
- 16. Following is not the assumption of MM Approach
 - (a) Investors behave rationally
 - (b) Investors are free to buy & sell securities.
 - (c) There is a transaction cash
 - (d) Investors can borrow without restriction
- 17. Capital structure is optimum when
 - (a) M. V. of equity share does not change
 - (b) M. V. of equity share changes
 - (c) Cost of equity changes
 - (d) None of the above
- 18. Capital structure with equity shares only
 - (a) Enhances credit standing of the company
 - (b) Directors have greater discretion in declaration of dividend.
 - (c) There is no danger of existence of the company
 - (d) All the above
- 19. The combination of debt and equity used to finance a firm is called....
 - (a) Capital Budgeting
 - (b) Cost of Capital
 - (c) Capital Structure
 - (d) Working Capital
- 20. State what is not a feature of optimum capital structure
 - (a) Profitability
 - (b) Bonus Shares
 - (c) Conservatism
 - (d) Control
- 21. Perfect Capital Market is a assumption of which Capital Structure Theory?
 - (a) Modigliani-Miller Approach
 - (b) Traditional Approach
 - (c) Net Income Approach
 - (d) Net Operating Income Approach.

[Ans.: (1 – b), (2 – c), (3 – c), (4 – a), (5 – d), (6 – d), (7 – b), (8 – a), (9 – d), (10 – c), (11 – c), (12 – c), (13 – d), (14 – d), (15 – a), (16 – c), (17 – a), (18 – d), (19 – d), (20 – b), (21 – a)].

III State whether the following Statements, are true or false

1. Capital structure is the composition of securities issued to raise finance.
2. Capital structure is organisation structure of a company.

3. An ideal capital structure can be formulated by combining debt and equity judiciously.
4. An ideal capital structure is one which maximizes market value per share.
5. Capital structure is make up of capitalisation.
6. Capital structure includes short to creditors, and equity shareholder's fund.
7. Capital structure influences risk and return of the shareholders.
8. Securities premium is included in own capital.
9. The capital structure need not be flexible.
10. Capital structure should not impair solvency of the company.
11. Cost of financing is high when finance is raised through raised through issue of equity shares.
12. Change in capital structure does not affect value of the firm.
13. The basic assumption of net income, approach in capital structure planning is that are these taxes.
14. A capital structure is optimum if market value of equity shares does not change in spite of change in the degree of leverage.
15. Traditional approach assumes that optimum capital structure exist.
16. According to MM approach optimum capital structure do not exist.
17. MM approach assumes that capital market is perfect.
18. MM approach is essentially net operating income approach.

[Ans.: **True:** 1, 3, 4, 5, 7, 8, 10, 11, 12, 14, 16, 17, 18; **False:** 2, 6, 9, 13, 15]

IV Match the Column

	Group A		Group B
1.	Own Capital	(a)	Debt
2.	Debentures	(b)	Maximum EPS
3.	Optimum Capital Structure	(c)	Suggested by Durand
4.	NI Approach	(d)	Equity Capital
5.	MM Approach	(e)	Optimum Capital Structure does not exist
		(f)	There are no taxes

[Ans.:(1 –d), (2 – a), (3 –b), (4 – c), (5 –e)]

REVIEW QUESTIONS

Q.1 Concept Testing

- (a) Target Capital Structure.
- (b) Net Income Approach.
- (c) MM Theory of Capital Structure.

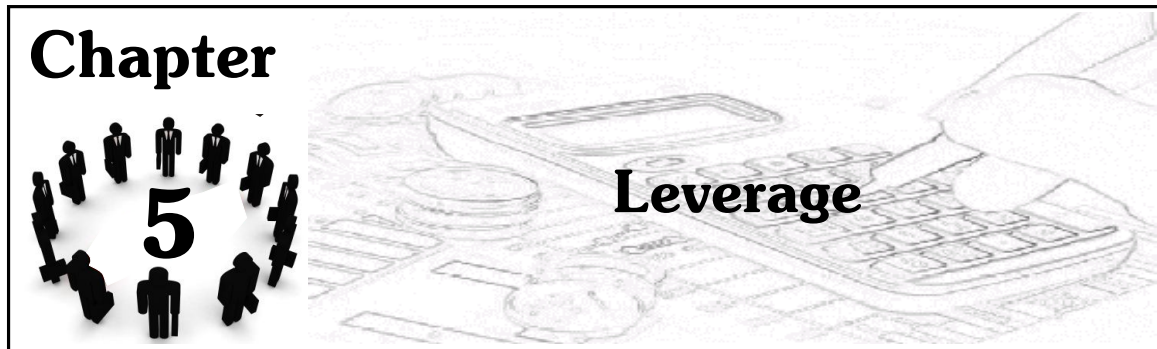
Q.2 Explain factors/determinants of Capital Structure planning.

PRACTICE QUESTIONS

1. A Ltd. Has agreed to buy the net assets of B Ltd. For ₹ 18,00,000. In order to finance the purchase, directors of A Ltd. Are considering the following proposals:
 - (a) To issues ₹ 18,00,000 5%20 years sinking fund debentures.
 - (b) To issues ₹ 18,00,000 5 1/2% cumulative preference shares.
 - (c) To issue 60,000 equity shares at a premium of ₹10.

Summarised balance sheets as on 31st March, 2002 and Profit and Loss Accounts for the year ended for each company are as follows:





LEVERAGE

Leverage refers to amplified benefit on comparatively lower level of investment or lower sales. Such enhancement of profit is usually seen because of fixed costs. These could be operating fixed cost or financial fixed cost. As sales volume increases, fixed cost do not increase. Hence, it results in higher level of profit.

Fixed cost, however, also leads to higher level of break-even point. Higher break-even point is a risk. Thus, highly leveraged firms feature high risk and high return. Leverages are also referred in the context of optimal utilization such as asset leverage and working capital leverage.

TYPES OF LEVERAGE

1. Operating Leverage: Operating leverage refers to enhancement of profits because of fixed operating expenses. As sales increase, fixed cost do not increase which results in proportionately higher profits. Degree of operating leverage calculated as:

$$DOL = \frac{\text{Contribution}}{\text{PBIT}} = \frac{\% \text{ change in PBIT}}{\% \text{ change in Sales}}$$

Higher fixed expenses indicate higher operating break-even point and hence higher business risk. Fixed operating expenses are determined by nature of business and industry. For instance, heavy engineering units would have higher level of fixed overheads whereas service industry would have lower overheads. Thus, DOL is dictated by these factors and managers have little liberty to adjust it at their will.

2. Financial Leverage: Financial leverage refers to higher level of profit because of higher fixed financial expenses. These include interest on loan and debentures as well as preference dividend. Degree of financial leverage is calculated as:

$$\frac{\text{PBIT}}{\text{PBT}} = \frac{\% \text{ change in PBT}}{\% \text{ change in PBIT}}$$

Higher financial leverage indicates higher financial break-even point and higher financial risk. Capital structure to some extent is determined by nature of business and industry. However, finance

managers have greater flexibility in choice of capital structure. They can decide quantum of borrowed capital and preference shares. Aggressive policies will lead to higher borrowings, higher DFL, which will result in high risk and high return profile.

Conservative policies would lead to lower level of borrowings, and therefore low risk low return profile.

It may be argued that capital-intensive units are more likely to have higher debt to equity proportion and hence higher financial leverage (e.g., Power Sector Units).

3. Combined Leverage: Combined leverage refers to higher profits because of fixed costs. These include fixed operating expenses as well as fixed financial expenses. Degree of combined leverage is calculated as:

$$DCL = \frac{\text{Contribution}}{\text{PBT}} = \frac{\% \text{ change in PBIT}}{\% \text{ change in Sales}}$$

Alternate Formula:

$$DCL = DOL \times DFL$$

DCL is a complete indicator of leverage benefits and leverage risks. DCL also indicates overall break-even point. While operating fixed costs are determined by nature of business and industry. Financial fixed costs can be adjusted by appropriate choice of capital structure. Aggressive firms choose higher level of DCL whereas conservative go for lower level of DCL.

Distinguish between Operating Leverage and Financial Leverage

The differences between the two leverages are as follows:

	Operating Leverage	Financial Leverage
1. Objective	The objective is to magnify the effect of changes in sales on operating profit.	The objective is to magnify the effect of changes in operating profits on earning per share.
2. Relationship	It establishes relationship between operating profit and sales.	It establishes relationship between operating profit and return on equity.
3. Measurement	It measures a firm's ability to use fixed cost assets to magnify the operating profits.	It measures a firm's ability to use fixed cost funds to magnify the return to equity shareholders.
4. Relationship	It relates to the assets side of the Balance sheet.	It relates to the liability side of the Balance sheet.
5. Effect on income	It affects the profit before interest and tax.	It affects the profit after interest and tax.
6. Risk	It involves operating risk of being unable to cover fixed operating cost.	It involves financial risk of being unable to cover fixed financial cost.
7. Decision	It is concerned with investment decision.	It is concern with financial decision.
8. Stage	It is described as first stage leverage.	It is described as second stage leverage.
9. Formula	$DOL = \frac{\text{Contribution}}{\text{PBIT}}$	$DFL = \frac{\text{PBIT}}{\text{PBT}}$

Business Risk and Financial Risk

Business Risk: Higher operating fixed cost leads to higher operating break-even point. Risk of not achieving operating break-even point because of lower level of sales is called business risk. Higher business risk means higher DOL and possible higher profits after break-even point. Business risk is measured in terms of operating leverage.

$$DOL = \frac{\text{Contribution}}{\text{PBIT}} = \frac{\% \text{ change in PBIT}}{\% \text{ change in Sales}}$$

Business risk has effect on gross profit margin and return on capital employed. Business risk is determined by nature of business and industry.

Financial Risk: Higher financial expenses such as interest and preference dividend lead to higher financial break-even point. Risk of not achieving financial break-even is called financial risk. Higher financial risk means higher DFL and possible higher profits after break-even point. Financial risk is measured in terms of financial leverage.

$$DEL = \frac{\text{PBIT}}{\text{PBT}} = \frac{\% \text{ change in PBT}}{\% \text{ change in PBIT}}$$

Financial risk has effect on net profit margin. Level of financial risk is a choice of finance manager and aggressive/conservative policies of the firm.

Break-even Analysis

It is a technique for studying the relationship among fixed costs, variable cost, sales volumes and profits. It occurs when the PBIT is equal to zero, as a result of which the earnings per share is also effectively zero. In other words, the break-even point is the PBIT level where EPS is the same for two or more financial plans or alternatives. So, it effectively analyzes the effect of financing alternatives on earnings per share.

Thus, the operating break-even point is defined as that level of sales at which PBIT is equal to zero. It is used to find the sales required to reach a target level of PBIT.

Income Statement Format

Particulars	Amt (₹)
Sales	xxx
Less: Variable Cost	(xxx)
Contribution	xxx
Less: Fixed Cost	(xxx)
Earning Before Interest & Tax (EBIT)	xxx
Less: Interest	(xxx)
Earning Before Tax (EBT)	xxx
Less: Tax	(xxx)
Earning After Tax (EAT)	xxx

LEVERAGE: PROBLEMS AND SOLUTIONS

Illustration 1

Jigna Ltd. sells 1,00,000 units of product. Selling price is ₹ 10 per unit and variable cost is ₹ 3, if the fixed cost for the year amounts to ₹ 4,00,000. Find out the effect on profit, if the company sells 1,10,000 units and 80,000 units.

Solution:

Particulars	Amt (₹)	Amt (₹)	Amt (₹)
Units	1,00,000	1,10,000	80,000
Sales	10,00,000	11,00,000	8,00,000
Less: Variable cost	3,00,000	3,30,000	2,40,000
Contribution	7,00,000	7,70,000	5,60,000
Less: Fixed cost	4,00,000	4,00,000	4,00,000
Profit	3,00,000	3,70,000	1,60,000

Comment: The companies profit when the sales is ₹ 1,10,000 units is ₹ 3,70,000 and when the sales are 80000 units, the profit is ₹ 1,60,000, i.e., 10% increase in sales increases profit by 23.33% and 20% decrease in sales reduces profit by 46.67%.

Illustration 2

Ambika Ltd. sells 2,000 units per annum. The selling price per unit is ₹ 300 and the variable cost per unit is ₹ 70. The fixed operating cost is ₹ 60,000.

Calculate operating leverage.

Solution:

Particulars	Amt (₹)
Sales (2,000 × 300)	6,00,000
Less: Variable cost (70 × 2,000)	1,40,000
Contribution	4,60,000
Less: Fixed Cost	60,000
PBIT	4,00,000

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{PBIT}} = \frac{4,60,000}{4,00,000} = 1.15$$

Illustration 3

Y Ltd. sells its product at ₹ 20 per unit. Variable cost per unit is ₹ 15. Find out the degree of operating leverage for sale of 3,000 units and 3,500 units. What do you understand from the degree of operating leverage of these sales volumes? Fixed cost is ₹ 10,000.

Solution:

Particulars	Amt (₹)	Amt (₹)
Units	3,000	3,500
Sales	60,000	70,000
Less: Variable cost	45,000	52,500
Contribution	15,000	17,500
Less: Fixed cost	10,000	10,000
PBIT	5,000	7,500

$$\text{Operating Leverage (3,000 units)} = \frac{\text{Contribution}}{\text{PBIT}} = \frac{15,000}{5,000} = 3$$

$$\text{Operating Leverage (3,500 units)} = \frac{\text{Contribution}}{\text{PBIT}} = \frac{17,500}{7,500} = 2.3$$

Comment: Higher units/sales results into lower operating/business risk and *vice versa*.

Illustration 4

Compute financial leverage from the following information:

Particulars	(₹)
Interest	10,000
Sales (1,000 units)	1,00,000
Variable Cost	50,000
Fixed Cost	30,000

Solution:

Particulars	Amt (₹)
Sales	1,00,000
Less: Variable cost	50,000
Contribution	50,000
Less: Fixed cost	30,000
PBIT	20,000
Less: Interest	10,000
PBT	10,000

$$\begin{aligned} \text{Financial Leverage} &= \frac{\text{PBIT}}{\text{PBT}} \\ &= \frac{20,000}{10,000} \\ &= 2 \end{aligned}$$

Illustration 5

Shruti Ltd. has the following structure:

Particulars	(₹)
Equity share capital	5,00,000
10% Preference share capital	5,00,000
8% Debentures	5,50,000

The present EBIT is ₹ 2,50,000 and tax rate is 50%. Calculate financial leverage.

Solution:

Particulars	(₹)
EBIT (Earning before Interest, and Tax)	2,50,000
Less: Interest (5,50,000 × 8%)	44,000
PBT	2,06,000
Less: Tax @ 50%	1,03,000
PAT	1,03,000

$$\begin{aligned}
 \text{Financial Leverage} &= \frac{\text{PBIT}}{\text{PBT}} \\
 &= \frac{2,50,000}{2,06,000} \\
 &= 1.21
 \end{aligned}$$

Illustration 6

Y Ltd. has sales of ₹ 2,00,000. Variable cost is 50% of sales while the fixed operating cost amounts to ₹ 60,000. Interest on long-term loan amounted to ₹ 20,000.

You are requested to calculate the composite leverage and analyze the impact if sales increase by 10%.

Solution:

Particulars	(₹)	Sales ↑ 10%
Sales	2,00,000	2,20,000
Less: Variable cost	1,00,000	1,10,000
Contribution	1,00,000	1,10,000
Less: Fixed cost	60,000	60,000
PBIT	40,000	50,000
Less: Interest	20,000	20,000
PBT	20,000	30,000

$$\text{Composite Leverage (at present)} = \frac{\text{Contribution}}{\text{PBT}} = \frac{1,00,000}{20,000} = 5$$

$$\text{Composite Leverage (at 10\%↑)} = \frac{\text{Contribution}}{\text{PBT}} = \frac{1,10,000}{30,000} = 3.67$$

Analysis: Increase in sales reduces the combined risk and *vice versa*.

Illustration 7

The following information is available in respect of two firms, P Ltd. and Q Ltd.

Particulars	P Ltd. (₹)	Q Ltd. (₹)
Sales	500	1,000
Less: Variable cost	200	300
Contribution	300	700
Less: Fixed cost	150	400
EBIT	150	300
Less: Interest	50	100
Profit before tax	100	200

You are required to calculate different leverages for both the firms and also comment on their relative risk position.

Solution:

Particulars	P Ltd.	Q Ltd.
(1) Operating Leverage Ratio = $\frac{\text{Contribution}}{\text{PBT}}$	$= \frac{300}{150}$ = 2	$= \frac{700}{300}$ = 2.3
(2) Financial Leverage Ratio = $\frac{\text{PBIT}}{\text{PBT}}$	$= \frac{150}{100}$ = 1.5	$= \frac{300}{200}$ = 1.5
(3) Combined Leverage Ratio = Operating Leverage Ratio × Financial Leverage Ratio	$= 2 \times 1.5$ = 3	$= 2.3 \times 1.5$ = 3.45

Comment:

- Operating leverage:** Q Ltd. has comparatively higher operating risk.
- Financial Leverage:** The financial risk of both companies is same.
- Combined Leverage:** The combine risk is higher for Q Ltd.

Illustration 8

A simplified Income Statement of Zenith Ltd. is given below. Calculate its degree of operating leverage, degree of financial leverage and degree of combined leverage.

Particulars	₹
Sales	
Variable cost	2,00,000
Fixed cost	75,000
EBIT	2,08,000
Interest	1,10,000
Taxes (30%)	29,400
Net Income	68,600

Solution:**Revenue Statement for year**

Particulars	₹
Sales	4,83,000
Less: Variable cost	2,00,000
Contribution	2,83,000
Less: Fixed cost	75,000
PBIT	2,08,000
Less: Interest	1,10,000
PBT	98,000
Less: Tax (30%)	29,400
PAT	68,600

$$\text{Operating Leverage Ratio} = \frac{\text{Contribution}}{\text{PBIT}} = \frac{2,83,000}{2,08,000} = 1.36$$

$$\text{Financial Leverage Ratio} = \frac{\text{PBIT}}{\text{PBT}} = \frac{2,08,000}{98,000} = 2.12$$

$$\text{Combined Leverage Ratio} = \frac{\text{Contribution}}{\text{PBT}} = \frac{2,83,000}{98,000} = 2.9$$

Illustration 9

- (i) Find out operating leverage from the following data:

Sales	₹ 50,000
Variable Costs	60%
Fixed Costs	₹ 12,000

- (ii) Find out financial leverage from the following data:

Net Worth	₹ 25,00,000

Debt/Equity	3:1
Interest Rate	12%
Operating Profit	₹ 20,00,000

Solution:

(i)

Particulars	₹
Sales	50,000
Less: Variable cost (60%)	30,000
Contribution	20,000
Less: Fixed cost	12,000
PBIT	8,000

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{PBIT}} = \frac{20,000}{8,000} = 2.5$$

(ii) Own Funds = Net worth = Equity = Shareholder's fund = ₹ 25,00,000

$$\text{Debt-equity Ratio} = \frac{\text{Debt}}{\text{Equity}}$$

$$\frac{3}{1} = \frac{\text{Debt}}{25,00,000}$$

$$\therefore \text{Debt} = ₹ 75,00,000$$

$$\begin{aligned} \therefore \text{Interest} &= ₹ 75,00,000 \times 12\% \\ &= ₹ 9,00,000 \end{aligned}$$

$$\text{Operating Profit} = \text{EBIT} \quad 20,00,000$$

$$\text{Less: Interest} \quad 9,00,000$$

$$\text{EBT} \quad \underline{11,00,000}$$

$$\text{Financial Leverage Ratio} = \frac{\text{EBIT}}{\text{EBT}} = \frac{20,00,000}{11,00,000} = 1.8$$

Illustration 10

From the following information available for 4 firms, calculate the Earning before Interest and Tax (EBIT), Earnings per share (EPS), the operating leverage and the financial leverage.

Particulars	Firms			
	P	Q	R	S
Sales (in units)	20,000	25,000	30,000	40,000
Selling price per unit (₹)	15	20	25	30
Variable cost per unit (₹)	10	15	20	25

Fixed cost (₹)	30,000	40,000	50,000	60,000
Interest (₹)	15,000	25,000	35,000	40,000
Tax (%)	40	40	40	40
Number of equity shares	5,000	9,000	10,000	12,000

Solution:

Particulars	P	Q	R	S
Sales	3,00,000	5,00,000	7,50,000	12,00,000
Less: Variable cost	2,00,000	3,75,000	6,00,000	10,00,000
Contribution	1,00,000	1,25,000	1,50,000	2,00,000
Less: Fixed cost	30,000	40,000	50,000	60,000
PBIT	70,000	85,000	1,00,000	1,40,000
Less: Interest	15,000	25,000	35,000	40,000
PBT	55,000	60,000	65,000	1,00,000
(-) Tax (40%)	22,000	24,000	26,000	40,000
PAT	33,000	36,000	39,000	60,000
Less: Pref. dividend	—	—	—	—
Profit available to ESH (a) . .	33,000	36,000	39,000	60,000
No. of Equity Shares (b) . .	5,000	9,000	10,000	12,000
EPS (a/b)	₹ 6.6	₹ 4	₹ 3.9	₹ 5
Operating Leverage = $\frac{\text{Contribution}}{\text{PBIT}}$	$= \frac{1,00,000}{70,000}$ = 1.42	$= \frac{1,25,000}{85,000}$ = 1.47	$= \frac{1,50,000}{1,00,000}$ = 1.5	$= \frac{2,00,000}{1,40,000}$ = 1.42
Financial Leverage = $\frac{\text{PBIT}}{\text{PBT}}$	$= \frac{70,000}{55,000}$ = 1.27	$= \frac{85,000}{60,000}$ = 1.42	$= \frac{1,00,000}{65,000}$ = 1.54	$= \frac{1,40,000}{1,00,000}$ = 1.4

Illustration 11

A firm has sales of ₹ 75,00,000; Variable Cost ₹ 42,00,000 and Fixed Cost of ₹ 6,00,000. It has Debt of ₹ 45,00,000 at 9% and Equity of ₹ 55,00,000.

- What is firm's ROI?
- Does it have a favourable Financial Leverage?
- If the firm belongs to an industry, whose asset turnover is 3, does it have high or low asset leverage?
- What are the Operating, Financial and Combined Leverage of the firm?
- If the sales drop to ₹ 50,00,000, what will be the new EBIT?

Solution:

Particulars	₹
Sales	75,00,000
Less: Variable cost (56%)	42,00,000

Contribution	33,00,000
Less: Fixed cost	6,00,000
PBIT	27,00,000
Less: Interest (9% × 45,00,000)	4,05,000
PBT	22,95,000

$$\begin{aligned}
 \text{(a) ROI} &= \frac{\text{EBIT}}{\text{Capital Employed}} \times 100 \\
 &= \frac{27,00,000}{55,00,000 + 45,00,000} \times 100 \\
 &= \frac{27,00,000}{1,00,00,000} \times 100 = 27\%
 \end{aligned}$$

(b) Since ROI is greater than interest on borrowed fund, it can be said that the firm has favourable financial leverage.

$$\begin{aligned}
 \text{(c) Asset turnover ratio} &= \frac{\text{Sales}}{\text{Capital}} \text{ or } \frac{\text{Sales}}{\text{Capital Employed}} \\
 &= \frac{75,00,000}{1,00,00,000} = 0.75
 \end{aligned}$$

Comment: The firm has low asset leverage. It indicates inefficient utilization of asset/excess capacity.

$$\begin{aligned}
 \text{(d) Operating Leverage Ratio} &= \frac{\text{Contribution}}{\text{PBIT}} \\
 &= \frac{33,00,000}{27,00,000} \\
 &= 1.22
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) Financial Leverage Ratio} &= \frac{\text{PBIT}}{\text{PBT}} \\
 &= \frac{27,00,000}{22,95,000} \\
 &= 1.17
 \end{aligned}$$

$$\begin{aligned}
 \text{Combined Leverage Ratio} &= \frac{\text{Contribution}}{\text{PBT}} \\
 &= \frac{33,00,000}{22,95,000} \\
 &= 1.43
 \end{aligned}$$

	₹
Sales	50,00,000
Less: Variable cost (56%)	<u>28,00,000</u>

Contribution	22,00,000
Less: Fixed Cost	<u>6,00,000</u>
EBIT	<u>16,00,000</u>

Hence, new EBIT will be ₹ 16,00,000.

Illustration 12

The selected financial data for A, B and C companies for the year ended 31st March, 2010 were as follows:

Particulars	A	B	C
Variable Cost as a Percentage of Sales	66 2/3	75	50
Interest Expenses (₹)	200	300	1000
Degree of Operating Leverage	5	6	2
Degree of Financial Leverage	3	4	2
Income Tax Rate (%)	40	40	40

Prepare a income statement for each of the three companies.

(M.U., M.Com, Nov. 2002)

Solution:

Particulars	A	B	C
Sales	100% → 4,500	100 → 9,600	100 → 8,000
Less: Variable cost	66.66 % → 3,000	75 → 7,200	50 → 4,000
Contribution	33.33% → 1,500	25 → 2,400	50 → 4,000
Less: Fixed cost	1,200	2,000	2,000
PBIT	300	400	2,000
Less: Interest	200	300	1,000
PBT	100	100	1,000
Less: Tax (40%)	40	40	400
PAT	60	60	600

Working Notes:

(1) A Ltd.

$$\text{Degree of Financial Leverage} = \frac{\text{PBIT}}{\text{PBIT} - 1}$$

$$3 = \frac{\text{PBIT}}{\text{PBIT} - 1}$$

$$3 = \frac{\text{PBIT}}{\text{PBIT} - 200}$$

$$3 (\text{PBIT} - 200) = \text{PBIT}$$

$$3 \text{ PBIT} - 600 = \text{PBIT}$$

$$3 \text{ PBIT} - \text{PBIT} = 600$$

$$2 \text{ PBIT} = 600$$

$$\text{PBIT} = 300$$

$$\text{Degree of Operating Leverage} = \frac{\text{Contribution}}{\text{PBIT}}$$

$$5 = \frac{\text{Contribution}}{300}$$

$$\text{Contribution} = 1,500$$

(2) B Ltd.

$$\text{Degree of Financial Leverage} = \frac{\text{PBIT}}{\text{PBIT} - \text{I}}$$

$$4 = \frac{\text{PBIT}}{\text{PBIT} - \text{I}}$$

$$4 = \frac{\text{PBIT}}{\text{PBIT} - 300}$$

$$4 \text{ PBIT} - 1200 = \text{PBIT}$$

$$4 \text{ PBIT} - \text{PBIT} = 1200$$

$$3 \text{ PBIT} = 1,200$$

$$\text{PBIT} = 400$$

$$\text{Degree of Operating Leverage} = \frac{\text{Contribution}}{\text{PBIT}}$$

$$6 = \frac{\text{Contribution}}{400}$$

$$\text{Contribution} = 2,400$$

(3) C Ltd.

$$\text{Degree of Financial Leverage} = \frac{\text{PBIT}}{\text{PBIT} - \text{I}}$$

$$2 = \frac{\text{PBIT}}{\text{PBIT} - \text{I}}$$

$$2 = \frac{\text{PBIT}}{\text{PBIT} - 100}$$

$$2 (\text{PBIT} - 1,000) = \text{PBIT}$$

$$2 \text{ PBIT} - 2,000 = \text{PBIT}$$

$$2 \text{ PBIT} - \text{PBIT} = 2,000$$

$$\text{PBIT} = 2,000$$

$$\text{Degree of Operating Leverage} = \frac{\text{Contribution}}{\text{PBIT}}$$

$$2 = \frac{\text{Contribution}}{\text{PBIT}}$$

$$\text{Contribution} = 4,000$$

Illustration 13

A firm has sales of ₹ 150 lakhs, variable cost of ₹ 84 lakhs and fixed cost of ₹ 12 lakhs. It has a debt of ₹ 90 lakhs at 9% and equity of ₹ 110 lakhs.

- What is the firm's ROI?
- Does it have favourable financial leverage?
- If the firm belongs to an industry whose asset turnover is 2, does it have high or low asset leverage?
- What is the operating, financial and combined leverage of the firm?
- If the sales drop to ₹ 125 lakhs, what will be the new EBIT?
- At what level, the EBT of the firm will be equal to zero?

(M.U., M.Com, Oct. 2003)

Solution:

Particulars	₹
Sales	1,50,00,000
Less: Variable cost (56%)	84,00,000
Contribution	66,00,000
Less: Fixed cost	12,00,000
PBIT	54,00,000
Less: Interest	8,10,000
PBT	45,90,000

$$\begin{aligned}
 \text{(a) ROI} &= \frac{\text{EBIT}}{\text{Capital employed}} \times 100 \\
 &= \frac{54,00,000}{90,00,000 + 1,10,00,000} \times 100 \\
 &= 27\%
 \end{aligned}$$

- Since ROI is greater than interest on borrowed fund, it can be said that the firm has favourable financial leverages.

$$\begin{aligned}
 \text{(c) Asset turnover ratio} &= \frac{\text{Sales}}{\text{Capital Employed}} \text{ or } \frac{\text{Sales}}{\text{Net Assets}} \\
 &= \frac{1,50,00,000}{2,00,00,000} \\
 &= 0.75
 \end{aligned}$$

Comment: The firm has low asset leverage. It indicates inefficient utilization of assets/excess capacity.

$$\begin{aligned}
 \text{(d) Operating Leverage} &= \frac{\text{Contribution}}{\text{EBIT}} \\
 &= \frac{66,00,000}{54,00,000} \\
 &= 1.22
 \end{aligned}$$

$$\begin{aligned}
 \text{Financial Leverage} &= \frac{\text{EBIT}}{\text{EBT}} \\
 &= \frac{54,00,000}{45,90,000} \\
 &= 1.18
 \end{aligned}$$

$$\begin{aligned}
 \text{Combined Leverage} &= \frac{\text{Contribution}}{\text{PBT}} \\
 &= \frac{66,00,000}{45,90,000} \\
 &= ₹ 1.44
 \end{aligned}$$

	₹
Sales	125
Less: Variable cost (56%)	<u>70</u>
Contribution	55
Less: Fixed Cost	<u>12</u>
EBIT	<u>43</u>

Hence, new EBIT is ₹ 43 lakhs.

	₹
(f) Sales (100%)	45,68,182
Less: Variable cost (56%)	<u>25,58,182</u>
Contribution (44%)	20,10,000
Less: Fixed Cost	<u>12,00,000</u>
PBIT	8,10,000
Less: Interest	<u>8,10,000</u>
PBT	0

At sales level of ₹ 45,68,182 EBT of firm will be zero.

Illustration 14

Calculate operating leverage and financial leverage under situations A, B and C and Financial Plans I, II and III respectively from the following information relating to the operation and capital structure of Rani Ltd. Also find out combination of operating and financial leverages, which gives the highest value and least value. How are these calculation useful to finance manager?

Installed Capacity (No. of Units)			1,200
Actual Production and Sales (No. of Units)			800
Selling Price per Unit (₹)			15
Variable Cost per Unit (₹)			10
Fixed Cost – Situation A (₹)			1,000
Fixed Cost – Situation B (₹)			2,000
Fixed Cost – Situation C (₹)			3,000
Financial Plans	I	II	III
Equity (₹)	5,000	7,500	2,500
12% debt (₹)	5,000	2,500	7,500

(M.U., BMS, Nov. 2007)

Solution:

Revenue Statement for the year.....

Particulars	₹	₹	₹
Situation	A	B	C
Sales (800 × 15)	12,000	12,000	12,000
Less: Variable cost (800 × 10)	8,000	8,000	8,000
Contribution	4,000	4,000	4,000
Less: Fixed Cost	1,000	2,000	3,000
PBIT	3,000	2,000	1,000

Situation A

Fixed cost (₹ 1,000)

Financial Plan	I	II	III
PBIT	3,000	3,000	3,000
Less: Interest	600	300	900
PBT	2,400	2,700	2,100

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{PBIT}} = \frac{4,000}{3,000} = 1.33$$

$$\text{Financial Leverage} = \frac{\text{PBIT}}{\text{PBT}}$$

$$\text{Plan [I]} = \frac{3,000}{2,400} = 1.25$$

$$\text{Plan [II]} = \frac{3,000}{2,700} = 1.11$$

$$\text{Plan [III]} = \frac{3,000}{2,100} = 1.43$$

Situation B**Fixed Cost (₹ 2,000)**

Financial Plan	I	II	III
PBIT	2,000	2,000	2,000
Less: Interest	600	300	900
PBT	1,400	1,700	1,100

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{PBIT}} = \frac{4,000}{2,000} = 2$$

$$\text{Financial Leverage} = \frac{\text{PBIT}}{\text{PBT}}$$

$$\text{Plan [I]} = \frac{2,000}{1,400} = 1.43$$

$$\text{Plan [II]} = \frac{2,000}{1,700} = 1.18$$

$$\text{Plan [III]} = \frac{2,000}{1,100} = 1.82$$

Situation C**Fixed Cost (₹ 3,000)**

Financial Plan	I	II	III
PBIT	1,000	1,000	1,000
Less: Interest	600	300	900
PBT	400	700	100

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{PBIT}} = \frac{4,000}{1,000} = 4$$

$$\text{Financial Leverage} = \frac{\text{PBIT}}{\text{PBT}}$$

$$\text{Plan [I]} = \frac{1,000}{400} = 2.5$$

$$\text{Plan [II]} = \frac{1,000}{700} = 1.43$$

$$\text{Plan [III]} = \frac{1,000}{100} = 10$$

Situation A

$$\text{Combined Leverage} = \text{Operating Leverage} \times \text{Financial Leverage}$$

$$\text{Plan [I]} = 1.33 \times 1.25 = 1.66$$

$$\text{Plan [II]} = 1.33 \times 1.11 = 1.48$$

$$\text{Plan [III]} = 1.33 \times 1.43 = 1.90$$

Situation B

Combined Leverage = Operating Leverage $\times$ Financial Leverage

$$\text{Plan [I]} = 2 \times 1.43 = 2.86$$

$$\text{Plan [II]} = 2 \times 1.18 = 2.36$$

$$\text{Plan [III]} = 2 \times 1.82 = 3.64$$

Situation C

Combined Leverage = Operating Leverage $\times$ Financial Leverage

$$\text{Plan [I]} = 4 \times 2.5 = 10$$

$$\text{Plan [II]} = 4 \times 1.43 = 5.72$$

$$\text{Plan [III]} = 4 \times 10 = 40$$

Conclusion: The highest combined leverage is under situation C, Plan III, *i.e.*, 40 and least is under situation A, Plan II, *i.e.*, 1.48.

Utility of calculation of finance manager: These calculations indicate how does variation in fixed cost and capital structure brings about change in risk and returns.

The finance manager should select the combination which will result into manageable risk with best possible returns.

Illustration 15

Given below is Balance Sheet of A Ltd.

Liabilities	₹	Assets	₹
ESC (₹ 10/Share)	10,00,000	Sundry Assets	31,00,000
10% Preference shares	10,00,000		
8% Debentures	11,00,000		
	31,00,000		31,00,000

(1) If ROI is 18% and Tax rate is 40%, calculate: (a) DFL, (b) EPS, (c) DOL and (d) DCL.

Company's assets turnover ratio is 0.6 and the P/V ratio is 33.33% (1/3).

Solution:**Working Notes:**

1. Capital Employed = ₹ 31 lakhs

ROI = 18%

$$\text{ROI} = \frac{\text{EBIT}}{\text{Capital employed}} \times 100$$

$$\therefore 18\% = \frac{\text{EBIT}}{31,00,000} \times 100$$

$$\therefore \text{EBIT} = 5,58,000$$

Particulars	₹
Sales	18,60,000
Less: Variable cost	12,40,000
Contribution	6,20,000
Less: Fixed cost	62,000
EBIT	5,58,000
Less: Interest (debentures) (11,00,000 × 8%)	88,000
PBT	4,70,000
Less: Tax (40%)	1,88,000
PAT	2,82,000
Less: Preference dividend (1,00,000 × 10%)	1,00,000
Profit available to ESH (a)	1,82,000
No. of equity shares (b)	1,00,000
(ESC/FV) (10,00,000/10)	

(b) $\therefore \text{EPS} (a \div b) = 1.82$

(a) $\text{DFL} (\text{EBIT}/\text{PBT})$

$$= \frac{5,58,000}{4,70,000} = 1.18$$

(c) $\text{DOL} (\text{C}/\text{EBIT})$

$$= \frac{6,20,000}{5,58,000} = 1.111$$

(d) $\text{DCL} (\text{C}/\text{PBT})$

$$= \frac{6,20,000}{4,70,000} = 1.319$$

2. Assets turnover ratio = $\frac{\text{Sales}}{\text{Net assets}}$

$$\begin{aligned} \therefore \text{Sales} &= \text{NA} \times \text{ATR} \\ &= 31,00,000 \times 0.6 \\ &= 18,60,000 \end{aligned}$$

3. Contribution = 33.33% of Sales (PV ratio)

$$\therefore \text{C} = 1/3 \times 18,60,000$$

$$= 6,20,000$$

Illustration 16

Chittaranjan works is a rail coach manufacturing company and Infotech is a large size software development firm. Based on leverages, you are required to advice an investor on the choice of investment in equity of these two firms:

Solution: Leverage is referred to higher profits because of fixed cost.

Operating Leverage: Operating Leverage refers to enhanced profits because of fixed operating expenses.

$$\text{Formula: DOL} = \frac{\text{Contribution}}{\text{PBIT}} = \frac{\% \text{ Change in PBIT}}{\% \text{ Change in Sales}}$$

Reason: Fixed operating expenses.

Effects: Higher gross profit, higher operating break-even point, higher business risks.

Financial leverage: Financial leverage refers to possible higher profits because of fixed financial expenses such as interest and preference dividend.

$$\text{Formula: DFL} = \frac{\text{PBIT}}{\text{PBT}} = \frac{\% \text{ Change in PBT}}{\% \text{ Change in PBIT}}$$

Reason: Interest, Preference Dividend.

Effects: Higher net profit, higher financial break-even point, higher financial risk.

Combined Leverage: Combined Leverage refers to higher overall return because of operating fixed cost as well as financial fixed cost (interest, preference dividend).

$$\text{Formula: DCL} = \frac{\text{Contribution}}{\text{PBIT}} = \frac{\% \text{ Change in PBT}}{\% \text{ Change in Sales}}$$

Reason: Interest Preference dividend, Operating fixed costs.

Effects: Higher net profit, high overall break-even point, higher overall risk.

Comparative Observations

	Chittaranjan Works	Infotech
(i) Industry	Rail coach manufacturing.	Software.
(ii) Assets	Heavy assets such as huge land and building, plant and machinery.	Lower level of asset investment. Just an office as premises.
(iii) Manpower	Unskilled and skilled labour.	Professional expertise.
(iv) Capital Requirement	High	Low

Determinants of Leverages

	Chittaranjan Works	Infotech

(i) Operating leverage (DOL)	Higher factory overheads such as power, depreciation and maintenance	Low factory overheads. High (fixed) salary bill of professionals.
(ii) Financial Leverage (DFL)	Capital-intensive, likely to borrow more	Less capital required, possibly lower borrowings.

Comments:**(i) Chittaranjan Works**

- (a) Higher DOL because of overheads.
- (b) Higher DFL (high borrowings).
- (c) Higher DCL.
- (d) High overall and financial break-even point.
- (e) Indicates highly leveraged, high risk and high return profile with average higher break-even point.

(ii) Infotech

- (a) Higher DOL because of professional salaries.
- (b) Lower DFL (low borrowings).
- (c) Moderate DCL.
- (d) Higher operating break-even point but moderate overall break-even point.
- (e) Indicates moderately leveraged, moderate risk and moderate return profile with break-even point.

Conclusion:

- (a) Chittaranjan Works has high risk and high return profile. Business risk as well as financial risk is high. It is suitable for aggressive investor.
- (b) Infotech has moderate risk and return profile. Business risk is high but financial risk is low. It is suitable for conservative investor.
- (c) It may be noted that apart from leverages, there are many other factors which influence investment decisions. In this case, rail coach manufacturing is a defensive industry that survives better in recession. Software firms give better returns in bullish markets.

Illustration 17

Interest ₹ 1,200/- DFL 3, DOL 2, PV Ratio 1/3, Interest Rate @ 10%. Debt : Equity is 2 : 1. Tax @ 50%.

- (a) Prepare Income Statement.
- (b) Calculate ROI.
- (c) Is financial leverage favourable?
- (d) Calculate Asset Leverage.

- (e) If Industry Asset leverage is 1.1, is this firm efficient?

Solution:

(a) Income Statement

Sales	10,800
Less: VC	7,200
Contribution	3,600
Less: FC	1,800
PBIT	1,800
Less: Interest	1,200
PBT	600
Less: Tax (50%)	300
PAT	300

$$DFL = \frac{PBIT}{PBT} = \frac{PBIT}{PBIT - I}$$

$$3 = \frac{PBIT}{PBIT - 1,200}$$

$$3 PBIT - 3,600 = PBIT$$

$$2 PBIT = 3,600$$

$$PBIT = \frac{3,600}{2}$$

$$\therefore PBIT = 1,800$$

$$DOL = \frac{C}{PBIT}$$

$$2 = \frac{C}{1,800}$$

$$\therefore C = 3,600$$

- (b) 10% = 1,200

$$100\% = ?$$

$$\text{Debt} = 12,000$$

$$\text{Equity} = 6,000$$

$$\text{Capital} = 18,000$$

$$\begin{aligned} ROI &= \frac{PBIT}{\text{Capital Employed}} \times 100 \\ &= \frac{1,800}{18,000} \times 100 = 10 \end{aligned}$$

- (c) ROI = Interest on borrowing funds, hence financial leverage is neither favourable nor adverse.

- (d) Asset Leverage = $\frac{\text{Sales}}{\text{Capital}} = \frac{10,800}{18,000} = 0.6$

(e) The firm is inefficient $\therefore$ Asset leverage is less than standard.

Illustration 18

The following details for company A and B are given. You are required to compute the sales and then comment on the profitability of both the companies.

Particulars	A	B
Operating Leverage	4	4.5
Combined Leverage	8	11.25
9% Debentures	100000	120000
PV Ratio	20%	25%
Tax Rate	50%	50%

Solution:

A Ltd.

$$9\% \text{ Debentures} = 1,00,000$$

$$\therefore \text{Interest} = 1,00,000 \times 9\% = 9,000$$

$$\text{DCL} = \text{DOL} \times \text{DFL}$$

$$8 = 4 \times \text{DFL}$$

$$\therefore \text{DFL} = 2$$

$$\text{Also, DFL} = \frac{\text{PBIT}}{\text{PBIT} - 1}$$

$$2 = \frac{\text{PBIT}}{\text{PBIT} - 1}$$

$$2 \text{ PBIT} - 18,000 = \text{PBIT}$$

$$\text{PBIT} = 18,000$$

$$\text{DOL} = \frac{C}{\text{PBIT}}$$

$$4 = \frac{C}{18,000}$$

$$\therefore C = 72,000$$

$$\text{DCL} = \frac{C}{\text{PBIT}}$$

$$8 = \frac{72,000}{\text{PBT}}$$

$$\text{PBT} = 9,000$$

$$\text{Contribution} = \text{Sales} \times \text{PV ratio}$$

$$C = \text{Sales} \times \frac{20}{100}$$

$$\begin{aligned}\therefore \text{Sales} &= C \times \frac{100}{20} \\ &= 72,000 \times \frac{100}{20} \\ &= 3,60,000\end{aligned}$$

Revenue Statement for year ending

Particulars	₹
Sales	3,60,000
Less: VC *	2,88,000
Contribution	72,000
Less: FC *	54,000
PBIT	18,000
Less: Interest	9,000
PBT	9,000
Less: Tax @ 50%	4,500
PAT	4,500

$$\begin{aligned}\therefore \text{Net profit margin} &= \frac{\text{NPAT}}{\text{Sales}} \times 100 \\ &= \frac{4,500}{3,60,000} \times 100 \\ &= 1.25\%\end{aligned}$$

B Ltd.

$$\text{Interest} = 9\% \times 1,20,000 = 10,800$$

$$\text{DFL} = \frac{11.25}{4.5} = 2.5$$

$$\therefore 2.5 = \frac{\text{PBIT}}{\text{PBIT} - 10,800}$$

$$2.5 \text{ PBIT} - 27,000 = \text{PBIT}$$

$$1.5 \text{ PBIT} = 27,000$$

$$\text{PBIT} = 18,000$$

$$\text{DOL} = \frac{C}{\text{PBIT}}$$

$$4.5 = \frac{C}{18,000}$$

$$C = 81,000$$

$$DOL = \frac{C}{PBT}$$

$$11.25 = \frac{81,000}{PBT}$$

$$\therefore PBT = 7,200$$

$$\therefore \text{Sales} = \text{Contribution} \times \frac{100}{25}$$

$$81,000 \times \frac{100}{25} = 3,24,000$$

Revenue Statement for year ending

Particulars	₹
Sales	3,24,000
Less: VC	2,43,000
Contribution	81,000
Less: FC	63,000
PBIT	18,000
Less: Interest	10,800
PBT	7,200
Less: @ Tax 50%	3,600
PAT	3,600

$$\text{Net profit margin} = \frac{3,600}{3,24,000} \times 100 = 1.11\%$$

Comment: A Ltd. has achieved higher profitability (NPM) at lower risk.

Illustration 19

From the following particulars, prepare income statement of A Ltd. and B Ltd.

	A Ltd.	B Ltd.
Degree of Combined Leverage	6 times	15 times
Degree of Operating Leverage	3 times	5 times
Variable Cost as a % of Sales	40%	50%
Rate of Income Tax	35%	35%
Number of Equity Shares	1,00,000	1,00,000

Earning Per Share	₹ 1.30	₹ 0.65

(M.U., TYBMS, Nov. 2011)

Solution:**A Ltd.**

$$\text{EPS} = \frac{\text{NPAT} - \text{Pref. Dividend}}{\text{No. of Equity Shares}}$$

$$1.30 = \frac{\text{NPAT} - 0}{1,00,000}$$

$$\therefore \text{NPAT} = 1,30,000$$

	%	₹
NPBT	→ 100	?
Less: Tax	→ 35	?
NPAT	→ 65	1,30,000

$$\therefore \text{NPBT} = 1,30,000 \times \frac{100}{65} = 2,00,000$$

$$\rightarrow \text{DCL} = \frac{\text{C}}{\text{PBT}}$$

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

$$\therefore \text{C} = 12,00,000$$

$$\rightarrow \text{DOL} = \frac{\text{C}}{\text{PBIT}}$$

$$3 = \frac{12,00,000}{\text{PBIT}}$$

$$\therefore \text{PBIT} = 4,00,000$$

%

→ Sales	→ 100	→ ?
Less: VC	40	→ ?
Contribution	60	→ 12,00,000

$$\therefore \text{Sales} = 12,00,000 \times \frac{100}{60} = 20,00,000$$

B Ltd.

$$\rightarrow \text{NPAT} = 0.65 \times 1,00,000 = 65,000$$

$$\text{NPBT} = 65,000 \times \frac{100}{65} = 1,00,000$$

$$\rightarrow \text{DCL} = \frac{\text{C}}{\text{PBT}}$$

$$15 = \frac{\text{C}}{1,00,000}$$

$$\therefore \text{C} = 15,00,000$$

$$\rightarrow \text{DCL} = \frac{\text{C}}{\text{PBT}}$$

$$5 = \frac{15,00,000}{\text{PBIT}}$$

$$\therefore \text{PBIT} = 3,00,000$$

$$\rightarrow \text{Sales} = 15,00,000 \times \frac{100}{50} = 30,00,000$$

Income Statement for year ending

Particulars	A Ltd.	B Ltd.
Sales	20,00,000	30,00,000
Less: VC	8,00,000	15,00,000
Contribution	12,00,000	15,00,000
Less: FC	8,00,000	12,00,000
PBIT	4,00,000	3,00,000
Less: Interest	2,00,000	2,00,000
NPBT	2,00,000	1,00,000
Less: Tax	70,000	35,000
NPAT (a)	1,30,000	65,000
Verification		
No. of Shares (b)	1,00,000	1,00,000
$\therefore \text{EPS (a} \div \text{b)}$	1.30	0.65

PRACTICE PROBLEMS

Q. 1 Case Study: Observe the following data.

Income Statement

Particulars	A	B
Sales	50 L	50 L
PBIT	5 L	5 L

Less: Interest	0.4 L	1.6 L
PBT	4.6 L	3.4 L
- Tax	2.3 L	1.7 L
PAT	2.3 L	1.7 L

Sources of Funds

Particulars	A	B
Equity	16 L	4 L
Debt	4 L	16 L

Company A has more profit than company B. So, Company A is better. Do you agree? Discuss.

Q.2 Operating leverages (contribution/profit) of an organization has been increased from 4 last year to 5 during the current year. Fixed overheads have increased by 5% during the current year compared to last year. Sales have also increased by 8% over last year. Assess to what extent the profit of current year is likely to change over last year. Trace the reason for such a change.

Q.3 If the combined leverage and operative leverage of a company are 2.5 and 1.25 respectively, find the financial leverage and P/V ratio given that the equity dividend per share is 2, interest payable per year is ₹ 1 lakh, total fixed cost ₹ 0.5 lakh and sales ₹ 10 lakhs.

Q.4 Compute the operating, financial and combined leverage on basis of following information:

Sales 1,00,000 units at ₹ 2 per unit

Variable Cost – ₹ 0.70 per unit

Fixed Cost – ₹ 1,00,000

Interest Charge – ₹ 3,668

(M.U., BMS, Apr., 2012)

Q.5. The Balance Sheet of Alpha Numeric Company Ltd. is given below:

Liabilities	₹	Assets	₹
Equity Capital (₹ 10 per share)	90,000	Net Fixed Assets	2,25,000
10% Long-term Debt	1,20,000	Current Assets	75,000
Retained Earnings	30,000		
Current Liabilities	60,000		
	3,00,000		3,00,000

The company's total assets turnover ratio is 3, its fixed operating cost is ₹ 1,50,000 and its variable operating cost ratio is 50%. The Income Tax rate is 50%.

You are required to:

- (a) Calculate the different type of leverages for the company.

- (b) Determine the likely level of EBIT if EPS: (i) ₹ 1, (ii) ₹ 2 and (iii) ₹ 0 (zero).

Solution:

- (a) Calculation of Leverage

Working Note: Calculation of Sales

$$\text{STR} = \frac{\text{Sales}}{\text{Total Assets}}$$

$$9,00,000 = 3 \times 3,00,000$$

Alpha Numeric Co.
Income Statement for the year ended

Particulars	₹
Sales	9,00,000
Less: Variable Cost (50% of Sales)	4,50,000
Contributions	4,50,000
Less: Fixed Cost	1,50,000
EBIT	3,00,000
Less: Interest (1,20,000 × 10/100)	12,000
EBT	2,88,000
Less: Tax @ 50%	1,44,000
EAT	1,44,000

$$(i) \text{ Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{4,50,000}{3,00,000} = 1.5$$

$$(ii) \text{ Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{3,00,000}{2,88,000} = 1.04$$

$$(iii) \text{ Combined Leverage} = \text{Operating Leverage} \times \text{Financial Leverage} \\ = 1.5 \times 1.04 = 1.56$$

- (b) Calculation of likely levels of EBIT at different levels of EPS

$$\text{EPS} = \frac{(\text{EBIT} - T)(1 - T)}{N}$$

Where,

EPS = Earning Per Share

EBIT = Earning Before Interest and Tax

I = Interest

N = No. of Equity Shares

- (i) Calculation of EBIT if EPS is ₹ 1

$$1 = \frac{\text{EBIT} - 12,000(1 - 0.50)}{9,000}$$

$$9,000 = (\text{EBIT} - 12,000) 0.50$$

$$9,000 = 0.50 \text{ EBIT} - 6,000$$

$$0.50 \text{ EBIT} = 9,000 + 6,000$$

$$\text{EBIT} = 15,000 \div 0.50 = ₹ 30,000$$

- (ii) Calculation of EBIT if EPS is ₹ 2

$$2 = \frac{(\text{EBIT} - 12,000)(1 - 0.50)}{9,000}$$

$$\text{Or } 18,000 = 0.50 \text{ EBIT} - 6,000$$

$$\text{Or EBIT} = 24,000 \div 0.50 = ₹ 48,000$$

- (iii) Calculation of EBIT if EPS is ₹ 0

$$0 = \frac{(\text{EBIT} - 12,000)(1 - 0.50)}{9,000}$$

$$= 0.50 \text{ EBIT} = 6,000$$

$$\text{EBIT} = \frac{6,000}{0.50} = ₹ 12,000$$

Q.6 (a) A firm is considering two credit policies 'X' and 'Y'. The collection period will be 3 months in policy 'X' and 4 months in policy 'Y'.

At present, the firm's sales are ₹ 20,00,000 and they are expected to increase by 20% and 25% under these two policies and the bad debt losses will be 4% and 6% respectively. At present, the total cost of sales for the firm are ₹ 16,00,000 and the firm wants to maintain the same profitability.

It the firm's required rate of return on receivable is 18%, which policy it should follow?

(b) Calculate the degree of operating leverage, financial leverage and combined leverage for the following firms and interpret the results:

Particulars	P	Q	R
Output (Units)	2,50,000	1,25,000	7,50,000
Fixed Cost (₹)	5,00,000	2,50,000	10,00,000
Unit Variable Cost (₹)	5	2	7.50
Unit Selling Price (₹)	7.50	7	10.00
Interest Expense (₹)	75,000	25,000	—

Solution:

(a) Present Sales = ₹ 20,00,000

COGS = ₹ 16,00,000

$$\text{Present Profitability} \times ₹ 100 = \frac{4,00,000}{20,00,000} \times 100 = 20\%$$

Particulars	Policy X	Policy Y
A. Additional Sales	4,00,000	5,00,000
B. Profitability of additional sales (20%)	80,000	1,00,000
C. Additional bad debts losses (Additional Sales × % Bad debts)	16,000	30,000
D. Additional receivables (Additional Sales/Receivable Turnover)	1,00,000	1,66,667
E. Investment in additional investment (D × 0.8)	80,000	1,33,337
F. Cost of additional investment (E × 0.18)	14,400	24,000
G. Bad debts loss + Cost of Additional Loss (C + F)	30,400	54,000
H. Incrementary Benefits (B – G)	49,600	46,000

Since the profitability in case of Policy X is more than that of Y, its shares be adopted.

Notes: Receivable turnover for Policy X = $\frac{12}{3} = 4$, Y = $\frac{12}{4} = 3$

(b) Calculation of Degree of Operating Leverage, Financial Leverage and Combined Leverage

Particulars	P (₹)	Q (₹)	R (₹)
Sales (Output × SD)	18,75,000	8,75,000	75,00,000
Less: Valuable Costs	12,50,000	2,50,000	56,25,000
Contribution	6,25,000	6,25,000	18,75,000
Less: Operating Fixed Costs	5,00,000	2,50,000	10,00,000
EBIT	1,25,000	3,75,000	8,75,000
Less: Interest	75,000	25,000	–
EBT	50,000	3,50,000	8,75,000

Particulars	P	Q	R
Operating Leverage = $\frac{C}{EBIT}$	$= \frac{6,25,000}{1,25,000}$	$= \frac{6,25,000}{3,75,000}$	$= \frac{18,75,000}{8,75,000}$
	= 5 times	= 1.67 hours.	= 2.14 hours.
Financial Leverage = $\frac{EBIT}{EBT}$	$\frac{1,25,000}{50,000}$	$\frac{3,75,000}{3,50,000}$	$\frac{8,75,000}{8,75,000}$
	= 2.5 hours.	= 1.07 hours	= 1 time
Combined Leverage = $\frac{C}{EBT}$	$= \frac{6,25,000}{50,000}$	$= \frac{6,25,000}{3,50,000}$	$= \frac{18,75,000}{8,75,000}$

	= 12.5 hours.	= 1.79 times	= 2.14 times
	Aggressive Policy	Moderate Policy	No Financing Risk

Q. 7 You are given the following particulars of X Ltd.:

EPS	₹ 12
No. of equity shares	50,000
Equity	₹ 5,00,000
Debt/equity mix	4 : 1
Debt carries interest at	10% p.a.
Rate of income-tax	40%
Fixed cost	₹ 3,00,000

You are required to calculate:

- Degree of Operating Leverage, Financial Leverage and Combined Leverage.
- Degree of Operating Leverage, Financial Leverage and Combined Leverage, if debt/equity mix is changed to 1 : 4 and total funds remaining same.

Solution:

Profit After Tax

$$(\text{EPS} \times \text{No. of Shares}) \quad 12 \times 50,000 \quad = \quad 6,00,000$$

$$\text{Add: Tax} \left(\frac{40}{60} \times 6,00,000 \right) \quad = \quad \underline{4,00,000}$$

$$\text{Profit Before Tax} \quad 10,00,000$$

$$\text{Add: Interest (10\% of 20,00,000)} \quad \underline{2,00,000}$$

$$(\text{Debt} = 4 \times 5,00,000 = 20,00,000)$$

$$\text{Profit Before Interest and Tax} \quad 12,00,000$$

$$\text{Add: Fixed Cost} \quad \underline{3,00,000}$$

$$\text{Contribution} \quad \underline{15,00,000}$$

$$\begin{aligned} \text{Degree of Operating Leverage} &= \frac{\text{Contribution}}{\text{EBIT}} \\ &= \frac{15,00,000}{12,00,000} = 1.25 \end{aligned}$$

$$\begin{aligned} \text{Degree of Financial Leverage} &= \frac{\text{PBIT}}{\text{PBT}} \\ &= \frac{12,00,000}{10,00,000} = 1.20 \end{aligned}$$

$$\begin{aligned}\text{Degree of Combined Leverage} &= \frac{\text{Contribution}}{\text{PBT}} \\ &= \frac{15,00,000}{10,00,000} = 1.50\end{aligned}$$

(b) When Debt to Equity mix is changed to 1 : 4

Total funds = (5,00,000 + 20,00,000) =	25,00,000
Debt = $\frac{1}{5} \times 25,00,000$ =	5,00,000
Equity = $\frac{4}{5} \times 25,00,000$ =	20,00,000
Interest = 10% of 5,00,000 =	50,000
Contribution =	15,00,000
Less: Fixed Cost =	<u>3,00,000</u>
PBIT	12,00,000
Less: Interest	<u>50,000</u>
PBT	11,50,000
Less: Tax	<u>4,60,000</u>
PAT	<u>6,90,000</u>

$$\begin{aligned}\text{(i) Degree of Operating Leverage} &= \frac{\text{Contribution}}{\text{EBIT}} \\ &= \frac{15,00,000}{12,00,000} = 1.25\end{aligned}$$

$$\text{(ii) Degree of Financial Leverage} = \frac{12,00,000}{11,50,000} = 1.04$$

$$\text{(iii) Degree of Combined Leverage} = \frac{15,00,000}{11,50,000} = 1.30$$

Q.8 From the following particulars, prepare Income Statements of Mayur Ltd. and Peacock Ltd.

	Mayur Ltd.	Peacock Ltd.
Degree of Combined Leverage	7.5 times	6 times
Degree of Operating Leverage	15. times	2.4 times
P/V Ratio	40%	40%
Rate of Income Tax	40%	40%
Number of Equity Shares of ₹ 10/-	12,00,000	12,00,000
Earnings per share	₹ 6.70	₹ 4.40

Offer your comments on the profitability and leverages of both the companies.

Solution:

Income Statement

Particulars	Mayur Ltd. (₹)	Peacock Ltd. (₹)
Sales	2512.50	1320
Less: Variable Cost	1507.50	792
Contribution	1005.00	528
Less: Fixed Cot	325	308
EBIT	670.00	220
Less: Interest	536.00	132
EBT	134	88
Less: Income Tax @ 40%	53.60	35.20
EAT	80.40	52.80
No. of Equity Shares	12 Lakhs	12 Lakhs
EPS	₹ 6.70	₹ 4.40

Working Notes:

	Mayur Ltd.	Peacock Ltd.
1. $\text{EPS} \times \text{No. of Shares} = \text{EAT}$	$12 \times 6.70 = 80.40$	$12 \times 4.40 = 52.80$
2. $\text{EAT} + \text{IT. @ 40\%} = \text{EBT}$	$80.40 + 53.60 = 134$	$52.80 + 35.20 = 88$
3. $\text{Combine leverage} \div \text{Operative leverage}$ = Financial leverage	$= \frac{7.5}{1.5} = 5$	$= \frac{6}{2.4} = 2.5$
4. $\text{EBT} \times \text{Financial leverage} = \text{EBT}$	$134 \times 5 = 670$	$88 \times 2.5 = 220$
5. $\text{Operating leverage} \times \text{EBIT} = \text{Contribution}$	$1.5 \times 6.70 = 1,005$	$2.4 \times 220 = 528$
6. $\text{Contribution} \div \text{P/V ratio} = \text{Sales}$	$= 1,005 \div 0.40 = 2,512.50$	$528 \div 0.40 = 1,320$

Comment: Assigning both the companies are engaged in similar business. It is observed that Mayur Limited has approximately 4 times more debt financing, due to which Mayur Ltd.; EPS is ₹ 6.70 whereas it is only ₹ 4.40 for Peacock Ltd.

Operating Risk of Peacock Ltd. is greater than that of Mayur Ltd. The reason is that it has less debt financing.

Q. 9 XYZ Ltd. had the following Balance Sheet as at 31st March, 2010.

Liabilities	₹ (in crores)	Assets	₹ (in crores)
Equity Share Capital (One crore shares of ₹ 10 each)	10	Fixed Assets (Net)	25
		Current Assets	15
Reserves and Surplus	2		
15% Debentures	20		
Current Liabilities	8		
	40		40

You are also given the following additional information:

Fixed costs p.a. (excluding interest)	₹ 8 crores
Variable operating cost ratio	65%
Total assets turnover ratio	2.5
Income tax rate	40%

Calculate and comment on the following:

- Earnings per share
- Operating Leverage
- Financial Leverage
- Combined Leverage

Solution:

Total Assets = ₹ 40 crores

Total Assets Turnover ratio = 2.5

∴ Total Sales = $2.5 \times 40 = ₹ 100$ crores

Calculation of Profit After Tax (PAT)

(₹ in Crores)

Sales	100.0
Less: Variable Operating Cost (65%)	65.0
Contribution	35.0
Less: Fixed Cost (except Interest)	8.0
EBIT	27.0
Less: Interest on Debenture (15% of ₹ 20 crores)	3.0
EBT	24.0
Less: Income Tax @ 40%	9.6
PAT	14.4

$$(i) \text{ EPS} = \frac{14.4 \text{ crores}}{1 \text{ crore}} = ₹ 14.40$$

$$(ii) \text{ Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{35}{27} = 1.296$$

It indicates two choice of technology and fixed cost in cost structure. It is level specific when firm operates beyond operating BEP, then operating leverage is low, It indicates sensitivity of EBIT to change in sales at a particular level.

$$(iii) \text{ Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{27}{24} = 1.125$$

The Financial leverage is very comfortable since the debt service obligation is small *vis-a-vis* EBIT.

$$(iv) \text{ Combined leverage} = \left(\frac{C}{EBIT} \right) \times \left(\frac{EBIT}{EBT} \right) = 1.296 \times 1.125 = 1.458$$

The combined leverage studies the choice of fixed cost in cost structure and choice of debt in capital structure. It studies how sensitive the change in EPS is *vis-a-vis* change in sales. The operating financial, combined leverages are measures of risk.

EXERCISE

I. Fill in the Blanks

- _____ is the sensitivity of operating profit to changes in sale.
- Operating leverage is = $\frac{\text{_____}}{\text{EBIT}}$
- _____ arises when the firm raises finance by fixed interest bearing securities.
- _____ is useful for profit planning.
- Financial leverage involves _____.
- _____ is the combination of operating and financial leverage.
- Degree of operating leverage is calculated by change in proper divided by change in _____.
- _____ is the inability of a company to cover fixed financial changes.
- _____ affect profit before interest and tax.

[Ans.: (1) Operating leverage, (2) Contribution, (3) Financial leverage, (4) Financial leverage, (5) Financial Risk, (6) Composite, (7) Sales, (8) Financial Risk, (9) Operating leverage.]

II Multiple Choice Questions

- High gearing will increase

(a) Financial Risk	(b) Business Risk
(c) Cost of Final	(d) Shareholders Equity
- A high geared company exposes to

(a) Business Risk	(b) Financial Risk
(c) Inflation Risk	(d) Interest Rate Risk
- Interest on Debentures ₹ 4,00,000 preference dividend ₹ 2,00,000 Tax rate is 4 % . If EBIT is ₹ 15,00,000 the financial leverage is

(a) 1.75	(b) 2.88	(c) 1.96	(d) 3.75

4. Operating leverage is concerned with
 - (a) Operation of any Firm
 - (b) Finance of any Firm
 - (c) Capital of any Firm
 - (d) None of the above
5. Financial leverage is
 - (a) EBIT/EBT
 - (b) EBT/EBIT
 - (c) C/EBT
 - (d) C/EBIT
6. High operating & financial leverage implies
 - (a) High Risk
 - (b) Thin Interest
 - (c) Both a & b
 - (d) None of the above
7. Ideal situation for profit maximization is
 - (a) Thin financial leverage
 - (b) Low operating leverage
 - (c) Low operating and high financial leverage
 - (d) None of the above
8. EBT is ₹ 1120 lakhs
OBT ₹ 320 lakhs
Fixed cost ₹ 700 lakhs
If sales are increased by 5% the % of change in earnings per share is
 - (a) 28.44%
 - (b) 25%
 - (c) 19%
 - (d) 20%
9. Refer to Q. no 8 the financial leverage is
 - (a) 2.5%
 - (b) 3.5%
 - (c) 2.6%
 - (d) 4.5%
10. Refer to Q No.8, the operating
 - (a) 2.6%
 - (b) 3.4%
 - (c) 1.625%
 - (d) 2.75%
11. Refer to Q No.8, the contribution is
 - (a) ₹ 1200 lakhs
 - (b) ₹ 1820 lakhs
 - (c) ₹ 2000 lakhs
 - (d) ₹ 3000 lakhs
12. Operating leverage is 1.26 and financial leverage is 1.02 The combined leverage is
 - (a) 2.9%
 - (b) 1.29%
 - (c) 3.29%
 - (d) 4.50%
13. The source of capital use to get financial leverage is
 - (a) Debentures
 - (b) Equity capital
 - (c) Debt capital
 - (d) Short term loans
14. Effective use of leverage reduces the overall cost of
 - (a) Capital
 - (b) Money
 - (c) Production
 - (d) Sales
15. Financial leverage implies application of debt capital for maximising
 - (a) EBIT
 - (b) PBT
 - (c) Debt
 - (d) EPS

16. Leverages help in
 - (a) Long tems loans
 - (b) Designing capital structure
 - (c) Raising short term loans
 - (d) Raising medium term loans
17. Leverage analyses relationship between
 - (a) Equity and Debt
 - (b) Debentures and loans
 - (c) Financial and operating leverage
 - (d) Short term loans and equity
18. Favourable D. FL should be
 - (a) More than 1
 - (b) Equal to 1
 - (c) Equal to Zero
 - (d) Less than 1
19. Favourable D. FL should be
 - (a) More than 1
 - (b) Less than 1
 - (c) Equal to 1
 - (d) Equal to Zero
20. Operating leverage is used to measure
 - (a) Financial Risk
 - (b) Business Risk
 - (c) Market Risk
 - (d) Economic Risk
21. The limitation operating leverage is
 - (a) Higher Risk
 - (b) Profitability
 - (c) Liquidity
 - (d) Cost effective
22. The leverage having combined effect on financial and operating leverage is
 - (a) Capital gearing
 - (b) Financial leverage
 - (c) Operating leverage
 - (d) Combined leverage
23. The Formula of DCL is.....
 - (a) $DOL + DFL$
 - (b) $DOL \times DFL$
 - (c) C/PBT
 - (d) (b) & (c)

[Ans.: (1 – a), (2 – b), (3 – c), (4 – a), (5 – a), (6 – c), (7 – c), (8 – a), (9 – b), (10 – c), (11 – b), (12 – b), (13 – c), (14 – a), (15 – d), (16 – b), (17 – a), (18 – a), (19 – a), (20 – a), (21 – a), (22 – d), (23 – d)]

III. State whether, the Following Statements are True or False

1. Business Risk is the variability of EBIT.
2. Financial Risk is the variability of EBIT.
3. Business Risk is associated with capital structure decision.
4. Financial Risk is associated with capital Budgeting decisions.
5. Financial leverage exists if these are fixed costs.
6. Operating leverage is calculated by dividing contribution by EBT.

7. Financial leverage is calculated by dividing EBT by EBIT.
8. Combined leverage should be as Low as possible
9. Trading on equity is used to increase EPS.

[Ans.: True: 8, 9;

False: 1, 2, 3, 4, 5, 6, 7]

IV. Match the Column

Group A	Group B
1. Operating leverage	(a) $\frac{C}{EBIT}$
2. Operating leverage	(b) Increase s Financial Risk
3. Financial leverage	(c) Composite leverage
4. Combined leverage	(d) Decrease financial Risk
5. High gearing	(e) Fixed interest securities
	(f) Sensitivity of operating profits

[Ans.: (1 – e), (2 – a), (c – f), (4 - c), (5 – b)]

REVIEW QUESTIONS

Q.1 Concept Testing.

- (a) Types of Leverage Ratio.
- (b) Operating Leverage vs. Financial Leverage.

PRACTICE QUESTIONS

1. (a) Find out the Operating Leverage from the following data:

Sales	₹ 50,000
Variable Costs	60%
Fixed Costs	₹ 12,000

2. (b) Find the Financial Leverage from the following data:

Net Worth	₹ 25,00,000
Debt/Equity	3:1
Interest Rate	12%
Operating Profit	₹ 20,00,000

(C.A)

[Ans.: Operating Leverage: 2.5; Financial Leverage: 1.82]

2. Calculate EPS(Earning Per Share) of Solid Ltd. And Sound Ltd assuming:

- (a) 20% before Tax Rate of Return on Assets,
- (b) 10% before Tax Rate of Return on Assets

Based on the following data:

(₹ Lakhs)

Particulars	Solid Ltd. ₹	Sound Ltd. ₹
Assets	100	100
Debt	—	50 (12% Debentures & Loan)
Equity	100 Share of ₹ 10 each	50 (Share of ₹ 10 each)

Assume a 50% Income Tax in both cases.

Give your comments on the Financial Leverage.

(ICWA)

[Ans.: EPS-Solid Ltd.: 1,0.50; Sound Ltd.: 1, 40, 0.04]

3. Saraju Ltd. Produces electronic components with a selling price per unit of ₹ 100. Fixed cost amount to ₹ 2,00,000. 5,000 units are produced and sold each year. Annual profits amount to ₹ 50,000. The company's all equity-financed assets are ₹ 5,00,000.



Chapter



Investment Objectives

INTRODUCTION

Varieties of investment avenues are available in India. An investor can himself select the best avenue after studying the pros and cons of different alternatives. Even financial advertising, newspaper supplements on financial matters and investment journals offer guidance to investors in the selection of suitable investment avenues. The following investment avenues are popular and used extensively in India:

1. **Investment in shares, debentures and bonds** of different types issued by companies, corporations and public sector organizations.
2. Postal savings schemes.
3. **PF, PPF and other tax shelter savings schemes** such as National Savings Schemes, National Savings Certificates and Tax Saving Schemes of LIC, ICICI, Infrastructure Bonds and so on.
4. **Investment in investment intermediaries** such as UTI and mutual funds run by LIC, banks and HDFC, etc.
5. **Deposits in companies** (public deposits) or deposits in public sector organizations and banks.
6. **Life insurance investment, i.e., investment** in different life policies such as whole life policy, endowment policy and so on.
7. Investment in gold, silver, precious metals and antiques.
8. Investment in real estates.
9. **Investment in Gilt-edged securities** and securities of Government and Semi-government Organizations (*e.g.*, Relief Bonds, Bonds of Port Trust, Treasury Bills, etc.)

It may be noted that there are some avenues/investment schemes where tax benefits are available. Such schemes are called tax savings schemes of investment. The tax liability reduces when investment is made in such schemes. The schemes are decided by government and announced along with the annual budget. The basic purpose of such schemes is to encourage investment in certain investment avenues. In some schemes, the entire investment is made tax free, *i.e.*, it is deducted from yearly taxable income.

Popular tax savings investment schemes are as noted below:

1. Public Provident Fund (PPF)
2. Tax sheltered saving schemes of post office such as NSC, NSS, etc.
3. Investment in infrastructure bonds of IDBI, ICICI.
4. Life insurance schemes where insurance premium is given tax benefit.
5. Investment in mutual funds. Here, the tax benefit relates to income earned through such investment.
6. Investment in Residential House Principal as well as interest provide tax benefit.
7. Investment in pension plan of Life Insurance Companies.
8. Mediclaim, *i.e.*, Health Insurance.

The following figure indicates alternative avenues for investment.



INVESTMENT TRAITS

Every investor has certain specific objectives to achieve through his long-term/short-term investment. Such objective may be monetary/financial or personal in character. The objective include safety and security of the funds invested (principal amount), profitability (through interest, dividend and capital appreciation) and liquidity (convertibility into cash as and when required). These objectives are universal in character as every investor will like to have a fair balance of these three

financial objectives. An investor will not like to take undue risk about his principal amount even when the interest rate offered is extremely attractive. These objectives or factors are known as investment attributes.

There are personal objectives which are given due consideration by every investor while selecting suitable avenues for investment. Personal objectives may be like provisions for old age and sickness, provisions for house construction, provisions for education, marriage of children and finally provisions for dependence including wife, parents or physically handicapped member of the family.

Investment avenues selected should be suitable for achieving both the objectives decided. Merits and demerits of various investment avenues need to be considered in the context of such investment objectives.

1. Period of Investment

Period of investment is one major consideration while selecting avenues for investment. Such period may be short (up to 1 year), medium (1 to 3 years) or long (more than 3 years). Return/rate of interest is normally more in the case of longer term investment, while it is the less in the shorter period investment. The period of investment relates to liquidity, an investor has to decide when he needs money back and adjust the period accordingly. LIC policy is an investment for a very long period.

2. Risk in Investment

Risk is another factor which needs careful consideration while selecting the avenue for investment. Risk is the normal feature of every investment as an investor has to part with his money immediately and has to collect it back with some benefit in due course. The risk may be more in some investment avenues and less in other.

The risk in the investment may be related to non-payment of principal amount or interest thereon. In addition, liquidity risk, inflation risk, market risk, business risk, political risk, etc. are some more risk connected with the investment made. The risk in the investment depend on various factors. For example, the risk is more if period of maturity is longer and *vice versa*. In addition, the risk is less if the borrower is creditworthy or the agency issuing security is creditworthy. The objective of investor should be minimize the risk and to maximize the return out of the investment made.

COMPARISON OF INVESTMENT AVENUES

Selecting of suitable avenue for investment depends in various factors. An integrated approach on the part of an investor is necessary in this regard. An investor also needs proper education, training and guidance for the selection of most convenient avenues for his investment. It is a delicate decision which needs knowledge, judgement and vision.

Investment decision need flexibility as per the situation in the capital and money market. They also need periodical review for suitable adjustment. And investor has to review the investment portfolio and make suitable adjustment in the same periodically. Investment made in a particular avenue may become risky or unremunerative after a period of five or ten years. Such investment avenue needs to be replaced by selecting a better avenue. This suggests the importance of flexibility in investment decision. The following points are considered for selecting suitable investment avenue.



INVESTMENT OBJECTIVES

Investment is a widespread practice and many have made their fortunes the process. The starting point in this process is to determine the characteristics of the various investment and then matching them with the individual's need and preferences. All personal investing is designed in order to achieve certain objectives. These objectives may be tangible such as buying a car, house, etc., and intangible objectives such as social status, security, etc. Similarly, these objective may be classified as financial or personal objectives. Financial objectives are safety, profitability and liquidity. Personal or individual objectives may be related to personal characteristics of individual such as family commitments, status, etc.

The objectives can be classified on the basis of the investor's approach as follows:

- (a) **Short-term high priority objectives:** Some investors have high priority towards achieving certain objectives in short time. For example, a young couple will give high priority to buy a house.
- (b) **Long-term high priority objectives:** Some investors look forward and invest on the basis of objectives of long-term needs. They want to achieve financial independence in long period. For example, investing for post-retirement period or education of child, etc.
- (c) **Low priority objectives:** These objectives have low priority in investing. These objectives are not painful. After investing in high priorities assets, investors can invest in these low priority assets. For example, provision for tour, domestic appliance, etc.

- (d) **Money making objectives:** Investors put their surplus money in this kind of investment. Their objective is to maximize wealth. Usually, the investors invest in shares of companies which provides capital appreciation apart from regular income from dividend.

INVESTMENT AND SPECULATION

“Speculation, is an activity, quite contrary to its literal meaning, in which a person assumes high risks, often without regard for the safety of his invested principal, to achieve large capital gains.” The time span in which the gain is sought to be made is usually very short.

Investment involves putting money into an assets which is not necessarily in order to enjoy a series of returns. The investor sacrifice some money today in anticipation of a financial return in future. He indulges in a bit of speculation. There is an element of speculation involved in all investment decisions. However, it does not mean that all investment are speculative by nature. Genuine investments are carefully thought-out decisions. On the other hand, speculative investments are not carefully thought-out decisions. They are based on tips and rumours.

An investment can be distinguished from speculation in three ways – risk, capital gain and time period. Risk has definite financial meaning. It is a possibility of incurring a loss in a financial transaction.

Investment involves limited risk while speculation is considered as an investment of funds with high risk. Speculation involves buying a security at a low price and selling at a high price to make a capital gain. Investment involves longer-term allocation of funds, whereas speculation involves holding a security for a short-term and trading quickly for earning higher gain.

Speculation involves a higher level of risk and a more uncertain expectation of return. Investments are not risk-free but the risk can be calculated. The expected return is consistent with the risk of investment.

ELEMENTS OF INVESTMENT

- (a) **Return:** Investors buy or sell financial instruments in order to earn return on them. The return on investment is the reward to the investors. The return includes both current income and capital gains or losses, which arises by the increase or decrease of the security price.
- (b) **Risk:** Risk is the chance of loss due to variability of returns on an investment. In case of every investment, there is chance of loss. It may be loss of interest, dividend or principal amount of investment. However, risk and return are inseparable. Return is a precise statistical term and it is measurable. But the risk is not precise statistical term.
- (c) **Time:** Time is an important factor in investment. It offers several different courses of action. Time period depends on the attitude of the investors who follows a ‘buy and hold’ policy. As time moves on, analysts believe that conditions may change and investors may reevaluate expected return and risk for each investment.

PRACTICE QUESTION PAPER I

[Total Marks = 60]

N.B.: (1) All questions are **compulsory** carrying **15 Marks each**.

(2) **Figures** to the **right** side indicate **full** marks.

(3) **Working notes** and **assumptions** should form **part** of your answers.

(4) Use of simple calculator is **allowed**.

1. The financial statements of Tata Ltd. For the current year end reveal the following information **15**

Ratio of current assets to current liabilities	1.75 : 1.0
Liquidity ratio(debtors and bank balances to current liabilities)	1.25 : 1.0
Issued capital in equity shares of ₹ 10 each	₹ 1,20,000
Net current assets (as over current liabilities)	₹ 60,600
Fixed assets (net blocks) – Percentage of Shareholder's equity	60%
As on the closing date	
Gross profit – Percentage of turnover	20%
Annual rate of turnover of stock(based on cost at March 31)	5.26 times
Average age of outstanding debtors for the current year	2 months
Net profit – Percentage on issued share capital	16%
On March 31 st the current assets consisted of stock, debtors and bank balances	

You are required to reconstruct, in as much as possible:

OR

1. From the following particulars, draw up the Balances sheet of a company: **15**

Current Ratio	2.5
Quick Ratio	1.5
Net Working Capital	₹ 90,000
Stock Turnover Ratio (Cost of Sales/Closing Stock)	6 Times
Gross Profit Ratio	20%
Fixed Assets Turnover Ratio (Cost of Sales)	2 Times
Debtors Turnover Ratio	2 Months
Fixed Assets to Shareholders' Net Worth	0.80
Reserve and Surplus to Capital	0.50

Note:

- (i) Liquid Liabilities are equal to Current Liabilities
- (ii) Long Term Liabilities are 75% of Current Liabilities.

2. A firm has Sales of ₹ 75,00,000, Variable Cos of ₹ 42,00,000 and Fixed Cost of ₹ 6,00,000. It has a Debt of ₹ 45,00,000 at 9% and Equity of ₹ 55,00,000 **15**
- What is the firm's ROI?
 - Does it have a favourable Financial Leverage?
 - If the firm belongs to an industry, whose asset turnover is 3, does it have high or low asset leverage?
 - What are the Operating, Financial and Combined Leverages of the firm?
 - If the Sales drop to ₹ 50,00,000, what will be the new EBIT?

OR

2. One-up Ltd. has equity share capital of ₹ 5,00,000 divided into share of ₹ 100 each. It wishes to raise further ₹ 3,00,000 for expansion-cum-modernisation scheme. The company plans the following financing alternatives : **15**
- By Issuing equity shares only
 - ₹ 1,00,000 by issuing equity shares and ₹ 2,00,000 through debentures or term loan @ 10% per annum.
 - By raising term loan only at 10% per annum. .
 - ₹ 1,00,000 by issuing Equity Shares and ₹ 2,00,000 by issuing 8% Preference Shares.
- You are required to suggest the best alternative giving your comment assuming that the estimated earning before interest and taxes (EBIT) after expansion is ₹ 1,50,000 and corporate rate of tax is 35%.
3. TB2 Ltd. requires ₹ 40,00,000 and provides you the following information: **15**
- Debt Equity ratio will be 3/5 : 2/5
 - Debt will carry interest of 12% for first ₹ 4,00,000 and 12.5% for the balance (c) EPS for the current year is ₹ 20. Dividend payment ratio is 60%. Dividend Growth rate expected is 5%. Market Price per share is ₹ 90. Cost of floatation is ₹ 6 per share.
 - Present equity capital is ₹ 2,00,000 divided into fully paid shares of ₹ 10 each
 - Corporate tax rate is 30%.
- Compute weighted Marginal Cost of Capital.

OR

3. ABC Ltd. wishes to raise additional finance of ₹ 20 Lakhs for meeting its investment plans. The company has ₹ 4,00,000 in the form of retained earnings available for investment purposes. The following are the further details: **15**
- Debt equity ratio 25 : 75
 - Cost of debt at the rate of 10% (before tax) upto ₹ 2,00,000 and 13% (before tax) beyond that
 - Earning per share ₹ 12
 - Dividend payout 50% of earnings
 - Expected growth rate in dividend 10%

- (f) Current market price per share ₹ 60
- (g) Company tax rate is 30% and shareholder's personal tax is 20%.

Required :

- (i) Calculate the post tax average cost of additional debt
- (ii) Calculate the cost of retained earnings and cost of equity
- (iii) Calculate the overall weighted average (after tax) cost of additional finance.

4. (a) Fill in the blanks and re-write with appropriate option :

8

- (i) Financial management includes _____.
 - (1) Tax management
 - (2) Human resource management
 - (3) Production management
 - (4) Marketing management
- (ii) The interest paid on the principal for a fixed period of time at a fixed rate of interest is called _____.
 - (1) Simple interest
 - (2) Compound interest
 - (3) PV
 - (4) FV
- (iii) A low inventory turnover ratio indicates _____.
 - (1) Investment tied up in stock
 - (2) Absolute goods on hand
 - (3) Adverse liquidity
 - (4) All of the above
- (iv) The cost which equates the PV of cash inflow with the PV of cash outflow is _____.
 - (1) Explicit cost
 - (2) Historical cost
 - (3) Future cost
 - (4) Implicit cost
- (v) The factor which is not relevant for determination of debt equity mix _____.
 - (1) Taxation
 - (2) Nature of Asset base
 - (3) Industry norms
 - (4) Viability of cash flows
- (vi) Ideal situation for profit maximisation is
 - (1) Thin financial leverage
 - (2) Low operating leverage
 - (3) Low operating and high financial leverage
 - (4) None of the above
- (vii) Bonus Shares are issued to
 - (1) Equity shareholders
 - (2) Preference shareholders
 - (3) Debenture holders
 - (4) Bond holders
- (viii) Activity ratios include _
 - (1) Capital Turnover ratio
 - (2) Stock Turnover Ratio
 - (3) Debtors Turnover Ratio
 - (4) All of the above

(b) Match the column:

7

Column 'A'

Column 'B'

- (i) Discounting
- (ii) Operating ratio
- (iii) Own capital
- (iv) Combined leverage
- (v) Shares listed on stock exchange
- (vi) Lower liquid ratio
- (vii) Finance

- (a) Equity capital
- (b) Composite leverage
- (c) Life blood of an organisation
- (d) Liquid investment
- (e) Bad liquidity position
- (f) Debt capital
- (g) Operating cost +Sales
- (h) Deciding present value of future amount

OR

4. Write short notes on (any **three**) :

15

- (a) Profit maximisation
- (b) Debt Equity ratio
- (c) Optimum capital structure
- (d) Functions of a financial manager
- (e) Combined leverage.

□□□

SPACIMEN PAPER I

[Total Marks = 60]

N.B.: (1) All questions are compulsory carrying 15 Marks each.

- (2) Working Notes and Assumption should form a **part** of your answer.
- (3) Use of **simple calculator** is allowed.
- (4) **Figures** to the **right** indicate **full marks**.

1. From the following information, calculate return on total assets and prepare the balance sheet—

Net Profit after interest, tax and Preference Dividend ₹ 1,11,000

Tax Rate 50%

18% Preference Share Capital ?

15% Debentures ?

Return on Capital Employed = 50%

Return on Shareholder's Funds = 60%

Return on Equity Shareholder's Fund = 74%

Current Ratio 2 : 1

Net Fixed Assets ₹ 4,50,000

OR

1. Using the following data, complete and prepare Balance Sheet:

Gross profit (20% of Sales) = 1,20,000

Shareholder's Equity = 1,00,000

Credit sales to Total Sales = 80%

Total Assets Turnover = 3 times

Inventory turnover (To cost of sales) = 8 times

Average collection period (360 days year) = 18 days

Current ratio = 1.6

Long-term debt to equity = 40%

Liabilities	Amount ₹	Assets	Amount ₹
Shareholders Equity	10,00,000	Fixed Assets	?
Creditors	?	Current Assets:	?
Long-term Debt.	?	Cash	?
		Debtors	?
		Inventory	?
Total	?	Total	?

2. Three companies P, Q and R are in the same type of business and hence have similar operating risks. Their capital structure is as follows: **15**

	Particulars	P	Q	R
1.	Equity Share Capital (Face Value ₹ 10 Share)	8,00,000	5,00,000	10,00,000
2.	Market Value Per Share	30	40	24
3.	Dividend Per Share	5.40	8	5.76
4.	Debenture (Face Value of Debentures ₹ 100)	—	2,00,000	5,00,000
5.	Market Value Per Debenture	—	250	160
6.	Interest Rate	—	20%	16%

Assume that current levels of dividends are generally expected to continue indefinitely and the income-tax Rate at 50%.

You are required to compute weighted average cost of capital of each company, using market values.

OR

2. During the year 2010-11, Indian oil made a sale of oil worth ₹ 128.5 crores which was down by 3.7% compared to previous year's sales. While the company could reduce its overheads, its variable input cost went up significantly. As a result, variable cost to sales ratio in 2010-11 stood at 27.9% as opposed to 24.25% in the previous year. The financial highlights of the company for the year 2010-11 are as under: **15**

Particulars	In Crores
Sales	128.5
Fixed Cost	?
Interest Expenses	3.25
EBT (excluding other income)	0.35

- (1) Calculate operating leverage.
 (2) Calculate financial leverage.
 (3) Calculate combined leverage.
3. From the following data, find out the value of each firm as per MM approach and WACC. **15**

Particulars	Firm X	Firm Y	Firm Z
(A) EBIT	24,00,000	24,00,000	24,00,000
(B) No of Equity shares	6,00,000	5,00,000	4,00,000
(C) 10% debentures	—	18,00,000	20,00,000

Every firm expects 24% returns on investment. Assume that entire earnings available for equity shareholders is declared and paid, as dividend.

OR

3. (a) A bank granted a loan of ₹ 6,17,400 repayable in 4 annual instalments in the ratio of 1:2:3:4 respectively, beginning with the end of 1st year. Determine the amount of instalment if effective rate of interest is 18% p.a. as per present value factor. **8**

- (b) A person deposits ₹ 50,000, ₹ 1,00,000, ₹ 1,50,000 and 2,00,000 in his deposit. Determine his account balance at the end of 4th year if interest rate is 12% p.a. Calculate as per Compound Value Factor. 7

4. (A) Multiple Choice Questions: 5

1. Cost of goods sold is ₹ 5,40,000, Net Sales ₹ 6,00,000, Sales return ₹ 10,000, GP ratio is _____.
 (A) 20% (C) 12%
 (B) 15% (D) 10%
2. Proprietary Ratio is a _____.
 (A) Balance Sheet Ratio (C) Combined Ratio
 (B) Revenue Statement Ratio (D) None of the above
3. A high geared company is exposed to _____.
 (A) Business Risk (C) Inflation Risk
 (B) Financial Risk (D) Interest Rate Risk
4. Shares listed on stock exchange are _____.
 (A) Liquid (C) Traded on stock exchange
 (B) Not liquid (D) Both (A) & (C)
5. Mr. Sanjay has received ₹ 10,000 at the end of 5 years, if the rate of interest increase, then the PV of the cash flow would _____.
 (A) Fall (C) Remain unchanged
 (B) Risk (D) Rise slowly

(B) Fill in the blanks: 5

1. Marketable securities is a _____ asset.
 (Liquid/Non-liquid)
2. _____ helps the investors to decide the return on investments.
 (Current Ratio/Future Value of Annuity)
3. Prepaid expenses are not _____ assets.
 (Liquid/Non-liquid)
4. Cost of equity depends on the _____.
 (Rate of dividend/Market sentiments)
5. _____ is the sensitivity of operating profits to change in sale.
 (Operating Leverage/Financial Leverage)

(C) Match the following 5

(1) Test of liquidity	(a) Liquid Investment
(2) Share listed on stock exchange	(b) Immediate Solvency
(3) Own Capital	(c) Cost has been incurred
(4) Historical cost	(a) Networth

- (5) Debtors turnover
- (e) Efficiency in collection from account receivable
- (f) Promptness in payment
4. Attempt the following short notes (Any three) 15
- Debt Equity Ratio.
 - Limitations of Ratio Analysis
 - Sources of Long-term Finance.
 - Capital Gearing Ratio.
 - Factors Affecting Capital Structure.
 - Weighted Average Cost of Capital.

ANSWERS:

Q.1 Solution

- Return on equity shareholder's Fund = 74%

$$74 = \frac{\text{Profit Available for Equity Shareholders}}{\text{Equity Shareholders Funds (ESHF)}} \times 100$$

$$\text{ESHF} = \frac{1,10,000}{74} \times 100$$

$$= ₹ 1,50,000 \quad \text{01}$$
- Let Pref. Share Capital be ₹ x
 $\therefore \text{Pref. dividend} = x \times 18\%$

$$0.18x$$
- Return on shareholders Fund = 60%

$$\frac{\text{Net Profit after tax} + \text{Pref. dividend}}{\text{Shareholders Fund}} \times 100 \quad \text{01}$$

$$= \frac{1,10,000 + 0.18x}{1,50,000 + x} = 0.6$$

$$= 1,11,000 + 0.18x = 90,000 + 0.6x \quad \text{01}$$

$$0.18x - 0.6x = ₹ 21,000$$

$$0.42x = ₹ 21,000$$

$$x = ₹ 21,000 / 0.42$$

$$x = ₹ 50,000$$

$$\therefore \text{Pref. share capital} = ₹ 50,000$$

WN.4

Particulars	₹
(A) (B+C) EBT	2,40,000
(B) (-) Tax	1,20,000

(C) (D+E) EAT	1,20,000
(D) (-) Pref. Dividend	9,000
(E) Profit Available for Equity Shareholders	1,11,000

WN.5 Let 15% Debenture be ₹ P

$$\therefore \text{Interest} = P \times 15\% = 0.15P$$

$$\text{EBIT} = \text{EBT} + \text{Interest}$$

$$\text{EBIT} = 2,40,000 + 0.15P$$

WN.6 Return on Capital Employed

$$\frac{\text{EBIT}}{\text{Capital Employed}} \times 100 \quad \mathbf{0.5}$$

$$= \frac{2,40,000 + 0.15y}{2,00,000 + y} = 0.5$$

$$= 2,40,000 + 0.15y = 0.5 (2,00,000 + y)$$

$$= 2,40,000 + 0.15y = 1,00,000 + 0.5y$$

$$1,40,000 = 0.35y$$

$$y = \frac{1,40,000}{0.35} \quad \mathbf{0.5}$$

$$y = 15\% \text{ Debenture} = ₹ 4,00,000 \quad \mathbf{1}$$

WN.7 Capital Employed = Shareholders Fund + Long term loan

$$= [1,50,000 + 50,000] + 4,00,000$$

$$= ₹ 6,00,000 \quad \mathbf{1}$$

WN.8 Working Capital = Capital Employed – Net Fixed Assets

$$= 6,00,000 - 4,50,000$$

$$= ₹ 1,50,000 \quad \mathbf{1}$$

WN.9 Current Ratio

$$\frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{2}{1}$$

$$\text{CA} = 2 \text{ CL}$$

$$\text{CA} - \text{CL} = \text{WB}$$

$$2 \text{ CL} - \text{CL} = 1,50,000$$

$$\text{CL} = 1,50,000 \quad \mathbf{01}$$

$$\therefore \text{CA} = 2 \times \text{CL}$$

$$= 2 \times 1,50,000$$

$$= 3,00,000 \quad \mathbf{01}$$

WN.10 Total Assets = Fixed Assets + Current Assets

$$= 4,50,000 + 3,00,000$$

$$= 7,50,000$$

$$\begin{aligned}
 &= \text{EBIT} = \text{EBT} + \text{Interest} \\
 &= 2,40,000 + (15\% \times 4,00,000) \\
 &= 2,40,000 + 60,000 \\
 &= ₹ 3,00,000
 \end{aligned}$$

WN.11 Return on Total Assets

$$\frac{\text{EBIT}}{\text{Total Assets}} \times 100 \quad \text{01}$$

$$\frac{3,00,000}{7,50,000} \times 100 = 40\% \quad \text{01}$$

Balance Sheet as on.....

Liabilities	₹	Assets	₹
Equity Shareholders		Fixed Assets	0.5 4,50,000
Fund	0.5 1,50,000	Current Assets	0.5 3,00,000
Preference Share			
Capital	0.5 50,000		
15% Debentures	0.5 4,00,000		
Current liabilities	0.5 1,50,000		
	7,50,000		7,50,000

OR

Answer 1

$$1. \quad \text{Gross profit ratio} = \frac{\text{Gross profit}}{\text{Sales}} \times 100$$

$$\text{Sales} = \frac{1,20,000}{20\%} \times 100$$

$$= 6,00,000$$

$$(\text{Sales} - \text{COS}) = \text{GP}$$

$$\text{Sales} - \text{GP} = \text{COS}$$

$$\text{Credit sales} = 6,00,000 \times 80\%$$

$$= 4,80,000$$

$$\text{Cost of Sales} = \text{Sales} - \text{GP}$$

$$= 6,00,000 - 1,20,000$$

$$= 4,80,000$$

$$2. \quad \text{Inventory Turnover Ratio} = \frac{\text{Cost of goods sold}}{\text{Stock}}$$

$$8 = \frac{4,80,000}{\text{Stock}}$$

$$\text{Stock} = 60,000$$

$$3. \quad \text{Debtors Turnover Ratio} = \frac{\text{Credit Sales}}{\text{Debt}}$$

	Debt velocity	=	$\frac{360 \text{ days}}{\text{DTR}}$	
	18	=	$\frac{360}{\text{DTR}}$	
	DTR	=	20 times	
	DTR	=	$\frac{\text{Credit Sales}}{\text{Debtors}}$	
	20	=	$\frac{4,80,000}{\text{Debtors}}$	
	Debtors	=	$\frac{4,80,000}{20}$	
	Debtors	=	24,000	
4.	Total Assets Turnover	=	$\frac{\text{Sales}}{\text{Total Assets}}$	(1 marks)
	3	=	$\frac{6,00,000}{\text{Total Assets}}$	(1 marks)
	Total Assets = 2,00,000			
	Total Liabilities = 2,00,000			
5.	Debt equity ratio	=	$\frac{\text{Debt}}{\text{Equity}}$	
	Debt equity ratio	=	40%	
	Debt	=	Total Liability – Equity	
		=	2,00,000 – 1,00,000	
		=	1,00,000	(1 marks)
	So debt equity Ratio	=	40% of 1,00,000	
	Long Term DEBT	=	40,000	(1 marks)
6.	Creditors	=	Total Liability – Equity – Long term debt	
		=	2,00,000 – 1,00,000 – 40,000	
		=	60,000	
7.	Current Ratio	=	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	
	1.6	=	$\frac{\text{Current Assets}}{60,000}$	
	Current Assets	=	96,000	
8.	Fixed Assets	=	Total Assets – Current Assets	
		=	2,00,000 – 96,000	
		=	1,04,000	
9.	Cash	=	Current Assets – Interest – debt	
		=	96,000 – 60,000 – 24,000	
		=	12,000	

Liability	Marks	₹	Assets	Rs	Marks
Equity		1,00,000	Cash	12,000	1
Creditors	2	60,000	Debtors	24,000	2
Long-term debt	2	40,000	Stock	60,000	3
			FA	1,04,000	1
		2,00,000		2,00,000	

Note: If a/s is not written, then marks to be given for respective working note.

Answer 2

Cost of equity

	KE	=	$\frac{\text{Dividend}}{\text{Market}} \times 100$	
Company P	P	=	$\frac{5.40}{30} \times 100$	= 18%
(1 marks)				
Company Q	Q	=	$\frac{8}{40} \times 100$	= 20%
(1 marks)				
Company R	R	=	$\frac{5.76}{24} \times 100$	= 24%

Cost of Debt

(1 marks)	KD	=	$\frac{\text{Interest}(1 - \text{Tax})}{\text{Market value}} \times 100$

Company P = nil

(1 marks)

Company Q	Q	=	$\frac{20(1 - 0.50)}{250} \times 100$	= 4%
(1 marks)				

Company R	R	=	$\frac{16(1 - 0.50)}{160} \times 100$	= 5%
(1 marks))				

(at market value)

Marks	Company	Equity		Debt	
		₹	%	₹	%
1	P	24,00,000	100		
1	Q	20,00,000	80	5,00,000	20
1	R	24,00,000	75	8,00,000	25

WACC

(Cost of Equity $\times$ % of Equity) + (Cost of Debt $\times$ % of Debt)

P $(18\% \times 1.00) + (\text{NIL}) = 18\%$

(2 marks)

Q $(20\% \times 0.80) + (4\% \times 0.20) = 16.8$

(2 marks)

R $(24\% \times 0.75) + (5\% \times 0.25) = 19.25\%$

(2 marks)

	Sales	128.50
2 mark	Less Variable cost(128.5 × 27.9/100)	35.85
1 mark	Contribution	92.65
	Earning before Tax	0.35
2 mark	Add: Interest	3.25
1 mark	EBIT	3.60

- (1) Calculation of Operating leverage (3 Marks)

Degree operating Leverage (DOL)

$$= \frac{\text{Contribution}}{\text{EBIT}} = \frac{92.65}{3.06} = 25.73$$

- (2) Calculation of financial leverage (3 marks)

$$= \frac{\text{EBIT}}{\text{EBT}} = \frac{3.06}{0.35} = 10.28$$

- (3) Calculation of combined leverage (3 marks)

$$25.73 \times 10.28 = 264.50$$

Answer 3

M		Particulars	X	Y	Z
1	(A)	EBIT	24,00,000	24,00,000	24,00,000
1	(B)	Less: Interest	-	1,80,000	2,00,000
1	(C)	Earning to Equity Shareholders	24,00,000	22,20,000	22,00,000
1	(D)	Overall Capitalization Rate	0.24	0.24	0.24
3	(E)	Total Value of firm	1,00,00,000	1,00,00,000	1,00,00,000
1	(F)	Less: MV of Debt	0	18,00,000	20,00,000
1	(G)	Market Value of equity	1,00,00,000	82,00,000	80,00,000
3	(H)	Equity Capitalization Rate (C/G)	0.24	0.271	0.275
3	(I)	WACC (H x G/E) + (Debenture rate x F/E)	(0.24 × 1,00,00,000/1,00,00,000) +(0.10 × 0/1,00,00,000)	(0.271 × 82,00,000/1,00,00,000) + (0.10 × 18,00,000/10,00,000) 0.222+0.018	(0.275 × 80,00,000/1,00,00,000) +(0.10 × 20,00,000/1,00,00,000) 0.22+0.02
			0.24	0.24	0.24

OR

Answer 3

Q.3 (A) Solution

Step 1: Determination of relevant present value factor

Year	Present Value of One Rupee for relevant year @ 18%. P .a.	Ratio	Product
A	B	C	D= B × C
1	0.847	1	0.847
2	0.718	2	1.436
3	0.609	3	1.827

4	0.516	4	2.064
		Total	6.174

2 marks**Step 2:** Equivalent amount for each unit of ratio = ₹ 6, 17,400 ÷ 6.174 = ₹ 1,00,00 **2 marks****Step 3:** Calculation of amount of each instalment

Year A	Equivalent Amount B	Ratio C	Amount of Instalment for each year D=B (C
1	1,00,000	1	₹ 1,00,000
2	1,00,000	2	₹ 2,00,000
3	1,00,000	3	₹ 3,00,000
4	1,00,000	4	₹ 4,00,000

4 marks**Q.3. (B) Solution****Calculation of Account Balance at the of 4th year**

Year A	Deposits B (1 mark)	Year (1 mark)	Compound Value Factor @ 12% p.a. C (2 marks)	Product D=B × C (2 marks)	Marks
1	50,000	4	1.574	78,700	1.5
2	1,00,000	3	1.405	1,40,500	1.5
3	1,50,000	2	1.254	1,88,100	1.5
4	2,00,000	1	1.120	2,24,000	1.5
			Total Maturity Value =	6,31,300	1

Multiple choice questions

- (1) D (10%)
- (2) A (Balance sheet ratio)
- (3) B (Financial risk)
- (4) D (Liquid and traded on stock exchange)
- (5) A (Fall)

Fill in the blanks

- (1) Liquid
- (2) Future value of annuity
- (3) Liquid
- (4) Rate of dividend
- (5) Operating leverage

Match the following**Answer: -**

1. (b) Immediate Solvency
2. (a) liquid Investment
3. (d) Net worth
4. (c) Cost has been incurred
5. (e) Efficiency in collection from account receivable

Q4 (Short Notes Any Three)**1. Debt Equity Ratio:**

It Expresses has relation between the external the equities and internal equities or the relationship between borrowed capital and owner's capital.

$$(a) \text{ Debt Equity Ratio} = \frac{\text{Long Terms Debts}}{\text{Shareholders Funds}}$$

$$(b) \text{ Debt Equity Ratio} = \frac{\text{Long Terms Debts}}{\text{Shareholders Funds} + \text{Long Term Debt}}$$

Components: Shareholder's Funds consist of preference share capital, equity share capital, capital reserves, revenue reserves and reserves representing earmarked surplus viz. reserves for contingencies, sinking fund for renewal of fixed assets or redemption of debentures. The amount of fictitious assets is deducted from the above.

Debts represents long term debts. It includes mortgage loans and debentures.

Significance: The ratio shows favourable or unfavourable financial position of the Concern. It shows long term capital structure. The low ratio is viewed as favourable from long term creditors point of view. It reveals high margin of safety to the creditors. Higher ratio is unfavourable. Higher the ratio greater will be the risk involved in respect of creditors. It indicates too much dependence on long term debts. Yet in certain cases Return on Equity can improve due to higher ratio due to tax-laws regarding interest payment.

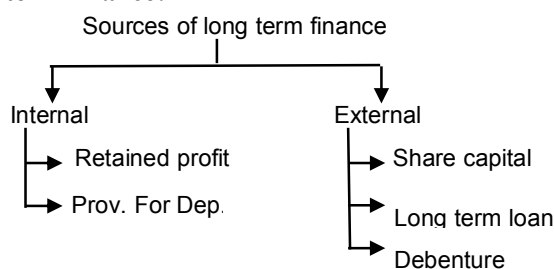
Standard Ratio: Generally, financial institutions favour ratio of 2:1. This implies that of total capital, debts would be 2/3 and equity 1/3.

2. Limitation of Ratio (Any Eight give full marks)

1. Ratios are calculated from the data available from financial statements, which are themselves subject to serious limitations. Ratios also suffer from the same limitations.
2. Comparisons of ratios of two firms or two departments will not provide any useful information, if the firms or departments compared are of different size, age, etc.
3. Ratios do not indicate the price changes and during inflationary periods, trend analysis of ratios is bound to mislead the analyst.

4. Differences in accounting policies with reference to stock valuation, depreciation, etc., render ratios meaningless. Besides, there are no standard definitions for certain terms like 'Operating Profit', 'Current Assets', etc.
5. Without further investigation, ratios may not serve their purposes.
6. Ratios are not reliable, as in some cases, they are influenced by 'window dressing' in the Balance Sheet.
7. Ratios when studied in Isolation do not signify anything material as they are just expressions of relative aspects of a business.
8. Ratios are just numerical expressions resulting from a quantitative analysis.
9. Ratios are sometimes regarded as analysis of historical data and hence depending too much on ratios would be dangerous.
10. Inconsistent accounting practices will render computation and analysis of ratios useless.
11. Ratios are often calculated as rough estimates and are often calculated with the figures as on a particular date. Therefore, they are not accurate and precise.
12. Ratios are calculated from single set of figures. As such they are not of much use unless they are compared with standards and employed in trend analysis.
13. Past experience has shown that it is very difficult to lay down a common standard for comparison by ratios:

3. Sources of long term finance:



4. **Capital Gearing Ratio:** Capital Gearing Ratio brings out the relationship between two types of capital i.e., capital carrying fixed rate of interest or fixed dividend and capital that does not carry fixed rate of interest or fixed dividend. It is a modified counterpart of Debt Equity Ratio. In short, capital gearing ratio indicates the degree to which capital has been geared in the capital structure of a company.

This ratio is also known as 'Leverage Ratio' or 'Financial Leverage Ratio', or 'Capital Structure Ratio.'

The formula used for obtaining the ratio is:

- (a) Fixed Interest bearing securities
- (b) Equity Capital & Reserves & Surplus

Gearing of Capital: Gearing assists a company in planning its capital structure and making suitable adjustments.

A company is said to be high geared when its fixed interest bearing securities are greater than equity shareholders' funds.

A company is said to be low geared when equity shareholders funds are greater than fixed interest bearing securities.

Purpose: The main purpose served by capital gearing ratio is that it analyses the capital structure of a company effectively.

Significance: capital Gearing ratio is an Important Balance Sheet ratio.

- (a) It is the mechanism to ascertain whether a company is practising 'trading on equity' and if so to what extent.
- (b) The ratio aids in bringing about a balanced capital structure in a company.

In case of highly geared companies, during lean period, it would be difficult to pay fixed interest charges and the company may be forced to liquidate. The shareholders will not be getting any return on their capital.

Standard Ratio: Though It Is very difficult to determine a standard capital gearing ratio, according to the Securities and Exchange Board of India a ratio of 1:4 between equity and preference capital is considered reasonable.

Whether high gearing ratio is good for a new company or not will depend on circumstances.

A high ratio will not be good for a new company which has no clear indications of its future profitability .

5. **Factors affecting capital structure:** Tax Advantage, Attitude of Investors to Risk and Return, Control of Firm, Flexibility, Timing, Legality, Profitability, Nature of Business, Marketing Conditions, Cost of Flotation, Tax Rate, Purpose of Financing, Government Policies: (Any 8 points give full marks)
6. **Weighted average cost of capital:** Meaning: . it is a weighted average of costs of various sources of funds where the weights are being proportion of each source of funds in the capital structure.

Procedure to calculate WACC

Step –1: Calculate the individual cost of each source of finance:

- Cost of Debentures
- Cost of Preference Shares
- Cost of Equity Shares

Step 2: Calculate the proportions of each source of finance in the existing capital structure; For this purpose the BOOK VALUE OR MARKET VALUE weights can be used.

Step 3: multiply the Cost of each source of finance with the corresponding weights of that source of finance and sum total of that will be WACC.



SPACIMEN PAPER II

[Total Marks = 60]

N.B.: (1) **All** questions are **compulsory** carrying 15 Marks **each**.

(2) Working Notes and Assumption should form a **part** of your answer.

(3) Use of **simple calculator** is **allowed**.

(4) **Figures** to the right indicate **full** marks.

1. From the following information, calculate return on total assets and prepare the balance sheet— **15**

- (a) Net Worth turnover ratio (on cost of sales) = 2
- (b) Fixed Assets turnover ratio (on cost of sale) = 4
- (c) Gross Profit turnover ratio = 20%
- (d) Creditors Velocity = 73 days
- (e) Debtors Velocity = 2 months
- (f) Stock Velocity = 6 times

Reserves and surplus amount to ₹ 10,000. Closing stock was ₹ 5,000 in excess of opening stock. Gross profit was ₹ 60,000. Assume a year consists of 365 days. You can make necessary assumption wherever required.

OR

1. Compute the following Balance Sheet of Airtel Ltd, assuming that only the Equity Capital and Retained Earnings figures are given. **15**

Liabilities	Amount ₹	Assets	Amount ₹
Equity Capital	1,20,000	Fixed Assets	?
Retained Earnings	1,20,000	Stock	?
Creditors	?	Debtors	?
		Cash	?
Total	?	Total	?

- (a) Total debt is 2/3 of Net Worth.
- (b) Turnover of Total Assets is 1.8
- (c) 30 days sales are in the form of Debtors
- (d) Stock Turnover ration is 5 times
- (e) Cost of goods sold in the year is ₹ 3,60,000
- (f) The acid test is 1:1

2. The following information has been given in respect of Lava Phone Ltd. **15**

Particulars	₹
Equity Share Capital (divided into shares of ₹ 10 each)	10,00,000
14% Debentures	30,00,000

Selling price per unit	50
Variable cost per unit	30
Fixed Cost	12,00,000

The company is producing at present 1,00,000 units. Now management of the company plans to increase output by 25%. The tax rate for the company is 40%.

You are required to make out the following calculations for existing as well as the planned level of output (a) operating leverage (b) Financial leverage and (c) Combined leverage

OR

2. Micromax Phone Ltd. has equity share capital of ₹ 5,00,000 divided into shares of ₹ 100 each. It wishes to raise further ₹ 3,00,000 for expansion cum modernization plans. The company plans the following financing schemes. **15**

- (a) Plans- I: All equity shares
- (b) Plan- II: ₹ One lakh in equity shares and ₹ Two lakh in 10% debentures
- (c) Plan- III: All debt at 10%
- (d) Plan- IV: ₹ One lakh in equity shares and ₹ Two lakhs preference capital with the rate of dividend at 8%

The company's earnings before interest and tax (EBIT) are ₹ 1,50,000.

The corporate rate of tax is 50%.

You are required to determine the earning per share (EPS) in each plan. Advice which plan to be selected.

3. Tata Foods Ltd. has the following capital structure: **15**

Particulars	₹ in Lakhs
Equity Share Capital	25
6% A- Preference Shares Capital	35
7% Debentures	30
Total	90

The market price of the company's equity share is ₹ 30. It is expected that the company would next year pay a dividend of ₹ 37 per share on the face value of ₹ 10. The company's growth prospects are 4% per annum. Assuming corporate taxation is @ 35%.

You are required to:

- (a) Compute weighted average cost of capital on the existing capital structure.
- (b) Compute the new weighted average cost of capital if the company raises additional capital of ₹ 40 lakhs as under:

Particulars	₹ in Lakhs
Equity Share Capital	10
7% B- Preference Shares Capital	15
9% Debentures	15
Total	40

This would result in increasing the expected dividend to ₹ 4.50 per equity share and leave the growth rate unchanged at 4% but the anticipated market price of the equity shares would fall to ₹ 25.

OR

3. Reliance Energy Ltd. Wishes to determine the weighted average cost of capital. You have been supplied with the following information: **15**

Balance Sheet

Liabilities	₹	Assets	₹
Equity Share Capital	12,00,000	Fixed Assets	25,00,000
15% Pref. Share Capital	4,50,000	Current Assets	15,00,000
Retained earnings	4,50,000		
14% Debentures	9,00,000		
Current Liabilities	10,00,000		
Total	40,00,000	Total	40,00,000

Additional Information:

- (a) 20 years, 14% debentures of ₹ 2,500 face value redeemable at 5% premium can be sold at par, 2% flotation costs.
- (b) 15% preference shares: sale price ₹ 100 per share, 2% flotation costs.
- (c) Equity shares: sale price ₹ 115 per share, flotation costs ₹ 5 per share.

The corporate tax rate is 35% and the expected growth in equity dividend is 8% per year. The expected dividend at the end of the current financial year is ₹ 11 per share. Assume that the company is satisfied with its present capital structure and intends to maintain it.

4. (a) Fill in the blanks and re-write with appropriate option: **8**
- Cost of obtaining another rupee of new capital is _____.
 - (a) Marginal cost
 - (b) Average Cost
 - (c) Specific cost
 - (d) None of the above
 - The interest paid on the principal for a fixed period of time at “fixed rate of interest is called. _____.
 - (a) Simple interest
 - (b) Compound interest
 - (c) Present value
 - (d) Face value
 - Shareholders’ equity does not include,
 - (a) Equity capital
 - (b) Reserves and surplus
 - (c) Debentures
 - (d) Preliminary expenses
 - Operating leverage is 1.26 and financial leverage is 1.02. The combined leverage is _____.
 - (a) 2.9
 - (b) 1.29
 - (c) 3.29
 - (d) 4.5

5. Current Ratio shows._____.
- (a) Short term solvency (b) Financial stability
(b) Collection efficiency (d) Higher Profitability
6. Interest on debenture has _____.
- (a) Tax benefit (b) No tax benefit
(c) Tax liability (d) None of the above
7. Gross profit ration is a _____.
- (a) Balance sheet ratio (b) Revenue statement ratio
(c) Combined ratio (d) None of the above
8. The factor which is not relevant for determination of debt equity mix _____.
- (a) Taxation (b) None of asset base
(c) Industry norms (d) Viability of cash flows

(b) Match the Columns:

7

	Column 'A'		Column 'B'
1	Ratio	A	Overall profitability
2	Preference Shares	B	Weighted average cost of capital
3	Debentures	C	Fixed Rate of dividend
4	Return on Capital Employed	D	Acquisition and utilization of funds
5	Future cost	E	Debt finance
6	Finance is concerned with	F	Expected cost
7	Composite cost	G	Proportion between two figures

OR

4. Write short notes (any three):-

15

- (a) Combined Leverage
(b) Factors affecting capital structure of an organisation
(c) Acid Test ratio
(d) Profit maximization V/s Wealth maximisation
(e) Weighted Average Cost of Capital

ANSWERS:**Q.1 Solution****Tata SKY Ltd**

1	Total Sales Gross Profit – ₹ 60,000 and GP Ratio -20% GP Ratio = = Total Sales =
2	Debtors Debtors velocity = 2 months. Debtors over 6 times in a year , Debtors =
3	Cost of Sales = Sales – Gross Profit = 3,00,000 – 60,000 =2,40,000
4	Net Worth Net worth turnover ratio (on cost of sales) = 2 , Net Worth = = Net Worth = Capital +Reserves Capital = Net worth – Reserves = 1,20,000 – 10,000 = 1,10,000
5	Fixed Assets Fixed asset turnover ratio (on cost of sales) = 4
6	Stock Stock velocity = 6 , Average stock = Closing stock = 40,000 + 5,000/2 = 42,500 Opening stock was lower than closing stock by 5000 Opening stock = 42,500 – 5,000 = 37,500
7	Purchases: To arrive let us prepare trading account to get the balancing figure.

	<table><tr><th>Particulars</th><th>₹</th><th>Particulars</th><th>₹</th></tr><tr><td>To Opening stock</td><td>37,500</td><td>By Sales</td><td>3,00,000</td></tr><tr><td>To Purchases * Balancing figure</td><td>2,45,000</td><td>By Closing Stock</td><td>42,500</td></tr><tr><td>To Gross Profit</td><td>60,000</td><td></td><td></td></tr><tr><td>Total</td><td>3,42,500</td><td>Total</td><td>3,42,500</td></tr></table>	Particulars	₹	Particulars	₹	To Opening stock	37,500	By Sales	3,00,000	To Purchases * Balancing figure	2,45,000	By Closing Stock	42,500	To Gross Profit	60,000			Total	3,42,500	Total	3,42,500																						
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8	Creditors																																										
	Creditors velocity = 73 days. In other words, creditors have turned over 5 times in a year. Creditors turnover ratio = , Creditors																																										
9	Balance Sheet																																										
	<table><tr><th>Liabilities</th><th></th><th>₹</th><th>Assets</th><th></th><th>₹</th></tr><tr><td>Capital</td><td>2M</td><td>1,10,000</td><td>Fixed Assets</td><td>2M</td><td>60,000</td></tr><tr><td>Reserves & Surplus</td><td>2M</td><td>10,000</td><td>Cash * Bal. Figure</td><td>2M</td><td>16,500</td></tr><tr><td>Creditors</td><td>2M</td><td>49,000</td><td>Debtors</td><td>2M</td><td>50,00Q</td></tr><tr><td></td><td></td><td></td><td>Stock</td><td>2M</td><td>42,500</td></tr><tr><td>Total</td><td></td><td>1,69,000</td><td>Total</td><td>1M</td><td>1,69,000</td></tr><tr><td></td><td>6M</td><td></td><td></td><td>9M</td><td></td></tr></table>	Liabilities		₹	Assets		₹	Capital	2M	1,10,000	Fixed Assets	2M	60,000	Reserves & Surplus	2M	10,000	Cash * Bal. Figure	2M	16,500	Creditors	2M	49,000	Debtors	2M	50,00Q				Stock	2M	42,500	Total		1,69,000	Total	1M	1,69,000		6M			9M	
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	6M			9M																																							

OR

Q.1 Solution

1	Total Debt is two – third of Net Worth Net Worth = Equity share capital + Retained Earnings $= 1,20,000 + 1,20,000$ $= 2,40,000$ Therefore Total Debts, Creditors = Total Liabilities = Equity capital + Retained Earnings + Creditors $= 1,20,000 + 1,20,000 + 1,60,000$ $= 4,00,000$ Total Liabilities = Total Assets - 4,00,000
2	Inventory Turnover Ratio = 5 , Stock =
3	Turnover of Total Assets is 1.8 Total assets have been turned over 1.8 times. It implies the firm has generated a sale of ₹ 1.8 for every rupee invested in total assets Assets Turnover Ratio = Sales = Total assets $\times$ 1.8 $= 4,00,000 \times 1.8$

	= 7,20,000																																																
4	30 days sales are in the form of debtors. In other words, debtors have turned over 12 times in a year (Assuming 360 days in a year) Debtors = , Debtors = Alternatively Debtors can be calculated as under considering 365 days a year: So debtors have turned over 12.167 (365 times in a year). Debtors =																																																
	Acid Test Ratio = There are only cash and debtors other than stock in current assets. So total cash and debtors are equal to current liabilities (creditors) i.e.1 ,60,000 Cash + Debtors = 1,60,000 Cash = 1,60,000 - 60,000 = 1,00,000																																																
	Alternatively cash bat. can be calculated as under: Cash + Debtors = 1,60,000 Cash = 1,60,000 -59,176 (As above) Cash = 1,00,824																																																
	<table><tr><th colspan="6">Balance Sheet</th></tr><tr><th>Liabilities</th><th></th><th>₹</th><th>Assets</th><th></th><th>₹</th></tr><tr><td>Equity Capital</td><td>Given</td><td>1,20,000</td><td>Fixed Assets (bal. figure)</td><td>2M</td><td>1,68,000</td></tr><tr><td>Retained Earnings</td><td>Given</td><td>1,20,000</td><td>Stock</td><td>3M</td><td>72,000</td></tr><tr><td>Creditors</td><td>3M</td><td>1,60,000</td><td>Debtors</td><td>3M</td><td>60,000</td></tr><tr><td></td><td></td><td></td><td>Cash</td><td>3M</td><td>1,00,000</td></tr><tr><td>Total</td><td></td><td>4,00,000</td><td>Total</td><td>1M</td><td>4,00,000</td></tr><tr><td></td><td>3M</td><td></td><td></td><td>12M</td><td></td></tr></table>	Balance Sheet						Liabilities		₹	Assets		₹	Equity Capital	Given	1,20,000	Fixed Assets (bal. figure)	2M	1,68,000	Retained Earnings	Given	1,20,000	Stock	3M	72,000	Creditors	3M	1,60,000	Debtors	3M	60,000				Cash	3M	1,00,000	Total		4,00,000	Total	1M	4,00,000		3M			12M	
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Total		4,00,000	Total	1M	4,00,000																																												
	3M			12M																																													

Q.2 Solution

LAVA Phone Ltd

Particulars	Present Production	Planned Production	
Production (in units)	1,00,000	1,25,000	
	₹	₹	
Total Sales	50,00,000	62,50,000	1M
Less: Variable Cost	30,00,000	37,50,000	1M
Contribution	20,00,000	25,00,000	1M
Less: Fixed Cost	12,00,000	12,00,000	1M
EBIT	8,00,000	13,00,000	1M

Less: Interest @J 14% on Rs 30,00,000	4,20,000	4,20,000	1M
Profit Before Tax	3,80,000	8,80,000	1M
(a) Operating Leverage =	=	=	3M
(b) Financial Leverage =	=	=	3M
(c) Combined Leverage = Operating Leverage x Financial Leverage	= 2.5 × 2.11 =5.28 times	= 1.92 × 1.48 =2.84 times	2M
			15M

OR

Q.2 Solution

Micromax Ltd

Particulars	Plan I – ₹	Plan II – ₹	Plan III – ₹	Plan IV – ₹	
Equity Shares	3,00,000	1,00,000	–	1,00,000	1M
Preference Shares	–	–	–	2,00,000	1M
10% Debentures	–	2,00,000	3,00,000	–	1M
Expansion	3,00,000	3,00,000	3,00,000	3,00,000	1M
Earnings Before Interest and Tax	1,50,000	1,50,000	1,50,000	1,50,000	1M
Less: Interest 10%	–	20,000	30,000	–	1M
	1,50,000	1,30,000	1,20,000	1,50,000	1M
Less: Tax @J 50%	75,000	65,000	60,000	75,000	1M
Earnings After Tax	75,000	65,000	60,000	75,000	1M
Less: Preference Dividend 8%	–	–	–	16,000	1M
Earnings available for Equity shareholders	75,000	65,000	60,000	59,000	1M
No. of Equity Shares	8,000	6,000	5,000	6,000	1M
Earnings Per Share =	₹ 9.375	₹ 10.83	₹ 12	₹ 9.83	1M
	2M	4M	4M	4M	14M

Comments:

Earnings Per Share is highest in Plan III i.e. ₹ 12/- Hence, Plan III should be selected (1M)

Q.3 Solution

Tata Foods Ltd

1	Ke (Cost of Capital) = =[+4=10+4=14%	2M
2	Kp = 6% = Cost of A Preference Shares	
3	Kd = Cost of Debentures (after tax) =	1M
4	(a) Weighted Average Cost of Existing Capital	

	<table><tr><th>Type</th><th>Capital</th><th>Proportion</th><th>Cost</th><th>Product</th></tr><tr><td>Equity Share Capital</td><td>25</td><td>27.78</td><td>14%</td><td>3.89</td></tr><tr><td>6% Preference Shares</td><td>35</td><td>38.89</td><td>6%</td><td>2.33</td></tr><tr><td>7% Debentures</td><td>30</td><td>33.33</td><td>4.55%</td><td>1.52</td></tr><tr><td></td><td>90</td><td>100.00</td><td>WACC</td><td>7.74</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>	Type	Capital	Proportion	Cost	Product	Equity Share Capital	25	27.78	14%	3.89	6% Preference Shares	35	38.89	6%	2.33	7% Debentures	30	33.33	4.55%	1.52		90	100.00	WACC	7.74						1M 1M 1M 1M												
Type	Capital	Proportion	Cost	Product																																								
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5	Ke NEW (Cost of Capital) = =[+4=18+4=22%	1M																																										
6	9% Debentures = 0.65 × 9 = 5.8%	1M																																										
7	(b) Computation of New Weighted Average Capital																																											
	<table><tr><th>Type</th><th>Capital</th><th>Proportion</th><th>Cost</th><th>Product</th><th></th></tr><tr><td>Equity Share Capital</td><td>35</td><td>26.92</td><td>22%</td><td>5.9231</td><td>1M</td></tr><tr><td>61Yo A Preference Shares</td><td>35</td><td>26.92</td><td>6%</td><td>1.6154</td><td>1M</td></tr><tr><td>7% B Preference Shares</td><td>15</td><td>11.54</td><td>7%</td><td>0.8078</td><td>1M</td></tr><tr><td>7% Debentures</td><td>30</td><td>23.08</td><td>4.55%</td><td>1.05014</td><td>1M</td></tr><tr><td>9% Debentures</td><td>15</td><td>11.54</td><td>5.85%</td><td>0.67509</td><td>1M</td></tr><tr><td></td><td>130</td><td>100</td><td></td><td>10.07153%</td><td></td></tr></table> Weighted Average Cost of Capital 10.07153%	Type	Capital	Proportion	Cost	Product		Equity Share Capital	35	26.92	22%	5.9231	1M	61Yo A Preference Shares	35	26.92	6%	1.6154	1M	7% B Preference Shares	15	11.54	7%	0.8078	1M	7% Debentures	30	23.08	4.55%	1.05014	1M	9% Debentures	15	11.54	5.85%	0.67509	1M		130	100		10.07153%		
Type	Capital	Proportion	Cost	Product																																								
Equity Share Capital	35	26.92	22%	5.9231	1M																																							
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7% Debentures	30	23.08	4.55%	1.05014	1M																																							
9% Debentures	15	11.54	5.85%	0.67509	1M																																							
	130	100		10.07153%																																								

OR

Reliance Energy Ltd

	Specific Cost of Capital																																								
1	$K_d =$																																								
	$=$					3M																																			
	$=$																																								
2	K_p					2M																																			
3	$K_e =$ $=$					2M																																			
4	Weighted Average Cost of Capital																																								
	<table><tr><td>Sources</td><td>₹</td><td>Weights</td><td>Specific Cost</td><td>Weighted</td></tr><tr><td>Equity Funds</td><td>16,50,000</td><td>0.55</td><td>0.1800</td><td>0.0990</td></tr><tr><td>15% Preference shares</td><td>4,50,000</td><td>0.15</td><td>0.1530</td><td>0.0229</td></tr><tr><td>14% Debentures</td><td>9,00,000</td><td>0.30</td><td>0.0931</td><td>0.0279</td></tr><tr><td></td><td>30,00,000</td><td>1.00</td><td></td><td>0.1498</td></tr><tr><td></td><td>2M</td><td>2M</td><td>2M</td><td>2M</td></tr><tr><td colspan="5">So, weighted average cost of capital = 14.98%</td></tr></table>					Sources	₹	Weights	Specific Cost	Weighted	Equity Funds	16,50,000	0.55	0.1800	0.0990	15% Preference shares	4,50,000	0.15	0.1530	0.0229	14% Debentures	9,00,000	0.30	0.0931	0.0279		30,00,000	1.00		0.1498		2M	2M	2M	2M	So, weighted average cost of capital = 14.98%					
Sources	₹	Weights	Specific Cost	Weighted																																					
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	30,00,000	1.00		0.1498																																					
	2M	2M	2M	2M																																					
So, weighted average cost of capital = 14.98%																																									

		15 M

Q.4 (a) Fill in the blanks and re-write with appropriate option:

(8 × 1M) = (8M)

1. Marginal cost
2. Simple interest
3. Debentures
4. 1.29
5. Short term solvency
6. Tax benefit
7. Revenue statement ratio
8. Industry norms

(b) Match the Columns:

(7 × 1M) = (7M)

Column A	Column B
Ratio	Proportion between two figures
Preference shares	Fixed Rate of Dividend
Debentures	Debt finance
Return on capital employed	Overall profitability
Future cost	Expected cost
Finance is concerned with	Acquisition and utilization of funds
Composite cost	Weighted average cost of capital

OR

Q.4 Write short note's (any three)

(3 × 5M) = (15M).

1. Combined Leverage: Operating leverage and financial leverage are combined to assess the impact of all types of fixed costs. It is thus, the relationship between contribution and taxable Income.

Combined Leverage = Operating leverage × Financial leverage OR

= **OR** =

2. Factors affecting capital structure of an organization: (consider any five points)

- Tax advantage
- Attitude of investors to risk and return
- Control of firm
- Flexibility
- Timing
- Profitability
- Nature of business
- Market conditions

- Cost of flotation
- Tax rate
- Government policies

3. Acid Test Ratio:

It is also known as quick ratio or quick assets ratio or acid test ratio. The ratio shows the firm's ability to meet its immediate obligations promptly. It measures the relationship between quick assets and quick liabilities.

Quick Ratio =

Quick assets = Current assets less stock and prepaid expenses

Quick liabilities = Current liabilities less bank overdraft & income received in advance

Standard Ratio is 1:1

4. Profit Maximisation V/s Wealth Maximisation:

Profit Maximisation	Wealth Maximisation
It increases profit of the organisation.	It increases the wealth of the shareholders.
It measures organisational effectiveness.	It measures financial stability of the organisation.
It achieves short term objective of the organisation.	It achieves long term objective of the organisation.
It does not directly increase EPS.	It increases EPS.
It does not consider time value of money.	It considers time value of money.

5. Weighted Average Cost of Capital:

It is the average cost of various sources of financing. It is also known as overall cost of capital or average cost of capital. Weighted average cost of capital is calculated after decided specific cost of capital by putting weight to each specific cost. The weight may be assigned by using either book value or market value of the source.

Calculation of Weighted Average Cost:

- Assignment of weights.
- Computation of specific cost of each source.
- Computation of weighted cost of capital = multiplying the cost of each source by its appropriate weights and weighted cost of all source is added.



APPENDIX

Appendix 1: Future Value Interest Factor (FVIF)											FVIF (r, n) = (1 + r) ⁿ		
Period n	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%
0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1	1.010	1.020	1.030	1.040	1.050	1.060	1.070	1.080	1.090	1.100	1.110	1.120	1.130
2	1.020	1.040	1.061	1.082	1.102	1.124	1.145	1.166	1.188	1.210	1.232	1.254	1.277
3	1.030	1.061	1.093	1.125	1.158	1.191	1.225	1.260	1.295	1.331	1.368	1.405	1.443
4	1.041	1.082	1.126	1.170	1.216	1.262	1.311	1.360	1.412	1.464	1.518	1.574	1.630
5	1.051	1.104	1.159	1.217	1.276	1.338	1.403	1.469	1.539	1.611	1.685	1.762	1.842
6	1.062	1.126	1.194	1.265	1.340	1.419	1.501	1.587	1.677	1.772	1.870	1.974	2.082
7	1.072	1.149	1.230	1.316	1.407	1.504	1.606	1.714	1.828	1.949	2.076	2.211	2.353
8	1.083	1.172	1.267	1.369	1.477	1.594	1.718	1.851	1.993	2.144	2.305	2.476	2.658
9	1.094	1.195	1.305	1.423	1.551	1.689	1.838	1.999	2.172	2.358	2.558	2.773	3.004
10	1.105	1.219	1.344	1.480	1.629	1.791	1.967	2.159	2.367	2.594	2.839	3.106	3.395
11	1.116	1.243	1.384	1.539	1.710	1.898	2.105	2.332	2.580	2.853	3.152	3.479	3.836
12	1.127	1.268	1.426	1.601	1.796	2.012	2.252	2.518	2.813	3.138	3.498	3.896	4.335
13	1.138	1.294	1.469	1.665	1.886	2.133	2.410	2.720	3.066	3.452	3.883	4.363	4.898
14	1.149	1.319	1.513	1.732	1.980	2.261	2.579	2.937	3.342	3.797	4.310	4.887	5.535
15	1.161	1.346	1.558	1.801	2.079	2.397	2.759	3.172	3.642	4.177	4.785	5.474	6.254
16	1.173	1.373	1.605	1.873	2.183	2.540	2.952	3.426	3.970	4.595	5.311	6.130	7.067
17	1.184	1.400	1.653	1.948	2.292	2.693	3.159	3.700	4.328	5.054	5.895	6.866	7.986
18	1.196	1.428	1.702	2.026	2.407	2.854	3.380	3.996	4.717	5.560	6.544	7.690	9.024
19	1.208	1.457	1.754	2.107	2.527	3.026	3.617	4.316	5.142	6.116	7.263	8.613	10.197
20	1.220	1.486	1.806	2.191	2.653	3.207	3.870	4.661	5.604	6.728	8.062	9.646	11.523
25	1.282	1.641	2.094	2.666	3.386	4.292	5.427	6.848	8.623	10.835	13.585	17.000	21.231
30	1.348	1.811	2.427	3.243	4.322	5.743	7.612	10.063	13.268	17.449	22.892	29.960	39.116

Appendix 1 (contd.)

Period n	14%	15%	16%	17%	18%	19%	20%	24%	28%	32%	36%	40%
0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1	1.140	1.150	1.160	1.170	1.180	1.190	1.200	1.240	1.280	1.320	1.360	1.400
2	1.300	1.322	1.346	1.369	1.392	1.416	1.440	1.538	1.638	1.742	1.850	1.960
3	1.482	1.521	1.561	1.602	1.643	1.685	1.728	1.907	2.097	2.300	2.515	2.744
4	1.689	1.749	1.811	1.874	1.939	2.005	2.074	2.364	2.684	3.036	3.421	3.842
5	1.925	2.011	2.100	2.192	2.288	2.386	2.488	2.392	3.436	4.007	4.653	5.378
6	2.195	2.313	2.436	2.565	2.700	2.840	2.986	3.635	4.398	5.290	6.328	7.530
7	2.502	2.660	2.826	3.001	3.185	3.379	3.583	4.508	5.629	6.983	8.605	10.541
8	2.853	3.059	3.278	3.511	3.759	4.021	4.300	5.590	7.206	9.217	11.703	14.758
9	3.252	3.518	3.803	4.108	4.435	4.785	5.160	6.931	9.223	12.166	15.917	20.661
10	3.707	4.046	4.411	4.807	5.234	5.695	6.192	8.549	11.806	16.060	21.647	28.925
11	4.226	4.652	5.117	5.624	6.176	6.777	7.430	10.657	15.112	21.199	29.439	40.496
12	4.818	5.350	5.936	6.580	7.288	8.064	8.916	13.215	19.343	27.983	40.037	56.694
13	5.492	6.153	6.886	7.699	8.599	9.596	10.699	16.386	24.159	36.937	54.451	79.372
14	6.261	7.076	7.988	9.007	10.141	11.420	12.839	20.319	31.961	48.751	74.053	111.120
15	7.138	8.137	9.266	10.539	11.974	13.590	15.407	25.196	40.565	64.359	100.712	155.568
16	8.137	9.358	10.748	12.330	14.129	16.172	18.488	31.243	51.923	84.954	136.969	217.795
17	9.276	10.761	12.468	14.426	16.672	19.244	22.186	38.741	66.461	112.139	186.278	304.914
18	10.575	12.375	14.463	16.879	19.673	22.901	26.623	48.039	85.071	148.023	253.388	426.879
19	12056	14.263	16.777	19.748	23.214	27.252	31.948	59.568	108.890	195.391	344.540	597.630
20	13.743	16.367	19.461	23.106	27.393	32.429	38.338	73.864	139.380	257.916	468.574	836.683
25	26.462	32.919	40.874	50.658	62.669	77.388	95.396	216.542	478.905	1033.590	2180.081	4499.880
30	50.950	66.212	85.850	111.065	143.371	184.675	237.376	634.820	1645.504	4142075	10143.019	24201.43

Appendix 2: Future Value Interest Factor for an Annuity (FVIFA) $FVIFA(r, n) = \frac{(1+r)^n - 1}{r}$

Period <i>n</i>	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	2.010	2.020	2.030	2.040	2.050	2.060	2.070	2.080	2.090	2.100	2.110	2.120	2.130
3	3.030	3.060	3.091	3.122	3.152	3.184	3.215	3.246	3.278	3.310	3.342	3.374	3.407
4	4.060	4.122	4.184	4.246	4.310	4.375	4.440	4.506	4.573	4.641	4.710	4.779	4.850
5	5.101	5.204	5.309	5.416	5.526	5.637	5.751	5.867	5.985	6.105	6.228	6.353	6.480
6	6.152	6.308	6.468	6.633	6.802	6.975	7.153	7.336	7.523	7.716	7.913	8.115	8.323
7	7.214	7.434	7.662	7.898	8.142	8.394	8.654	8.923	9.200	9.487	9.783	10.089	10.405
8	8.286	8.583	8.892	9.214	9.549	9.897	10.260	10.637	11.028	11.436	11.859	12.300	12.757
9	9.369	9.755	10.159	10.583	11.027	11.491	11.978	12.488	13.021	13.579	14.164	14.776	15.416
10	10.462	10.950	11.464	12.006	12.578	13.181	13.816	14.487	15.193	15.937	16.722	17.549	18.420
11	11.567	12.169	12.808	13.486	14.207	14.972	15.784	16.645	17.560	18.531	19.561	20.655	21.814
12	12.683	13.412	14.192	15.026	15.917	16.870	17.888	18.977	20.141	21.384	22.713	24.133	25.650
13	13.809	14.680	15.618	16.627	17.713	18.882	20.141	21.495	22.953	24.523	26.212	28.029	29.985
14	14.947	15.974	17.086	18.292	19.599	21.015	22.550	24.215	26.019	27.975	30.095	32.393	34.883
15	16.097	17.293	18.599	20.024	21.579	23.276	25.129	27.152	29.361	31.772	34.405	37.280	40.417
16	17.258	18.639	20.157	21.825	23.657	25.673	27.888	30.324	33.003	35.950	39.190	42.753	46.672
17	18.430	20.012	21.762	23.698	25.840	28.813	30.840	33.750	36.974	40.545	44.501	48.884	53.739
18	19.615	21.412	23.414	25.645	28.132	30.906	33.999	37.450	41.301	45.599	50.396	55.750	61.725
19	20.811	22.841	25.117	27.671	30.539	33.760	37.379	41.446	46.018	51.159	56.939	63.440	70.749
20	22.019	24.297	26.870	29.778	33.066	36.786	40.995	45.762	51.160	57.275	64.203	72.052	80.947
25	28.243	32.030	36.459	41.646	47.727	54.865	63.249	73.106	84.701	98.347	114.413	133.334	155.620
30	34.785	40.568	47.575	56.805	66.439	79.058	94.461	113.283	136.308	164.494	199.021	241.333	293.199

Appendix 2 (contd.)

Period <i>n</i>	14%	15%	16%	17%	18%	19%	20%	24%	28%	32%	36%	40%
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	2.140	2.150	2.160	2.170	2.180	2.190	2.200	2.240	2.280	2.320	2.360	2.400
3	3.440	3.473	3.506	3.539	3.572	3.606	3.640	3.778	3.918	4.062	4.210	4.360
4	4.921	4.993	5.066	5.141	5.215	5.291	5.368	5.684	6.016	6.362	6.725	7.104
5	6.610	6.742	6.877	7.014	7.154	7.297	7.442	8.048	8.700	9.398	10.146	10.946
6	8.536	8.754	8.977	9.207	9.442	9.683	9.930	10.980	12.136	13.406	14.799	16.324
7	10.730	11.067	11.414	11.772	12.142	12.523	12.916	14.615	16.534	18.696	21.126	23.853
8	13.233	13.727	14.240	14.773	15.327	15.902	16.499	19.123	22.163	25.678	29.732	34.395
9	16.085	16.786	17.518	18.285	19.086	19.923	20.799	24.712	29.369	34.895	41.435	49.153
10	19.337	20.304	21.321	22.393	23.521	24.709	25.959	31.643	38.592	47.062	57.352	69.814
11	23.044	24.349	25.733	27.200	28.755	30.404	32.150	40.238	50.399	63.122	78.998	98.739
12	27.271	29.002	30.850	32.824	34.931	37.180	39.580	50.985	65.510	84.320	108.437	139.235
13	32.089	34.352	36.786	39.404	42.219	45.244	48.497	64.110	84.853	112.303	148.475	195.929
14	37.518	40.505	43.672	47.103	50.818	54.841	59.196	80.496	109.612	149.240	202.926	275.300
15	43.842	47.580	51.660	56.110	60.965	66.261	72.035	100.815	141.303	197.997	276.979	386.420
16	50.980	55.717	60.925	66.649	72.939	79.850	87.442	126.011	181.868	262.356	377.692	541.988
17	59.118	65.075	71.673	78.979	87.068	96.022	105.931	157.253	233.791	347.310	514.661	759.784
18	68.394	75.836	84.141	93.406	103.740	115.266	128.117	195.994	300.252	459.449	700.939	1064.697
19	78.969	88.212	98.603	110.285	123.414	138.166	154.740	244.033	385.323	607.472	954.277	1491.576
20	91.025	102.440	115.380	130.033	146.628	165.418	186.688	303.601	494.213	802.863	1298.817	2089.206
25	181.871	212.793	249.214	292.105	342.603	402.042	471.981	898.092	1706.803	3226.844	6053.004	11247.199
30	356.787	434.745	530.321	647.439	790.948	966.712	1181.882	2640.916	5873.231	12940.859	28172.276	60501.081

Appendix 3: Present Value Interest Factor (PVIF)

<i>Period</i> <i>n</i>	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%
0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.901	0.893	0.885
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826	0.812	0.797	0.783
3	0.971	0.924	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751	0.731	0.712	0.693
4	0.961	0.924	0.889	0.855	0.823	0.792	0.763	0.735	0.708	0.683	0.659	0.636	0.613
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621	0.593	0.567	0.543
6	0.942	0.888	0.838	0.790	0.746	0.705	0.666	0.630	0.596	0.564	0.535	0.507	0.480
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513	0.482	0.452	0.425
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467	0.434	0.404	0.376
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424	0.391	0.361	0.333
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386	0.352	0.322	0.295
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350	0.317	0.287	0.261
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319	0.286	0.257	0.231
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290	0.258	0.229	0.204
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263	0.232	0.205	0.181
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239	0.209	0.183	0.160
16	0.853	0.728	0.623	0.534	0.458	0.394	0.339	0.292	0.252	0.218	0.188	0.163	0.141
17	0.844	0.714	0.605	0.513	0.436	0.377	0.311	0.270	0.231	0.198	0.170	0.146	0.125
18	0.836	0.700	0.587	0.494	0.416	0.350	0.296	0.250	0.212	0.180	0.153	0.130	0.111
19	0.828	0.686	0.570	0.475	0.396	0.331	0.276	0.232	0.194	0.164	0.138	0.116	0.098
20	0.820	0.673	0.554	0.456	0.377	0.312	0.258	0.215	0.178	0.149	0.124	0.104	0.087
25	0.780	0.610	0.478	0.375	0.295	0.233	0.184	0.146	0.116	0.092	0.074	0.059	0.047
30	0.742	0.552	0.412	0.308	0.231	0.174	0.131	0.099	0.075	0.057	0.044	0.033	0.026

Appendix 3 (contd.)

Period <i>n</i>	14%	15%	16%	17%	18%	19%	20%	24%	28%	32%	36%	40%
0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1	0.877	0.870	0.862	0.855	0.847	0.840	0.833	0.806	0.781	0.758	0.735	0.714
2	0.769	0.756	0.743	0.731	0.718	0.706	0.694	0.650	0.610	0.574	0.541	0.510
3	0.675	0.658	0.641	0.624	0.609	0.593	0.579	0.524	0.477	0.435	0.398	0.364
4	0.592	0.572	0.552	0.534	0.516	0.499	0.482	0.423	0.373	0.329	0.292	0.260
5	0.519	0.497	0.476	0.456	0.437	0.419	0.402	0.341	0.291	0.250	0.215	0.186
6	0.456	0.432	0.410	0.390	0.370	0.352	0.335	0.275	0.227	0.189	0.158	0.133
7	0.400	0.376	0.354	0.333	0.314	0.296	0.279	0.222	0.178	0.143	0.116	0.095
8	0.351	0.327	0.305	0.285	0.266	0.249	0.233	0.179	0.139	0.108	0.085	0.068
9	0.308	0.284	0.263	0.243	0.226	0.209	0.194	0.144	0.108	0.082	0.063	0.048
10	0.270	0.247	0.227	0.208	0.191	0.176	0.162	0.116	0.085	0.062	0.046	0.035
11	0.237	0.215	0.195	0.178	0.162	0.148	0.135	0.094	0.066	0.047	0.034	0.025
12	0.208	0.187	0.168	0.152	0.137	0.124	0.112	0.076	0.052	0.036	0.025	0.018
13	0.182	0.163	0.145	0.130	0.116	0.104	0.093	0.061	0.040	0.027	0.018	0.013
14	0.160	0.141	0.125	0.111	0.099	0.088	0.078	0.049	0.032	0.021	0.014	0.009
15	0.140	0.123	0.108	0.095	0.084	0.074	0.065	0.040	0.025	0.016	0.010	0.006
16	0.123	0.107	0.093	0.081	0.071	0.062	0.054	0.032	0.019	0.012	0.007	0.005
17	0.108	0.093	0.080	0.069	0.060	0.052	0.045	0.026	0.015	0.009	0.005	0.003
18	0.095	0.081	0.069	0.059	0.051	0.044	0.038	0.021	0.012	0.007	0.004	0.002
19	0.083	0.070	0.060	0.051	0.043	0.037	0.031	0.017	0.009	0.005	0.003	0.002
20	0.073	0.061	0.051	0.043	0.037	0.031	0.026	0.014	0.007	0.004	0.002	0.001
25	0.038	0.030	0.024	0.020	0.016	0.013	0.010	0.005	0.002	0.001	0.000	0.000
30	0.020	0.015	0.012	0.009	0.007	0.005	0.004	0.002	0.001	0.000	0.000	0.000

Appendix 4: Present Value Interest Factor for an Annuity (PVIFA) $PVIFA(r, n) = 1 - \frac{1}{(1+r)^n}$

Period <i>n</i>	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%
0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.901	0.893	0.885
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736	1.713	1.690	1.668
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487	2.444	2.402	2.361
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170	3.102	3.037	2.974
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791	3.696	3.605	3.517
6	5.795	5.601	5.417	5.242	5.076	4.917	4.766	4.623	4.486	4.355	4.231	4.111	3.998
7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868	4.712	4.564	4.423
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335	5.146	4.968	4.799
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759	5.537	5.328	5.132
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145	5.889	5.650	5.426
11	10.368	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495	6.207	5.938	5.687
12	11.255	10.575	9.945	9.385	8.863	8.384	7.943	7.536	7.161	6.814	6.492	6.194	5.918
13	12.134	11.348	10.635	9.986	9.394	8.853	8.358	7.904	7.487	7.103	6.750	6.424	6.122
14	13.004	12.106	11.296	10.563	9.899	9.295	8.745	8.244	7.786	7.367	6.982	6.628	6.302
15	13.865	12.849	11.938	11.118	10.380	9.712	9.108	8.559	8.060	7.606	7.191	6.811	6.462
16	14.718	13.578	12.561	11.652	10.838	10.106	9.447	8.851	8.312	7.824	7.379	6.974	6.604
17	15.562	14.292	13.166	12.166	11.274	10.477	9.763	9.122	8.544	8.022	7.549	7.120	6.729
18	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.372	8.756	8.201	7.702	7.250	6.840
19	17.226	15.678	14.324	13.134	12.085	11.158	10.336	9.604	8.950	8.365	7.839	7.366	6.938
20	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.818	9.128	8.514	7.963	7.469	7.025
25	22.023	19.523	17.413	15.622	14.094	12.783	11.654	10.675	9.823	9.077	8.422	7.843	7.330
30	25.808	22.397	19.600	17.292	15.373	13.765	12.409	11.258	10.274	9.427	8.694	8.055	7.496

Appendix 4 (contd.)

Period <i>n</i>	14%	15%	16%	17%	18%	19%	20%	24%	28%	32%	36%	40%
0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1	0.877	0.870	0.862	0.855	0.847	0.840	0.833	0.806	0.781	0.758	0.735	0.714
2	1.647	1.626	1.605	1.585	1.566	1.547	1.528	1.457	1.392	1.332	1.276	1.224
3	2.322	2.283	2.246	2.210	2.174	2.140	2.106	1.981	1.868	1.766	1.674	1.589
4	2.914	2.855	2.798	2.743	2.690	2.639	2.589	2.404	2.241	2.096	1.966	1.849
5	3.433	3.352	3.274	3.199	3.127	3.058	2.991	2.745	2.532	2.345	2.181	2.035
6	3.889	3.784	3.685	3.589	3.498	3.410	3.326	3.020	2.759	2.534	2.339	2.168
7	4.288	4.160	4.039	3.922	3.812	3.706	3.605	3.242	2.937	2.678	2.455	2.263
8	4.639	4.487	4.344	4.207	4.078	3.954	3.837	3.421	3.076	2.786	2.540	2.331
9	4.946	4.772	4.607	4.451	4.303	4.163	4.031	3.566	3.184	2.868	2.603	2.379
10	5.216	5.019	4.883	4.659	4.494	4.339	4.193	3.682	3.269	2.930	2.650	2.414
11	5.453	5.234	5.029	4.836	4.656	4.486	4.327	3.776	3.335	2.978	2.683	2.438
12	5.660	5.421	5.197	4.988	4.793	4.611	4.439	3.851	3.387	3.013	2.708	2.456
13	5.842	5.583	5.342	5.118	4.910	4.715	4.533	3.912	3.427	3.040	2.727	2.469
14	6.002	5.724	5.468	5.229	5.008	4.802	4.611	3.962	3.459	3.061	2.740	2.478
15	6.142	5.847	5.575	5.324	5.092	4.876	4.675	4.001	3.483	3.076	2.750	2.484
16	6.265	5.954	5.669	5.405	5.162	4.938	4.730	4.033	3.503	3.088	2.758	2.489
17	6.373	6.047	5.749	5.475	5.222	4.990	4.775	4.059	3.518	3.097	2.763	2.492
18	6.647	6.128	5.818	5.534	5.273	5.033	4.812	4.080	3.529	3.104	2.767	2.494
19	6.550	6.198	5.877	5.584	5.316	5.070	4.844	4.097	3.539	3.109	2.770	2.496
20	6.623	6.259	5.929	5.628	5.353	5.101	4.870	4.110	3.546	3.113	2.772	2.497
25	6.873	6.464	6.097	5.766	5.467	5.195	4.948	4.147	3.564	3.122	2.776	2.499
30	7.003	6.566	6.177	5.829	5.517	5.235	4.979	4.160	3.569	3.124	2.778	2.500