

FINANCIAL MANAGEMENT

QUESTION BOMB



Applicable for



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Ch - 1 - Ratios

BASIC CONCEPTS AND FORMULAE

1. Financial Analysis and Planning	Financial Analysis and Planning is carried out for the purpose of obtaining material and relevant information necessary for ascertaining the financial strengths and weaknesses of an enterprise and is necessary to analyze the data depicted in the financial statements. The main tools are Ratio Analysis and Cash Flow and Funds Flow Analysis.
2. Ratio Analysis	Ratio analysis is based on the fact that a single accounting figure by itself may not communicate any meaningful information but when expressed as a relative to some other figure, it may definitely provide some significant information. Ratio analysis is comparison of different numbers from the balance sheet, income statement, and cash flow statement against the figures of previous years, other companies, the industry, or even the economy in general for the purpose of financial analysis.
3. Importance of Ratio Analysis	The importance of ratio analysis lies in the fact that it presents facts on a comparative basis and enables drawing of inferences regarding the performance of a firm. It is relevant in assessing the performance of a firm in respect of following aspects: • Liquidity Position • Long-term Solvency • Operating Efficiency • Overall Profitability • Inter-firm Comparison • Financial Ratios for Supporting Budgeting.
4. Cash Flow Statement	Cash flow statement is a statement which discloses the changes in cash position between the two periods. Along with changes in the cash position the cash flow statement also outlines the reasons for such inflows or outflows of cash which in turn helps to analyze the functioning of a business.
5. Classification	The cash flow statement should report cash flows during the period

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of Cash Flow Activities	classified into following categories: • Operating Activities: These are the principal revenue-producing activities of the enterprise and other activities that are not investing or financing activities. • Investing Activities: These activities relate to the acquisition and disposal of long-term assets and other investments not included in cash equivalents. Cash equivalents are short term highly liquid investments that are readily convertible into known amounts of cash and which are subject to an insignificant risk of changes in value. • Financing Activities: These are activities that result in changes in the size and composition of the owners' capital (including preference share capital in the case of a company) and borrowings of the enterprise.
6. Procedure in Preparation of Cash Flow Statement	• Calculation of net increase or decrease in cash and cash equivalents: The difference between cash and cash equivalents for the period may be computed by comparing these accounts given in the comparative balance sheets. The results will be cash receipts and payments during the period responsible for the increase or decrease in cash and cash equivalent items. • Calculation of the net cash provided or used by operating activities: It is by the analysis of Profit and Loss Account, Comparative Balance Sheet and selected additional information. • Calculation of the net cash provided or used by investing and financing activities: All other changes in the Balance sheet items must be analysed taking into account the additional information and effect on cash may be grouped under the investing and financing activities. • Final Preparation of a Cash Flow Statement: It may be prepared by classifying all cash inflows and outflows in terms of operating, investing and financing activities. The net cash flow provided or used in each of these three activities may be highlighted. Ensure that the aggregate of net cash flows from operating, investing and financing activities is equal to net increase or decrease in cash and cash equivalents.
7. Reporting of Cash Flow from	There are two methods of converting net profit into net cash flows from operating activities-

Operating Activities	● Direct Method: actual cash receipts (for a period) from operating revenues and actual cash payments (for a period) for operating expenses are arranged and presented in the cash flow statement. The difference between cash receipts and cash payments is the net cash flow from operating activities. ● Indirect Method: In this method the net profit (loss) is used as the base then adjusted for items that affected net profit but did not affect cash.								
8. Funds Flow Statement	It ascertains the changes in financial position of a firm between two accounting periods. It analyses the reasons for change in financial position between two balance sheets. It shows the inflow and outflow of funds i.e., sources and application of funds during a particular period. ● Sources of Funds (a) Long term fund raised by issue of shares, debentures or sale of fixed assets and (b) Fund generated from operations which may be taken as a gross before payment of dividend and taxes or net after payment of dividend and taxes. ● Applications of Funds (a) Investment in Fixed Assets (b) Repayment of Capital								
9. Funds Flow Statement vs. Cash Flow Statement	<table><tr><th>Cash flow statement</th><th>Funds flow statement</th></tr><tr><td>(i) It ascertains the changes in balance of cash in hand and bank.</td><td>(i) It ascertains the changes in financial position between two accounting periods.</td></tr><tr><td>(ii) It analyses the reasons for changes in balance of cash in hand and bank.</td><td>(ii) It analyses the reasons for change in financial position between two balance sheets.</td></tr><tr><td>(iii) It shows the inflows and outflows of cash.</td><td>(iii) It reveals the sources and application of funds.</td></tr></table>	Cash flow statement	Funds flow statement	(i) It ascertains the changes in balance of cash in hand and bank.	(i) It ascertains the changes in financial position between two accounting periods.	(ii) It analyses the reasons for changes in balance of cash in hand and bank.	(ii) It analyses the reasons for change in financial position between two balance sheets.	(iii) It shows the inflows and outflows of cash.	(iii) It reveals the sources and application of funds.
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(iii) It shows the inflows and outflows of cash.	(iii) It reveals the sources and application of funds.								

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	(iv) It is an important tool for short term analysis.	(iv) It helps to test whether working capital has been effectively used or not.
	(v) The two significant areas of analysis are cash generating efficiency and free cash flow.	

SUMMARY OF RATIOS

Ratio	Formulae	Comments
Liquidity Ratio		
Current Ratio	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	A simple measure that estimates whether the business can pay short term debts. Ideal ratio is 2 : 1.
Quick Ratio	$\frac{\text{Quick Assets}}{\text{Current Liabilities}}$	It measures the ability to meet current debt immediately. Ideal ratio is 1 : 1.
Cash Ratio	$\frac{\left(\text{Cash and Bank balances} + \text{Marketable Securities} \right)}{\text{Current Liabilities}}$	It measures absolute liquidity of the business.
Basic Defense Interval Ratio	$\frac{\left(\text{Cash and Bank balances} + \text{Marketable Securities} \right)}{\text{Operating Expenses} \div \text{No. of days}}$	It measures the ability of the business to meet regular cash expenditures.
Net Working Capital Ratio	Current Assets – Current Liabilities	It is a measure of cash flow to determine the ability of business to survive financial crisis.
Capital Structure Ratio		
Equity Ratio	$\frac{\text{Shareholders' Equity}}{\text{Capital Employed}}$	It indicates owner's fund in companies to total fund invested.
Debt Ratio	$\frac{\text{Total outside liabilities}}{\text{Total Debt} + \text{Net worth}}$	It is an indicator of use of outside funds.

Debt to equity Ratio	$\frac{\text{Total Outside Liabilities}}{\text{Shareholders' Equity}}$	It indicates the composition of capital structure in terms of debt and equity.
Debt to Total assets Ratio	$\frac{\text{Total Outside Liabilities}}{\text{Total Assets}}$	It measures how much of total assets is financed by the debt.
Capital Gearing Ratio	$\frac{\left(\text{Preference Share Capital} + \text{Debentures} + \text{Other Borrowed funds} \right)}{\left(\text{Equity Share Capital} + \text{Reserves \& Surplus - Losses} \right)}$	It shows the proportion of fixed interest bearing capital to equity shareholders' fund. It also signifies the advantage of financial leverage to the equity shareholder.
Proprietary Ratio	$\frac{\text{Proprietary Fund}}{\text{Total Assets}}$	It measures the proportion of total assets financed by shareholders.
Coverage Ratios		
Debt Service Coverage Ratio (DSCR)	$\frac{\text{Earnings available for debt services}}{\text{Interest + Instalments}}$	It measures the ability to meet the commitment of various debt services like interest, installment etc. Ideal ratio is 2.
Interest Coverage Ratio	$\frac{\text{EBIT}}{\text{Interest}}$	It measures the ability of the business to meet interest. Ideal ratio is > 1.
Preference Dividend Coverage Ratio	$\frac{\text{Net Profit / Earning after taxes (EAT)}}{\text{Preference dividend liability}}$	It measures the ability to pay the preference shareholders' dividend. Ideal ratio is > 1.
Fixed Charges Coverage Ratio	$\frac{\text{EBIT} + \text{Depreciation}}{\text{Interest} + \frac{\text{Re-payment of loan}}{1 - \text{tax rate}}}$	This ratio shows how many times the cash flow before interest and taxes covers all fixed financing charges. The ideal ratio is > 1.
Activity Ratio/ Efficiency Ratio/ Performance Ratio/ Turnover Ratio		
Total Asset Turnover Ratio	$\frac{\text{Sales / Cost of Goods Sold}}{\text{Average Total Assets}}$	A measure of total asset utilisation. It helps to answer the question - What sales are being generated by each rupee's

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		worth of assets invested in the business?
Fixed Assets Turnover Ratio	$\frac{\text{Sales / Cost of Goods Sold}}{\text{Fixed Assets}}$	This ratio is about fixed asset capacity. A reducing sales or profit being generated from each rupee invested in fixed assets may indicate overcapacity or poorer-performing equipment.
Capital Turnover Ratio	$\frac{\text{Sales / Cost of Goods Sold}}{\text{Net Assets}}$	This indicates the firm's ability to generate sales per rupee of long term investment.
Working Capital Turnover Ratio	$\frac{\text{Sales / COGS}}{\text{Working Capital}}$	It measures the efficiency of the firm to use working capital.
Inventory Turnover Ratio	$\frac{\text{COGS / Sales}}{\text{Average Inventory}}$	It measures the efficiency of the firm to manage its inventory.
Debtors Turnover Ratio	$\frac{\text{Credit Sales}}{\text{Average Accounts Receivable}}$	It measures the efficiency at which firm is managing its receivables.
Receivables (Debtors') Velocity	$\frac{\text{Average Accounts Receivables}}{\text{Average Daily Credit Sales}}$	It measures the velocity of collection of receivables.
Payables Turnover Ratio	$\frac{\text{Annual Net Credit Purchases}}{\text{Average Accounts Payables}}$	It measures the velocity of payables payment.
Profitability Ratios based on Sales		
Gross Profit Ratio	$\frac{\text{Gross Profit}}{\text{Sales}} \times 100$	This ratio tells us something about the business's ability consistently to control its production costs or to manage the margins it makes on products it buys and sells.

Net Profit Ratio	$\frac{\text{Net Profit}}{\text{Sales}} \times 100$	It measures the relationship between net profit and sales of the business.
Operating Profit Ratio	$\frac{\text{Operating Profit}}{\text{Sales}} \times 100$	It measures operating performance of business.
Expenses Ratio		
Cost of Goods Sold (COGS) Ratio	$\frac{\text{COGS}}{\text{Sales}} \times 100$	It measures portion of a particular expenses in comparison to sales.
Operating Expenses Ratio	$\frac{\left(\begin{array}{l} \text{Administrative exp. +} \\ \text{Selling \& Distribution OH} \end{array} \right)}{\text{Sales}} \times 100$	
Operating Ratio	$\frac{\text{COGS} + \text{Operating expenses}}{\text{Sales}} \times 100$	
Financial Expenses Ratio	$\frac{\text{Financial expenses}}{\text{Sales}} \times 100$	
Profitability Ratios related to Overall Return on Assets/ Investments		
Return on Investment (ROI)	$\frac{\text{Return / Profit / Earnings}}{\text{Investments}} \times 100$	It measures overall return of the business on investment/ equity funds/ capital employed/ assets.
Return on Assets (ROA)	$\frac{\text{Net Profit after taxes}}{\text{Average total assets}}$	It measures net profit per rupee of average total assets/ average tangible assets/ average fixed assets.
Return on Capital Employed ROCE (Pre-tax)	$\frac{\text{EBIT}}{\text{Capital Employed}} \times 100$	It measures overall earnings (either pre-tax or post tax) on total capital employed.

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Return on Capital Employed ROCE (Post-tax)	$\frac{\text{EBIT}(1-t)}{\text{Capital Employed}} \times 100$	It indicates earnings available to equity shareholders in comparison to equity shareholders' networkth.
Return on Equity (ROE)	$\frac{\left(\begin{array}{c} \text{Net Profit after taxes -} \\ \text{Preference dividend (if any)} \end{array} \right)}{\text{Net worth / equity shareholders' fund}} \times 100$	
Profitability Ratios Required for Analysis from Owner's Point of View		
Earnings per Share (EPS)	$\frac{\text{Net profit available to equity share holders}}{\text{Number of equity shares outstanding}}$	EPS measures the overall profit generated for each share in existence over a particular period.
Dividend per Share (DPS)	$\frac{\text{Dividend paid to equity share holders}}{\text{Number of equity shares outstanding}}$	Proportion of profit distributed per equity share.
Dividend payout Ratio (DP)	$\frac{\text{Dividend per equity share}}{\text{Earning per Share (EPS)}}$	It shows % of EPS paid as dividend and retained earnings.
Profitability Ratios related to market/ valuation/ Investors		
Price-Earnings per Share (P/E Ratio)	$\frac{\text{Market Price per Share (MPS)}}{\text{Earning per Share (EPS)}}$	At any time, the P/E ratio is an indication of how highly the market "rates" or "values" a business. A P/E ratio is best viewed in the context of a sector or market average to get a feel for relative value and stock market pricing.
Dividend Yield	$\frac{\text{Dividend} \pm \text{Change in share price}}{\text{Initial share price}} \times 100$ OR $\frac{\text{Dividend per Share (DPS)}}{\text{Market Price per Share (MPS)}} \times 100$	It measures dividend paid based on market price of shares.

Earnings Yield	$\frac{\text{Earnings per Share (EPS)}}{\text{Market Price per Share (MPS)}} \times 100$	It is the relationship of earning per share and market value of shares.
Market Value / Book Value per Share	$\frac{\text{Market value per share}}{\text{Book value per share}}$	It indicates market response of the shareholders' investment.
Q Ratio	$\frac{\text{Market Value of equity and liabilities}}{\text{Estimated replacement cost of assets}}$	It measures market value of equity as well as debt in comparison to all assets at their replacement cost.

UNIT – I : APPLICATION OF RATIO ANALYSIS FOR PERFORMANCE EVALUATION, FINANCIAL HEALTH AND DECISION MAKING

SECTION-A

Question 1

Discuss any three ratios computed for investment analysis.

Answer

Three ratios computed for investment analysis are as follows:

- (i) Earnings per share = $\frac{\text{Net Profit available to equity shareholders}}{\text{Number of equity shares outstanding}}$
- (ii) Dividend yield ratio = $\frac{\text{Equity dividend per share (DPS)} \times 100}{\text{Market price per share (MPS)}}$
- (iii) Return on capital employed* = $\frac{\text{Earnings before interest and tax (EBIT)} \times 100}{\text{Capital employed}}$

* It can be pretax or post tax

Question 2

Discuss the financial ratios for evaluating company performance on operating efficiency and liquidity position aspects.

Answer

Financial ratios for evaluating performance on operational efficiency and liquidity position aspects

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are discussed as:

Operating Efficiency: Ratio analysis throws light on the degree of efficiency in the management and utilization of its assets. The various activity ratios (such as turnover ratios) measure this kind of operational efficiency. These ratios are employed to evaluate the efficiency with which the firm manages and utilises its assets. These ratios usually indicate the frequency of sales with respect to its assets. These assets may be capital assets or working capital or average inventory. In fact, the solvency of a firm is, in the ultimate analysis, dependent upon the sales revenues generated by use of its assets – total as well as its components.

Liquidity Position: With the help of ratio analysis, one can draw conclusions regarding liquidity position of a firm. The liquidity position of a firm would be satisfactory, if it is able to meet its current obligations when they become due. Inability to pay-off short-term liabilities affects its credibility as well as its credit rating. Continuous default on the part of the business leads to commercial bankruptcy. Eventually such commercial bankruptcy may lead to its sickness and dissolution. Liquidity ratios are current ratio, liquid ratio and cash to current liability ratio. These ratios are particularly useful in credit analysis by banks and other suppliers of short-term loans.

Question 3

Diagrammatically present the DU PONT CHART to calculate return on equity.

Answer

Du Pont Chart

There are three components in the calculation of return on equity using the traditional DuPont model- the net profit margin, asset turnover, and the equity multiplier. By examining each input individually, the sources of a company's return on equity can be discovered and compared to its competitors.

Return on Equity = (Net Profit Margin) (Asset Turnover) (Equity Multiplier)

$$\text{Or, } \frac{\text{Net Profit}}{\text{Shareholders Equity}} = \frac{\text{Net Profit}}{\text{Revenue}} \times \frac{\text{Revenue}}{\text{Assets}} \times \frac{\text{Assets}}{\text{Shareholders equity}}$$

Question 4

What do you mean by Stock Turnover ratio and Gearing ratio?

Answer

Stock Turnover Ratio and Gearing Ratio

Stock Turnover Ratio helps to find out if there is too much inventory build-up. An increasing stock turnover figure or one which is much larger than the "average" for an industry may indicate poor stock management. The formula for the Stock Turnover Ratio is as follows:

$$\text{Stock Turnover ratio} = \frac{\text{Cost of Sales}}{\text{Average inventory}} \text{ or } \frac{\text{Turnover}}{\text{Average inventory}}$$

Gearing Ratio indicates how much of the business is funded by borrowing. In theory, the higher the level of borrowing (gearing), the higher are the risks to a business, since the payment of interest and repayment of debts are not "optional" in the same way as dividends. However, gearing can be a financially sound part of a business's capital structure particularly if the business has strong, predictable cash flows. The formula for the Gearing Ratio is as follows:

$$\text{Gearing Ratio} = \frac{\text{Borrowings (all long term debts including normal overdraft)}}{\text{Net Assets or Shareholders' funds}}$$

Question 5

Discuss the composition of Return on Equity (ROE) using the DuPont model.

Answer

Composition of Return on Equity using the DuPont Model: There are three components in the calculation of return on equity using the traditional DuPont model- the net profit margin, asset turnover, and the equity multiplier. By examining each input individually, the sources of a company's return on equity can be discovered and compared to its competitors.

- (a) **Net Profit Margin:** The net profit margin is simply the after-tax profit a company generates for each rupee of revenue.

$$\text{Net profit margin} = \text{Net Income} \div \text{Revenue}$$

Net profit margin is a safety cushion; the lower the margin, lesser the room for error.

- (b) **Asset Turnover:** The asset turnover ratio is a measure of how effectively a company converts its assets into sales. It is calculated as follows:

$$\text{Asset Turnover} = \text{Revenue} \div \text{Assets}$$

The asset turnover ratio tends to be inversely related to the net profit margin; i.e., the higher the net profit margin, the lower the asset turnover.

- (c) **Equity Multiplier:** It is possible for a company with terrible sales and margins to take on excessive debt and artificially increase its return on equity. The equity multiplier, a measure of financial leverage, allows the investor to see what portion of the return on equity is the result of debt. The equity multiplier is calculated as follows:

$$\text{Equity Multiplier} = \text{Assets} \div \text{Shareholders' Equity}.$$

Calculation of Return on Equity

To calculate the return on equity using the DuPont model, simply multiply the three components (net profit margin, asset turnover, and equity multiplier.)

$$\text{Return on Equity} = \text{Net profit margin} \times \text{Asset turnover} \times \text{Equity multiplier}$$

Question 6

Explain briefly the limitations of Financial ratios.

Answer

Limitations of Financial Ratios

The limitations of financial ratios are listed below:

- (a) *Diversified product lines:* Many businesses operate a large number of divisions in quite different industries. In such cases, ratios calculated on the basis of aggregate data cannot be used for inter-firm comparisons.
- (b) *Financial data are badly distorted by inflation:* Historical cost values may be substantially different from true values. Such distortions of financial data are also carried in the financial ratios.
- (c) *Seasonal factors* may also influence financial data.
- (d) *To give a good shape to the popularly used financial ratios (like current ratio, debt- equity ratios, etc.):* The business may make some year-end adjustments. Such window dressing can change the character of financial ratios which would be different had there been no such change.
- (e) *Differences in accounting policies and accounting period:* It can make the accounting data of two firms non-comparable as also the accounting ratios.
- (f) *There is no standard set of ratios against which a firm's ratios can be compared:* Sometimes a firm's ratios are compared with the industry average. But if a firm desires to be above the average, then industry average becomes a low standard. On the other hand, for a below average firm, industry averages become too high a standard to achieve.

Question 7

Explain the important ratios that would be used in each of the following situations:

- (i) *A bank is approached by a company for a loan of ₹ 50 lakhs for working capital purposes.*
- (ii) *A long term creditor interested in determining whether his claim is adequately secured.*
- (iii) *A shareholder who is examining his portfolio and who is to decide whether he should hold or sell his holding in the company.*
- (iv) *A finance manager interested to know the effectiveness with which a firm uses its available resources.*

Answer**Important Ratios used in different situations**

- (i) *Liquidity Ratios*- Here Liquidity or short-term solvency ratios would be used by the bank to check the ability of the company to pay its short-term liabilities. A bank may use Current ratio and Quick ratio to judge short terms solvency of the firm.
- (ii) *Capital Structure/Leverage Ratios*- Here the long-term creditor would use the capital structure/leverage ratios to ensure the long term stability and structure of the firm. A long term creditors interested in the determining whether his claim is adequately secured may use Debt-service coverage and interest coverage ratio.
- (iii) *Profitability Ratios*- The shareholder would use the profitability ratios to measure the profitability or the operational efficiency of the firm to see the final results of business operations. A shareholder may use return on equity, earning per share and dividend per share.
- (iv) *Activity Ratios*- The finance manager would use these ratios to evaluate the efficiency with which the firm manages and utilises its assets. Some important ratios are (a) Capital turnover ratio (b) Current and fixed assets turnover ratio (c) Stock, Debtors and Creditors turnover ratio.

SECTION-B**Question 1**

From the following information, prepare a summarised Balance Sheet as at 31st March, 2002:

<i>Net Working Capital</i>	<i>₹ 2,40,000</i>
<i>Bank overdraft</i>	<i>₹ 40,000</i>
<i>Fixed Assets to Proprietary ratio</i>	<i>0.75</i>
<i>Reserves and Surplus</i>	<i>₹ 1,60,000</i>
<i>Current ratio</i>	<i>2.5</i>
<i>Liquid ratio (Quick Ratio)</i>	<i>1.5</i>

Answer**Working notes:**

1. Current assets and Current liabilities computation:

$$\frac{\text{Current assets}}{\text{Current liabilities}} = \frac{2.5}{1}$$

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$$\begin{aligned}\text{Or Current assets} &= 2.5 \text{ Current liabilities} \\ \text{Now, Working capital} &= \text{Current assets} - \text{Current liabilities} \\ \text{Or ₹ 2,40,000} &= 2.5 \text{ Current liability} - \text{Current liability} \\ \text{Or } 1.5 \text{ Current liability} &= ₹ 2,40,000 \\ \therefore \text{Current liabilities} &= ₹ 1,60,000 \\ \text{So, Current assets} &= ₹ 1,60,000 \times 2.5 = ₹ 4,00,000\end{aligned}$$

2. Computation of stock

$$\begin{aligned}\text{Liquid ratio} &= \frac{\text{Liquid assets}}{\text{Current liabilities}} \\ \text{Or } 1.5 &= \frac{\text{Current assets} - \text{Inventories}}{\text{Rs.1,60,000}} \\ \text{Or } 1.5 \times ₹ 1,60,000 &= ₹ 4,00,000 - \text{Inventories} \\ \text{Or Inventories} &= ₹ 4,00,000 - ₹ 2,40,000 \\ \text{Or Stock} &= ₹ 1,60,000\end{aligned}$$

3. Computation of Proprietary fund; Fixed assets; Capital and Sundry creditors

$$\begin{aligned}\text{Fixed Asset to Proprietary ratio} &= \frac{\text{Fixed assets}}{\text{Proprietary fund}} = 0.75 \\ \therefore \text{Fixed assets} &= 0.75 \text{ Proprietary fund (PF) [FA + NWC = PF} \\ &\quad \text{or NWC = PF - FA (i.e. .75 PF)]} \\ \text{and Net working capital (NWC)} &= 0.25 \text{ Proprietary fund} \\ \text{Or } ₹ 2,40,000/0.25 &= \text{Proprietary fund} \\ \text{Or Proprietary fund} &= ₹ 9,60,000 \\ \text{and Fixed assets} &= 0.75 \text{ proprietary fund} \\ &= 0.75 \times ₹ 9,60,000 \\ &= ₹ 7,20,000 \\ \text{Capital} &= \text{Proprietary fund} - \text{Reserves \& Surplus} \\ &= ₹ 9,60,000 - ₹ 1,60,000 = ₹ 8,00,000 \\ \text{Sundry creditors} &= (\text{Current liabilities} - \text{Bank overdraft}) \\ &= (₹ 1,60,000 - ₹ 40,000) = ₹ 1,20,000\end{aligned}$$

Balance Sheet

Liabilities	₹	Assets	₹
Capital	8,00,000	Fixed assets	7,20,000
Reserves & Surplus	1,60,000	Stock	1,60,000
Bank overdraft	40,000	Current assets	2,40,000
Sundry creditors	<u>1,20,000</u>		
	<u>11,20,000</u>		<u>11,20,000</u>

Question 2

With the help of the following information complete the Balance Sheet of MNOP Ltd.:

Equity share capital	₹ 1,00,000
The relevant ratios of the company are as follows:	
Current debt to total debt	0.40
Total debt to Equity share capital	0.60
Fixed assets to Equity share capital	0.60
Total assets turnover	2 Times
Inventory turnover	8 Times

Answer

MNOP Ltd
Balance Sheet

Liabilities	₹	Assets	₹
Equity share capital	1,00,000	Fixed assets	60,000
Current debt	24,000	Cash (balancing figure)	60,000
Long term debt	<u>36,000</u>	Inventory	<u>40,000</u>
	<u>1,60,000</u>		<u>1,60,000</u>

Working Notes

- Total debt = $0.60 \times \text{Equity share capital} = 0.60 \times ₹ 1,00,000 = ₹ 60,000$
Further, Current debt to total debt = 0.40. So, current debt = $0.40 \times ₹ 60,000 = ₹ 24,000$,
Long term debt = $₹ 60,000 - ₹ 24,000 = ₹ 36,000$
- Fixed assets = $0.60 \times \text{Equity share Capital} = 0.60 \times ₹ 1,00,000 = ₹ 60,000$
- Total assets to turnover = 2 Times : Inventory turnover = 8 Times
Hence, Inventory / Total assets = $2/8 = 1/4$, Total assets = ₹ 1,60,000
Therefore Inventory = $₹ 1,60,000 / 4 = ₹ 40,000$

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Question 3

JKL Limited has the following Balance Sheets as on March 31, 2015 and March 31, 2016:

Balance Sheet

	₹ in lakhs	
	March 31, 2015	March 31, 2016
<i>Sources of Funds:</i>		
Shareholders Funds	2,377	1,472
Loan Funds	<u>3,570</u>	<u>3,083</u>
	<u>5,947</u>	<u>4,555</u>
<i>Applications of Funds:</i>		
Fixed Assets	3,466	2,900
Cash and bank	489	470
Debtors	1,495	1,168
Stock	2,867	2,407
Other Current Assets	1,567	1,404
Less: Current Liabilities	<u>(3,937)</u>	<u>(3,794)</u>
	<u>5,947</u>	<u>4,555</u>

The Income Statement of the JKL Ltd. for the year ended is as follows:

	₹ in lakhs	
	March 31, 2015	March 31, 2016
Sales	22,165	13,882
Less: Cost of Goods sold	<u>20,860</u>	<u>12,544</u>
Gross Profit	1,305	1,338
Less: Selling, General and Administrative expenses	<u>1,135</u>	<u>752</u>
Earnings before Interest and Tax (EBIT)	170	586
Interest Expense	<u>113</u>	<u>105</u>
Profits before Tax	57	481
Tax	<u>23</u>	<u>192</u>
Profits after Tax (PAT)	34	289

Required:

- (i) Calculate for the year 2015-16:
 - (a) Inventory turnover ratio

- (b) *Financial Leverage*
 (c) *Return on Capital Employed (ROCE)*
 (d) *Return on Equity (ROE)*
 (e) *Average Collection period.*

(ii) Give a brief comment on the Financial Position of JKL Limited.

Answer

Ratios for the year 2015-2016

(i) (a) Inventory turnover ratio

$$= \frac{\text{COGS}}{\text{Average Inventory}} = \frac{20,860}{\frac{(2,867 + 2,407)}{2}} = 7.91$$

(b) Financial leverage

	2015-16	2014-15
$= \frac{\text{EBIT}}{\text{EBIT} - \text{I}}$	$= \frac{170}{57}$ $= 2.98$	$= \frac{586}{481}$ $= 1.22$

(c) ROCE

$$= \frac{\text{EBIT} (1-t)}{\text{Average Capital Employed}} = \frac{57 (1-0.4)}{\left(\frac{5,947 + 4,535}{2}\right)} = \frac{34.2}{5251} \times 100 = 0.651 \%$$

[Here Return on Capital Employed (ROCE) is calculated after Tax]

(d) ROE

$$= \frac{\text{Profits after tax}}{\text{Average shareholders' funds}} = \frac{34}{\frac{(2,377 + 1,472)}{2}} = \frac{34}{1,924.5} = 1.77\%$$

(e) Average Collection Period*

$$\text{Average Sales per day} = \frac{22,165}{365} = ₹ 60.73 \text{ lakhs}$$

3.18 Financial Management

$$\text{Average collection period} = \frac{\text{Average Debtors}}{\text{Average sales per day}} = \frac{(1,495 + 1,168)}{2} = \frac{1331.5}{60.73} = 22 \text{ days}$$

***Note:** In the above solution, 1 year = 365 days has been assumed. Alternatively, it may be solved on the basis of 1 year = 360 days.

(ii) Brief Comment on the financial position of JKL Ltd.

The profitability of operations of the company are showing sharp decline due to increase in operating expenses. The financial and operating leverages are becoming adverse.

The liquidity of the company is under great stress.

u3

Question 4

Using the following information, complete the Balance Sheet given below:

- (i) Total debt to net worth : 1 : 2
- (ii) Total assets turnover : 2
- (iii) Gross profit on sales : 30%
- (iv) Average collection period : 40 days
(Assume 360 days in a year)
- (v) Inventory turnover ratio based on cost of goods sold and year-end inventory : 3
- (vi) Acid test ratio : 0.75

Balance Sheet
as on March 31, 2016

Liabilities	₹	Assets	₹
Equity Shares Capital	4,00,000	Plant and Machinery	—
Reserves and Surplus	6,00,000	and other Fixed Assets	
Total Debt:		Current Assets:	
Current Liabilities	—	Inventory	—
		Debtors	—
		Cash	—

Answer

Net worth = Capital + Reserves and surplus
= 4,00,000 + 6,00,000 = ₹10,00,000

$$\frac{\text{Total Debt}}{\text{Networth}} = \frac{1}{2}$$

$$\therefore \text{Total debt} = ₹ 5,00,000$$

$$\text{Total Liability side} = ₹ 4,00,000 + ₹ 6,00,000 + ₹ 5,00,000$$

$$= ₹ 15,00,000$$

$$= \text{Total Assets}$$

$$\text{Total Assets Turnover} = \frac{\text{Sales}}{\text{Total assets}}$$

$$2 = \frac{\text{Sales}}{₹ 15,00,000}$$

$$\therefore \text{Sales} = ₹ 30,00,000$$

$$\text{Gross Profit on Sales : 30\% i.e. ₹ 9,00,000}$$

$$\therefore \text{Cost of Goods Sold (COGS)} = ₹ 30,00,000 - ₹ 9,00,000$$

$$= ₹ 21,00,000$$

$$\text{Inventory turnover} = \frac{\text{COGS}}{\text{Inventory}}$$

$$3 = \frac{₹ 21,00,000}{\text{Inventory}}$$

$$\therefore \text{Inventory} = ₹ 7,00,000$$

$$\text{Average collection period} = \frac{\text{Average debtors}}{\text{Sales / day}}$$

$$40 = \frac{\text{Debtors}}{₹ 30,00,000 / 360}$$

$$\therefore \text{Debtors} = ₹ 3,33,333.$$

$$\text{Acid test ratio} = \frac{\text{Current Assets - Stock (Quick Asset)}}{\text{Current liabilities}}$$

$$0.75 = \frac{\text{Current Assets} - ₹ 7,00,000}{₹ 5,00,000}$$

$$\therefore \text{Current Assets} = ₹ 10,75,000.$$

3.20 Financial Management

∴ Fixed Assets = Total Assets – Current Assets

$$= ₹ 15,00,000 - ₹ 10,75,000 = ₹ 4,25,000$$

Cash and Bank balance = Current Assets – Inventory – Debtors

$$= ₹ 10,75,000 - ₹ 7,00,000 - ₹ 3,33,333 = ₹ 41,667.$$

Balance Sheet as on March 31, 2016

Liabilities	₹	Assets	₹
Equity Share Capital	4,00,000	Plant and Machinery and other	
Reserves & Surplus	6,00,000	Fixed Assets	4,25,000
Total Debt:		Current Assets:	
Current liabilities	5,00,000	Inventory	7,00,000
		Debtors	3,33,333
		Cash	41,667
	<u>15,00,000</u>		<u>15,00,000</u>

Question 5

MN Limited gives you the following information related for the year ending 31st March, 2016:

- | | |
|---|-------------|
| (1) Current Ratio | 2.5 : 1 |
| (2) Debt-Equity Ratio | 1 : 1.5 |
| (3) Return on Total Assets (After Tax) | 15% |
| (4) Total Assets Turnover Ratio | 2 |
| (5) Gross Profit Ratio | 20% |
| (6) Stock Turnover Ratio | 7 |
| (7) Current Market Price per Equity Share | ₹ 16 |
| (8) Net Working Capital | ₹ 4,50,000 |
| (9) Fixed Assets | ₹ 10,00,000 |
| (10) 60,000 Equity Shares of | ₹ 10 each |
| (11) 20,000, 9% Preference Shares of | ₹ 10 each |
| (12) Opening Stock | ₹ 3,80,000 |

You are required to calculate:

- (i) Quick Ratio
- (ii) Fixed Assets Turnover Ratio
- (iii) Proprietary Ratio
- (iv) Earnings per Share
- (v) Price-Earning Ratio.

Answer**(a) Workings Notes:**

1. Net Working Capital $= \text{Current Assets} - \text{Current Liabilities}$
 $= 2.5 - 1 = 1.5$
 Thus, Current Assets $= \frac{\text{Net Working Capital} \times 2.5}{1.5}$
 $= \frac{₹ 4,50,000 \times 2.5}{1.5} = ₹ 7,50,000$
- Current Liabilities $= ₹ 7,50,000 - ₹ 4,50,000 = ₹ 3,00,000$
2. Sales $= \text{Total Assets Turnover} \times \text{Total Assets}$
 $= 2 \times (\text{Fixed Assets} + \text{Current Assets})$
 $= 2 \times (₹ 10,00,000 + ₹ 7,50,000) = ₹ 35,00,000$
3. Cost of Goods Sold $= 100\% - 20\% = 80\% \text{ of Sales}$
 $= 80\% \text{ of } ₹ 35,00,000 = ₹ 28,00,000$
4. Average Stock $= \frac{\text{Cost of Good Sold}}{\text{Stock Turnover Ratio}}$
 $= \frac{₹ 28,00,000}{7} = ₹ 4,00,000$
 Closing Stock $= (\text{Average Stock} \times 2) - \text{Opening Stock}$
 $= (₹ 4,00,000 \times 2) - ₹ 3,80,000 = ₹ 4,20,000$
 Quick Assets $= \text{Current Assets} - \text{Closing Stock}$
 $= ₹ 7,50,000 - ₹ 4,20,000 = ₹ 3,30,000$
 $\frac{\text{Debt}}{\text{Equity (here Proprietary fund)}} = \frac{1}{1.5}$, Or Proprietary fund = 1.5 Debt.
 Total Asset $= \text{Proprietary Fund (Equity)} + \text{Debt}$
 Or 17,50,000 $= 1.5 \text{ Debt} + \text{Debt}$
 Or Debt $= \frac{₹ 17,50,000}{2.5} = ₹ 7,00,000$
 Proprietary fund $= 7,00,000 \times 1.5 = ₹ 10,50,000$
 $= \frac{₹ 17,50,000 \times 1.5}{2.5} = ₹ 10,50,000$

3.22 Financial Management

5. Profit after tax (PAT) = Total Assets × Return on Total Assets
= ₹ 17,50,000 × 15% = ₹ 2,62,500

(i) Calculation of Quick Ratio

$$\text{Quick Ratio} = \frac{\text{Quick Assets}}{\text{Current Liabilities}} = \frac{\text{₹ 3,30,000}}{\text{₹ 3,00,000}} = 1.1:1$$

(ii) Calculation of Fixed Assets Turnover Ratio

$$\text{Fixed Assets Turnover Ratio} = \frac{\text{Sales}}{\text{Fixed Assets}} = \frac{\text{₹ 35,00,000}}{\text{₹ 10,00,000}} = 3.5$$

(iii) Calculation of Proprietary Ratio

$$\begin{aligned}\text{Proprietary Ratio} &= \frac{\text{Proprietary fund}}{\text{Total Assets}} \\ &= \frac{\text{₹ 10,50,000}}{\text{₹ 17,50,000}} = 0.6 : 1\end{aligned}$$

(iv) Calculation of Earnings per Equity Share (EPS)

$$\begin{aligned}\text{Earnings per Equity Share (EPS)} &= \frac{\text{PAT - Preference Share Dividend}}{\text{Number of Equity Shares}} \\ &= \frac{\text{₹ 2,62,500 - ₹ 18,000 (9\% of 2,00,000)}}{60,000} \\ &= \text{₹ 4.075 per share}\end{aligned}$$

(v) Calculation of Price-Earnings Ratio (P/E Ratio)

$$\text{P/E Ratio} = \frac{\text{Market Price of Equity Share}}{\text{EPS}} = \frac{\text{₹ 16}}{\text{₹ 4.075}} = 3.926$$

Question 6

Using the following data, complete the Balance Sheet given below:

Gross Profit	₹ 54,000
Shareholders' Funds	₹ 6,00,000
Gross Profit margin	20%
Credit sales to Total sales	80%
Total Assets turnover	0.3 times
Inventory turnover	4 times
Average collection period (a 360 days year)	20 days

<i>Current ratio</i>	<i>1.8</i>
<i>Long-term Debt to Equity</i>	<i>40%</i>
<i>Balance Sheet</i>	
<i>Creditors</i>	<i>Cash</i>
<i>Long-term debt</i>	<i>Debtors</i>
<i>Shareholders' funds</i>	<i>Inventory</i>
	<i>Fixed assets</i>

Answer

Gross Profit ₹ 54,000

Gross Profit Margin 20%

$$\therefore \text{Sales} = \frac{\text{Gross Profit}}{\text{Gross Profit Margin}} = ₹ 54,000 / 0.20 = ₹ 2,70,000$$

Credit Sales to Total Sales = 80%

$$\therefore \text{Credit Sales} = ₹ 2,70,000 \times 0.80 = ₹ 2,16,000$$

Total Assets Turnover = 0.3 times

$$\begin{aligned} \therefore \text{Total Assets} &= \frac{\text{Sales}}{\text{Total Assets Turnover}} \\ &= \frac{₹ 2,70,000}{0.3} = ₹ 9,00,000 \end{aligned}$$

Sales – Gross Profit = COGS

$$\therefore \text{COGS} = ₹ 2,70,000 - 54,000 = ₹ 2,16,000$$

Inventory turnover = 4 times

$$\text{Inventory} = \frac{\text{COGS}}{\text{Inventory turnover}} = \frac{2,16,000}{4} = ₹ 54,000$$

Average Collection Period = 20 days

$$\therefore \text{Debtors turnover} = \frac{360}{\text{Average Collection Period}} = 360/20 = 18$$

$$\therefore \text{Debtors} = \frac{\text{Credit Sales}}{\text{Debtors turnover}} = \frac{₹ 2,16,000}{18} = ₹ 12,000$$

Current ratio = 1.8

3.24 Financial Management

$$1.8 = \frac{\text{Debtors} + \text{Inventory} + \text{Cash (Current Assets)}}{\text{Creditors (Current Liabilities)}}$$

$$1.8 \text{ Creditors} = (\text{₹ } 12,000 + \text{₹ } 54,000 + \text{Cash})$$

$$1.8 \text{ Creditors} = \text{₹ } 66,000 + \text{Cash} \text{ ----- (i)}$$

$$\text{Long-term Debt to Equity} = 40\%$$

$$\text{Shareholders' Funds (Equity)} = \text{₹ } 6,00,000$$

$$\therefore \text{Long-term Debt} = \text{₹ } 6,00,000 \times 40\% = \text{₹ } 2,40,000$$

$$\text{Creditors} = \text{₹ } 9,00,000 - (6,00,000 + 2,40,000) = \text{₹ } 60,000$$

$$\therefore \text{Cash} = (\text{₹ } 60,000 \times 1.8) - \text{₹ } 66,000 = \text{₹ } 42,000 \quad [\text{From equation (i)}]$$

Balance Sheet

Liabilities	₹	Assets	₹
Creditors	60,000	Cash	42,000
		Debtors	12,000
Long-term debt	2,40,000	Inventory	54,000
Shareholders' funds	<u>6,00,000</u>	Fixed Assets (Balancing figure)	<u>7,92,000</u>
	<u>9,00,000</u>		<u>9,00,000</u>

Question 7

MNP Limited has made plans for the next year 2015 -16. It is estimated that the company will employ total assets of ₹ 25,00,000; 30% of assets being financed by debt at an interest cost of 9% p.a. The direct costs for the year are estimated at ₹ 15,00,000 and all other operating expenses are estimated at ₹ 2,40,000. The sales revenue are estimated at ₹ 22,50,000. Tax rate is assumed to be 40%. Required to calculate:

- Net profit margin (After tax);
- Return on Assets (After tax);
- Asset turnover; and
- Return on Equity.

Answer

The net profit is calculated as follows:

	₹
Sales Revenue	22,50,000
Less: Direct Costs	<u>15,00,000</u>

Gross Profits	7,50,000
Less: Operating Expense	<u>2,40,000</u>
Earnings before Interest and tax(EBIT)	5,10,000
Less: Interest on debt [9% × 7,50,000 (i.e. 30 % of 25,00,000)]	<u>67,500</u>
Earnings before Tax)(EBT)	4,42,500
Less: Taxes (@ 40%)	<u>1,77,000</u>
Profit after Tax (PAT)	<u>2,65,500</u>

(i) Net Profit Margin (After Tax)

$$\text{Net Profit Margin} = \frac{\text{EBIT} (1 - t)}{\text{Sales}} \times 100 = \frac{₹ 5,10,000 \times (1 - 0.4)}{₹ 22,50,000} = 13.6\%$$

(ii) Return on Assets (ROA)(After tax)

$$\begin{aligned} \text{ROA} &= \frac{\text{EBIT} (1 - t)}{\text{Total Assets}} \\ &= \frac{₹ 5,10,000 (1 - 0.4)}{₹ 25,00,000} = \frac{₹ 3,06,000}{₹ 25,00,000} \\ &= 0.1224 = 12.24\% \end{aligned}$$

(iii) Asset Turnover

$$\text{Asset Turnover} = \frac{\text{Sales}}{\text{Assets}} = \frac{₹ 22,50,000}{₹ 25,00,000} = 0.9$$

$$\text{Asset Turnover} = 0.9$$

(iv) Return on Equity (ROE)

$$\text{ROE} = \frac{\text{PAT}}{\text{Equity}} = \frac{₹ 2,65,500}{₹ 17,50,000} = 15.17\%$$

$$\text{ROE} = 15.17\%$$



Question 8

The following accounting information and financial ratios of M Limited relate to the year ended 31st March, 2016 :

Inventory Turnover Ratio	6 Times
Creditors Turnover Ratio	10 Times
Debtors Turnover Ratio	8 Times
Current Ratio	2.4

3.26 Financial Management

Gross Profit Ratio

25%

Total sales ₹ 30,00,000; cash sales 25% of credit sales; cash purchases ₹ 2,30,000; working capital ₹ 2,80,000; closing inventory is ₹ 80,000 more than opening inventory.

You are required to calculate:

- (i) *Average Inventory*
- (ii) *Purchases*
- (iii) *Average Debtors*
- (iv) *Average Creditors*
- (v) *Average Payment Period*
- (vi) *Average Collection Period*
- (vii) *Current Assets*
- (viii) *Current Liabilities.*

Answer

(i) Computation of Average Inventory

$$\begin{aligned}\text{Gross Profit} &= 25\% \text{ of ₹ } 30,00,000 = ₹ 7,50,000 \\ \text{Cost of goods sold (COGS)} &= \text{Sales} - \text{Gross Profit} = ₹ 30,00,000 - ₹ 7,50,000 \\ &= ₹ 22,50,000\end{aligned}$$

$$\text{Inventory Turnover Ratio} = \frac{\text{COGS}}{\text{Average Inventory}}$$

$$6 = \frac{₹ 22,50,000}{\text{Average inventory}}$$

$$\text{Average inventory} = ₹ 3,75,000$$

(ii) Computation of Purchases

$$\begin{aligned}\text{Purchases} &= \text{COGS} + (\text{Closing Stock} - \text{Opening Stock}) = ₹ 22,50,000 + 80,000^* \\ \text{Purchases} &= ₹ 23,30,000\end{aligned}$$

$$^* \text{ Increase in Stock} = \text{Closing Stock} - \text{Opening Stock} = ₹ 80,000$$

(iii) Computation of Average Debtors

$$\text{Let Credit Sales be ₹ } 100, \text{ Cash sales} = \frac{25}{100} \times 100 = ₹ 25$$

$$\text{Total Sales} = 100 + 25 = ₹ 125$$

$$\text{Total sales is ₹ } 125 \text{ credit sales is ₹ } 100$$

$$\text{If total sales is ₹ 30,00,000, then credit sales is} = \frac{\text{₹ 30,00,000} \times 100}{125}$$

$$\text{Credit Sales} = \text{₹ 24,00,000}$$

$$\text{Cash Sales} = (\text{₹ 30,00,000} - \text{₹ 24,00,000}) = \text{₹ 6,00,000}$$

$$\text{Debtors Turnover Ratio} = \frac{\text{Net Credit Sales}}{\text{Average debtors}} = 8 = \frac{\text{₹ 24,00,000}}{\text{Average debtors}} = 8$$

$$\text{Average Debtors} = \frac{\text{₹ 24,00,000}}{8}$$

$$\text{Average Debtors} = \text{₹ 3,00,000}$$

(iv) Computation of Average Creditors

$$\begin{aligned} \text{Credit Purchases} &= \text{Purchases} - \text{Cash Purchases} \\ &= \text{₹ 23,30,000} - \text{₹ 2,30,000} = \text{₹ 21,00,000} \end{aligned}$$

$$\text{Creditors Turnover Ratio} = \frac{\text{Credit Purchases}}{\text{Average Creditors}}$$

$$10 = \frac{21,00,000}{\text{Average Creditors}}$$

$$\text{Average Creditors} = \text{₹ 2,10,000}$$

(v) Computation of Average Payment Period

$$\begin{aligned} \text{Average Payment Period} &= \frac{\text{Average Creditors}}{\text{Average Daily Credit Purchases}} \\ &= \frac{\text{₹ 2,10,000}}{\left(\frac{\text{Credit Purchases}}{365} \right)} = \frac{\text{₹ 2,10,000}}{\left(\frac{\text{₹ 21,00,000}}{365} \right)} \\ &= \frac{\text{₹ 2,10,000}}{\text{₹ 21,00,000}} \times 365^* = 36.5 \text{ days} \end{aligned}$$

Alternatively

$$\begin{aligned} \text{Average Payment Period} &= 365 / \text{Creditors Turnover Ratio} \\ &= \frac{365^*}{10} = 36.5 \text{ days} \end{aligned}$$

3.28 Financial Management

(vi) Computation of Average Collection Period

$$\text{Average Collection Period} = \frac{\text{Average Debtors}}{\text{Net Credit Sales}} \times 365^* = \frac{\text{₹ } 3,00,000}{\text{₹ } 24,00,000} \times 365 = 45.625 \text{ days}$$

Alternatively

$$\begin{aligned}\text{Average collection period} &= \frac{365^*}{\text{Debtors Turnover Ratio}} \\ &= \frac{365}{8} = 45.625 \text{ days}\end{aligned}$$

* 1 year is taken as 365 days.

(vii) Computation of Current Assets

$$\text{Current Ratio} = \frac{\text{Current Assets (CA)}}{\text{Current Liabilities (CL)}} = 2.4$$

$$2.4 \text{ Current Liabilities} = \text{Current Assets or CL} = \text{CA}/2.4$$

$$\text{Further, Working capital} = \text{Current Assets} - \text{Current liabilities}$$

$$\text{So, ₹ } 2,80,000 = \text{CA} - \text{CA}/2.4$$

$$\text{₹ } 2,80,000 = 1.4 \text{ CA}/2.4 \text{ Or, } 1.4 \text{ CA} = \text{₹ } 16,72,000$$

$$\text{CA} = \text{₹ } 4,80,000$$

(viii) Computation of Current Liabilities

$$\text{Current liabilities} = \frac{4,80,000}{2.4} = \text{₹ } 2,00,000$$

Question 9

The following accounting information and financial ratios of PQR Ltd. relate to the year ended 31st December, 2015:

Particulars	2015
I Accounting Information:	
Gross Profit	15% of Sales
Net profit	8% of sales
Raw materials consumed	20% of Cost of Goods Sold
Direct wages	10% of Cost of Goods Sold
Stock of raw materials	3 months' usage
Stock of finished goods	6% of Cost of Goods Sold

<i>Debt collection period</i>	<i>60 days</i>
<i>All sales are on credit</i>	
II Financial Ratios:	
<i>Fixed assets to sales</i>	<i>1 : 3</i>
<i>Fixed assets to Current assets</i>	<i>13 : 11</i>
<i>Current ratio</i>	<i>2 : 1</i>
<i>Long-term loans to Current liabilities</i>	<i>2 : 1</i>
<i>Capital to Reserves and Surplus</i>	<i>1 : 4</i>

If value of fixed assets as on 31st December, 2014 amounted to ₹26 lakhs, prepare a Financial Statement of PQR Limited for the year ended 31st December, 2015 and also the Balance Sheet as on 31st December, 2015.

Answer

(a) Working Notes:

(i) *Calculation of Sales*

$$\frac{\text{Fixed Assets}}{\text{Sales}} = \frac{1}{3}$$

$$\therefore \frac{26,00,000}{\text{Sales}} = \frac{1}{3} \Rightarrow \text{Sales} = ₹ 78,00,000$$

(ii) *Calculation of Current Assets*

$$\frac{\text{Fixed Assets}}{\text{Current Assets}} = \frac{13}{11}$$

$$\therefore \frac{26,00,000}{\text{Current Assets}} = \frac{13}{11} \Rightarrow \text{Current Assets} = ₹ 22,00,000$$

(iii) *Calculation of Raw Material Consumption and Direct Wages*

	₹
Sales	78,00,000
Less: Gross Profit (15 % of Sales)	<u>11,70,000</u>
Cost of Goods	<u>66,30,000</u>

Raw Material Consumption (20% of *Cost of Goods Sold*) ₹13, 26,000

3.30 Financial Management

Direct Wages (10% of Cost of Goods Sold) ₹ 6,63,000

(iv) *Calculation of Stock of Raw Materials (= 3 months usage)*

$$= 13,26,000 \times \frac{3}{12} = ₹ 3,31,500$$

(v) *Calculation of Stock of Finished Goods (= 6% of Cost of Goods Sold)*

$$= 66,30,000 \times \frac{6}{100} = ₹ 3,97,800$$

(vi) *Calculation of Current Liabilities*

$$\frac{\text{Current Assets}}{\text{Current Liabilities}} = 2$$

$$\frac{22,00,000}{\text{Current Liabilities}} = 2 \Rightarrow \text{Current Liabilities} = ₹ 11,00,000$$

(vii) *Calculation of Debtors*

$$\text{Average collection period} = \frac{\text{Debtors}}{\text{Credit Sales}} \times 365^*$$

$$\frac{\text{Debtors}}{78,00,000} \times 365 = 60 \Rightarrow \text{Debtors} = ₹ 12,82,191.78 \text{ or } ₹ 12,82,192$$

* 1 year is taken as 365 days.

(viii) *Calculation of Long term Loan*

$$\frac{\text{Long term Loan}}{\text{Current Liabilities}} = \frac{2}{1}$$

$$\frac{\text{Long term loan}}{11,00,000} = \frac{2}{1} \Rightarrow \text{Long term loan} = ₹ 22,00,000.$$

(ix) *Calculation of Cash Balance*

	₹
Current assets	22,00,000
Less: Debtors	12,82,192
Raw materials stock	3,31,500
Finished goods stock	<u>3,97,800</u>
Cash balance	<u>20,11,492</u>
	<u>1,88,508</u>

(x) Calculation of Net worth

Fixed Assets		26,00,000
Current Assets		<u>22,00,000</u>
Total Assets		48,00,000
Less: Long term Loan	22,00,000	
Current Liabilities	<u>11,00,000</u>	<u>33,00,000</u>
Net worth		<u>15,00,000</u>

Net worth = Share capital + Reserves = ₹ 15,00,000

$$\frac{\text{Capital}}{\text{Reserves and Surplus}} = \frac{1}{4} \Rightarrow \text{Share Capital} = ₹ 15,00,000 \times \frac{1}{5} = ₹ 3,00,000$$

$$\text{Reserves and Surplus} = ₹ 15,00,000 \times \frac{4}{5} = ₹ 12,00,000$$

Profit and Loss Account of PQR Ltd.
for the year ended 31st December, 2015

Particulars	₹	Particulars	₹
To Direct Materials	13,26,000	By Sales	78,00,000
To Direct Wages	6,63,000		
To Works (Overhead)	46,41,000		
Balancing figure			
To Gross Profit c/d (15% of Sales)	<u>11,70,000</u>		
	<u>78,00,000</u>		<u>78,00,000</u>
To Selling and Distribution Expenses (Balancing figure)	5,46,000	By Gross Profit b/d	11,70,000
To Net Profit (8% of Sales)	<u>6,24,000</u>		
	<u>11,70,000</u>		<u>11,70,000</u>

Balance Sheet of PQR Ltd.
as at 31st December, 2015

Liabilities	₹	Assets	₹
Share Capital	3,00,000	Fixed Assets	26,00,000
Reserves and Surplus	12,00,000	Current Assets:	
Long term loans	22,00,000	Stock of Raw Material	3,31,500

3.32 Financial Management

Current liabilities	11,00,000	Stock of Finished Goods	3,97,800
		Debtors	12,82,192
		Cash	<u>1,88,508</u>
	<u>48,00,000</u>		<u>48,00,000</u>



Question 10

The assets of SONA Ltd. consist of fixed assets and current assets, while its current liabilities comprise bank credit in the ratio of 2 : 1. You are required to prepare the Balance Sheet of the company as on 31st March 2016 with the help of following information:

Share Capital ₹ 5,75,000

Working Capital (CA-CL) ₹ 1,50,000

Gross Margin 25%

Inventory Turnover 5 times

Average Collection Period 1.5 months

Current Ratio 1.5:1

Quick Ratio 0.8: 1

Reserves & Surplus to Bank & Cash 4 times

Assume 360 days in a year

Answer:

Working Notes:

1. Computation of Current Assets (CA) and Current Liabilities (CL)

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

$$\frac{\text{CA}}{\text{CL}} = \frac{1.5}{1}$$

$$\therefore \text{CA} = 1.5 \text{ CL}$$

$$\text{CA} - \text{CL} = ₹ 1,50,000$$

$$1.5 \text{ CL} - \text{CL} = ₹ 1,50,000$$

$$0.5 \text{ CL} = ₹ 1,50,000$$

$$\text{CL} = \frac{1,50,000}{0.5} = ₹ 3,00,000$$

$$\text{CA} = 1.5 \times 3,00,000 = ₹ 4,50,000$$

2. *Computation of Bank Credit (BC) and Other Current Liabilities (OCL)*

$$\begin{aligned}
 \frac{\text{Bank Credit}}{\text{Other CL}} &= \frac{2}{1} \\
 \text{BC} &= 2 \text{ OCL} \\
 \text{BC} + \text{OCL} &= \text{CL} \\
 2 \text{ OCL} + \text{OCL} &= ₹ 3,00,000 \\
 3 \text{ OCL} &= ₹ 3,00,000 \\
 \text{OCL} &= ₹ 1,00,000 \\
 \text{Bank Credit} &= 2 \times 1,00,000 = ₹ 2,00,000
 \end{aligned}$$

3. *Computation of Inventory*

$$\begin{aligned}
 \text{Quick Ratio} &= \frac{\text{Quick Assets}}{\text{Current Liabilities}} \\
 &= \frac{\text{Current Assets} - \text{Inventories}}{\text{Current Liabilities}} \\
 0.8 &= \frac{₹ 4,50,000 - \text{Inventories}}{₹ 3,00,000} \\
 0.8 \times ₹ 3,00,000 &= ₹ 4,50,000 - \text{Inventories} \\
 \text{Inventories} &= ₹ 4,50,000 - ₹ 2,40,000 = ₹ 2,10,000
 \end{aligned}$$

4. *Computation of Debtors*

$$\begin{aligned}
 \text{Inventory Turnover} &= 5 \text{ times} \\
 \text{Average Inventory} &= \frac{\text{Cost of goods sold (COGS)}}{\text{Inventory Turnover}} \\
 \text{COGS} &= ₹ 2,10,000 \times 5 = ₹ 10,50,000 \\
 \text{Average Collection Period (ACP)} &= 1.5 \text{ months} = 45 \text{ days} \\
 \text{Debtors Turnover} &= \frac{360}{\text{ACP}} = \frac{360}{45} = 8 \\
 \text{Gross Margin} &= \frac{\text{Sales} - \text{COGS}}{\text{Sales}} \times 100 = 25\% \\
 \text{Sales} - \text{COGS} &= \frac{25 \times \text{Sales}}{100}
 \end{aligned}$$

3.34 Financial Management

$$\begin{aligned}
 \text{Sales} - 0.25 \text{ Sales} &= \text{COGS} \\
 0.75 \text{ Sales} &= ₹ 10,50,000 \\
 \text{Sales} &= \frac{₹ 10,50,000}{0.75} = ₹ 14,00,000 \\
 \text{Debtors} &= \frac{\text{Sales}}{\text{Debtors Turnover}} \\
 &= \frac{₹ 14,00,000}{8} = ₹ 1,75,000
 \end{aligned}$$

5. Computation of Bank and Cash

$$\begin{aligned}
 \text{Bank \& Cash} &= \text{CA} - (\text{Debtors} + \text{Inventory}) \\
 &= ₹ 4,50,000 - (₹ 1,75,000 + 2,10,000) = ₹ 4,50,000 - 3,85,000 = ₹ 65,000
 \end{aligned}$$

6. Computation of Reserves & Surplus

$$\frac{\text{Reserves \& Surplus}}{\text{Bank \& Cash}} = 4$$

$$\text{Reserves \& Surplus} = 4 \times ₹ 65,000 = ₹ 2,60,000$$

Balance Sheet of SONA Ltd. as on March 31, 2016

Liabilities	₹	Assets	₹
Share Capital	5,75,000	Fixed Assets	6,85,000
Reserves & Surplus	2,60,000	Current Assets:	
Current Liabilities:		Inventories	2,10,000
Bank Credit	2,00,000	Debtors	1,75,000
Other Current Liabilities	1,00,000	Bank & Cash	65,000
	11,35,000		11,35,000

Question 11

NOOR Limited provides the following information for the year ending 31st March, 2014:

Equity Share Capital	₹ 25,00,000
Closing Stock	₹ 6,00,000
Stock Turnover Ratio	5 times
Gross Profit Ratio	25%
Net Profit / Sale	20%
Net Profit / Capital	$\frac{1}{4}$

You are required to prepare:

Trading and Profit & Loss Account for the year ending 31st March, 2014.

Answer

Working Notes:

$$\begin{aligned}
 \text{(i) } \frac{\text{Net Profit}}{\text{Capital}} &= \frac{1}{4} \\
 \frac{\text{Net Profit}}{25,00,000} &= \frac{1}{4} \\
 \text{Net Profit} &= 6,25,000 \\
 \text{(ii) } \frac{\text{Net Profit}}{\text{Sale}} &= 20\% \\
 \text{Sale} &= \frac{6,25,000}{0.20} = 31,25,000 \\
 \text{(iii) Gross Profit Ratio} &= \frac{\text{Gross Profit}}{\text{Sales}} \times 100 \\
 25 &= \frac{\text{Gross Profit}}{31,25,000} \times 100 \\
 \text{Gross Profit} &= \frac{31,25,000 \times 25}{100} \\
 &= 7,81,250 \\
 \text{(iv) Stock Turnover} &= \frac{\text{COGS}}{\text{Average Stock}} \\
 5 &= \left(\frac{31,25,000 - 7,81,250}{\text{Average Stock}} \right) \\
 \text{Average Stock} &= \frac{23,43,750}{5} \\
 &= 4,68,750 \\
 \text{(v) Average Stock} &= \frac{\text{Closing Stock} + \text{Opening Stock}}{2}
 \end{aligned}$$

3.36 Financial Management

$$4,68,750 = \frac{6,00,000 + \text{Opening Stock}}{2}$$

$$\text{Opening Stock} = 9,37,500 - 6,00,000 = 3,37,500$$

Trading A/c for the year ending 31st March, 2014

	₹		₹
To Opening Stock	3,37,500	By Sales	31,25,000
To Purchases (Balancing figure)	26,06,250	By Closing Stock	6,00,000
To Gross Profit c/f to P&L A/c	<u>7,81,250</u>		<u>-</u>
	<u>37,25,000</u>		<u>37,25,000</u>

Profit & Loss A/c for the year ending 31st March, 2014

	₹		₹
To Miscellaneous Expenses (balancing figure)	1,56,250	By Gross Profit b/f from Trading A/c	7,81,250
To Net Profit	<u>6,25,000</u>		<u>-</u>
	<u>7,81,250</u>		<u>7,81,250</u>

Ch - 2 - CashFlow & FundFlow Statement

Question 1

Distinguish between Cash Flow and Fund Flow statement.

Answer

The points of distinction between cash flow and funds flow statement are as below:

Cash flow statement	Funds flow statement
(i) It ascertains the changes in balance of cash in hand and bank.	(i) It ascertains the changes in financial position between two accounting periods.
(ii) It analyses the reasons for changes in balance of cash in hand and bank	(ii) It analyses the reasons for change in financial position between two balance sheets
(iii) It shows the inflows and outflows of cash.	(iii) It reveals the sources and application of funds.
(iv) It is an important tool for short term analysis.	(iv) It helps to test whether working capital has been effectively used or not.
(v) The two significant areas of analysis are cash generating efficiency and free cash flow.	

SECTION-B

Fund Flow Analysis

Question 1

The following are the Balance Sheets of Gama Limited for the year ending March 31, 20X4 and March 31, 20X5:

Balance Sheet as at March, 31

	20X5 (₹)	20X4 (₹)
Capital and Liabilities		
Share Capital	7,87,500	6,75,000
General Reserves	2,81,250	2,25,000
Capital Reserve (Profit on Sale of investment)	11,250	-

3.38 Financial Management

<i>Profit & Loss Account</i>	<i>2,25,000</i>	<i>1,12,500</i>
<i>15% Debentures</i>	<i>2,25,000</i>	<i>3,37,500</i>
<i>Accrued Expenses</i>	<i>13,500</i>	<i>11,250</i>
<i>Creditors</i>	<i>2,81,250</i>	<i>1,80,000</i>
<i>Provision for Dividends</i>	<i>38,250</i>	<i>33,750</i>
<i>Provision for Taxation</i>	<i>85,500</i>	<i>78,750</i>
<i>Total</i>	<i>19,48,500</i>	<i>16,53,750</i>
<i>Assets</i>		
<i>Fixed Assets</i>	<i>13,50,000</i>	<i>11,25,000</i>
<i>Less: Accumulated depreciation</i>	<i>2,81,250</i>	<i>2,25,000</i>
<i>Net Fixed Assets</i>	<i>10,68,750</i>	<i>9,00,000</i>
<i>Long-term Investments (at cost)</i>	<i>2,02,500</i>	<i>2,02,500</i>
<i>Stock (at cost)</i>	<i>3,03,750</i>	<i>2,25,000</i>
<i>Debtors (net of provision for doubtful debts of ₹ 45,000 and ₹ 56,250 respectively for 20X4 and 20X5 respectively)</i>	<i>2,75,625</i>	<i>2,53,125</i>
<i>Bills receivables</i>	<i>73,125</i>	<i>45,000</i>
<i>Prepaid Expenses</i>	<i>13,500</i>	<i>11,250</i>
<i>Miscellaneous Expenditure</i>	<i>11,250</i>	<i>16,875</i>
	<i>19,48,500</i>	<i>16,53,750</i>

Additional Information:

- (i) During the year 20X4-X5, fixed assets with a net book value of ₹ 11,250 (accumulated depreciation, ₹ 33,750) was sold for ₹ 9,000.
- (ii) During the year 20X4-X5, Investments costing ₹ 90,000 were sold, and also Investments costing ₹ 90,000 were purchased.
- (iii) Debentures were retired at a Premium of 10%.
- (iv) Tax of ₹ 61,875 was paid for 20X3-X4.
- (v) During the year 20X4-X5, bad debts of ₹ 15,750 were written off against the provision for Doubtful Debt account.
- (vi) The proposed dividend for 20X3-X4 was paid in 20X4-X5.

Required:

Prepare a Funds Flow Statement (Statement of changes in Financial Position on working capital basis) for the year ended March 31, 20X5.

Answer**Fund Flow Statement as at 31st March 20X5**

	(₹)
A. Sources of Funds:	
(i) Fund from Business Operations (W.N. 1)	3,16,125
(ii) Sale of Fixed Assets	9,000
(iii) Sale of Investments (₹90,000 + ₹11,250)	1,01,250
(iv) Issue of Shares (₹7,87,500 - ₹6,75,000)	1,12,500
Total sources	5,38,875
B. Application of Funds:	
(i) Purchase of Fixed Assets	2,70,000
(ii) Purchase of Investments	90,000
(iii) Payment to Debenture holders {(₹3,37,500 - ₹2,25,000) × 110%}	1,23,750
(iv) Payment of Dividends	33,750
Total uses	5,17,500
Increase in Working Capital (A - B)	21,375

Working Notes (W.N.):**1. Computation of Funds from Business Operation**

	(₹)
Profit and loss as on March 31, 20X5	2,25,000
Add: Depreciation	90,000
Loss on Sale of Asset	2,250
Misc. Expenditure written off	5,625
Transfer to Reserves	56,250
Premium on Redemption of debentures	11,250
Provision for Dividend	38,250
	4,28,625
Less: Profit and loss as on March 31, 20X4	1,12,500
Fund from Operations	3,16,125

3.40 Financial Management

2. Accumulated Depreciation A/c

To Fixed Asset A/c	33,750	By Balance b/d	2,25,000
To Balance c/d	2,81,250	By P/L A/c (Prov. for depreciation) (Bal. Fig.)	90,000
	3,15,000		3,15,000

3. Fixed Assets A/c

To Balance b/d	11,25,000	By Acc. Depreciation A/c	33,750
To Bank (Purchase of Fixed Asset) (Bal. fig.)	2,70,000	By Cash	9,000
		By P/L (Loss on sale)	2,250
		By Balance c/d	13,50,000
	13,95,000		13,95,000

4. Statement of Changes in Working Capital

	March 31, 20X4	March 31, 20X5	Change in Working Capital	
			Increase	Decrease
Current Assets				
Stock	2,25,000	3,03,750	78,750	--
Debtors	2,53,125	2,75,625	22,500	--
Bills Receivables	45,000	73,125	28,125	--
Prepaid Expenses	11,250	13,500	2,250	--
	5,34,375	6,66,000	--	--
Current Liabilities				
Accrued Expenses	11,250	13,500	--	2,250
Creditors	1,80,000	2,81,250	--	1,01,250
Provision for Taxation	78,750	85,500	--	6,750
	2,70,000	3,80,250	--	--
Working Capital	2,64,375	2,85,750	--	--
Increase in Working Capital	21,375	--	--	21,375
	2,85,750	2,85,750	1,31,625	1,31,625



Question 2

Following are the financial statements of Zed Ltd.:

Balance Sheet as on

	March 31, 20X7(₹)	March 31, 20X6 (₹)
Capital and Liabilities:		
Share capital, ₹10 par value	1,67,500	1,50,000
Share premium	3,35,000	2,37,500
Reserves and Surplus	1,74,300	1,23,250
Debentures	2,40,000	--
Long-term loans	40,000	50,000
Creditors	28,800	27,100
Bank Overdraft	7,500	6,250
Accrued expenses	4,350	4,600
Income-tax payable	48,250	16,850
	10,45,700	6,15,550
Assets:		
Land	3,600	3,600
Building, net of depreciation	6,01,800	1,78,400
Machinery, net of depreciation	1,10,850	1,07,050
Investment in 'A' Ltd.	75,000	--
Stock	58,800	46,150
Prepaid expenses	1,900	2,300
Debtors	76,350	77,150
Trade Investments	40,000	1,05,000
Cash	77,400	95,900
	10,45,700	6,15,550

Income Statement
for the year ended March 31, 20X7

	(₹)
Net Sales	13,50,000
Less: Cost of goods sold and operating expenses (including depreciation on	

3.42 Financial Management

<i>buildings of ₹ 6,600 and depreciation on machinery of ₹ 11,400)</i>	<i>(12,58,950)</i>
<i>Net operating profit</i>	<i>91,050</i>
<i>Gain on sale of trade investments</i>	<i>6,400</i>
<i>Gain on sale of machinery</i>	<i>1,850</i>
<i>Profits before tax</i>	<i>99,300</i>
<i>Income-tax</i>	<i>(48,250)</i>
<i>Profit after tax</i>	<i>51,050</i>

Additional information:

- (i) Machinery with a net book value of ₹ 9,150 was sold during the year.*
- (ii) The shares of 'A' Ltd. were acquired by issue of debentures.*

Required:

Prepare a Funds Flow Statement (Statement of changes in Financial position on Working capital basis) for the year ended March 31, 20X7.

Answer

Fund Flow Statement as at 31st March 20X7

	(₹)
A. Sources of Funds:	
(i) Fund from Business Operations	67,200
(ii) Sale of Machinery (₹9,150 + ₹1,850)	11,000
(iii) Proceeds from issue of Debentures (₹2,40,000 – ₹75,000*)	1,65,000
(iv) Proceeds from issue of Shares (including share premium)	1,15,000
Total sources	3,58,200
B. Application of Funds:	
(i) Purchase of Building (₹6,01,800 + ₹6,600 – ₹1,78,400)	4,30,000
(ii) Purchase of Machinery	24,350
(iii) Payment of long-term loan (₹50,000 – ₹40,000)	10,000
Total uses	4,64,350
Net Decrease in Working Capital (A – B)	(1,06,150)

*Investment worth ₹75,000 in A Ltd. has been acquired without incurring any cash outflow hence, it will not affect the working capital.

Workings:

1. Schedule of Changes in Working Capital

	March 31, 20X7	March 31, 20X6	Change in Working Capital	
			Increase	Decrease
Current Assets				
Stock	58,800	46,150	12,650	--
Prepaid expenses	1,900	2,300	--	400
Debtors	76,350	77,150	--	800
Trade Investments	40,000	1,05,000	--	65,000
Cash	77,400	95,900	--	18,500
	2,54,450	3,26,500	--	--
Current Liabilities			--	--
Creditors	28,800	27,100	--	1,700
Bank overdraft	7,500	6,250	--	1,250
Accrued expenses	4,350	4,600	250	--
Income tax payable	48,250	16,850	--	31,400
	88,900	54,800	--	--
Net Working Capital	1,65,550	2,71,700	--	--
Decrease in net working capital	1,06,150	--	1,06,150	--
	2,71,700	2,71,700	1,19,050	1,19,050

2. Machinery Account

	(₹)		(₹)
To Balance b/d	1,07,050	By Bank A/c (Sale)	11,000
„ Bank A/c (Purchase of machinery) (Bal. figure)	24,350	„ Depreciation (given)	11,400
„ P & L A/c (Profit)	1,850	„ Balance c/d	1,10,850
	1,33,250		1,33,250

3. Trade Investments Account

	(₹)		(₹)
To Balance b/d	1,05,000	By Bank (Sale of trade investments)	65,000

3.44 Financial Management

		„ Balance c/d	40,000
	1,05,000		1,05,000

4. Estimation of Funds flow from Operations

	(₹)	(₹)
Profits after tax		51,050
Add: Depreciation on Buildings	6,600	
Depreciation on Machinery	11,400	18,000
		69,050
Less: Gain on sale of machinery		1,850
Funds from Operations		67,200

Gain on sale of trade investments has been considered as an operating income. Trade investments have been considered as part of current assets.

Question 3

Balance Sheet of OP Ltd. as on 31st March, 20X7 and 20X8 are as follows:

Liabilities	Amount 31.3.20X7 (₹)	Amount 31.3.20X8 (₹)	Assets	Amount 31.3.20X7 (₹)	Amount 31.3.20X8 (₹)
Share capital	20,00,000	20,00,000	Land and Building	15,00,000	14,00,000
General Reserve	4,00,000	4,50,000	Plant and Machinery	18,00,000	17,50,000
Profit and Loss A/c	2,50,000	3,60,000	Investment	4,00,000	3,72,000
10% Debentures	10,00,000	8,00,000	Stock	4,80,000	8,50,000
Bank Loan (long-term)	5,00,000	6,00,000	Debtors	6,00,000	7,98,000
Creditors	4,00,000	5,80,000	Prepaid Expenses	50,000	40,000
Outstanding Expenses	20,000	25,000	Cash and Bank	1,40,000	85,000
Proposed Dividend	3,00,000	3,60,000			
Provision for taxation	1,00,000	1,20,000			
	49,70,000	52,95,000		49,70,000	52,95,000

Additional information:

- (i) New machinery for ₹ 3,00,000 was purchased but an old machinery costing ₹ 1,45,000 was sold for ₹ 50,000 and accumulated depreciation thereon was ₹ 75,000.
- (ii) 10% Debentures were redeemed at 20% premium.
- (iii) Investment were sold for ₹ 45,000, and its profit was transferred to general reserve.
- (iv) Income-tax paid during the year 20X7-X8 was ₹ 80,000.
- (v) An interim dividend of ₹ 1,20,000 has been paid during the year 20X7-X8.
- (vi) Assume the provision for taxation as current liability and proposed dividend as non-current liability.
- (vii) Investment are non-trade investment.

You are required to prepare:

- (i) Schedule of changes in working capital.
- (ii) Funds flow statement.

Answer**(i) Schedule of Changes in Working Capital**

Particulars	31st March		Working Capital	
	20X7 (₹)	20X8 (₹)	Increase (₹)	Decrease (₹)
A. Current Assets:				
Stock	4,80,000	8,50,000	3,70,000	--
Debtors	6,00,000	7,98,000	1,98,000	--
Prepaid Expenses	50,000	40,000	--	10,000
Cash and Bank	1,40,000	85,000	--	55,000
Total (A)	12,70,000	17,73,000		
B. Current Liabilities:				
Creditors	4,00,000	5,80,000	--	1,80,000
Outstanding Expenses	20,000	25,000	--	5,000
Provision for Taxation	1,00,000	1,20,000	--	20,000
Total (B)	5,20,000	7,25,000		
Working Capital (A – B)	7,50,000	10,48,000	5,68,000	2,70,000
Increase in Working Capital	2,98,000			2,98,000
Total	10,48,000	10,48,000	5,68,000	5,68,000

3.46 Financial Management

(ii) Funds Flow Statement for the year ending 31st March, 20X8

	(₹)
A. Sources of Funds:	
(i) Fund from Business Operations	10,63,000
(ii) Bank loan taken	1,00,000
(iii) Proceeds from sale of machinery	50,000
(iv) Proceeds from sale of investments	45,000
Total sources	12,58,000
B. Application of Funds:	
(i) Redemption of 10% Debentures	2,40,000
(ii) Purchase of Machinery	3,00,000
(iii) Dividend paid	3,00,000
(iv) Interim dividend paid	1,20,000
Total uses	9,60,000
Net Increase in Working Capital (A – B)	2,98,000

Workings:

1. Computation of Funds from Business Operation

	(₹)
Profit and loss as on March 31, 20X8	3,60,000
Add: General reserve	33,000
Depreciation on Land & Building	1,00,000
Depreciation on Plant & Machinery	2,80,000
Loss on sale of machinery	20,000
Interim dividend paid	1,20,000
Premium on Redemption of debentures	40,000
Proposed Dividend	3,60,000
	13,13,000
Less: Profit and loss as on March 31, 20X7	2,50,000
Fund from Operations	10,63,000

2. Depreciation on Land and Building

$$= ₹15,00,000 - ₹14,00,000 = ₹1,00,000.$$

3. Loss on Sale of Old Machine

$$= \text{Cost ₹1,45,000} - ₹75,000 \text{ (Cum-Dep.)} - ₹50,000 \text{ (Sales value)} = ₹20,000$$

4. Depreciation on Plant and Machinery:

Plant and Machinery A/c

	(₹)		(₹)
To Balance b/d	18,00,000	By Bank A/c (Sold)	50,000
To Bank A/c (Purchases)	3,00,000	By Profit and Loss A/c (Loss on Sale)	20,000
		By Depreciation (Balancing figure)	2,80,000
		By Balance c/d	17,50,000
	21,00,000		21,00,000

5. Premium on Redemption of Debentures:

$$\text{Amount of Debenture Redeemed} = ₹10,00,000 - ₹8,00,000$$

$$= ₹2,00,000$$

$$\text{Premium} = ₹2,00,000 \times 20/100 = ₹40,000$$

6. Profit on sale of investment:

Investment A/c

	(₹)		(₹)
To Balance b/d	4,00,000	By Bank A/c (Sales)	45,000
To General Reserve (Profit on Sales)	17,000	By Balance c/d	3,72,000
	4,17,000		4,17,000

7. Amount transferred to General Reserve from Profit and Loss A/c:

General Reserve A/c

	(₹)		(₹)
To Balance c/d	4,50,000	By Balance b/d	4,00,000
		By Investment A/c	17,000
		By Profit and Loss A/c (Transfer)	33,000
	4,50,000		4,50,000

3.48 Financial Management

Question 4

The following are the Balance Sheet of Peacock Limited as on 31st March, 20X8 and 31st March, 20X9.

	<i>Rupees</i> <i>31st March, 20X8</i>	<i>Rupees</i> <i>31st March, 20X9</i>
Liabilities		
Share capital	44,00,000	66,00,000
Reserves and Surplus	27,50,000	38,50,000
Depreciation	8,80,000	13,20,000
Bank Loan	17,60,000	8,80,000
Sundry Creditors	13,20,000	14,85,000
Proposed dividend	4,00,000	6,00,000
Provision for taxation	4,00,000	5,50,000
	1,19,10,000	1,52,85,000
Assets		
Land	33,00,000	44,00,000
Plant and Machinery	50,60,000	69,30,000
Inventories	19,80,000	22,00,000
Sundry Debtors	11,00,000	17,05,000
Cash and Bank Balances	4,70,000	50,000
	1,19,10,000	1,52,85,000

Additional Information:

- The machine which was purchased earlier for ₹ 6,00,000 was sold during the financial year 20X8-20X9 for ₹ 40,000. The book value of the machine was ₹ 60,000. A new machinery was purchased during the financial year.
- The company had issued new shares to the extent of ₹22,00,000.

You are required to prepare:

- Statement showing changes in the Working Capital;
- Statement of Sources and Application of funds.

Answer

(1) Schedule of Changes in Working Capital

Particulars	31st March		Working Capital	
	20X8 (₹)	20X9 (₹)	Increase (₹)	Decrease (₹)
A. Current Assets:				
Inventories	19,80,000	22,00,000	2,20,000	--
Sundry Debtors	11,00,000	17,05,000	6,05,000	--
Cash and Bank	4,70,000	50,000	--	4,20,000
Total (A)	35,50,000	39,55,000		
B. Current Liabilities:				
Sundry Creditors	13,20,000	14,85,000	--	1,65,000
Provision for Taxation	4,00,000	5,50,000	--	1,50,000
Total (B)	17,20,000	20,35,000		
Working Capital (A – B)	18,30,000	19,20,000		
Increase in Working Capital	90,000			90,000
Total	19,20,000	19,20,000	8,25,000	8,25,000

(2) Funds Flow Statement for the year ending 31st March, 20X9

	(₹)
A. Sources of Funds:	
(i) Fund from Business Operations	27,00,000
(ii) Proceeds from issue of shares	22,00,000
(iii) Proceeds from sale of machinery	40,000
Total sources	49,40,000
B. Application of Funds:	
(i) Payment of dividend	4,00,000
(ii) Repayment of bank loan	8,80,000
(iii) Purchase of land	11,00,000
(iv) Purchase of machinery	24,70,000
Total uses	48,50,000
Net Increase in Working Capital (A – B)	90,000

Working Notes:**1. Computation of Funds from Business Operation**

	(₹)
Reserve and surplus as on March 31, 20X9	38,50,000
Add: Provision for depreciation	9,80,000
Proposed dividend	6,00,000
Loss on sale of machinery	20,000
	54,50,000
Less: Profit and loss as on March 31, 20X8	27,50,000
Fund from Operations	27,00,000

2. Provision for Depreciation A/c

	(₹)		(₹)
To Plant & Machinery A/c	5,40,000	By Balance b/d	8,80,000
To Balance c/d	13,20,000	By Profit & Loss A/c (Balancing figure)	9,80,000
	18,60,000		18,60,000

3. Plant & Machinery A/c

	(₹)		(₹)
To Balance b/f	50,60,000	By Prov. for Dep. A/c	5,40,000
To Bank (Purchases)	24,70,000	By Cash	40,000
		By Profit & Loss A/c (Loss on Sale)	20,000
		By Balance c/d	69,30,000
	75,30,000		75,30,000

Question 5

The financial statement and operating results of PQR revealed the following position as on 31st March, 20X6:

— Equity share capital (₹10 fully paid share)	₹ 20,00,000
— Working capital	₹ 6,00,000
— Bank overdraft	₹ 1,00,000
— Current ratio	2.5 : 1
— Liquidity ratio	1.5 : 1

— Proprietary ratio (Net fixed assets/Proprietary fund)	0.75 : 1
— Cost of goods sold	₹14,40,000
— Debtors velocity	2 months
— Stock turnover based on cost of goods sold	4 times
— Gross profit ratio	20% of sales
— Net profit ratio	15% of sales

Closing stock was 25% higher than the opening stock. There were also free reserves brought forward from earlier years. Current assets include stock, debtors and cash only. The current liabilities except bank overdraft treated as creditors.

Expenses include depreciation of ₹ 90,000.

The following information was collected from the records for the year ended 31st March, 20X7:

- Total sales for the year were 20% higher as compared to previous year.
- Balances as on 31st March, 20X7 were : Stock ₹ 5,20,000, Creditors ₹ 4,15,000, Debtors ₹ 4,95,000 and Cash balance ₹ 3,10,000.
- Percentage of Gross profit on turnover has gone up from 20% to 25% and ratio of net profit to sales from 15% to 16%.
- A portions of Fixed assets was very old (book values ₹ 1,80,000) disposed for ₹ 90,000. (No depreciations to be provided on this item).
- Long-term investments were purchased for ₹ 2,96,600.
- Bank overdraft fully discharged.
- Percentage of depreciation to Fixed assets to be provided at the rate in the previous year.

Required:

- (i) Prepare Balance Sheet as on 31st March, 20X6 and 31st March, 20X7.
- (ii) Prepare the fund flow statement for the year ended 31st March, 20X7.

Answer

(i) Balance Sheet

Liabilities	31 March 20X6	31 March 20X7	Assets	31 March 20X6	31 March 20X7
Equity share capital (₹10 each fully paid)	20,00,000	20,00,000	Fixed Assets (₹ 18,90,000– ₹ 90,000)	18,00,000	15,39,000

3.52 Financial Management

Reserve and Surplus (Balancing figure)	1,30,000	1,30,000	Long term investment	--	2,96,600
Profit & Loss A/c (15% of sales)	2,70,000	6,15,600	Current Assets		
Current Liabilities			Stock	4,00,000	5,20,000
Bank Overdraft	1,00,000	--	Sundry Debtors	3,00,000	4,95,000
Creditors	3,00,000	4,15,000	Cash at Bank	3,00,000	3,10,000
Total	28,00,000	31,60,600	Total	28,00,000	31,60,600

Calculation for 31 March, 20X6

(1) Calculation of Current Assets and Current Liabilities

Working capital = Current Assets (CA) – Current Liabilities (CL)

and Current Ratio = 2.5 : 1

₹ 6,00,000 = 2.5 CL – CL

CL = ₹ 6,00,000 ÷ 1.5 = ₹ 4,00,000 and CA = 2.5 × ₹ 4,00,000 = ₹ 10,00,000

Creditors = Current Liabilities – Bank Overdraft

Creditors = ₹ 4,00,000 – ₹ 1,00,000 = ₹ 3,00,000

(2) Calculation of Stock:

Liquid Ratio = $\frac{\text{Current Assets} - \text{Stock}}{\text{Current Liabilities}} = 1.5$

= $\frac{₹ 10,00,000 - \text{Stock}}{₹ 4,00,000} = 1.5$

Stock = ₹ 10,00,000 – ₹ 6,00,000 = ₹ 4,00,000

(3) Calculation of fixed assets:

Fixed assets to proprietary fund is 0.75, working capital is therefore 0.25 of proprietary

fund. So, Fixed assets = $\frac{\text{Working Capital}}{0.25} \times 0.75 = \frac{₹ 6,00,000}{0.25} \times 0.75 = ₹ 18,00,000$

(4) Sales = $\frac{\text{Cost of Goods Sold}}{1 - \text{Gross Profit ratio}} = \frac{₹ 14,40,000}{1 - 0.2} = ₹ 18,00,000$

(5) Debtors = $\frac{\text{Sales}}{12 \text{ months}} \times 2 \text{ months} = \frac{₹ 18,00,000}{12 \text{ months}} \times 2 \text{ months} = ₹ 3,00,000$

(6) Net profit = 15% of ₹ 18,00,000 = ₹ 2,70,000

- (7) Cash and Bank balance = Current Assets – Stock – Debtors
 $= ₹10,00,000 - ₹4,00,000 - ₹3,00,000 = ₹3,00,000$

Calculation for the year 31st March, 20X7

- (1) Sales = ₹18,00,000 × 1.20 = ₹ 21,60,000
 (2) Calculation of fixed assets

	(₹)		(₹)
To Opening balance	18,00,000	By Banks (Sale)	90,000
		By Profit & Loss A/c (Loss on sales of Fixed asset)	90,000
		By Profit & Loss A/c (Dep) (5% as in previous year)	81,000
		By Balance b/d	15,39,000
Total	18,00,000		18,00,000

- (3) Net profit for the year 20X7 = $16\% \times ₹ 21,60,000 = ₹3,45,600$

$$\text{Total Profit} = ₹ 2,70,000 + ₹3,45,600 = ₹6,15,600$$

- (4) Calculation of fund from Business operations:

Net profit for the year 20X7		= ₹3,45,600
Add: Depreciation	₹81,000	
Loss on sale of assets	<u>₹90,000</u>	= <u>₹1,71,000</u>
Total		= <u>₹5,16,600</u>

- (ii) Funds Flow Statement for the year ending 31st March, 20X7

	(₹)
A. Sources of Funds:	
(i) Fund from Business Operations	5,16,600
(iii) Proceeds from sale of fixed assets	90,000
Total sources	6,06,600
B. Application of Funds:	
(i) Purchase of investments	2,96,600
Net Increase in Working Capital (A – B)	3,10,000

Schedule of Changes in Working Capital

Particulars	31st March		Working Capital	
	20X6 (₹)	20X7 (₹)	Increase (₹)	Decrease (₹)
A. Current Assets:				
Stock	4,00,000	5,20,000	1,20,000	--
Sundry Debtors	3,00,000	4,95,000	6,05,000	--
Cash and Bank	3,00,000	3,10,000	10,000	
Total (A)	10,00,000	13,25,000		
B. Current Liabilities:				
Sundry Creditors	3,00,000	4,15,000	--	1,15,000
Bank Overdraft	1,00,000	--	1,00,000	--
Total (B)	4,00,000	4,15,000		
Working Capital (A – B)	6,00,000	9,10,000		
Increase in Working Capital	3,10,000			3,10,000
Total	9,10,000	9,10,000	4,25,000	4,25,000



Question 6

Balance Sheets of RST Limited as on March 31, 20X8 and March 31, 20X9 are as under:

Liabilities	31.3.20X8 (₹)	31.3.20X9 (₹)	Assets	31.3.20X8 (₹)	31.3.20X9 (₹)
Equity Share Capital (₹10 face value per share)	10,00,000	12,00,000	Land & Building	6,00,000	7,00,000
General Reserve	3,50,000	2,00,000	Plant & Machinery	9,00,000	11,00,000
9% Preference Share Capital	3,00,000	5,00,000	Investments (Long-term)	2,50,000	2,50,000
Share Premium A/c	25,000	4,000	Stock	3,60,000	3,50,000
Profit & Loss A/c	2,00,000	3,00,000	Debtors	3,00,000	3,90,000
8% Debentures	3,00,000	1,00,000	Cash & Bank	1,00,000	95,000
Creditors	2,05,000	3,00,000	Prepaid Expenses	15,000	20,000

<i>Bills Payable</i>	45,000	81,000	<i>Advance Tax Payment</i>	80,000	1,05,000
<i>Provision for Tax</i>	70,000	1,00,000	<i>Preliminary Expenses</i>	40,000	35,000
<i>Proposed Dividend</i>	1,50,000	2,60,000			
	26,45,000	30,45,000		26,45,000	30,45,000

Additional information:

- (i) *Depreciation charged on building and plant and machinery during the year 20X8-X9 were ₹ 50,000 and ₹ 1,20,000 respectively.*
- (ii) *During the year an old machine costing ₹ 1,50,000 was sold for ₹ 32,000. Its written down value was ₹ 40,000 on date of sale.*
- (iii) *During the year, income tax for the year 20X7-X8 was assessed at ₹ 76,000. A cheque of ₹ 4,000 was received along with the assessment order towards refund of income tax paid in excess, by way of advance tax in earlier years.*
- (iv) *Proposed dividend for 20X7-X8 was paid during the year 20X8-X9.*
- (v) *9% Preference shares of ₹ 3,00,000, which were due for redemption, were redeemed during the year 20X8-X9 at a premium of 5%, out of the proceeds of fresh issue of 9% Preference shares.*
- (vi) *Bonus shares were issued to the existing equity shareholders at the rate of one share for every five shares held on 31.3.20X8 out of general reserves.*
- (vii) *Debentures were redeemed at the beginning of the year at a premium of 3%.*
- (viii) *Interim dividend paid during the year 20X8-X9 was ₹ 50,000.*

Required:

- (a) *Schedule of Changes in Working Capital; and*
- (b) *Fund Flow Statement for the year ended March 31, 20X9.*

Answer

- (a) **Schedule of Changes in Working Capital**

Particulars	31st March		Working Capital	
	20X9 (₹)	20X9 (₹)	Increase (₹)	Decrease (₹)
A. Current Assets:				
Stock	3,60,000	3,50,000	--	10,000
Sundry Debtors	3,00,000	3,90,000	90,000	--

3.56 Financial Management

Prepaid expenses	15,000	20,000	5,000	--
Cash and Bank	1,00,000	95,000	--	5,000
Total (A)	7,75,000	8,55,000		
B. Current Liabilities:				
Sundry Creditors	2,05,000	3,00,000	--	95,000
Bills Payables	45,000	81,000	--	36,000
Total (B)	2,50,000	3,81,000		
Working Capital (A – B)	5,25,000	4,74,000		
Decrease in Working Capital		51,000	51,000	
Total	5,25,000	5,25,000	1,46,000	1,46,000

(b) Funds Flow Statement for the year ending 31st March, 20X9

	(₹)
A. Sources of Funds:	
(i) Fund from Business Operations	7,49,000
(ii) Proceeds from issue of 9% Preference shares	5,00,000
(iii) Proceeds from sale of Plant & Machinery	32,000
(iv) Income tax refund	4,000
Total sources	12,85,000
B. Application of Funds:	
(i) Purchase of Land and Building	1,50,000
(ii) Purchase of Plant and Machinery	3,60,000
(iii) Redemption of 8% Debentures	2,06,000
(iv) Redemption of 9% Preference shares	3,15,000
(v) Payment of income tax assessed	1,05,000
(vi) Payment of Interim dividend	50,000
(vii) Payment of dividend	1,50,000
Total uses	13,36,000
Net Decrease in Working Capital (A – B)	51,000

Working Notes:**(1) Computation of Funds from Business Operation**

	(₹)
Profit & Loss as on March 31, 20X9	3,00,000
Add: Depreciation on Land and Building	50,000
Depreciation on Plant and Machinery	1,20,000
Loss on sale of Plant and Machinery	8,000
Preliminary expenses written off	5,000
Transfer to General Reserve	50,000
Proposed dividend	2,60,000
Provision for tax	1,06,000
Interim dividend paid	50,000
	9,49,000
Less: Profit and loss as on March 31, 20X8	2,00,000
Fund from Operations	7,49,000

(2) Plant & Machinery A/c

	(₹)		(₹)
To Balance b/d	9,00,000	By Depreciation	1,20,000
To Bank [Purchase (Bal. Fig.)]	3,60,000	By Bank (Sale)	32,000
		By P/L A/c (Loss on Sale)	8,000
		By Balance c/d	11,00,000
	12,60,000		12,60,000

(3) Land and Building A/c

	(₹)		(₹)
To Balance b/d	6,00,000	By Depreciation	50,000
To Bank (Purchase) (Bal. Fig.)	1,50,000	By Balance c/d	7,00,000
	7,50,000		7,50,000

(4) Provision for Taxation A/c

	(₹)		(₹)
To Advance tax payment A/c	76,000	By Balance b/d	70,000

3.58 Financial Management

To Balance c/d	1,00,000	By P/L A/c (additional provision for 20X7-X8)	6,000
		By P/L A/c (Provision for X8-X9)	1,00,000
	1,76,000		1,76,000

(5) Advance Tax Payment A/c

	(₹)		(₹)
To Balance b/d	80,000	By Provision for taxation A/c	76,000
To Bank (paid for 08-09)	1,05,000	By Bank (Refund of tax)	4,000
		By Balance c/d	1,05,000
	1,85,000		1,85,000

(6) 8% Debentures A/c

	(₹)		(₹)
To Bank (2,00,000 x 103%) (redemption)	2,06,000	By Balance b/d	3,00,000
		By Premium on redemption	
To Balance c/d	1,00,000	of Debentures A/c	6,000
	3,06,000		3,06,000

(7) 9% Preference Share Capital A/c

	(₹)		(₹)
To Bank A/c (redemption) (3,00,000 x 105%)	3,15,000	By Balance b/d	3,00,000
		By Premium on redemption	
To Balance c/d	5,00,000	of Preference shares A/c	15,000
		By Bank (Issue)	5,00,000
	8,15,000		8,15,000

(8) Securities Premium A/c

	(₹)		(₹)
To Premium on redemption of debentures A/c	6,000	By Balance b/d	25,000
To Premium on redemption of preference shares A/c	15,000		
To Balance c/d	4,000		
	25,000		25,000

(9) General Reserve A/c

	(₹)		(₹)
To Bonus to Shareholders A/c	2,00,000	By Balance b/d	3,50,000
To Balance c/d	2,00,000	By P/L A/c (transfer)	50,000
	4,00,000		4,00,000

Provision for tax and Advance tax may be taken as current liability and current assets respectively.

Cash Flow Statement Analysis

Question 7

XYZ Ltd. Company's Balance Sheet for 20X2 and the Company's Income Statement for the year is as follows:

Balance Sheet as at 31st December 20X2

(₹ in crore)

	Particulars	Note No.	20X2	20X1
I	Equity and Liabilities:			
(1)	Shareholders' funds			
	(a) Share Capital		140	140
	(b) Reserves and surplus		110	92
(2)	Non-current liabilities			
	(a) Long-term borrowings		135	40
(3)	Current liabilities			
	(a) Trade Payables		230	310
	(b) Other current liabilities		70	60
	(c) Provision for Current Tax		15	8
	Total		700	650
II	Assets:			
(1)	Non-current assets			
	(a) Fixed Assets (tangible)			
	(i) Plant and equipment		430	309

3.60 Financial Management

	<i>Less: Accumulated Depreciation</i>		(218)	(194)
			212	115
	(b) <i>Investment Property</i>		60	75
(2)	<i>Current Assets</i>			
	(a) <i>Inventories</i>		205	160
	(b) <i>Trade receivable</i>		180	270
	(c) <i>Cash and cash equivalents</i>		26	10
	(d) <i>Other Current Assets</i>		17	20
			700	650

Income Statement (extract) as at 31st December 20X2

(₹ in crore)

<i>Sales</i>	1,000
<i>Less : Cost of goods sold</i>	(530)
<i>Gross margin</i>	470
<i>Less : Operating expenses</i>	(352)
<i>Net operating income</i>	118
<i>Non-operating items:</i>	
<i>Loss on sale of equipment</i>	(4)
<i>Profit before taxes</i>	114
<i>Less : Provision for income-taxes</i>	(48)
<i>Net Profit</i>	66

Additional information:

- (i) *Dividends of ₹ 48 crores were paid in 20X2.*
- (ii) *The loss on sale of equipment of ₹ 4 crore reflects a transaction in which equipment with an original cost of ₹ 12 crore and accumulated depreciation of ₹ 5 crore were sold for ₹ 3 crore in cash.*

Required:

Using the indirect method construct a statement of cash flows for the year 20X2.

Answer

Statement of Cash Flows for the year ended 31st December 20X2

	(₹ in crore)
Cash flow from Operating Activities	
Profit before taxation	114
Adjustments:	
Add: Loss on sale of equipment	4
Add: Depreciation (₹218 + ₹5 – ₹194)	29
<i>Operating profit before working capital changes</i>	147
Decrease in trade receivable (₹270 – ₹180)	90
Increase in inventory (₹205 – ₹160)	(45)
Decrease in other current assets (₹20 – ₹17)	3
Decrease in trade payable (₹310 – ₹230)	(80)
Increase in other current liabilities (₹70 – ₹60)	10
<i>Cash generated from operations</i>	125
Less: Income tax paid (₹8 + ₹48 – ₹15)	(41)
<i>Net Cash from Operating activities (A)</i>	84
Cash flow from Investing Activities	
Purchase of plant and equipment (₹430 + ₹12 – ₹309)	(133)
Sale of investments (₹75 – ₹60)	15
Sale of plant and equipment	3
<i>Net cash from Investing activities (B)</i>	(115)
Cash Flow from Financing Activities	
Payment of dividend	(48)
Long term borrowings (₹135 – ₹40)	95
<i>Net cash from Financing activities (C)</i>	47
Net Increase/(Decrease) in cash and cash equivalents (A+B+C)	16
Cash and cash equivalent at the beginning of the year	10
Cash and cash equivalent at the end of the year	26



Question 8

The following is the Statement of Profit and Loss of XYZ Ltd. for the period ended 20X4:

3.62 Financial Management

	Particulars	Note No.	(₹)	(₹)
I	Revenue from Operations			1,62,700
	Other Income (Dividend from investment in ABC Ltd.)			6,000
				1,68,700
II	Expenses:			
	Cost of goods sold			89,300
	Salaries			34,400
	Interest			10,650
	Depreciation		7,450	
	Patent amortisation		900	8,350
	Other expenses:			
	Insurance		500	
	Research and development		1,250	
	Bad debts		2,050	3,800
III	Profit before tax (I – II)			22,200
IV	Tax expense:			
	(i) Current tax		6,600	
	(iii) Deferred tax		1,550	8,150
	Profit for the period (III – IV)			14,050

Additional information's are:

- (i) 70% of gross revenue from operations was on credit.
- (ii) Merchandise purchases amounting to ₹ 92,000 were on credit.
- (iii) Salaries payable totaled ₹ 1,600 at the end of the year.
- (iv) Amortisation of premium on bonds payable was ₹ 1,350.
- (v) No dividends were received from the other company.
- (vi) XYZ Ltd. declared cash dividend of ₹ 4,000.
- (vii) Changes in Current Assets and Current Liabilities were as follows:

	Increase/(Decrease) (₹)
Cash	500

<i>Marketable securities</i>	1,600
<i>Trade receivable</i>	(7,150)
<i>Allowance for bad debt</i>	(1,900)
<i>Inventory</i>	2,700
<i>Prepaid insurance</i>	700
<i>Trade payable (for merchandise)</i>	5,650
<i>Salaries payable</i>	(2,050)
<i>Dividends payable</i>	(3,000)

Prepare a statement showing the amount of cash flow from operations.

Answer

Statement showing Cash flow from Operations

	(₹)	(₹)
<i>Cash Flow from Operations</i>		
Cash receipts from customers		
- Cash sales (30% × ₹1,62,700)	48,810	
- Collection from debtors	1,20,890	
Total cash from operations		1,69,700
<i>Uses of cash from operations</i>		
Payment to suppliers	86,350	
Salaries expense	36,450	
Payment for insurance	1,200	
Research and development	1,250	(1,25,250)
Cash generated from operations		44,450
Income tax payment		(6,600)
<i>Net cash flow from operating activities</i>		37,850

Working Notes

(1) Collection from debtors

	(₹)
Credit sales (70% × ₹1,62,700)	1,13,890
Less : Bad debts (₹2,050 - ₹1,900)	(150)
Add : Decrease in trade receivables	7,150
Collection from debtors on credit sales	1,20,890

3.64 Financial Management

- (2) Dividends earned ₹ 6,000 on equity of ABC Ltd. is considered in cash flow from investing activities hence, it will not be considered here.
- (3) Payment to suppliers
- | | |
|------------------------------------|----------------|
| Cost of goods sold | ₹ 89,300 |
| Add: Increase in inventory | <u>2,700</u> |
| Purchases | 92,000 |
| Less: increase in accounts payable | <u>(5,650)</u> |
| Payment to suppliers | <u>86,350</u> |
- (4) Calculation of salaries payment
- | | |
|---------------------------------|-----------------|
| Salary expense | ₹ 34,400 |
| Add: decrease in salary payable | <u>2,050</u> |
| Payment of salaries | <u>₹ 36,450</u> |
- (5) Insurance payments
- | | |
|------------------------------------|----------------|
| Insurance | ₹ 500 |
| Add: increase in prepaid insurance | <u>700</u> |
| Payment for insurance | <u>₹ 1,200</u> |
- (6) Interest payment
- | | |
|------------------------------------|-----------------|
| Interest expenses | ₹ 10,650 |
| Add : Amortisation of bond premium | <u>1,350</u> |
| Interest payments | <u>₹ 12,000</u> |
- (Interest payment is shown under cash flow from financing activities, hence, it will not be considered here)
- (7) Income tax payments
- | | |
|--------------------------------|----------------|
| Income tax expense | ₹ 8,150 |
| Less: deferred tax | (1,550) |
| | ₹ 6,600 |
| Changes in current tax payable | <u>Nil</u> |
| Income tax payments | <u>₹ 6,600</u> |

Question 9

From the information contained in Statement of Profit and Loss and Balance Sheet of A Ltd., prepare Cash Flow Statement:

Statement of Profit and Loss for the period ended March 31, 20X6

	Particulars	Note No.	(₹)	(₹)
I	Revenue from Operations			2,52,00,000
	Other Income			
	- Profits on sale of equipment			1,20,000
				2,53,20,000
II	Expenses			
	Cash cost of goods sold		1,98,00,000	
	Salaries and wages		24,00,000	
	Depreciation		6,00,000	
	Other operating expenses		8,00,000	2,36,00,000
III	Profit before tax (I – II)			17,20,000
IV	Tax expense (Provision for taxation)			8,80,000
	Profit for the period (III – IV)			8,40,000

Balance Sheet as at 31st March 20X6

Particulars	Note No.	20X6	20X5
I Equity and Liabilities:			
(1) Shareholders' funds			
(a) Share Capital		44,40,000	36,00,000
(b) Reserves and surplus		16,38,000	15,18,000
(2) Current liabilities			
(a) Trade Payables		23,40,000	24,00,000
(b) Other current liabilities		4,80,000	2,40,000
(c) Provision for Current Tax		1,32,000	1,20,000
Total		90,30,000	78,78,000
II Assets:			
(1) Non-current assets			
(a) Fixed assets (tangible)			
(i) Land		9,60,000	4,80,000
(ii) Plant and equipment		57,60,000	36,00,000
Less: Accumulated Depreciation		(13,20,000)	(12,00,000)

3.66 Financial Management

(2) <i>Current Assets</i>			
(a) <i>Inventories</i>		9,60,000	26,40,000
(b) <i>Trade receivable</i>		18,60,000	16,80,000
(c) <i>Cash and cash equivalents</i>		7,20,000	6,00,000
(d) <i>Other Current Assets</i>		90,000	78,000
		90,30,000	78,78,000

Additional Information:

- (i) *Dividend declared and paid during the year was ₹ 7,20,000.*
- (ii) *The original cost of equipment sold during the year 20X5-X6 was ₹ 7,20,000.*

Answer

Statement of Cash Flow for the year ended 31st December 20X6

	(₹)
Cash flow from Operating Activities	
Profit before taxation	17,20,000
Adjustments:	
Less: Profit on sale of equipment	(1,20,000)
Add: Depreciation	6,00,000
<i>Operating profit before working capital changes</i>	22,00,000
Increase in trade receivable (₹18,60,000 – ₹16,80,000)	(1,80,000)
Decrease in inventories (₹26,40,000 – ₹9,60,000)	16,80,000
Increase in other current assets (₹90,000 – ₹78,000)	(12,000)
Decrease in trade payable (₹24,00,000 – ₹23,40,000)	(60,000)
Increase in other current liabilities (₹4,80,000 – ₹2,40,000)	2,40,000
<i>Cash generated from operations</i>	38,68,000
Less: Income tax paid	(8,68,000)
<i>Net Cash from Operating activities (A)</i>	30,00,000
Cash flow from Investing Activities	
Purchase of land (₹9,60,000 - ₹4,80,000)	(4,80,000)
Sale of equipment	3,60,000
Purchase of plant and equipment	(28,80,000)
<i>Net cash from Investing activities (B)</i>	(30,00,000)

Cash Flow from Financing Activities	
Issue of equity shares (₹44,40,000 – ₹36,00,000)	8,40,000
Dividend paid	(7,20,000)
<i>Net cash from Financing activities (C)</i>	1,20,000
Net Increase/(Decrease) in cash and cash equivalents (A+B+C)	1,20,000
Cash and cash equivalent at the beginning of the year	6,00,000
Cash and cash equivalent at the end of the year	7,20,000

Working Notes:**(1) Liabilities for Current Tax Account**

Particulars	(₹)	Particulars	(₹)
To Bank A/c (bal. figure)	8,68,000	By Balance b/d	1,20,000
To Balance c/d	1,32,000	By Statement of P&L (Prov.)	8,80,000
	10,00,000		10,00,000

(2) Plant and Equipment Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	36,00,000	By Bank A/c	3,60,000
To Statement of P&L	1,20,000	By Acc. Depreciation A/c	4,80,000
To Bank (Purchase) (Bal. fig.)	28,80,000	By Balance c/d	57,60,000
	66,00,000		66,00,000

(3) Accumulated Depreciation on Plant and Equipment Account

Particulars	(₹)	Particulars	(₹)
To Plant and equipment A/c	4,80,000	By Balance b/d	12,00,000
To Balance c/d	13,20,000	By Statement of P&L	6,00,000
	18,00,000		18,00,000

Question 10

X Ltd. has the following balances as on 1st April 20X7:

	(₹)
<i>Plant and equipments</i>	<i>11,40,000</i>
<i>Less; Depreciation</i>	<i>3,99,000</i>
<i>Inventories and Trade receivables</i>	<i>4,75,000</i>
<i>Cash and cash equivalent</i>	<i>66,500</i>

3.68 Financial Management

Trade payables	1,14,000
Bills payable	76,000
Equity share capital (Share of ₹100 each)	5,70,000

The Company made the following estimates for financial year 20X7-X8:

- The company will pay a free of tax dividend of 10%, the rate of dividend distribution tax being 25%.
- The company will acquire plant costing ₹ 1,90,000 after selling one machine for ₹ 38,000 costing ₹ 95,000 and on which depreciation provided amounted to ₹ 66,500.
- Inventories and trade receivables, Trade payables and Bills payables at the end of financial year are expected to be ₹ 5,60,500, ₹ 1,48,200 and ₹ 98,800 respectively.
- The profit would be ₹ 1,04,500 after depreciation of ₹ 1,14,000.

Prepare the projected cash flow statement and ascertain the bank balance of X Ltd. at the end of financial year 20X7-X8.

Answer

Projected Statement of Cash Flow for the year ended 31st March 20X8

	(₹)
Cash flow from Operating Activities	
Profit before taxation	1,04,500
Adjustments:	
Less: Profit on sale of machine {₹38,000 – (₹95,000 – ₹66,500)}	(9,500)
Add: Depreciation	1,14,000
<i>Operating profit before working capital changes</i>	2,09,000
Increase in Inventories & Trade receivable (₹5,60,500 – ₹4,75,000)	(85,500)
Increase in Trade payables (₹1,48,200 – ₹1,14,000)	34,200
Increase in Bills payable (₹98,800 – ₹76,000)	22,800
<i>Cash generated from operations</i>	1,80,500
Less: Income tax paid*	Nil
<i>Net Cash from Operating activities (A)</i>	1,80,500
Cash flow from Investing Activities	
Purchase of plant	(1,90,000)
Sale of machine	38,000
<i>Net cash from Investing activities (B)</i>	(1,52,000)

Cash Flow from Financing Activities	
Dividend paid	(57,000)
Dividend distribution tax (Working note)	(19,000)
<i>Net cash from Financing activities (C)</i>	(76,000)
Net Increase/(Decrease) in cash and cash equivalents (A+B+C)	(47,500)
Cash and cash equivalent at the beginning of the year	66,500
Cash and cash equivalent at the end of the year	19,000

* No information is given on corporate tax.

Working note:

Dividend distribution tax is paid on the gross amount of dividend paid. The gross dividend is calculated as : $\frac{\text{Dividend Payable}}{(1 - \text{tax rate})}$

$$\text{Gross Amount of Dividend} = \frac{\text{₹ } 57,000}{(1 - 0.25)} = \text{₹ } 76,000$$

$$\text{Dividend Distribution Tax} = \text{₹ } 76,000 \times 25\% = \text{₹ } 19,000$$

Question 11

The following are the summarised Balance Sheet and Statement of Profit and Loss of XYZ Ltd. Balance Sheet as at 31st March 20X9

(₹ in 000)

	Particulars	Note No.	20X9	20X8
I	Equity and Liabilities:			
(1)	Shareholders' funds			
	(a) Equity Share Capital		5,200	3,900
	(b) Reserves and surplus		2,600	1,690
(2)	Non-current liabilities			
	(a) Long-term borrowings			
	(i) 12% Debentures		1,300	--
(3)	Current liabilities			
	(a) Trade Payables		1,222	936
	(b) Other current liabilities		65	52

3.70 Financial Management

	(c) Provision for Current Tax		195	520
	Total		10,582	7,098
II	Assets:			
(1)	Non-current assets			
	(a) Fixed assets (tangible)			
	(i) Plant and Machinery		5,525	3,978
	(ii) Land & Building		1,040	1,040
	(b) Investment Property		130	130
(2)	Current Assets			
	(a) Inventories		975	676
	(b) Trade receivable		1,131	728
	(c) Cash and cash equivalents		1,729	520
	(d) Other Current Assets		52	26
			10,582	7,098

Statement of Profit and Loss for the year ended 31st March, 20X9 (₹ in 000)

	Particulars	Note No.	(₹)	(₹)
I	Revenue from Operations			6,331
	Other Income:			
	(i) Cash Discount		39	
	(ii) Commission		91	
	(iii) Dividend		260	390
				6,721
II	Expenses:			
	Purchases on stock in trade			2,080
	Changes in inventories of finished goods, stock in trade and work in progress			(299)
	Employee Benefit expense			650
	Depreciation			390
	Other expenses:			
	Office expenses		390	

	<i>Rent</i>		<i>130</i>	
	<i>Selling & distribution expenses</i>		<i>780</i>	<i>1,300</i>
<i>III</i>	<i>Profit before tax (I – II)</i>			<i>2,600</i>
<i>IV</i>	<i>Tax expense (Current)</i>			<i>1,040</i>
	<i>Profit for the period (III – IV)</i>			<i>1,560</i>

Dividend paid during the year is ₹ 6,50,000.

You are required to prepare a Cash flow statement.

Answer

Statement of Cash Flow for the year ended 31st March, 20X9

(₹ in 000)

	(₹)
Cash flow from Operating Activities	
Profit before taxation	2,600
Adjustments:	
Less: Dividend received	(260)
Add: Depreciation	390
<i>Operating profit before working capital changes</i>	<i>2,730</i>
Increase in Inventories (₹975 – ₹676)	(299)
Increase in Trade receivables (₹1,131 – ₹728)	(403)
Increase in other current assets (₹52 – ₹26)	(26)
Increase in Trade payables (₹1,222 – ₹936)	286
Increase in other current liabilities (₹65 – ₹52)	13
<i>Cash generated from operations</i>	<i>2,301</i>
Less: Income tax paid (₹520 + ₹1,040 – ₹195)	(1,365)
<i>Net Cash from Operating activities (A)</i>	<i>936</i>
Cash flow from Investing Activities	
Dividend received	260
Purchase of plant and machinery (₹5,525 + ₹390 – ₹3,978)	(1,937)
<i>Net cash from Investing activities (B)</i>	<i>(1,677)</i>
Cash Flow from Financing Activities	
Issue of equity shares	1,300

3.72 Financial Management

Dividend paid	(650)
Issue of 12% debenture	1,300
<i>Net cash from Financing activities (C)</i>	1,950
Net Increase/(Decrease) in cash and cash equivalents (A+B+C)	1,209
Cash and cash equivalent at the beginning of the year	520
Cash and cash equivalent at the end of the year	1,729

Question 12

The Balance Sheet (extract) of X Ltd. as on 31st March, 20X7 is as follows:

		<i>Particulars</i>	<i>Note No.</i>	<i>20X7</i>
I		<i>Equity and Liabilities:</i>		
	(1)	<i>Shareholders' funds</i>		
		(a) <i>Equity Share Capital</i>		60,00,000
		(b) <i>8% Preference Share Capital</i>		32,50,000
		(c) <i>Reserves and surplus</i>		14,00,000
	(2)	<i>Non-current liabilities</i>		
		(a) <i>Long- term borrowings</i>		
		(i) <i>10% Debentures</i>		19,50,000
	(3)	<i>Current liabilities</i>		
		(a) <i>Trade Payables</i>		32,50,000
		<i>Total</i>		1,58,50,000
II		<i>Assets:</i>		
	(1)	<i>Non-current assets</i>		
		(a) <i>Fixed assets (tangible)</i>		1,62,50,000
		<i>Less: Accumulated Depreciation</i>		(52,00,000)
				1,10,50,000
	(2)	<i>Current Assets</i>		
		(a) <i>Inventories</i>		19,50,000
		(b) <i>Trade receivable</i>		26,00,000
		(c) <i>Cash and cash equivalents</i>		2,50,000
				1,58,50,000

The following additional information is available:

- (i) The stock turnover ratio based on cost of goods sold would be 6 times.
- (ii) The cost of fixed assets to sales ratio would be 1.4.
- (iii) Fixed assets costing ₹ 30,00,000 to be installed on 1st April, 20X7, payment would be made on March 31, 20X8.
- (iv) In March, 20X8, a dividend of 7 per cent on equity capital would be paid.
- (v) ₹ 5,50,000, 11% Debentures would be issued on 1st April, 20X7.
- (vi) ₹ 30,00,000, Equity shares would be issued on 31st March, 20X8.
- (vii) Trade payables would be 25% of materials consumed.
- (viii) Trade receivables would be 10% of sales.
- (ix) The cost of goods sold would be 90 per cent of sales including material 40 per cent and depreciation 5 per cent of sales.
- (x) The profit is subject to debenture interest and taxation @ 30 per cent.

Required:

- (i) Prepare the projected Balance Sheet as on 31st March, 20X8.
- (ii) Prepare projected Cash Flow Statement in accordance with AS-3.

Answer

Workings:

$$(1) \text{ Sales} = \frac{\text{Cost of fixed assets}^*}{1.4} = \frac{\text{₹ 1,92,50,000}}{1.4} = \text{₹ 1,37,50,000}$$

*Cost of fixed assets:

As on 31st March 20X7 ₹1,62,50,000

Add: Purchased during the year ₹ 30,00,000
₹ 1,92,50,000

- (2) Cost of Goods Sold = (Sales × 0.90) = (₹1,37,50,000 × 0.90) = ₹1,23,75,000
- (3) Material = (Sales × 0.40) = (₹1,37,50,000 × 0.40) = ₹ 55,00,000
- (4) Depreciation = (Sales × 0.05) = (₹1,37,50,000 × 0.05) = ₹ 6,87,500
- (5) Operating profit = (Sales × 0.10) = (₹1,37,50,000 × 0.10) = ₹ 13,75,000
- (6) Calculation of Net Fixed Assets:

3.74 Financial Management

	(₹)	(₹)
Opening balance		1,62,50,000
Add: Purchase		30,00,000
Less: Accumulated Depreciation	52,00,000	
Additional Depreciation	6,87,500	(58,87,500)
Closing balance of fixed assets		1,33,62,500

(7) Calculation of Closing Inventories:

$$\text{Average Inventories} = \frac{\text{Cost of Goods Sold}}{\text{Stock Turnover Ratio}} = \frac{₹1,23,75,000}{6} = ₹ 20,62,500$$

$$\text{Now, Average Inventories} = \frac{\text{Opening Inventories} + \text{Closing Inventories}}{2}$$

$$\text{Or, } ₹20,62,500 = \frac{₹19,50,000 + \text{Closing Inventories}}{2}$$

$$\text{Or, Closing Inventories} = ₹41,25,000 - ₹19,50,000 = ₹ 21,75,000$$

$$(8) \text{ Trade Receivables} = (\text{Sales} \times 0.10) = (₹1,37,50,000 \times 0.10) = ₹ 13,75,000$$

$$(9) \text{ Trade Payables} = (\text{Material consumed} \times 0.25) = (₹55,00,000 \times 0.25) = ₹ 13,75,000$$

(10) Calculation of Interest and Provision for Taxation:

	(₹)	(₹)
Operating profit (Working note 5)		13,75,000
Less: Interest on 10% Debentures (10% of ₹19,50,000)	(1,95,000)	
Less: Interest on 11% Debentures (11% of ₹5,50,000)	(60,500)	(2,55,500)
Profit before tax		11,19,500
Less: Provision for tax @ 30%		(3,35,850)
Profit after tax		7,83,650
Less: Preference share dividend (8% of ₹32,50,000)		(2,60,000)
Profit available for equity share holders		5,23,650
Less: Provision for dividend (7% of ₹60,00,000)		(4,20,000)
Surplus to be transferred under the head Reserve & Surplus		1,03,650

(11) Reserve and surplus

Opening balance	14,00,000
Add: Surplus transferred (Working note 10)	<u>1,03,650</u>
	<u>15,03,650</u>

(i) Statement of Projected Balance Sheet as at 31st March, 20X8

Particulars	Note No.	20X8	20X7
I Equity and Liabilities:			
(1) Shareholders' funds			
(a) Equity Share Capital		90,00,000	60,00,000
(b) 8% Preference Share Capital		32,50,000	32,50,000
(c) Reserves and surplus		15,03,650	14,00,000
(2) Non-current liabilities			
(a) Long-term borrowings			
(i) 10% Debentures		19,50,000	19,50,000
(ii) 11% Debentures		5,50,000	--
(3) Current liabilities			
(a) Trade Payables		13,75,000	32,50,000
(b) Provision for Taxation		3,35,850	--
Total		1,79,64,500	1,58,50,000
II Assets:			
(1) Non-current assets			
(a) Fixed assets (tangible)		1,92,50,000	1,62,50,000
Less: Accumulated Depreciation		(58,87,500)	(52,00,000)
		1,33,62,500	1,10,50,000
(2) Current Assets			
(a) Inventories		21,75,000	19,50,000
(b) Trade receivable		13,75,000	26,00,000
(c) Cash and cash equivalents		10,52,000	2,50,000
		1,79,64,500	1,58,50,000

(ii) Statement of Projected Cash Flow for the year ended 31st March, 20X8

	(₹)
Cash flow from Operating Activities	
Profit before taxation	11,19,500
Adjustments:	
Add: Depreciation	6,87,500
<i>Operating profit before working capital changes</i>	18,07,000
Increase in Inventories (₹21,75,000 – ₹19,50,000)	(2,25,000)
Increase in Trade receivables (₹26,00,000 – ₹13,75,000)	12,25,000
Increase in Trade payables (₹32,50,000 – ₹13,75,000)	(18,75,000)
<i>Cash generated from operations</i>	9,32,000
Less: Income tax paid	--
<i>Net Cash from Operating activities (A)</i>	9,32,000
Cash flow from Investing Activities	
Purchase of fixed assets	(30,00,000)
<i>Net cash from Investing activities (B)</i>	(30,00,000)
Cash Flow from Financing Activities	
Issue of equity shares	30,00,000
Issue of 11% Debenture	5,50,000
Dividend paid to equity share holders	(4,20,000)
Dividend paid to 8% Preference share holders	(2,60,000)
<i>Net cash from Financing activities (C)</i>	28,70,000
Net Increase/(Decrease) in cash and cash equivalents (A+B+C)	8,02,000
Cash and cash equivalent at the beginning of the year	2,50,000
Cash and cash equivalent at the end of the year	10,52,000

Question 13

Balance Sheets of a company as on 31st March, 20X7 and 20X8 were as follows:

Particulars	Note No.	20X8	20X7
I Equity and Liabilities:			
(1) Shareholders' funds			
(a) Equity Share Capital		10,00,000	10,00,000
(b) 8% Preference Share Capital		3,00,000	2,00,000

(c) <i>Reserves and surplus</i>			
(i) <i>Securities Premium Reserve</i>		25,000	--
(ii) <i>General Reserve</i>		1,45,000	1,20,000
(iii) <i>Surplus (Bal. in Statement of P&L)</i>		3,00,000	2,10,000
(2) <i>Non-current liabilities</i>			
(a) <i>Long-term borrowings</i>			
(i) <i>11% Debentures</i>		3,00,000	5,00,000
(3) <i>Current liabilities</i>			
(a) <i>Trade Payables</i>		2,15,000	1,85,000
(b) <i>Provision for Taxation</i>		1,05,000	80,000
(c) <i>Proposed dividend</i>		1,44,000	1,36,000
<i>Total</i>		25,34,000	24,31,000
II Assets:			
(1) <i>Non-current assets</i>			
(a) <i>Fixed assets (tangible):</i>			
(i) <i>Land and Building</i>		6,50,000	7,00,000
(ii) <i>Plant and Machinery</i>		6,60,000	6,00,000
(b) <i>Fixed assets (Intangible):</i>			
(i) <i>Goodwill</i>		80,000	1,00,000
(c) <i>Non-current investments</i>		2,20,000	2,40,000
(2) <i>Current Assets</i>			
(a) <i>Inventories</i>		3,85,000	4,00,000
(b) <i>Trade receivable</i>		4,15,000	2,88,000
(c) <i>Cash and cash equivalents</i>		93,000	88,000
(d) <i>Other current assets</i>			
(i) <i>Prepaid expenses</i>		11,000	15,000
(ii) <i>Premium on redemption of debentures</i>		20,000	--
		25,34,000	24,31,000

Additional Information:

1. Investments were sold during the year at a profit of ₹ 15,000.
2. During the year an old machine costing ₹ 80,000 was sold for ₹ 36,000. Its written down value was ₹ 45,000.

3.78 Financial Management

3. Depreciation charged on Plants and Machinery @ 20 per cent on the opening balance.
4. There was no purchase or sale of Land and Building.
5. Provision for tax made during the year was ₹ 96,000.
6. Preference shares were issued for consideration of cash during the year.
7. Proposed dividend as at 31st March 20X7 and 20X8 are ₹ 1,36,000 and ₹ 1,44,000 respectively.

You are required to prepare:

- (i) Cash flow statement as per AS 3.
- (ii) Schedule of Changes in Working Capital.

Answer

- (i) Statement of Cash Flow for the year ending 31st March, 20X8

	(₹)
Cash flow from Operating Activities	
Surplus during the year (₹3,00,000 – ₹2,10,000)	90,000
Adjustments:	
Add: Transfer to General Reserve	25,000
Provision for Tax	96,000
Proposed Dividend	1,44,000
Profit before Tax	3,55,000
Depreciation:	
Land and Building (₹7,00,000 – ₹6,50,000)	50,000
Plant and Machinery	1,20,000
Loss on sale of Plant and Machinery	9,000
Goodwill written off (₹1,00,000 – ₹80,000)	20,000
Interest on 11% Debentures (11% of ₹3,00,000)	33,000
Less: Profit on sale of Investments	(15,000)
<i>Operating profit before working capital changes</i>	5,72,000
Decrease in Prepaid expenses	4,000
Decrease in Inventories	15,000
Increase in Trade receivables	(1,27,000)
Increase in Trade payables	30,000
<i>Cash generated from operations</i>	4,94,000

Less: Income tax paid	(71,000)
Net Cash from Operating activities (A)	4,23,000
Cash flow from Investing Activities	
Sale of investment {(₹2,40,000 – ₹2,20,000) + ₹15,000}	35,000
Sale of Plant and Machinery	36,000
Purchase of Plant and Machinery	(2,25,000)
Net cash from Investing activities (B)	(1,54,000)
Cash Flow from Financing Activities	
Issue of 8% Preference shares	1,00,000
Premium received in issue of shares	25,000
Redemption of 11% Debentures (including premium)	(2,20,000)
Dividend paid	(1,36,000)
Interest paid to 11% Debenture holders	(33,000)
Net cash from Financing activities (C)	(2,64,000)
Net Increase/(Decrease) in cash and cash equivalents (A+B+C)	5,000
Cash and cash equivalent at the beginning of the year	88,000
Cash and cash equivalent at the end of the year	93,000

Working Notes:**(1) Provision for the Tax Account**

	(₹)		(₹)
To Bank (paid)	71,000	By Balance b/d	80,000
To Balance c/d	1,05,000	By Statement of P&L	96,000
	1,76,000		1,76,000

(2) Investment Account

	(₹)		(₹)
To Balance b/d	2,40,000	By Bank A/c	35,000
To Statement of P&L (Profit on sale)	15,000	By Balance c/d	2,20,000
	2,55,000		2,55,000

(3) Plant and Machinery Account

	(₹)		(₹)
To Balance b/d	6,00,000	By Bank (sale)	36,000

3.80 Financial Management

To Bank a/c (Purchase)	2,25,000	By Statement of P&L (Loss on sale)	9,000
		By Depreciation	1,20,000
		By Balance c/d	6,60,000
	8,25,000		8,25,000

Note: Since the date of redemption of debentures is not mentioned in the question, therefore, it is assumed that the debentures are redeemed at the beginning of the year.

(ii) Schedule of Changes in Working Capital

Particulars	31 st March		Change in Working Capital	
	20X7 (₹)	20X8 (₹)	Increase (₹)	Decrease (₹)
Current Assets				
Inventories	4,00,000	3,85,000	--	15,000
Trade receivables	2,88,000	4,15,000	1,27,000	--
Prepaid Expenses	15,000	11,000	--	4,000
Cash and Bank	88,000	93,000	5,000	--
Total (A)	7,91,000	9,04,000		
Current Liabilities				
Trade payables	1,85,000	2,15,000	--	30,000
Total (B)	1,85,000	2,15,000		
Working Capital (A – B)	6,06,000	6,89,000		
Increase in Working Capital	83,000	--	--	83,000
	6,89,000	6,89,000	1,32,000	1,32,000

Question 14

The Balance sheet of a company as at 31st March, 20X9 is as below:

Particulars	Note No.	20X9	20X8
I Equity and Liabilities:			
(1) Shareholders' funds			
(a) Share Capital		19,20,000	14,40,000
(b) Reserves and surplus			

(i) Capital reserve	48,000	--
(ii) General reserve	9,60,000	8,16,000
(iii) Surplus (Bal. in Statement of P&L)	3,60,000	2,88,000
(2) Non-current liabilities		
(a) Long-term borrowings		
(i) 9% Debentures	6,72,000	9,60,000
(3) Current liabilities		
(a) Trade payables	5,90,000	5,50,000
(b) Bills payables	34,000	26,000
(b) Unpaid dividends	19,200	--
(c) Provision for Current Tax	4,08,000	4,32,000
(d) Proposed dividend	1,72,800	1,44,000
Total	51,84,000	46,56,000
II Assets:		
(1) Non-current assets		
(a) Fixed Assets	45,60,000	38,40,000
Less: Depreciation	(13,92,000)	(11,04,000)
	31,68,000	27,36,000
(b) Investment Property	3,84,000	4,80,000
(2) Current Assets		
(a) Inventories	1,84,000	1,40,000
(b) Trade receivables	14,00,000	12,00,000
(b) Cash and cash equivalents	--	4,000
(c) Other Current Assets	48,000	96,000
	51,84,000	46,56,000

Additional information:

During the year ended 31st March, 20X9 the company:

- (i) Sold a machine for ₹ 1,20,000; the cost of machine was ₹ 2,40,000 and depreciation provided on it was ₹ 84,000.
- (ii) Provided ₹ 4,20,000 as depreciation on fixed assets.
- (iii) Sold some investment and profit credited to capital reserve.

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- (iv) Redeemed 30% of the debentures @ ₹ 105.
- (v) Decided to write off fixed assets costing ₹ 60,000 on which depreciation amounting to ₹ 48,000 has been provided.

You are required to prepare Cash Flow Statement as per AS 3.

Answer

Statement of Cash for the year ending 31st March, 20X9

	(₹)
Cash flow from Operating Activities	
Surplus during the year (₹3,60,000 – ₹2,88,000)	72,000
Adjustments:	
Add: Transfer to General Reserve	1,44,000
Proposed Dividend	1,72,800
Provision for Tax	4,08,000
Profit before Tax	7,96,800
Depreciation on fixed assets	4,20,000
Loss on sale of Machinery	36,000
Fixed assets written off	12,000
Interest on 9% Debentures (9% of ₹6,72,000)	60,480
Premium on redemption of Debentures $\left(\frac{₹9,60,000 - ₹6,72,000}{₹100} \times ₹5 \right)$	14,400
<i>Operating profit before working capital changes</i>	13,39,680
Increase in Trade Payables (₹5,90,000 – ₹5,50,000)	40,000
Increase in Bills Payables (₹34,000 – ₹26,000)	8,000
Increase in Inventories	(44,000)
Increase in Trade receivables	(2,00,000)
Decrease in other current assets	48,000
<i>Cash generated from operations</i>	11,91,680
Less: Income tax paid	(4,32,000)
<i>Net Cash from Operating activities (A)</i>	7,59,680

Cash flow from Investing Activities	
Sale of fixed assets (machine)	1,20,000
Purchase of fixed assets	(10,20,000)
Sale of Investments {(₹4,80,000 – ₹3,84,000) + ₹48,000}	1,44,000
<i>Net cash from Investing activities (B)</i>	<i>(7,56,000)</i>
Cash Flow from Financing Activities	
Issue of equity shares (₹19,20,000 – ₹14,40,000)	4,80,000
Redemption of 9% Debentures (including premium)	(3,02,400)
Dividend paid (₹1,44,000 – ₹19,200)	(1,24,800)
Interest paid to 9% Debenture holders	(60,480)
<i>Net cash from Financing activities (C)</i>	<i>(7,680)</i>
Net Increase/(Decrease) in cash and cash equivalents (A+B+C)	(4,000)
Cash and cash equivalent at the beginning of the year	4,000
Cash and cash equivalent at the end of the year	0

Working Notes:**(i) Fixed Assets Account**

Particulars	(₹)	Particulars	(₹)
To Balance b/d	27,36,000	By Bank (Sale)	1,20,000
To Bank (Purchases)	10,20,000	By Statement of P&L (Loss on sale)	36,000
(Balancing figure)		By Depreciation	4,20,000
		By Statement of P&L (Assets written off)	12,000
		By Balance c/d	31,68,000
	37,56,000		37,56,000

Ch - 3 - Cost of Capital

BASIC CONCEPTS AND FORMULAE

Cost of Capital	
1. Cost of Capital	Cost of capital is the return expected by the providers of capital (i.e. shareholders, lenders and the debt-holders) to the business as a compensation for their contribution to the total capital. It is also known as Discount rate, Minimum rate of return etc. It can also be stated as the opportunity cost of an investment, i.e. the rate of return that a company would otherwise be able to earn at the same risk level as the investment that has been selected.
2. Sources of Capital	Sources of capital may include: (i) Equity shares (ii) Preference shares (iii) Debentures/Bond/ other debt instruments (iv) Loan from financial institutions etc.
3. Cost of Debt	(a) Cost of Debt: A debt may be in the form of Bond or Debenture. (i) Cost of Debentures: The cost of debentures and long term loans is the contractual interest rate adjusted further for the tax liability of the company. • Cost of Irredeemable Debentures: Cost of debentures not redeemable during the life time of the company. $K_d = \frac{I}{NP}(1-t)$ • Cost of Redeemable Debentures: If the debentures are redeemable after the expiry of a fixed period, the cost of debentures would be:

	$K_d = \frac{I(1-t) + \frac{(RV - NP)}{n}}{\frac{(RV + NP)}{2}}$ (This formula to calculate cost of debt is used where, only interest on debt is tax deductible) Or $K_d = \frac{I + \frac{(RV - NP)}{n}}{\frac{(RV + NP)}{2}}(1-t)$ (This formula to calculate cost of debt is used where not only interest on debt but discount on issue of debt and premium on redemption of debt are also tax deductible) <i>In absence of any specific information, students may use any of the above formulae to calculate the Cost of Debt (K_d) with logical assumption.</i>
4. Amortisation of Bond	A bond may be amortised every year i.e. principal is repaid every year rather than at maturity. In such a situation, the principal will go down with annual payments and interest will be computed on the outstanding amount. $V_B = \sum_{t=1}^n \frac{C_t}{(1+k_d)^t}$
5. Cost of Preference Share	The cost of preference share capital is the dividend expected by its holders. Cost of Irredeemable Preference Shares $\text{Cost of irredeemable preference shares}(K_p) = \frac{PD}{P_0}$ Cost of Redeemable Preference Shares: If the preference shares are redeemable after the expiry of a fixed period the cost of preference shares would be: $K_p = \frac{PD + (RV - NP)/n}{\frac{RV + NP}{2}}$

6. Cost of Equity	Cost of equity capital is the rate of return which equates the present value of expected dividends with the market share price. Methods for Computation of Cost of Equity Capital • Dividend Price Approach (: Here, cost of equity capital is computed by dividing the expected dividend by market price per share. $K_e = \frac{D_1}{P_0}$ • Earning/ Price Approach: The advocates of this approach co-relate the earnings of the company with the market price of its share. $K_e = \frac{E}{P}$ • Realized Yield Approach: According to this approach, the average rate of return realized in the past few years is historically regarded as 'expected return' in the future. The yield of equity for the year is: $Y_t = \frac{D_t + P_t}{P_{t-1}}$ • Capital Asset Pricing Model Approach (CAPM): CAPM model describes the risk-return trade-off for securities. It describes the linear relationship between risk and return for securities. $K_e = R_f + \beta (R_m - R_f)$
7. Cost of Retained Earnings	It is the opportunity cost of dividends foregone by shareholders. • DCF $K_s = \frac{D_1}{P_0} + g$ • CAPM $K_s = R_f + \beta (R_m - R_f)$ If personal tax rate (t_p) is given, then $K_s = K_e(1-t_p)$
8. Weighted Average Cost of Capital (WACC)	It is an average rate of return expected by all contributors of capital taking the weight of each element of capital to total capital $WACC (K_o) = (\% \text{ Debt} \times K_d) + (\% \text{ Pref. capital} \times K_p) + (\% \text{ Equity capital} \times K_e)$

9. Marginal Cost of Capital	It may be defined as “the cost of raising an additional rupee of capital”. To calculate the marginal cost of capital, the intended financing proportion should be applied as weights to marginal component costs. The marginal cost of capital should, therefore, be calculated in the composite sense. The marginal weights represent the proportion of funds the firm intends to employ.
Capital Structure Theories	
10. Capital Structure	Capital structure refers to the mix of a firm’s capitalisation (i.e. mix of long term sources of funds such as debentures, preference share capital, equity share capital and retained earnings for meeting total capital requirement). While choosing a suitable financing pattern, certain factors like cost, risk, control, flexibility and other considerations like nature of industry, competition in the industry etc. should be considered.
11. Optimal Capital Structure (EBIT-EPS Analysis)	The basic objective of financial management is to design an appropriate capital structure which can provide the highest earnings per share (EPS) over the firm’s expected range of earnings before interest and taxes (EBIT). EBIT-EPS analysis is a vital tool for designing the optimal capital structure of a firm. The objective of this analysis is to find the EBIT level that will equate EPS regardless of the financing plan chosen. $\frac{(EBIT - I_1)(1 - t)}{E_1} = \frac{(EBIT - I_2)(1 - t)}{E_2}$
12. Net Income (NI) Approach	According to this approach, capital structure decision is relevant to the value of the firm. The value of the firm on the basis of NI approach can be ascertained as follows: $V = S + D$
13. Net Operating Income (NOI) Approach	NOI means earnings before interest and tax. According to this approach, capital structure decisions of the firm are irrelevant. The value of the firm on this basis is calculated as follows: $V = \frac{NOI}{K_o}$

14. Modigliani-Miller (MM) Approach -1958: Without tax.	Modigliani-Miller derived the following three propositions: (i) Total market value of a firm is equal to its expected net operating income divided by the discount rate appropriate to its risk class decided by the market. (ii) The expected yield on equity is equal to the risk free rate plus a premium determined as per the following equation: $K_e = K_o + (K_o - K_d) \text{ Debt/Equity}$ (iii) Average cost of capital is not affected by financial decision.
15. Modigliani-Miller (MM) Approach -1963: With tax.	In 1963, MM model was amended by incorporating tax, they recognised that the value of the firm will increase or cost of capital will decrease where corporate taxes exist. The value of a levered firm will be greater than the value of unlevered firm by an amount equal to amount of debt multiplied by corporate tax rate. MM has developed the formulae for computation of cost of capital (K_o), cost of equity (K_e) for the levered firm. (i) Value of a levered company = Value of an unlevered company + Tax benefit (ii) Cost of equity in a levered company $(K_{eg}) = K_{eu} + (K_{eu} - K_d) \frac{\text{Debt}(1-t)}{\text{Equity}}$ (iii) WACC in a levered company (K_{og}) = $K_{eu}(1-tL)$
16. Traditional Approach	The principle implication of this approach is that the cost of capital is dependent on the capital structure and there is an optimal capital structure which minimises cost of capital.
17. Over Capitalisation	It is a situation where a firm has more capital than it needs or in other words assets are worth less than its issued share capital, and earnings are insufficient to pay dividend and interest.
18. Under Capitalisation	It is just reverse of over-capitalisation. It is a state, when its actual capitalization is lower than its proper capitalization as warranted by its earning capacity.
Business Risk and Financial Risk	
19. Leverages	In financial analysis, leverage represents the influence of one financial variable over some other related financial variable. These financial variables may be costs, output, sales revenue, Earnings Before Interest and Tax (EBIT), Earning per share (EPS) etc.

20. Operating Leverage	Operating leverage (OL) maybe defined as the employment of an asset with a fixed cost in the hope that sufficient revenue will be generated to cover all the fixed and variable costs. The use of assets for which a company pays a fixed cost is called operating leverage. $\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}}$
21. Degree of Operating Leverage	The operating leverage may also be defined as “the firm’s ability to use fixed operating cost to magnify the effects of changes in sales on its earnings before interest and taxes.” $\text{Degree of Operating Leverage (DOL)} = \frac{\% \text{ change in EBIT}}{\% \text{ change in Sales}}$
22. Financial Leverage	Financial leverage (FL) maybe defined as ‘the use of funds with a fixed cost in order to increase earnings per share.’ In other words, it is the use of company funds on which it pays a limited return. Financial leverage involves the use of funds obtained at a fixed cost in the hope of increasing the return to common stockholders. $\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}}$
23. Degree of Financial Leverage	Degree of financial leverage is the ratio of the percentage increase in earnings per share (EPS) to the percentage increase in earnings before interest and taxes (EBIT). Financial Leverage (FL) is also defined as “the ability of a firm to use fixed financial charges to magnify the effect of changes in EBIT on EPS. $\text{Degree of Financial Leverage (DFL)} = \frac{\% \text{ change in EPS}}{\% \text{ change in EBIT}}$
24. Combined Leverage	Combined leverage maybe defined as the potential use of fixed costs, both operating and financial, which magnifies the effect of sales volume change on the earning per share of the firm. $\text{Degree of Combined Leverage} = \text{DOL} \times \text{DFL}$
25. Degree of Combined Leverage	Degree of combined leverage (DCL) is the ratio of percentage change in earning per share to the percentage change in sales. It indicates the effect the sales changes will have on EPS. $\text{Degree of Combined Leverage (DCL)} = \frac{\% \text{ Change in EPS}}{\% \text{ Change in Sales}}$

UNIT – I : COST OF CAPITAL

SECTION-A

Question 1

What is meant by weighted average cost of capital? Illustrate with an example.

Answer

Meaning of Weighted Average Cost of Capital (WACC) and an Example: The composite or overall cost of capital of a firm is the weighted average of the costs of the various sources of funds. Weights are taken to be in the proportion of each source of fund in the capital structure. While making financial decisions this overall or weighted cost is used. Each investment is financed from a pool of funds which represents the various sources from which funds have been raised. Any decision of investment, therefore, has to be made with reference to the overall cost of capital and not with reference to the cost of a specific source of fund used in the investment decision.

The weighted average cost of capital is calculated by:

- (i) Calculating the cost of specific source of fund e.g. cost of debt, equity etc;
- (ii) Multiplying the cost of each source by its proportion in capital structure; and
- (iii) Adding the weighted component cost to get the firm's WACC represented by K_0 .

$$K_0 = K_1 W_1 + K_2 W_2 + \dots$$

Where,

K_1, K_2 are component costs and W_1, W_2 are weights.

Example of WACC

Capital structure of a firm is given as under:

Equity Capital	5,00,000
Reserves	2,00,000
Debt	3,00,000
	10,00,000

The component costs (before tax) are: Equity Capital 18% and Debt 10%.

Tax Rate is 35%. WACC is required to be computed.

Cost of Debt = $10\% (1 - 0.35) = 6.5\%$

Cost of Retained Earnings is taken to be same as cost of equity.

Computation of WACC

Source	Proportion	After- tax Cost	WACC
Equity Capital	0.50	0.18	0.09
Retained Earnings	0.20	0.18	0.036
Debt	0.30	0.065	0.0195
			0.1455

Weighted Average Cost of Capital = 14.55%.

(Note: The above example is just illustrative in nature.)

Question 2

Discuss the dividend-price approach, and earnings price approach to estimate cost of equity capital.

Answer

In dividend price approach, cost of equity capital is computed by dividing the current dividend by average market price per share. This ratio expresses the cost of equity capital in relation to what yield the company should pay to attract investors. It is computed as:

$$K_e = \frac{D_1}{P_0}$$

Where,

D_1 = Dividend per share in period 1

P_0 = Market price per share today

Whereas, on the other hand, the advocates of earnings price approach co-relate the earnings of the company with the market price of its share. Accordingly, the cost of ordinary share capital would be based upon the expected rate of earnings of a company. This approach is similar to dividend price approach, only it seeks to nullify the effect of changes in dividend policy.

SECTION-B**Question 1**

A Company issues ₹ 10,00,000, 12% debentures of ₹ 100 each. The debentures are redeemable after the expiry of fixed period of 7 years. The Company is in 35% tax bracket.

Required:

- (i) *Calculate the cost of debt after tax, if debentures are issued at*
 (a) *Par; (b) 10% Discount; (c) 10% Premium.*

(ii) If brokerage is paid at 2%, what will be the cost of debentures, if issue is at par?

Answer

(i) Calculation of Cost of Debt after tax:

$$\text{Cost of Debt (K}_d\text{)} = \frac{I(1-t) + \frac{RV - NP}{n}}{\frac{RV + NP}{2}}$$

Where,

- I = Annual Interest Payment
- NP = Net proceeds of debentures
- RV = Redemption value of debentures
- t = Income tax rate
- n = Life of debentures

(a) Cost of 12% Debentures, if issued at par:

$$K_d = \frac{\text{₹}1,20,000(1-0.35) + \frac{\text{₹}10,00,000 - \text{₹}10,00,000}{7 \text{ years}}}{\frac{\text{₹}10,00,000 + \text{₹}10,00,000}{2}} = \frac{\text{₹}78,000}{\text{₹}10,00,000} = 0.078 \text{ or } 7.8\%$$

(b) Cost of 12% Debentures, if issued at 10% discount:

$$K_d = \frac{\text{₹}1,20,000(1-0.35) + \frac{\text{₹}10,00,000 - \text{₹}9,00,000}{7 \text{ years}}}{\frac{\text{₹}10,00,000 + \text{₹}9,00,000}{2}} = \frac{\text{₹}78,000 + \text{₹}14,286}{\text{₹}9,50,000} = 0.0971 \text{ or } 9.71\%$$

(c) Cost of 12% Debentures, if issued at 10% Premium:

$$K_d = \frac{\text{₹}1,20,000(1-0.35) + \frac{\text{₹}10,00,000 - \text{₹}11,00,000}{7 \text{ years}}}{\frac{\text{₹}10,00,000 + \text{₹}11,00,000}{2}} = \frac{\text{₹}78,000 - \text{₹}14,286}{\text{₹}10,50,000} = 0.0607 \text{ or } 6.07\%$$

(ii) Cost of 12% Debentures, if brokerage is paid at 2% and debentures are issued at par:

$$K_d = \frac{\frac{₹1,20,000(1-0.35) + \frac{₹10,00,000 - ₹9,80,000^*}{7 \text{ years}}}{\frac{₹10,00,000 + ₹9,80,000^*}{2}}} = \frac{₹80,857}{₹9,90,000} = 0.0817 \text{ or } 8.17\%$$

* Net Proceeds = Par value of shares – 2% Brokerage of par value
 = ₹10,00,000 – 2% of ₹10,00,000 = ₹9,80,000



Question 2

Y Ltd. retains ₹ 7,50,000 out of its current earnings. The expected rate of return to the shareholders, if they had invested the funds elsewhere is 10%. The brokerage is 3% and the shareholders come in 30% tax bracket. Calculate the cost of retained earnings.

Answer

Computation of Cost of Retained Earnings (K_r)

$$K_s = k(1 - t_p) - \text{Brokerage}$$

Where, k = Opportunity cost; t_p = Shareholders' personal tax

$$K_s = 0.10(1 - 0.30) - 0.03 = 0.04 \text{ or } 4\%$$

Alternatively

Cost of Retained earnings is equal to opportunity cost for benefits forgone by the shareholders

	(₹)
Earnings before tax (10% of ₹7,50,000)	75,000
Less: Tax (30% of ₹75,000)	(22,500)
After tax earnings	52,500
Less: Brokerage (3% of ₹7,50,000)	(22,500)
Net earnings	30,000
Total Investment	7,50,000
Effective Rate of earnings $\left(\frac{₹30,000}{₹7,50,000} \times 100 \right)$	4%

**Question 3**

PQR Ltd. has the following capital structure on October 31, 2015:

Sources of capital	(₹)
Equity Share Capital (2,00,000 Shares of ₹ 10 each)	20,00,000
Reserves & Surplus	20,00,000
12% Preference Shares	10,00,000
9% Debentures	30,00,000
	80,00,000

The market price of equity share is ₹ 30. It is expected that the company will pay next year a dividend of ₹ 3 per share, which will grow at 7% forever. Assume 40% income tax rate.

You are required to compute weighted average cost of capital using market value weights.

Answer

Workings:

- (i) Cost of Equity (K_e) = $\frac{D_1}{P_0} + g = \frac{₹ 3}{₹ 30} + 0.07 = 0.1 + 0.07 = 0.17 = 17\%$
- (ii) Cost of Debentures (K_d) = $I (1 - t) = 0.09 (1 - 0.4) = 0.054$ or 5.4%

Computation of Weighted Average Cost of Capital (WACC using market value weights)

Source of capital	Market Value of capital (₹)	Weight	Cost of capital (%)	WACC (%)
9% Debentures	30,00,000	0.30	5.40	1.62
12% Preference Shares	10,00,000	0.10	12.00	1.20
Equity Share Capital (₹30 × 2,00,000 shares)	60,00,000	0.60	17.00	10.20
Total	1,00,00,000	1.00		13.02

Question 4

A company issued 40,000, 12% Redeemable Preference Share of ₹ 100 each at a premium of ₹ 5 each, redeemable after 10 years at a premium of ₹ 10 each. The flotation cost of each share is ₹ 2.

You are required to calculate cost of preference share capital ignoring dividend tax.

AnswerCalculation of Cost of Preference Shares (K_p)

Preference Dividend (PD) = ₹100 × 40,000 shares × 0.12 = ₹4,80,000

Floatation Cost = 40,000 shares × ₹ 2 = ₹ 80,000

Net Proceeds (NP) = ₹105 × 40,000 shares – ₹ 80,000 = ₹ 41,20,000

Redemption Value (RV) = 40,000 shares × ₹110 = ₹ 44,00,000

$$\begin{aligned}
 \text{Cost of Redeemable Preference Shares} &= \frac{\text{PD} + (\text{RV} - \text{NP}) / N}{\frac{\text{RV} + \text{NP}}{2}} \\
 K_p &= \frac{\text{₹4,80,000} + (\text{₹44,00,000} - \text{₹41,20,000}) / 10 \text{ years}}{\frac{\text{₹44,00,000} + \text{₹41,20,000}}{2}} \\
 &= \frac{\text{₹4,80,000} + \text{₹2,80,000} / 10 \text{ years}}{\text{₹85,20,000} / 2} \\
 &= \frac{\text{₹4,80,000} + \text{₹28,000}}{\text{₹42,60,000}} = \frac{\text{₹5,08,000}}{\text{₹42,60,000}} \\
 &= 0.1192 \text{ or } 11.92\%
 \end{aligned}$$

Question 5

The following is the capital structure of Simons Company Ltd. as on 31.12.20X5:

	(₹)
Equity shares : 10,000 shares (of ₹ 100 each)	10,00,000
10% Preference Shares (of ₹ 100 each)	4,00,000
12% Debentures	6,00,000
	20,00,000

The market price of the company's share is ₹ 110 and it is expected that a dividend of ₹ 10 per share would be declared for the year 20X6. The dividend growth rate is 6%:

- If the company is in the 50% tax bracket, compute the weighted average cost of capital.
- Assuming that in order to finance an expansion plan, the company intends to borrow a fund of ₹ 10 lakhs bearing 14% rate of interest, what will be the company's revised weighted average cost of capital? This financing decision is expected to increase dividend from ₹ 10 to ₹ 12 per share. However, the market price of equity share is expected to decline from ₹ 110 to ₹ 105 per share.

4.13 Financial Management

Answer

(i) Computation of the weighted average cost of capital (using market value weights*)

Source of finance (a)	Market Value of capital (₹)	Weight (b)	After tax Cost of capital (%) (c)	WACC (%) (d) = (b) × (c)
Equity share (Working note 1) [₹110 × 10,000 shares]	11,00,000	0.5238	15.09	7.9041
10% Preference share	4,00,000	0.1905	10.00	1.9050
12% Debentures	6,00,000	0.2857	6.00	1.7142
	21,00,000	1.0000		11.5233

(ii) Computation of Revised Weighted Average Cost of Capital (using market value weights*)

Source of finance (a)	Market Value of capital (₹)	Weight (b)	After tax Cost of capital (%) (c)	WACC (%) (d) = (b) × (c)
Equity shares (Working note 2) [₹105 × 10,000 shares]	10,50,000	0.3443	17.43	6.0011
10% Preference shares	4,00,000	0.1311	10.00	1.3110
12% Debentures	6,00,000	0.1967	6.00	1.1802
14% Loan	10,00,000	0.3279	7.00	2.2953
	30,50,000	1.0000		10.7876

(* This can also be calculated using book value weights.)

Working Notes:

(1) Cost of equity shares (K_e)

$$\begin{aligned}
 K_e &= \frac{\text{Dividend per share } (D_1)}{\text{Market price per share } (P_0)} + \text{Growthrate } (g) \\
 &= \frac{₹10}{₹110} + 0.06 = 0.1509 \text{ or } 15.09\%
 \end{aligned}$$

(2) Revised cost of equity shares (K_e)

$$\text{Revised } K_e = \frac{₹12}{₹105} + 0.06 = 0.1742 \text{ or } 17.43\%$$



Question 6

XYZ Ltd. has the following book value capital structure:

<i>Equity Capital (in shares of ₹ 10 each, fully paid up- at par)</i>	<i>₹ 15 crores</i>
<i>11% Preference Capital (in shares of ₹ 100 each, fully paid up- at par)</i>	<i>₹ 1 crore</i>
<i>Retained Earnings</i>	<i>₹ 20 crores</i>
<i>13.5% Debentures (of ₹ 100 each)</i>	<i>₹ 10 crores</i>
<i>15% Term Loans</i>	<i>₹ 12.5 crores</i>

The next expected dividend on equity shares per share is ₹ 3.60; the dividend per share is expected to grow at the rate of 7%. The market price per share is ₹ 40.

Preference stock, redeemable after ten years, is currently selling at ₹ 75 per share.

Debentures, redeemable after six years, are selling at ₹ 80 per debenture.

The Income tax rate for the company is 40%.

(i) *Required*

Calculate the current weighted average cost of capital using:

- (a) *book value proportions; and*
- (b) *market value proportions.*

(ii) *Define the weighted marginal cost of capital schedule for the company, if it raises ₹ 10 crores next year, given the following information:*

- (a) *the amount will be raised by equity and debt in equal proportions;*
- (b) *the company expects to retain ₹ 1.5 crores earnings next year;*
- (c) *the additional issue of equity shares will result in the net price per share being fixed at ₹ 32;*
- (d) *the debt capital raised by way of term loans will cost 15% for the first ₹ 2.5 crores and 16% for the next ₹ 2.5 crores.*

4.15 Financial Management

Answer

- (i) (a) Statement showing computation of weighted average cost of capital by using Book value proportions

Source of finance	Amount (Book value) (₹ in crores)	Weight (Book value proportion) (a)	Cost of capital (%) (b)	Weighted cost of capital (%) (c) = (a)x(b)
Equity capital (W.N.1)	15.00	0.256	16.00	4.096
11% Preference capital (W.N.2)	1.00	0.017	15.43	0.262
Retained earnings (W.N.1)	20.00	0.342	16.00	5.472
13.5% Debentures (W.N.3)	10.00	0.171	12.70	2.171
15% term loans (W.N.4)	12.50	0.214	9.00	1.926
	58.50	1.000		13.927

- (b) Statement showing computation of weighted average cost of capital by using market value proportions

Source of finance	Amount (₹ in crores)	Weight (Market value proportions) (a)	Cost of capital (%) (b)	Weighted cost of capital (%) (c) = (a) x (b)
Equity capital (W.N.1)	60.00 (1.5 crores x ₹ 40)	0.739	16.00	11.824
11% Preference capital (W.N.2)	0.75 (1 lakh x ₹ 75)	0.009	15.43	0.138
13.5% Debentures (W.N.3)	8.00 (10 lakhs x ₹ 80)	0.098	12.70	1.245
15% Term loans (W.N.4)	12.50	0.154	9.00	1.386
	81.25	1.00		14.593

[Note: Since retained earnings are treated as equity capital for purposes of calculation of cost of specific source of finance, the market value of the ordinary shares may be taken to represent the combined market value of equity shares and retained earnings. The separate market values of retained earnings and ordinary shares may also be worked out by allocating

to each of these a percentage of total market value equal to their percentage share of the total based on book value.]

Working Notes (W.N.):

1. Cost of equity capital and retained earnings (K_e)

$$K_e = \frac{D_1}{P_0} + g$$

Where, K_e = Cost of equity capital

D_1 = Expected dividend at the end of year 1

P_0 = Current market price of equity share

g = Growth rate of dividend

Now, it is given that $D_1 = ₹ 3.60$, $P_0 = ₹ 40$ and $g = 7\%$

$$\text{Therefore, } K_e = \frac{₹ 3.60}{₹ 40} + 0.07$$

$$\text{or } K_e = 16\%$$

2. Cost of preference capital (K_p)

$$K_p = \frac{PD + \left[\frac{RV - NP}{n} \right]}{\frac{RV + NP}{2}}$$

Where, PD = Preference dividend

RV = Redeemable value of preference shares

NP = Current market price of preference shares

n = Redemption period of preference shares

Now, it is given that $PD = 11\%$, $RV = ₹ 100$, $NP = ₹ 75$ and $n = 10$ years

$$\text{Therefore } K_p = \frac{₹ 11 + \left[\frac{₹ 100 - ₹ 75}{10} \right]}{\left[\frac{₹ 100 + ₹ 75}{2} \right]} \times 100 = 15.43 \%$$

3. Cost of debentures (K_d)

$$K_d = \frac{I(1-t) \left[\frac{RV - NP}{n} \right]}{\frac{RV + NP}{2}}$$

Where, I = Interest payment
 t = Tax rate applicable to the company
 RV = Redeemable value of debentures
 NP = Current market price of debentures
 n = Redemption period of debentures

Now it is given that $I = 13.5$, $t = 40\%$, $RV = ₹ 100$, $NP = ₹ 80$ and $n = 6$ years

$$\text{Therefore, } K_d = \frac{₹13.5(1-0.40) + \left[\frac{₹ 100 - ₹ 80}{6} \right]}{\left[\frac{₹ 100 + ₹ 80}{2} \right]} \times 100 = 12.70\%$$

4. Cost of Term loans (K_t)

$$K_t = r(1-t)$$

Where, r = Rate of interest on term loans
 t = Tax rate applicable to the company

Now, $r = 15\%$ and $t = 40\%$

Therefore, $K_t = 15\% (1 - 0.40) = 9\%$

(ii) Statement showing weighted marginal cost of capital schedule for the company, if it raises ₹ 10 crores next year, given the following information:

Source of finance	Amount (₹ in crores)	Weight (a)	After tax Cost of capital (%) (b)	Weighted Average cost of capital (%) (c) = (a) x (b)
Equity shares (W.N.5)	3.5	0.35	18.25	6.387
Retained earnings	1.5	0.15	18.25	2.737
15% Debt (W.N.6)	2.5	0.25	9.00	2.250
16% of Debt (W.N.6)	2.5	0.25	9.60	2.400
	10.0	1.00		13.774

Working Notes (W.N.):

5. Cost of equity share (K_e) (including fresh issue of equity shares)

$$K_e = \frac{D_1}{P_0} + g$$

Now, $D_1 = ₹ 3.60$, $P_0 = ₹ 32$ and $g = 0.07$

$$\text{Therefore, } K_e = \left[\frac{₹ 3.60}{₹ 32} \right] + 0.07 = 18.25\%$$

6. Cost of debt (K_d) = $r(1 - t)$

(For first ₹ 2.5 crores)

$$r = 15\% \text{ and } t = 40\%$$

$$\text{Therefore, } K_d = 15\% (1 - 40\%) = 9\%$$

(For the next 2.5 crores)

$$r = 16\% \text{ and } t = 40\%$$

$$\text{Therefore, } K_d = 16\% (1 - 40\%) = 9.6\%$$

Question 7

JKL Ltd. has the following book-value capital structure as on March 31, 20X5.

	(₹)
Equity share capital (2,00,000 shares)	40,00,000
11.5% Preference shares	10,00,000
10% Debentures	30,00,000
	80,00,000

The equity shares of the company are sold for ₹ 20. It is expected that the company will pay next year a dividend of ₹ 2 per equity share, which is expected to grow by 5% p.a. forever. Assume a 35% corporate tax rate.

Required:

- Compute weighted average cost of capital (WACC) of the company based on the existing capital structure.*
- Compute the new WACC, if the company raises an additional ₹ 20 lakhs debt by issuing 12% debentures. This would result in increasing the expected equity dividend to ₹ 2.40*

and leave the growth rate unchanged, but the price of equity share will fall to ₹ 16 per share.

Answer

(i) Computation of Weighted Average Cost of Capital based on existing capital structure

Source of Capital	Existing Capital structure (₹)	Weights (a)	After tax cost of capital (%) (b)	WACC (%) (a) × (b)
Equity share capital (W.N.1)	40,00,000	0.500	15.00	7.500
11.5% Preference share capital (W.N.2)	10,00,000	0.125	11.50	1.437
10% Debentures (W.N.3)	30,00,000	0.375	6.50	2.438
	80,00,000	1.000		11.375

Working Notes (W.N.):

1. Cost of equity capital:

$$K_e = \frac{\text{Expected Dividend (D}_1\text{)}}{\text{Current Market Price per share (P}_0\text{)}} + \text{Growth (g)}$$

$$= \frac{₹ 2}{₹ 20} + 0.05 = 0.15 \text{ or } 15\%$$

2. Cost of preference share capital:

$$= \frac{\text{Annual preference share dividend (PD)}}{\text{Net proceeds in the issue of preference share (NP)}}$$

$$= \frac{₹ 1,15,000}{₹ 10,00,000} = 0.115 \text{ or } 11.5\%$$

3. Cost of 10% Debentures:

$$= \frac{I(1-t)}{NP} = \frac{₹ 3,00,000(1-0.35)}{₹ 30,00,000} = 0.065 \text{ or } 6.5\%$$

(ii) Computation of Weighted Average Cost of Capital based on new capital structure

Source of Capital	New Capital structure (₹)	Weights (b)	After tax cost of capital (%) (a)	WACC (%) (a) × (b)
Equity share capital (W.N. 4)	40,00,000	0.40	20.00	8.00
Preference share (W.N. 2)	10,00,000	0.10	11.50	1.15
10% Debentures (W.N. 3)	30,00,000	0.30	6.50	1.95
12% Debentures (W.N.5)	20,00,000	0.20	7.80	1.56
	1,00,00,000	1.00		12.66

Working Notes (W.N.):

4. Cost of equity capital:

$$K_e = \frac{\text{Expected Dividend (D}_1\text{)}}{\text{Current Market Price per share (P}_0\text{)}} + \text{Growth (g)} = \frac{₹ 2.40}{₹ 16} + 5\% = 20\%$$

5. Cost of 12% Debentures

$$K_d = \frac{₹ 2,40,000(1 - 0.35)}{₹ 20,00,000} = 0.078 \text{ or } 7.8\%$$

Question 8

ABC Limited has the following book value capital structure:

Equity Share Capital (150 million shares, ₹10 par)	₹ 1,500 million
Reserves and Surplus	₹ 2,250 million
10.5% Preference Share Capital (1 million shares, ₹100 par)	₹ 100 million
9.5% Debentures (1.5 million debentures, ₹1,000 par)	₹ 1,500 million
8.5% Term Loans from Financial Institutions	₹ 500 million

The debentures of ABC Limited are redeemable after three years and are quoting at ₹ 981.05 per debenture. The applicable income tax rate for the company is 35%.

The current market price per equity share is ₹ 60. The prevailing default-risk free interest rate on 10-year GOI Treasury Bonds is 5.5%. The average market risk premium is 8%. The beta of the company is 1.1875.

The preferred stock of the company is redeemable after 5 years is currently selling at ₹ 98.15 per preference share.

Required:

- (i) Calculate weighted average cost of capital of the company using market value weights.
- (ii) Define the marginal cost of capital schedule for the firm if it raises ₹ 750 million for a new project. The firm plans to have a debt of 20% of the newly raised capital. The beta of new project is 1.4375. The debt capital will be raised through term loans, it will carry interest rate of 9.5% for the first ₹100 million and 10% for the next ₹ 50 million.

Answer

Working Notes:

- (1) Computation of cost of debentures (K_d) :

$$K_d = \frac{95(1-0.35) + (1,000 - 981.05) / 3}{(1,000 + 981.05) / 2} = 6.872\%$$

- (2) Computation of cost of term loans (K_T) :

$$\begin{aligned} &= r(1-t) \\ &= 0.085(1-0.35) = 0.05525 \text{ or } 5.525\% \end{aligned}$$

- (3) Computation of cost of preference capital (K_p) :

$$\begin{aligned} K_p &= \frac{\text{Preference Dividend} + (RV - NP) / n}{(RV + NP) / 2} \\ &= \frac{10.5 + (100 - 98.15) / 5}{(100 + 98.15) / 2} = 0.1097 = 10.97\% \end{aligned}$$

- (4) Computation of cost of equity (K_e) :

$$\begin{aligned} &= R_f + \beta(R_m - R_f) \\ \text{Or,} &= \text{Risk free rate} + (\text{Beta} \times \text{Risk premium}) \\ &= 0.055 + (1.1875 \times 0.08) = 0.15 \text{ or } 15\% \end{aligned}$$

- (i) Calculation of Weighted Average cost of capital Using market value weights

Source of Capital	Market value of capital structure (₹ in millions)	Weights	After tax cost of capital (%)	WACC (%)
Equity share capital (150 million share × ₹ 60)	9,000	0.813	15.000	12.195
10.5% Preference share capital (1 million shares × ₹98.15)	98.15	0.0089	10.970	0.098
9.5 % Debentures	1,471.575	0.1329	6.872	0.913

(1.5 million × ₹981.05)				
8.5% Term loans	500	0.0452	5.525	0.249
	11,069.725	1.000		13.455

(ii) Marginal cost of capital (MCC) schedule :

New capital of ₹750 million will be raised in proportion of 20% Debt and 80% equity share capital i.e. ₹150 million debt and ₹600 million equity.

$$\begin{aligned}\text{Cost of equity shares (K}_e\text{)} &= \text{Risk free rate} + (\text{Beta} \times \text{Risk premium}) \\ &= 0.055 + (1.4375 \times 0.08) = 0.17 \text{ or } 17\%\end{aligned}$$

Cost of Debt (K_d):

$$\text{for first ₹100 million} = 9.5\% \times (1 - 0.35) = 6.175\%$$

$$\text{for next ₹50 million} = 10\% \times (1 - 0.35) = 6.5\%$$

$$\begin{aligned}\text{Marginal Cost of Capital} &= 0.17 \times \frac{₹600\text{m}}{₹750\text{m}} + \left(0.06175 \times \frac{₹100\text{m}}{₹750\text{m}} + 0.065 \times \frac{₹50\text{m}}{₹750\text{m}} \right) \\ &= 0.136 + (0.008 + 0.004) = 0.148 \text{ or } 14.8\%\end{aligned}$$

Question 9

The R&G Ltd. has following capital structure at 31st December 2015, which is considered to be optimum:

	(₹)
13% Debenture	3,60,000
11% Preference share capital	1,20,000
Equity share capital (2,00,000 shares)	19,20,000

The company's share has a current market price of ₹ 27.75 per share. The expected dividend per share in next year is 50 percent of the 2015 EPS. The EPS of last 10 years is as follows. The past trends are expected to continue:

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
EPS (₹)	1.00	1.120	1.254	1.405	1.574	1.762	1.974	2.211	2.476	2.773

The company can issue 14 percent new debenture. The company's debenture is currently selling at ₹ 98. The new preference issue can be sold at a net price of ₹ 9.80, paying a dividend of ₹ 1.20 per share. The company's marginal tax rate is 50%.

4.23 Financial Management

- (i) Calculate the after tax cost (a) of new debts and new preference share capital, (b) of ordinary equity, assuming new equity comes from retained earnings.
- (ii) Calculate the marginal cost of capital.
- (iii) How much can be spent for capital investment before new ordinary share must be sold? (Assuming that retained earnings available for next year's investment is 50% of 2015 earnings.)
- (iv) What will be marginal cost of capital (cost of fund raised in excess of the amount calculated in part (iii) if the company can sell new ordinary shares to net ₹ 20 per share ? The cost of debt and of preference capital is constant.

Answer

- (i) Calculation of after tax cost of the followings:

$$(a) \text{ New 14\% Debentures } (K_d) = \frac{I(1-t)}{NP} = \frac{₹14(1-0.5)}{₹98} = 0.0714 \text{ or } 7.14\%$$

$$\text{New 12\% Preference Shares } (K_p) = \frac{PD}{NP} = \frac{₹1.20}{₹9.80} = 0.1224 \text{ or } 12.24\%$$

$$(b) \text{ Equity Shares (Retained Earnings) } (K_e) = \frac{\text{Expected dividend } (D_1)}{\text{Current market price } (P_0)} + \text{Growthrate } (G)$$

$$= \frac{50\% \text{ of } ₹2.773}{₹27.75} + 0.12^* = 0.17 \text{ or } 17\%$$

* Growth rate (on the basis of EPS) is calculated as below :

$$\frac{\text{EPS in current year} - \text{EPS in previous year}}{\text{EPS in previous year}} = \frac{₹2.773 - ₹2.476}{₹2.476} = 0.12$$

(Students may verify the growth trend by applying the above formula to last three or four years)

- (ii) Calculation of marginal cost of capital (on the basis of existing capital structure):

Source of capital	Weight (a)	After tax Cost of capital (%) (b)	WACC (%) (a) × (b)
14% Debenture	0.15	7.14	1.071
12% Preference shares	0.05	12.24	0.612
Equity shares	0.80	17.00	13.600
Marginal cost of capital			15.283

- (iii) The company can spent for capital investment before issuing new equity shares and without increasing its marginal cost of capital:

Retained earnings can be available for capital investment

= 50% of 2015 EPS × equity shares outstanding

= 50% of ₹ 2.773 × 2,00,000 shares = ₹2,77,300

Since, marginal cost of capital is to be maintained at the current level i.e. 15.28%, the retained earnings should be equal to 80% of total additional capital for investment.

Thus investment before issuing equity $\left(\frac{₹2,77,300}{80} \times 100 \right) = ₹ 3,46,625$

The remaining capital of ₹ 69,325 i.e. ₹ 3,46,625 – ₹ 2,77,300 shall be financed by issuing 14% Debenture and 12% preference shares in the ratio of 3 : 1 respectively.

- (iv) If the company spends more than ₹ 3,46,625 as calculated in part (iii) above, it will have to issue new shares at ₹ 20 per share.

The cost of new issue of equity shares will be:

$$K_e = \frac{\text{Expected dividend } (D_1)}{\text{Current market price } (P_0)} + \text{Growth rate } (g) = \frac{50\% \text{ of } ₹2.773}{₹20} + 0.12 = 0.1893 \text{ or } 18.93\%$$

Calculation of marginal cost of capital (assuming the existing capital structure will be maintained):

Source of capital	Weight (a)	Cost (%) (b)	WACC (%) (a) × (b)
14% Debenture	0.15	7.14	1.071
12% Preference shares	0.05	12.24	0.612
Equity shares	0.80	18.93	15.144
Marginal cost of capital			16.827

Question 10

You are required to determine the weighted average cost of capital of a firm using (i) book-value weights and (ii) market value weights. The following information is available for your perusal:

Present book value of the firm's capital structure is:

	(₹)
Debentures of ₹ 100 each	8,00,000
Preference shares of ₹ 100 each	2,00,000
Equity shares of ₹ 10 each	10,00,000
	20,00,000

4.25 Financial Management

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 as follows:

- (i) ₹ 100 per debenture redeemable at par : 20 years maturity 8% coupon rate, 4% flotation costs, sale price ₹ 100.
- (ii) ₹ 100 preference share redeemable at par : 15 years 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 is ₹ 2 per share; the anticipated growth rate in dividends is 5% and the firm has the practice of paying all its earnings in the form of dividend. The corporate tax rate is 50%.

Answer

Working Notes:

Determination of Cost of capital:

- (i) Cost of Debentures (K_d)

$$K_d = \frac{I(1-t) + \frac{RV - NP}{n}}{\frac{RV + NP}{2}}$$

Where,

- I = Annual Interest Payment
- NP = Net proceeds of debentures net of flotation costs
- RV = Redemption value of debentures
- t = Income tax rate
- n = Life of debentures

$$K_d = \frac{₹8(1-0.5) + \frac{₹100 - ₹96^*}{20 \text{ years}}}{\frac{₹100 + ₹96^*}{2}} = \frac{₹4.20}{₹98} = 0.0429 \text{ or } 4.29\%$$

* Net Proceeds = Par value per shares - 4% Flotation cost per share
= ₹100 - 4% of ₹100 = ₹96

(ii) Cost of Preference Shares (K_p)

$$K_p = \frac{PD + \frac{RV - NP}{n}}{\frac{RV + NP}{2}}$$

Where,

PD = Preference Dividend per share

NP = Net proceeds of share net of flotation costs

RV = Redemption value of shares

n = Life of preference shares

$$K_p = \frac{\text{₹}10 + \frac{\text{₹}100 - \text{₹}95^*}{15 \text{ years}}}{\frac{\text{₹}100 + \text{₹}95^*}{2}} = \frac{\text{₹}10.33}{\text{₹}97.5} = 0.106 \text{ or } 10.60\%$$

* Net Proceeds = Par value per shares - 5% Flotation cost per share
 = ₹100 - 5% of ₹100 = ₹95

(iii) Cost of Equity (K_e)

$$K_e = \frac{\text{Expected dividend } (D_1)}{\text{Current market price } (P_0)} + \text{Growthrate } (g) = \frac{\text{₹}2}{\text{₹}22 - \text{₹}2} + 0.05 = 0.15 \text{ or } 15\%$$

(i) Computation of Weighted Average Cost of Capital based on Book Value Weights

Source of Capital	Book Value (₹)	Weights to Total Capital	After tax Cost of capital (%)	WACC (%)
Debentures	8,00,000	0.40	4.29	1.716
Preference Shares	2,00,000	0.10	10.60	1.060
Equity Shares	10,00,000	0.50	15.00	7.500
	20,00,000	1.00		10.276

(ii) Computation of Weighted Average Cost of Capital based on Market Value Weights

Source of Capital	Market Value (₹)	Weights to Total Capital	After tax Cost of capital (%)	WACC (%)
Debentures (8,000 units × ₹110)	8,80,000	0.2651	4.29	1.137
Pref. Shares (2,000 shares × ₹120)	2,40,000	0.0723	10.60	0.766
Equity Shares (1,00,000 shares × ₹22)	22,00,000	0.6626	15.00	9.939
	33,20,000	1.00		11.842

**Question 11**

The following is the capital structure of a Company:

Source of capital	Book value (₹)	Market value (₹)
Equity shares @ ₹ 100 each	80,00,000	1,60,00,000
9% Cumulative preference shares @ ₹ 100 each	20,00,000	24,00,000
11% Debentures	60,00,000	66,00,000
Retained earnings	40,00,000	—
	2,00,00,000	2,50,00,000

The current market price of the company's equity share is ₹ 200. For the last year the company had paid equity dividend at 25 per cent and its dividend is likely to grow 5 per cent every year. The corporate tax rate is 30 per cent and shareholders personal income tax rate is 20 per cent.

You are required to calculate:

- Cost of capital for each source of capital.
- Weighted average cost of capital on the basis of book value weights.
- Weighted average cost of capital on the basis of market value weights.

Answer

- (i) Calculation of Cost of Capital for each source of capital:

- (a) Cost of Equity share capital:

$$K_e = \frac{D_0 (1+g)}{\text{Market Price per share } (P_0)} + g = \frac{25\% \times ₹100(1+0.05)}{₹200} + 0.05$$

$$= \frac{₹26.25}{₹200} + 0.05 = 0.18125 \text{ or } 18.125\%$$

- (b) Cost of Preference share capital (K_p) = 9%

- (c) Cost of Debentures (K_d) = $r(1-t)$
 $= 11\%(1-0.3) = 7.7\%$

- (d) Cost of Retained Earnings: $K_s = K_e(1-t_p) = 18.125(1-0.2) = 14.5\%$

(ii) Weighted Average Cost of Capital on the basis of book value weights

Source	Amount (₹)	Weights (a)	After tax Cost of Capital (%) (b)	WACC (%) (c) = (a) × (b)
Equity share	80,00,000	0.40	18.125	7.25
9% Preference share	20,00,000	0.10	9.000	0.90
11% Debentures	60,00,000	0.30	7.700	2.31
Retained earnings	40,00,000	0.20	14.500	2.90
	2,00,00,000	1.00		13.36

(iii) Weighted Average Cost of Capital on the basis of market value weights

Source	Amount (₹)	Weights (a)	After tax Cost of Capital (%) (b)	WACC (%) (c) = (a) × (b)
Equity share	1,60,00,000	0.640	18.125	11.60
9% Preference share	24,00,000	0.096	9.000	0.864
11% Debentures	66,00,000	0.264	7.700	2.033
	2,50,00,000	1.000		14.497

Question 12

The capital structure of a company as on 31st March, 20X5 is as follows:

	(₹)
Equity share capital : 6,00,000 equity shares of ₹ 100 each	6,00,00,000
Reserve and surplus	1,20,00,000
12% Debenture of ₹ 100 each	1,80,00,000

For the year ended 31st March, 20X5 the company has paid equity dividend @24%. Dividend is likely to grow by 5% every year. The market price of equity share is ₹ 600 per share. Corporate tax rate applicable to the company is 30%.

Required:

- Compute the current weighted average cost of capital.
- The company has plan to raise a further ₹ 3,00,00,000 by way of long-term loan at 18% interest. If loan is raised, the market price of equity share is expected to fall to ₹ 500 per share. What will be the new weighted average cost of capital of the company?

Answer**(i) Computation of Current Weighted Average Cost of Capital**

$$\begin{aligned}
 \text{(a) Cost of 12\% Debentures (K}_d\text{)} &= \frac{I(1-t)}{NP} = \frac{₹12(1-0.3)}{₹100} = 0.084 \text{ or } 8.4\% \\
 \text{(b) Cost of Equity Share Capital (K}_e\text{)} &= \frac{D_0(1+g)}{P_0} + g = \frac{₹100 \times 24\%(1+0.05)}{₹600} + 0.05 \\
 &= \frac{₹25.2}{₹600} + 0.05 = 0.092 \text{ or } 9.2\%
 \end{aligned}$$

Source of capital	Amount (₹)	Weight	After tax Cost of Capital (%)	WACC (%)
Equity share capital (including Reserve & Surplus)	7,20,00,000	0.80	9.20	7.36
12% Debentures	1,80,00,000	0.20	8.40	1.68
Weighted Average Cost of Capital				9.04

(ii) Computation of New Weighted Average Cost of Capital

$$\begin{aligned}
 \text{(a) Cost of Existing 12\% Debentures (K}_d\text{)} &= 8.4\% \text{ (as calculated above)} \\
 \text{(b) Cost of Term Loan (K}_t\text{)} &= \text{Rate of Interest (r)} \times (1-\text{tax rate}) \\
 &= 0.18(1-0.03) = 0.126 \text{ or } 12.6\% \\
 \text{(c) Cost of Equity Share Capital (K}_e\text{)} &= \frac{₹24(1.05)}{₹500} + 0.05 = \frac{₹25.2}{₹500} + 0.05 \\
 &= 0.0504 + 0.05 = 0.1004 = 10.04\%
 \end{aligned}$$

Source of capital	Amount (₹)	Weight	After tax Cost of Capital (%)	WACC (%)
Equity share capital (including Reserve & Surplus)	7,20,00,000	0.60	10.04	6.02
12% Debentures	1,80,00,000	0.15	8.40	1.26
18% Term loan	3,00,00,000	0.25	12.60	3.15
Weighted Average Cost of Capital				10.43

[WACC for the company can also be calculated using market value weights]

Question 13

The capital structure of a company consists of equity shares of ₹ 50 lakhs; 10 percent preference shares of ₹ 10 lakhs and 12 percent debentures of ₹ 30 lakhs. The cost of equity capital for the company is 14.7 percent and income-tax rate for this company is 30 percent.

You are required to calculate the Weighted Average Cost of Capital (WACC).

Answer**Calculation of Weighted Average Cost of Capital (WACC)**

Source	Amount (₹)	Weight	Cost of Capital after tax	WACC
Equity Capital	50,00,000	0.5556	0.147	0.0817
10% Preference Capital	10,00,000	0.1111	0.100	0.0111
12% Debentures	30,00,000	0.3333	0.084*	0.0280
Total	90,00,000	1.0000		0.1208

* Cost of Debentures (after tax) = $12\% (1 - 0.30) = 8.4\% = 0.084$

Weighted Average Cost of Capital = $0.1208 = 12.08\%$

Question 14

ABC Ltd. wishes to raise additional finance of ₹ 20 lakhs for meeting its investments plan. The company has ₹ 4,00,000 in the form of retained earnings available for investment purposes. The following are the further details:

- *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.*
- *Earnings per share ₹ 12.*
- *Dividend payout 50% of earnings.*
- *Expected growth rate in dividend 10%.*
- *Current market price per share, ₹ 60.*
- *Company's tax rate is 30% and shareholder's personal tax rate 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.*

Answer

Pattern of raising Capital:

Portion of Debt = ₹ 20,00,000 × 25% = ₹ 5,00,000 and

Portion of Equity = ₹ 20,00,000 × 75% = ₹ 15,00,000, of this ₹ 4,00,000 is from retained earnings and ₹11,00,000 by issuing fresh equity shares.

$$(i) \text{ Cost of Debt } (K_d) = \frac{\text{Total Interest}(1-t)}{\text{Debt}}$$

$$= \frac{(10\% \text{ of } ₹2,00,000 + 13\% \text{ of } ₹3,00,000)(1-0.3)}{₹5,00,000} = \frac{₹59,000(1-0.3)}{₹5,00,000} = 0.0826 \text{ or } 8.26\%$$

$$(ii) \text{ Cost of Equity } (K_e) = \frac{\text{EPS} \times \text{Payout ratio}(1+g)}{P_0} + g$$

$$= \frac{₹12 \times 0.5(1+0.1)}{₹60} + 0.1 = 0.11 + 0.10 = 0.21 \text{ or } 21\%$$

$$\text{Cost of retained earnings } (K_s) = K_e (1 - t_p) = 0.21(1 - 0.2) = 0.168 \text{ or } 16.8\%$$

(iii) **Weighted average cost of capital (K_o)**

Source of capital	Amount (₹)	Proportion of total Capital	Cost of Capital (%)	WACC (%)
Equity Capital	11,00,000	0.55	21.00	11.550
Retained earning	4,00,000	0.20	16.80	3.360
Debt	5,00,000	0.25	8.26	2.065
Total	20,00,000	1.00		16.975

Question 15

The capital structure of MNP Ltd. is as under:

9% Debenture	₹ 2,75,000
11% Preference shares	₹ 2,25,000
Equity shares (face value : ₹ 10 per share)	₹ 5,00,000
	<u>₹ 10,00,000</u>

Additional information:

- (i) ₹ 100 per debenture redeemable at par has 2% floatation cost and 10 years of maturity. The market price per debenture is ₹ 105.

- (ii) ₹ 100 per preference share redeemable at par has 3% floatation cost and 10 years of maturity. The market price per preference share is ₹ 106.
- (iii) Equity share has ₹ 4 floatation cost and market price per share of ₹ 24. The next year expected dividend is ₹ 2 per share with annual growth of 5%. The firm has a practice of paying all earnings in the form of dividends.
- (iv) Corporate Income-tax rate is 35%.

Required : Calculate Weighted Average Cost of Capital (WACC) using market value weights.

Answer

Workings:

- (i) Cost of Equity (K_e)

$$K_e = \frac{D_1}{P_0 - \text{Floatation cost}} + g = \frac{₹ 2}{₹ 24 - ₹ 4} + 0.05 = 0.15 \text{ or } 15\%$$

- (ii) Cost of Debt (k_d)

$$K_d = \frac{I(1-t) + \frac{RV - NP}{n}}{\frac{RV + NP}{2}} = \frac{₹ 9(1-0.35) + \frac{₹ 100 - ₹ 98^*}{10 \text{ years}}}{\frac{₹ 100 + ₹ 98^*}{2}}$$

$$= \frac{₹ 5.85 + ₹ 0.20}{₹ 99} = 0.0611 \text{ or } 6.11\%$$

* NP = ₹ 100 – 2% of ₹ 100 = ₹ 98

- (iii) Cost of Preference Shares (k_p)

$$K_p = \frac{PD + \frac{RV - NP}{n}}{\frac{RV + NP}{2}} = \frac{₹ 11 + \frac{₹ 100 - ₹ 97^*}{10 \text{ years}}}{\frac{₹ 100 + ₹ 97^*}{2}} = \frac{₹ 11 + ₹ 0.3}{₹ 98.5} = 0.1147 \text{ or } 11.47\%$$

* NP = ₹ 100 – 3% of ₹ 100 = ₹ 97

Calculation of WACC using Market Value Weights

Source of Capital	Market Value (₹)	Weights to Total Capital	After tax cost of capital (%)	WACC (%)
9% Debentures (₹ 105 × 2,750 debentures)	2,88,750	0.1672	6.11	1.02
11% Preference Shares	2,38,500	0.1381	11.47	1.58

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(₹106 × 2,250 preference share)				
Equity Shares (₹ 24 × 50,000 shares)	12,00,000	0.6947	15.00	10.42
	17,27,250	1.00		13.02

Question 16

SK Limited has obtained funds from the following sources, the specific cost are also given against them:

Source of funds	Amount (₹)	Cost of Capital
Equity shares	30,00,000	15 percent
Preference shares	8,00,000	8 percent
Retained earnings	12,00,000	11 percent
Debentures	10,00,000	9 percent (before tax)

You are required to calculate weighted average cost of capital. Assume that Corporate tax rate is 30 percent.

Answer

Calculation of Weighted Average Cost of Capital (WACC)

Sources of Funds	Amount (₹)	Weight	Cost of Capital (%)	WACC (%)
Equity Shares	30,00,000	0.500	15.00	7.50
Preference Shares	8,00,000	0.133	8.00	1.06
Retained Earnings	12,00,000	0.200	11.00	2.20
Debentures	10,00,000	0.167	6.30*	1.05
Total	60,00,000	1.000		11.81

*Cost of Debentures (K_d) = K_d (before tax) $\times$ (1 - t) = 9% (1 - 0.3) = 6.30%

Question 17

Beeta Ltd. has furnished the following information:

- Earning per share (ESP) ₹ 4
- Dividend payout ratio 25%
- Market price per share ₹ 40
- Rate of tax 30%
- Growth rate of dividend 8%

The company wants to raise additional capital of ₹ 10 lakhs including debt of ₹ 4 lakhs. The cost of debt (before tax) is 10% upto ₹ 2 lakhs and 15% beyond that.

Compute the after tax cost of equity and debt and the weighted average cost of capital.

Answer

(i) Cost of Equity Share Capital (K_e)

$$K_e = \frac{D_0(1+g)}{P_0} + g = \frac{25\% \text{ of } ₹4 (1+0.08)}{₹40} + 0.08 = \frac{₹1.08}{₹40} + 0.08 = 0.107 \text{ or } 10.7\%$$

(ii) Cost of Debt (K_d)

$$K_d = \frac{\text{Interest}}{\text{Net Proceeds}} \times 100 \times (1 - t)$$

Interest on first ₹ 2,00,000 @ 10% = 20,000

Interest on next ₹ 2,00,000 @ 15% = 30,000

$$K_d = \frac{50,000}{4,00,000} \times (1 - 0.3) = 0.0875 \text{ or } 8.75 \%$$

(iii) Weighted Average Cost of Capital (WACC)

Source of capital	Amount (₹)	Weights	Cost of Capital (%)	WACC (%)
Equity shares	6,00,000	0.60	10.70	6.42
Debt	4,00,000	0.40	8.75	3.50
Total	10,00,000	1.00		9.92

Ch - 4 - Capital Structure Decisions

Question 1

What is 'Optimum Capital Structure'?

Answer

Optimum Capital Structure: The capital structure is said to be optimum when the firm has selected such a combination of equity and debt so that the wealth of firm is maximum. At this capital structure, the cost of capital is minimum and the market price per share is maximum.

Question 2

Explain in brief the assumptions of Modigliani-Miller theory.

Answer

Assumptions of Modigliani – Miller Theory

- (a) Capital markets are perfect. All information is freely available and there is no transaction cost.
- (b) All investors are rational.
- (c) No existence of corporate taxes.
- (d) Firms can be grouped into "equivalent risk classes" on the basis of their business risk.

Question 3

What is optimum capital structure? Explain.

Answer

Optimum Capital Structure: Optimum capital structure deals with the issue of right mix of debt and equity in the long-term capital structure of a firm. According to this, if a company takes on debt, the value of the firm increases upto a certain point. Beyond that value of the firm will start to decrease. If the company is unable to pay the debt within the specified period then it will affect the goodwill of the company in the market. Therefore, company should select its appropriate capital structure with due consideration of all factors.

Question 4

What is Net Operating Income (NOI) theory of capital structure? Explain the assumptions of Net Operating Income approach theory of capital structure.

Answer

Net Operating Income (NOI) Theory of Capital Structure

According to NOI approach, there is no relationship between the cost of capital and value of the firm i.e. the value of the firm is independent of the capital structure of the firm.

Assumptions

- (a) The corporate income taxes do not exist.
- (b) The market capitalizes the value of the firm as whole. Thus the split between debt and equity is not important.
- (c) The increase in proportion of debt in capital structure leads to change in risk perception of the shareholders.
- (d) The overall cost of capital (K_0) remains constant for all degrees of debt equity mix.

Question 5

Explain the principles of "Trading on equity".

Answer

The term trading on equity means debts are contracted and loans are raised mainly on the basis of equity capital. Those who provide debt have a limited share in the firm's earning and hence want to be protected in terms of earnings and values represented by equity capital. Since fixed charges do not vary with firms earnings before interest and tax, a magnified effect is produced on earning per share. Whether the leverage is favourable, in the sense, increase in earnings per share more proportionately to the increased earnings before interest and tax, depends on the profitability of investment proposal. If the rate of returns on investment exceeds their explicit cost, financial leverage is said to be positive.

Question 6

Discuss the concept of Debt-Equity or EBIT-EPS indifference point, while determining the capital structure of a company.

Answer

The determination of optimum level of debt in the capital structure of a company is a formidable task and is a major policy decision. It ensures that the firm is able to service its debt as well as contain its interest cost. Determination of optimum level of debt involves equalizing between return and risk.

EBIT – EPS analysis is a widely used tool to determine level of debt in a firm. Through this analysis, a comparison can be drawn for various methods of financing by obtaining indifference point. It is a point to the EBIT level at which EPS remains unchanged irrespective of debt-equity mix. The indifference point for the capital mix (equity share capital and debt) can be determined as follows:

$$\frac{(EBIT - I_1)(1 - T)}{E_1} = \frac{(EBIT - I_2)(1 - T)}{E_2}$$

Question 7

Discuss financial break-even and EBIT-EPS indifference analysis.

Answer**Financial Break-even and EBIT-EPS Indifference Analysis**

Financial break-even point is the minimum level of EBIT needed to satisfy all the fixed financial charges i.e. interest and preference dividend. It denotes the level of EBIT for which firm's EPS equals zero. If the EBIT is less than the financial breakeven point, then the EPS will be negative but if the expected level of EBIT is more than the breakeven point, then more fixed costs financing instruments can be taken in the capital structure, otherwise, equity would be preferred.

EBIT-EPS analysis is a vital tool for designing the optimal capital structure of a firm. The objective of this analysis is to find the EBIT level that will equate EPS regardless of the financing plan chosen.

$$\frac{(EBIT - I_1)(1 - T)}{E_1} = \frac{(EBIT - I_2)(1 - T)}{E_2}$$

Where,

EBIT =	Indifference point
E ₁ =	Number of equity shares in Alternative 1
E ₂ =	Number of equity shares in Alternative 2
I ₁ =	Interest charges in Alternative 1
I ₂ =	Interest charges in Alternative 2
T =	Tax-rate

Question 8

Explain, briefly, Modigliani and Miller approach (without tax) on Cost of Capital.

Answer

This approach describes, in a perfect capital market where there is no transaction cost and no taxes, the value and cost of capital of a company remain unchanged irrespective of change in the capital structure. The approach is based on further additional assumptions like:

- Capital markets are perfect. All information is freely available and there are no transaction costs.
- All investors are rational.
- Firms can be grouped into 'Equivalent risk classes' on the basis of their business risk.
- Non-existence of corporate taxes.

Based on the above assumptions, Modigliani-Miller derived the following three propositions:

- (i) Total market value of a firm is equal to its expected net operating income divided by the discount rate appropriate to its risk class decided by the market.

$$\text{Value of levered firm (V}_g\text{)} = \text{Value of unlevered firm (V}_u\text{)}$$

$$\text{Value of a firm} = \frac{\text{Net Operating Income (NOI)}}{K_0}$$

- (ii) A firm having debt in capital structure has higher cost of equity than an unlevered firm. The cost equity will include risk premium for the financial risk. The cost of equity in a levered firm is determined as under:

$$K_e = K_0 + (K_0 - K_d) \frac{\text{Debt}}{\text{Equity}}$$

- (iii) The structure of the capital (financial leverage) does not effect the overall cost of capital. The cost of capital is only affected by the business risk.

Question 9

Discuss the relationship between the financial leverage and firms required rate of return to equity shareholders as per Modigliani and Miller (with tax) Proposition II.

Answer

Relationship between the financial leverage and firm's required rate of return to equity shareholders with corporate taxes is given by the following relation :

$$\text{Cost of equity in a levered company (K}_{eg}\text{)} = K_{eu} + (K_{eu} - K_d) \frac{\text{Debt (1-t)}}{\text{Equity}}$$

Where, K_{eg} = Cost of equity in a levered company

K_{eu} = Cost of equity in an unlevered company

K_d = Cost of debt

t = Tax rate

Question 10

Discuss the major considerations in capital structure planning.

Answer

There are three major considerations, i.e. risk, cost of capital and control, which help the finance manager in determining the proportion in which he can raise funds from various sources.

Risk: The finance manager attempts to design the capital structure in such a manner, so that risk and cost are the least and the control of the existing management is diluted to the least extent. However, there are also secondary factors also like – marketability of the issue,

manoeuvrability and flexibility of the capital structure, timing of raising the funds. Risk is of two kinds, i.e., Financial risk and Business risk. Here, we are concerned primarily with the financial risk. Financial risk also is of two types:

- Risk of cash insolvency
- Risk of variation in the expected earnings available to equity share-holders

Cost of Capital: Cost is an important consideration in capital structure decisions. It is obvious that a business should be at least capable of earning enough revenue to meet its cost of capital and finance its growth. Hence, along with a risk as a factor, the finance manager has to consider the cost aspect carefully while determining the capital structure.

Control: Along with cost and risk factors, the control aspect is also an important consideration in planning the capital structure. When a company issues further equity shares, it automatically dilutes the controlling interest of the present owners. Similarly, preference shareholders can have voting rights, in case dividends on such shares are not paid for consecutive years. Financial institutions normally stipulate that they shall have one or more directors on the Boards. Hence, when the management agrees to raise loans from financial institutions, by implication it agrees to forego a part of its control over the company. It is obvious, therefore, that decisions concerning capital structure are taken after keeping the control factor in mind.

Question 11

List the fundamental principles governing capital structure.

Answer

Fundamental Principles Governing Capital Structure

The fundamental principles are:

- Cost Principle:** According to this principle, an ideal pattern or capital structure is one that minimises cost of capital structure and maximises earnings per share (EPS).
- Risk Principle:** According to this principle, reliance is placed more on common equity for financing capital requirements than excessive use of debt. Use of more and more debt means higher commitment in form of interest payout. This would lead to erosion of shareholders value in unfavourable business situation.
- Control Principle:** While designing a capital structure, the finance manager may also keep in mind that existing management control and ownership remains undisturbed.
- Flexibility Principle:** It means that the management chooses such a combination of sources of financing which it finds easier to adjust according to changes in need of funds in future too.
- Other Considerations:** Besides above principles, other factors such as nature of industry, timing of issue and competition in the industry should also be considered.

Question 12

What is Over-capitalisation? State its causes and consequences.

Answer**Over-capitalization and its Causes and Consequences**

It is a situation where a firm has more capital than it needs or in other words assets are worth less than its issued share capital, and earnings are insufficient to pay dividend and interest.

Causes of Over Capitalization

Over-capitalisation arises due to following reasons:

- (i) Raising more money through issue of shares or debentures than company can employ profitably.
- (ii) Borrowing huge amount at higher rate than rate at which company can earn.
- (iii) Excessive payment for the acquisition of fictitious assets such as goodwill etc.
- (iv) Improper provision for depreciation, replacement of assets and distribution of dividends at a higher rate.
- (v) Wrong estimation of earnings and capitalization.

Consequences of Over-Capitalisation

Over-capitalisation results in the following consequences:

- (i) Considerable reduction in the rate of dividend and interest payments.
- (ii) Reduction in the market price of shares.
- (iii) Resorting to "window dressing".
- (iv) Some companies may opt for reorganization. However, sometimes the matter gets worse and the company may go into liquidation.

SECTION-B**Question 1**

Calculate the level of earnings before interest and tax (EBIT) at which the EPS indifference point between the following financing alternatives will occur.

- (i) Equity share capital of ₹ 6,00,000 and 12% debentures of ₹ 4,00,000.

Or

- (ii) Equity share capital of ₹ 4,00,000, 14% preference share capital of ₹ 2,00,000 and 12% debentures of ₹ 4,00,000.

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Assume the corporate tax rate is 35% and par value of equity share is ₹ 10 in each case.

Answer

Computation of level of earnings before interest and tax (EBIT)

In case alternative (i) is accepted, then the EPS of the firm would be:

$$\begin{aligned} \text{EPS}_{\text{Alternative (i)}} &= \frac{(\text{EBIT} - \text{Interest}) (1 - \text{tax rate})}{\text{No. of equity shares}} \\ &= \frac{(\text{EBIT} - 0.12 \times ₹ 4,00,000) (1 - 0.35)}{60,000 \text{ shares}} \end{aligned}$$

In case the alternative (ii) is accepted, then the EPS of the firm would be

$$\text{EPS}_{\text{Alternative (ii)}} = \frac{(\text{EBIT} - 0.12 \times ₹ 4,00,000) (1 - 0.35) - (0.14 \times ₹ 2,00,000)}{40,000 \text{ shares}}$$

In order to determine the indifference level of EBIT, the EPS under the two alternative plans should be equated as follows:

$$\begin{aligned} \frac{(\text{EBIT} - 0.12 \times ₹ 4,00,000) (1 - 0.35)}{60,000 \text{ shares}} &= \frac{(\text{EBIT} - 0.12 \times ₹ 4,00,000) (1 - 0.35) - (0.14 \times ₹ 2,00,000)}{40,000 \text{ shares}} \\ \text{Or } \frac{0.65 \text{ EBIT} - ₹ 31,200}{3} &= \frac{0.65 \text{ EBIT} - ₹ 59,200}{2} \\ \text{Or } 1.30 \text{ EBIT} - ₹ 62,400 &= 1.95 \text{ EBIT} - ₹ 1,77,600 \\ \text{Or } (1.95 - 1.30) \text{ EBIT} &= ₹ 1,77,600 - ₹ 62,400 = ₹ 1,15,200 \\ \text{Or } \text{EBIT} &= \frac{₹ 1,15,200}{0.65} \\ \text{Or } \text{EBIT} &= ₹ 1,77,231 \end{aligned}$$

Question 2

A new project is under consideration in Zip Ltd., which requires a capital investment of ₹ 4.50 crores. Interest on term loan is 12% and Corporate Tax rate is 50%. If the Debt Equity ratio insisted by the financing agencies is 2 : 1, calculate the point of indifference for the project.

Answer

The capital investment can be financed in two ways i.e.

(i) By issuing equity shares only worth ₹ 4.5 crore or

- (ii) By raising capital through taking a term loan of ₹ 3 crores and ₹ 1.50 crores through issuing equity shares (as the company has to comply with the 2 : 1 Debt Equity ratio insisted by financing agencies).

In first option interest will be Zero and in second option the interest will be ₹ 36,00,000

Point of Indifference between the above two alternatives =

$$\frac{\text{EBIT}_1 \times (1 - t)}{\text{No. of equity shares (N}_1\text{)}} = \frac{(\text{EBIT}_2 - \text{Interest}) \times (1 - t)}{\text{No. of equity shares (N}_2\text{)}}$$

$$\text{Or, } \frac{\text{EBIT}(1 - 0.50)}{45,00,000 \text{ shares}} = \frac{(\text{EBIT} - ₹ 36,00,000) \times (1 - 0.50)}{15,00,000 \text{ shares}}$$

$$\text{Or, } 0.5 \text{ EBIT} = 1.5 \text{ EBIT} - ₹ 54,00,000$$

$$\text{EBIT} = ₹ 54,00,000$$

EBIT at point of Indifference will be ₹ 54 Lakhs.

(The face value of the equity shares is assumed as ₹10 per share. However, indifference point will be same irrespective of face value per share).

Question 3

There are two firms P and Q which are identical except P does not use any debt in its capital structure while Q has ₹ 8,00,000, 9% debentures in its capital structure. Both the firms have earnings before interest and tax of ₹ 2,60,000 p.a. and the capitalization rate is 10%. Assuming the corporate tax of 30%, calculate the value of these firms according to MM Hypothesis.

Answer

Calculation of Value of Firms P and Q according to MM Hypothesis

Market Value of Firm P (Unlevered)

$$V_u = \frac{\text{EBIT} (1 - t)}{K_e} = \frac{2,60,000 (1 - 0.30)}{10\%} = \frac{₹ 1,82,000}{10\%} = ₹ 18,20,000$$

Market Value of Firm Q (Levered)

$$V_g = V_u + TB$$

$$= ₹ 18,20,000 + (₹ 8,00,000 \times 0.30) = ₹ 18,20,000 + ₹ 2,40,000 = ₹ 20,60,000$$

**Question 4**

X Ltd. is considering the following two alternative financing plans:

	Plan – I (₹)	Plan – II (₹)
Equity shares of ₹ 10 each	4,00,000	4,00,000
12% Debentures	2,00,000	-
Preference Shares of ₹ 100 each	-	2,00,000
	6,00,000	6,00,000

The indifference point between the plans is ₹ 2,40,000. Corporate tax rate is 30%. Calculate the rate of dividend on preference shares.

Answer

Computation of Rate of Preference Dividend

$$\frac{(\text{EBIT} - \text{Interest}) (1 - t)}{\text{No. of Equity Shares (N}_1\text{)}} = \frac{\text{EBIT} (1 - t) - \text{Preference Dividend}}{\text{No. of Equity Shares (N}_2\text{)}}$$

$$\frac{(\text{₹}2,40,000 - \text{₹}24,000) (1 - 0.30)}{40,000 \text{ shares}} = \frac{\text{₹}2,40,000 (1 - 0.30) - \text{Preference Dividend}}{40,000 \text{ shares}}$$

$$\frac{\text{₹}2,16,000 (1 - 0.30)}{40,000 \text{ shares}} = \frac{\text{₹}1,68,000 - \text{Preference Dividend}}{40,000 \text{ shares}}$$

$$\text{₹}1,51,200 = \text{₹}1,68,000 - \text{Preference Dividend}$$

$$\text{Preference Dividend} = \text{₹}1,68,000 - \text{₹}1,51,200 = \text{₹}16,800$$

$$\text{Rate of Dividend} = \frac{\text{Preference Dividend}}{\text{Preference share capital}} \times 100 = \frac{\text{₹}16,800}{\text{₹}2,00,000} \times 100 = 8.4\%$$

Question 5

Z Ltd.'s operating income (before interest and tax) is ₹ 9,00,000. The firm's cost of debt is 10 per cent and currently firm employs ₹ 30,00,000 of debt. The overall cost of capital of firm is 12 per cent.

Required: Calculate cost of equity.

Answer

$$\text{Value of a firm (V)} = \frac{\text{EBIT}}{\text{Overall cost of capital (K}_0\text{)}} \quad \text{or,} \quad \frac{\text{₹}9,00,000}{0.12} = \text{₹}75,00,000$$

$$\begin{aligned}\text{Market value of equity (S)} &= \text{Value of the firm (V)} - \text{Value of Debts (D)} \\ &= ₹75,00,000 - ₹30,00,000 = ₹45,00,000\end{aligned}$$

Calculation of Cost of Equity

$$\text{Overall Cost of Capital (K}_0\text{)} = K_e \left(\frac{S}{V} \right) + K_d \left(\frac{D}{V} \right)$$

$$\text{Or, } K_0 \times V = (K_e \times S) + (K_d \times D) \quad \text{Or, } K_e = \frac{(K_0 \times V) - (K_d \times D)}{S}$$

$$\text{Or, } = \frac{(0.12 \times ₹75,00,000) - (0.10 \times ₹30,00,000)}{₹45,00,000} = \frac{₹9,00,000 - ₹3,00,000}{₹45,00,000} = 0.1333 \text{ or } 13.33\%$$

Question 6

RES Ltd. is an all equity financed company with a market value of ₹25,00,000 and cost of equity (K_e) 21%. The company wants to buyback equity shares worth ₹5,00,000 by issuing and raising 15% perpetual debt of the same amount. Rate of tax may be taken as 30%. After the capital restructuring and applying MM Model (with taxes), you are required to calculate:

- (i) *Market value of RES Ltd.*
- (ii) *Cost of Equity (K_e)*
- (iii) *Weighted average cost of capital (using market weights) and comment on it.*

Answer

$$\text{Value of a company (V)} = \text{Value of equity (S)} + \text{Value of debt (D)}$$

$$₹25,00,000 = \frac{\text{Net Income (NI)}}{K_e} + ₹5,00,000$$

$$\text{Or, Net Income (NI)} = 0.21 (₹25,00,000 - ₹5,00,000)$$

$$\text{Market Value of Equity} = ₹25,00,000$$

$$K_e = 21\%$$

$$\frac{\text{Net income (NI) for equity - holders}}{K_e} = \text{Market Value of Equity}$$

$$\frac{\text{Net income (NI) for equity holders}}{0.21} = ₹25,00,000$$

$$\text{Net income for equity holders} = ₹5,25,000$$

$$\text{EBIT} = ₹5,25,000 / 0.7 = ₹7,50,000$$

4.45 Financial Management

	All Equity	Debt and Equity
EBIT	7,50,000	7,50,000
Interest to debt-holders	-	75,000
EBT	7,50,000	6,75,000
Taxes (30%)	2,25,000	2,02,500
Income available to equity shareholders	5,25,000	4,72,500
Income to debt holders plus income available to shareholders	5,25,000	5,47,500

Present value of tax-shield benefits = ₹ 5,00,000 × 0.30 = ₹1,50,000

(i) Value of Restructured firm

$$= ₹ 25,00,000 + ₹ 1,50,000 = ₹ 26,50,000$$

(ii) Cost of Equity (K_e)

$$\text{Total Value} = ₹ 26,50,000$$

$$\text{Less: Value of Debt} = ₹ 5,00,000$$

$$\text{Value of Equity} = ₹ 21,50,000$$

$$K_e = \frac{4,72,500}{21,50,000} = 0.219 = 21.98\%$$

(iii) WACC (on market value weight)

$$\text{Cost of Debt (after tax)} = 15\% (1 - 0.3) = 0.15 (0.70) = 0.105 = 10.5\%$$

Components of Costs	Amount	Cost of Capital (%)	Weight	WACC (%)
Equity	21,50,000	21.98	0.81	17.80
Debt	5,00,000	10.50	0.19	2.00
	26,50,000			19.80

Comment: At present the company is all equity financed. So, $K_e = K_0$ i.e. 21%. However after restructuring, the K_0 would be reduced to 19.80% and K_e would increase from 21% to 21.98%.

Question 7

D Ltd. is foreseeing a growth rate of 12% per annum in the next two years. The growth rate is likely to be 10% for the third and fourth year. After that the growth rate is expected to stabilise at 8% per annum. If the last dividend was ₹ 1.50 per share and the investor's required rate of return is 16%, determine the current value of equity share of the company.

The P.V. factors at 16%

Year	1	2	3	4
P.V. Factor	0.862	0.743	0.641	0.552

Answer

The current value of equity share of D Ltd. is sum of the following:

- Presently value (PV) of dividends payments during 1 - 4 years; and
- Present value (PV) of expected market price at the end of the fourth year based on constant growth rate of 8 per cent.

Present value of dividends for the year 1- 4

Year	Dividend (₹)	PV factor at 16%	PV (₹)
1	1.50 (1 + 0.12) = 1.68	0.862	1.45
2	1.68 (1 + 0.12) = 1.88	0.743	1.40
3	1.88 (1 + 0.10) = 2.07	0.641	1.33
4	2.07 (1 + 0.10) = 2.28	0.552	1.26
Total			5.44

Present value of the market price (MP₄): end of the fourth year:

$$MP_4 = \frac{D_4(1+g)}{K_e - g} = \frac{₹2.28(1+0.08)}{0.16-0.08} = \frac{₹2.46}{0.08} = ₹ 30.75$$

$$PV \text{ of } ₹ 30.75 = ₹ 30.75 \times 0.552 = ₹ 16.97$$

$$\text{Hence, Value of equity shares} = ₹ 5.44 + ₹ 16.97 = ₹ 22.41$$

Question 8

A Company earns a profit of ₹ 3,00,000 per annum after meeting its Interest liability of ₹ 1,20,000 on 12% debentures. The Tax rate is 50%. The number of Equity Shares of ₹ 10 each are 80,000 and the retained earnings amount to ₹ 12,00,000. The company proposes to take up an expansion scheme for which a sum of ₹ 4,00,000 is required. It is anticipated that after expansion, the company will be able to achieve the same return on investment as at present. The funds required for expansion can be raised either through debt at the rate of 12% or by issuing Equity Shares at par.

Required:

- Compute the Earnings per Share (EPS), if:
 - The additional funds were raised as debt
 - The additional funds were raised by issue of equity shares.

(ii) Advise the company as to which source of finance is preferable.

Answer

Working Notes:

1. Capital employed before expansion plan:

	(₹)
Equity shares (₹10 × 80,000 shares)	8,00,000
Debentures {(₹ 1,20,000/12) × 100}	10,00,000
Retained earnings	12,00,000
Total capital employed	30,00,000

2. Earnings before the payment of interest and tax (EBIT):

	(₹)
Profit (EBT)	3,00,000
Interest	1,20,000
EBIT	4,20,000

3. Return on Capital Employed (ROCE):

$$\text{ROCE} = \frac{\text{EBIT}}{\text{Capital employed}} \times 100 = \frac{₹4,20,000}{₹30,00,000} \times 100 = 14\%$$

4. Earnings before interest and tax (EBIT) after expansion scheme:

After expansion, capital employed = ₹ 30,00,000 + ₹ 4,00,000 = ₹ 34,00,000

Desired EBIT = 14% × ₹34,00,000 = ₹4,76,000

(i) Computation of Earnings Per Share (EPS) under the following options:

	Present situation	Expansion scheme Additional funds raised as	
		Debt	Equity
	(₹)	(₹)	(₹)
Earnings before Interest and Tax (EBIT)	4,20,000	4,76,000	476,000
Less: Interest - Old capital	1,20,000	1,20,000	1,20,000
- New capital	--	48,000 (₹4,00,000 × 12%)	--
Earnings before Tax (EBT)	3,00,000	3,08,000	3,56,000

Less: Tax (50% of EBT)	1,50,000	1,54,000	1,78,000
PAT	1,50,000	1,54,000	1,78,000
No. of shares outstanding	80,000	80,000	1,20,000
Earnings per Share (EPS)	1.875 $\left(\frac{₹1,50,000}{80,000} \right)$	1.925 $\left(\frac{₹1,54,000}{80,000} \right)$	1.48 $\left(\frac{₹1,78,000}{1,20,000} \right)$

- (ii) **Advise to the Company:** When the expansion scheme is financed by additional debt, the EPS is higher. Hence, the company should finance the expansion scheme by raising debt.

Question 9

A Ltd. and B Ltd. are identical in every respect except capital structure. A Ltd. does not employ debts in its capital structure whereas B Ltd. employs 12% Debentures amounting to ₹ 10 lakhs. Assuming that :

- All assumptions of M-M model are met;*
- Income-tax rate is 30%;*
- EBIT is ₹ 2,50,000 and*
- The Equity capitalization rate of 'A' Ltd. is 20%.*

Calculate the value of both the companies and also find out the Weighted Average Cost of Capital for both the companies.

Answer

- (i) **Calculation of Value of Firms 'A Ltd.' and 'B Ltd' according to MM Hypothesis**

Market Value of 'A Ltd' (Unlevered)

$$V_u = \frac{\text{EBIT} (1 - t)}{K_e} = \frac{₹2,50,000 (1 - 0.30)}{20\%} = \frac{₹1,75,000}{20\%} = ₹ 8,75,000$$

Market Value of 'B Ltd.' (Levered)

$$\begin{aligned} V_g &= V_u + TB \\ &= ₹ 8,75,000 + (₹10,00,000 \times 0.30) \\ &= ₹ 8,75,000 + ₹ 3,00,000 = ₹ 11,75,000 \end{aligned}$$

- (ii) **Computation of Weighted Average Cost of Capital (WACC)**

WACC of 'A Ltd.' = 20% (i.e. $K_e = K_o$)

WACC of 'B Ltd.'

	B Ltd. (₹)
EBIT	2,50,000
Interest to Debt holders	(1,20,000)
EBT	1,30,000
Taxes @ 30%	(39,000)
Income available to Equity Shareholders	91,000
Total Value of Firm	11,75,000
Less: Market Value of Debt	(10,00,000)
Market Value of Equity	1,75,000
Return on equity (K_e) = 91,000 / 1,75,000	0.52

Computation of WACC B. Ltd

Component of Capital	Amount	Weight	Cost of Capital	WACC
Equity	1,75,000	0.149	0.52	0.0775
Debt	10,00,000	0.851	0.084*	0.0715
Total	11,75,000			0.1490

$$*K_d = 12\% (1 - 0.3) = 12\% \times 0.7 = 8.4\%$$

$$\text{WACC} = 14.90\%$$

Question 10

The management of Z Company Ltd. wants to raise its funds from market to meet out the financial demands of its long-term projects. The company has various combinations of proposals to raise its funds. You are given the following proposals of the company:

Proposal	Equity shares (%)	Debts (%)	Preference shares (%)
P	100	-	-
Q	50	50	-
R	50	-	50

- (i) Cost of debt and preference shares is 10% each.
- (ii) Tax rate – 50%
- (iii) Equity shares of the face value of ₹ 10 each will be issued at a premium of ₹ 10 per share.
- (iv) Total investment to be raised ₹ 40,00,000.
- (v) Expected earnings before interest and tax ₹ 18,00,000.

From the above proposals the management wants to take advice from you for appropriate plan after computing the following:

- Earnings per share
- Financial break-even-point
- Compute the EBIT range among the plans for indifference. Also indicate if any of the plans dominate.

Answer

(i) Computation of Earnings per Share (EPS)

Plans	P (₹)	Q (₹)	R (₹)
Earnings before interest & tax (EBIT)	18,00,000	18,00,000	18,00,000
Less: Interest charges	--	(2,00,000)	--
Earnings before tax (EBT)	18,00,000	16,00,000	18,00,000
Less: Tax @ 50%	(9,00,000)	(8,00,000)	(9,00,000)
Earnings after tax (EAT)	9,00,000	8,00,000	9,00,000
Less: Preference share dividend	--	--	(2,00,000)
Earnings available for equity shareholders	9,00,000	8,00,000	7,00,000
No. of equity shares	2,00,000	1,00,000	1,00,000
E.P.S	4.5	8	7

(ii) Computation of Financial Break-even Points

Proposal 'P' = 0

Proposal 'Q' = ₹ 2,00,000 (Interest charges)

Proposal 'R' = Earnings required for payment of preference share dividend
i.e. ₹ 2,00,000 ÷ 0.5 (Tax Rate) = ₹ 4,00,000

(iii) Computation of Indifference Point between the Proposals

Combination of Proposals

(a) Indifference point where EBIT of proposal "P" and proposal 'Q' is equal

$$\frac{\text{EBIT}(1-0.5)}{2,00,000 \text{ shares}} = \frac{(\text{EBIT} - ₹2,00,000)(1-0.5)}{1,00,000 \text{ shares}}$$

$$0.5 \text{ EBIT} = \text{EBIT} - ₹ 2,00,000$$

$$\text{EBIT} = ₹ 4,00,000$$

- (b) Indifference point where EBIT of proposal 'P' and proposal 'R' is equal:

$$\frac{\text{EBIT}(1-0.50)}{2,00,000 \text{ shares}} = \frac{\text{EBIT}(1-0.50) - ₹2,00,000}{1,00,000 \text{ shares}}$$

$$\frac{0.5 \text{ EBIT}}{2,00,000 \text{ shares}} = \frac{0.5 \text{ EBIT} - ₹2,00,000}{1,00,000 \text{ shares}}$$

$$0.25 \text{ EBIT} = 0.5 \text{ EBIT} - ₹2,00,000$$

$$\text{EBIT} = \frac{₹2,00,000}{0.25} = ₹8,00,000$$

- (c) Indifference point where EBIT of proposal 'Q' and proposal 'R' are equal

$$\frac{(\text{EBIT} - ₹2,00,000)(1-0.5)}{1,00,000 \text{ shares}} = \frac{\text{EBIT}(1-0.5) - ₹2,00,000}{1,00,000 \text{ shares}}$$

$$0.5 \text{ EBIT} - ₹1,00,000 = 0.5 \text{ EBIT} - ₹2,00,000$$

There is no indifference point between proposal 'Q' and proposal 'R'

Analysis: It can be seen that financial proposal 'Q' dominates proposal 'R', since the financial break-even-point of the former is only ₹2,00,000 but in case of latter, it is ₹4,00,000.

Question 11

A Company needs ₹31,25,000 for the construction of a new plant. The following three plans are feasible:

- I The Company may issue 3,12,500 equity shares at ₹10 per share.*
- II The Company may issue 1,56,250 equity shares at ₹10 per share and 15,625 debentures of ₹100 denomination bearing a 8% rate of interest.*
- III The Company may issue 1,56,250 equity shares at ₹10 per share and 15,625 cumulative preference shares at ₹100 per share bearing a 8% rate of dividend.*
 - (i) if the Company's earnings before interest and taxes are ₹62,500, ₹1,25,000, ₹2,50,000, ₹3,75,000 and ₹6,25,000, what are the earnings per share under each of three financial plans? Assume a Corporate Income tax rate of 40%.*
 - (ii) Which alternative would you recommend and why?*
 - (iii) Determine the EBIT-EPS indifference points by formulae between Financing Plan I and Plan II and Plan I and Plan III.*

Answer

(i) Computation of EPS under three-financial plans.

Plan I: Equity Financing

	(₹)	(₹)	(₹)	(₹)	(₹)
EBIT	62,500	1,25,000	2,50,000	3,75,000	6,25,000
Interest	0	0	0	0	0
EBT	62,500	1,25,000	2,50,000	3,75,000	6,25,000
Less: Tax @ 40%	25,000	50,000	1,00,000	1,50,000	2,50,000
PAT	37,500	75,000	1,50,000	2,25,000	3,75,000
No. of equity shares	3,12,500	3,12,500	3,12,500	3,12,500	3,12,500
EPS	0.12	0.24	0.48	0.72	1.20

Plan II: Debt – Equity Mix

	(₹)	(₹)	(₹)	(₹)	(₹)
EBIT	62,500	1,25,000	2,50,000	3,75,000	6,25,000
Less: Interest	1,25,000	1,25,000	1,25,000	1,25,000	1,25,000
EBT	(62,500)	0	1,25,000	2,50,000	5,00,000
Less: Tax @ 40%	25,000*	0	50,000	1,00,000	2,00,000
PAT	(37,500)	0	75,000	1,50,000	3,00,000
No. of equity shares	1,56,250	1,56,250	1,56,250	1,56,250	1,56,250
EPS	(₹ 0.24)	0	0.48	0.96	1.92

* The Company can set off losses against the overall business profit or may carry forward it to next financial years.

Plan III: Preference Shares – Equity Mix

	(₹)	(₹)	(₹)	(₹)	(₹)
EBIT	62,500	1,25,000	2,50,000	3,75,000	6,25,000
Less: Interest	0	0	0	0	0
EBT	62,500	1,25,000	2,50,000	3,75,000	6,25,000
Less: Tax @ 40%	25,000	50,000	1,00,000	1,50,000	2,50,000
PAT	37,500	75,000	1,50,000	2,25,000	3,75,000
Less: Pref. dividend	1,25,000*	1,25,000*	1,25,000	1,25,000	1,25,000
PAT after Pref. dividend.	(87,500)	(50,000)	25,000	1,00,000	2,50,000
No. of Equity shares	1,56,250	1,56,250	1,56,250	1,56,250	1,56,250
EPS	(0.56)	(0.32)	0.16	0.64	1.60

* In case of cumulative preference shares, the company has to pay cumulative dividend to preference shareholders, when company earns sufficient profits.

- (ii) From the above EPS computations tables under the three financial plans we can see that when EBIT is ₹ 2,50,000 or more, Plan II: Debt-Equity mix is preferable over the Plan I and Plan III, as rate of EPS is more under this plan. On the other hand an EBIT of less than ₹ 2,50,000, Plan I: Equity Financing has higher EPS than Plan II and Plan III. Plan III Preference share-Equity mix is not acceptable at any level of EBIT, as EPS under this plan is lower.

The choice of the financing plan will depend on the performance of the company and other macro economic conditions. If the company is expected to have higher operating profit Plan II: Debt – Equity Mix is preferable. Moreover, debt financing gives more benefit due to availability of tax shield.

- (iii) EBIT – EPS Indifference point : Plan I and Plan II

$$\frac{\text{EBIT}_1 \times (1-t)}{\text{No. of equity shares (N}_1\text{)}} = \frac{(\text{EBIT}_2 - \text{Interest}) \times (1-t)}{\text{No. of equity shares (N}_2\text{)}}$$

$$\frac{\text{EBIT}(1-0.40)}{3,12,500 \text{ shares}} = \frac{(\text{EBIT} - ₹1,25,000) \times (1-0.40)}{1,56,250 \text{ shares}}$$

$$0.6 \text{ EBIT} = 1.2 \text{ EBIT} - ₹1,50,000$$

$$\text{EBIT} = \frac{₹1,50,000}{0.6} = ₹ 2,50,000$$

Indifference points between Plan I and Plan II is ₹ 2,50,000

EBIT – EPS Indifference Point: Plan I and Plan III

$$\frac{\text{EBIT}_1 \times (1-t)}{\text{No. of equity shares (N}_1\text{)}} = \frac{\text{EBIT}_3 \times (1-t) - \text{Pr ef. dividend}}{\text{No. of equity shares (N}_3\text{)}}$$

$$\frac{\text{EBIT}_1(1-0.40)}{3,12,500 \text{ shares}} = \frac{\text{EBIT}_3(1-0.40) - ₹1,25,000}{1,56,250 \text{ shares}}$$

$$0.6 \text{ EBIT} = 1.2 \text{ EBIT} - ₹ 2,50,000$$

$$\text{EBIT} = \frac{₹2,50,000}{0.6} = ₹ 4,16,667$$

Indifference points between Plan I and Plan III is ₹ 4,16,667.

Ch - 5 - Leverage

Question 1

Differentiate between Business risk and Financial risk.

Answer

Business Risk and Financial Risk: Business risk refers to the risk associated with the firm's operations. It is an unavoidable risk because of the environment in which the firm has to operate and the business risk is represented by the variability of earnings before interest and tax (EBIT). The variability in turn is influenced by revenues and expenses. Revenues and expenses are affected by demand of firm's products, variations in prices and proportion of fixed cost in total cost.

Whereas, Financial risk refers to the additional risk placed on firm's shareholders as a result of debt use in financing. Companies that issue more debt instruments would have higher financial risk than companies financed mostly by equity. Financial risk can be measured by ratios such as firm's financial leverage multiplier, total debt to assets ratio etc.

Question 2

"Operating risk is associated with cost structure, whereas financial risk is associated with capital structure of a business concern." Critically examine this statement.

Answer

"Operating risk is associated with cost structure whereas financial risk is associated with capital structure of a business concern".

Operating risk refers to the risk associated with the firm's operations. It is represented by the variability of earnings before interest and tax (EBIT). The variability in turn is influenced by revenues and expenses, which are affected by demand of firm's products, variations in prices and proportion of fixed cost in total cost. If there is no fixed cost, there would be no operating risk. Whereas financial risk refers to the additional risk placed on firm's shareholders as a result of debt and preference shares used in the capital structure of the concern. Companies that issue more debt instruments would have higher financial risk than companies financed mostly by equity.

Question 3

Explain the concept of leveraged lease.

Answer

Concept of Leveraged Lease: Leveraged lease involves lessor, lessee and financier. In leveraged lease, the lessor makes a substantial borrowing, even upto 80 per cent of the assets

purchase price. He provides remaining amount – about 20 per cent or so – as equity to become the owner. The lessor claims all tax benefits related to the ownership of the assets. Lenders, generally large financial institutions, provide loans on a non-recourse basis to the lessor. Their debt is served exclusively out of the lease proceeds. To secure the loan provided by the lenders, the lessor also agrees to give them a mortgage on the asset. Leveraged lease are called so because the high non-recourse debt creates a high degree of leverage.

Question 4

Discuss the impact of financial leverage on shareholders wealth by using return-on-assets (ROA) and return-on-equity (ROE) analytic framework.

Answer

The impact of financial leverage on ROE is positive, if cost of debt (after-tax) is less than ROA. But it is a double-edged sword.

$$ROA = \frac{NOPAT}{Sales} \times \frac{Sales}{Capital\ employed}$$

$$ROE = ROA + \frac{D}{E} (ROA - K_d)$$

Where,

NOPAT i.e. Net Operating profit after tax = $EBIT * (1 - T_c)$

Capital employed = Shareholders funds + Loan funds

D = Debt amount in capital structure

E = Equity capital amount in capital structure

K_d = Interest rate * $(1 - T_c)$ in case of fresh loans of a company.

K_d = Yield to maturity * $(1 - T_c)$ in case of existing loans of a company.

SECTION-B

Question 1

Consider the following information for Omega Ltd.:

	₹ in lakhs
EBIT (Earnings before Interest and Tax)	15,750
Earnings before Tax (EBT):	7,000
Fixed Operating costs:	1,575

Required:

Calculate percentage change in earnings per share, if sales increase by 5%.

Answer

Operating Leverage (OL)

$$= \frac{\text{Contribution}}{\text{EBIT}} = \frac{\text{EBIT} + \text{Fixed Cost}}{\text{EBIT}} = \frac{₹ 15,750 + ₹ 1,575}{15,750} = 1.1$$

Financial Leverage (FL)

$$= \frac{\text{EBIT}}{\text{EBT}} = \frac{15,750}{7,000} = 2.25$$

Combined Leverage (CL)

$$= 1.1 \times 2.25 = 2.475$$

Percentage Change in Earnings per share

$$\text{DCL} = \frac{\% \text{ change in EPS}}{\% \text{ change in Sales}}$$

$$2.475 = \frac{\% \text{ change in EPS}}{5\%}$$

$$\therefore \% \text{ change in EPS} = 12.375\%.$$

Hence if sales is increased by 5%, EPS will be increased by 12.375%.

Question 2

A company operates at a production level of 5,000 units. The contribution is ₹ 60 per unit, operating leverage is 6, combined leverage is 24. If tax rate is 30%, what would be its earnings after tax?

Answer

Computation of Earnings after tax (EAT) or Profit after tax (PAT)

$$\text{Total contribution} = 5,000 \text{ units} \times ₹ 60/\text{unit} = ₹ 3,00,000$$

$$\text{Operating leverage (OL)} \times \text{Financial leverage (FL)} = \text{Combined leverage (CL)}$$

$$\therefore 6 \times \text{FL} = 24$$

$$\therefore \text{FL} = 4$$

4.57 Financial Management

$$\therefore OL = \frac{\text{Contribution}}{\text{EBIT}} \quad \therefore 6 = \frac{\text{₹ } 3,00,000}{\text{EBIT}} \quad \therefore \text{EBIT} = \text{₹ } 50,000$$

$$FL = \frac{\text{EBIT}}{\text{EBT}} \quad \therefore 4 = \frac{\text{₹ } 50,000}{\text{EBT}} \quad \therefore \text{EBT} = \text{₹ } 12,500$$

Since tax rate is 30%, therefore, Earnings after tax = $12,500 \times 0.70 = \text{₹ } 8,750$

Earnings after tax (EAT) = ₹ 8,750



Question 3

A firm has Sales of ₹ 40 lakhs; Variable cost of ₹ 25 lakhs; Fixed cost of ₹ 6 lakhs; 10% debt of ₹ 30 lakhs; and Equity Capital of ₹ 45 lakhs.

Required:

Calculate operating and financial leverage.

Answer

Calculation of Operating and Financial Leverage

	(₹)
Sales	40,00,000
Less: Variable cost	25,00,000
Contribution (C)	15,00,000
Less: Fixed cost	6,00,000
EBIT	9,00,000
Less: Interest	3,00,000
EBT	6,00,000

$$\text{Operating leverage} = \frac{C}{\text{EBIT}} = \frac{\text{₹ } 15,00,000}{\text{₹ } 9,00,000} = 1.67$$

$$\text{Financial leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{\text{₹ } 9,00,000}{\text{₹ } 6,00,000} = 1.50$$

Question 4

The following data relate to RT Ltd:

	(₹)
Earnings before interest and tax (EBIT)	10,00,000
Fixed cost	20,00,000
Earnings Before Tax (EBT)	8,00,000

Required: Calculate combined leverage.

Answer

Contribution:

$$\begin{aligned}
 C &= S - V \text{ and} \\
 \text{EBIT} &= C - F \\
 10,00,000 &= C - 20,00,000 \\
 \therefore C &= 30,00,000
 \end{aligned}$$

[C- Contribution, S- Sales, V- Variable cost, F- Fixed Cost]

$$\text{Operating leverage (OL)} = C / \text{EBIT} = 30,00,000 / 10,00,000 = 3 \text{ times}$$

$$\text{Financial leverage (FL)} = \text{EBIT} / \text{EBT} = 10,00,000 / 8,00,000 = 1.25 \text{ times}$$

$$\text{Combined leverage (CL)} = \text{OL} \times \text{FL} = 3 \times 1.25 = 3.75 \text{ times}$$

Question 5

A company operates at a production level of 1,000 units. The contribution is ₹ 60 per unit, operating leverage is 6, and combined leverage is 24. If tax rate is 30%, what would be its earnings after tax?

Answer**Computation of Earnings after tax**

$$\text{Contribution} = ₹ 60 \times 1,000 = ₹ 60,000$$

$$\text{Operating Leverage (OL)} \times \text{Financial Leverage (FL)} = \text{Combined Leverage (CL)}$$

$$6 \times \text{Financial Leverage} = 24$$

$$\therefore \text{Financial Leverage} = 4$$

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{₹ 60,000}{\text{EBIT}} = 6$$

$$\therefore \text{EBIT} = \frac{60,000}{6} = ₹ 10,000$$

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = 4$$

$$\therefore \text{EBT} = \frac{\text{EBIT}}{4} = \frac{10,000}{4} = ₹ 2,500$$

EBIT- Earnings before Interest and tax.

EBT- Earnings before tax.

Since tax rate = 30%

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$$\begin{aligned}\text{Earnings after Tax (EAT)} &= \text{EBT} (1 - 0.30) \text{ [30\% is tax rate]} \\ &= ₹2,500 (0.70)\end{aligned}$$

$$\therefore \text{Earnings after Tax (EAT)} = ₹1,750$$



Question 6

X Limited has estimated that for a new product its break-even point is 20,000 units if the item is sold for ₹ 14 per unit and variable cost ₹ 9 per unit. Calculate the degree of operating leverage for sales volume 25,000 units and 30,000 units.

Answer

Computation of Operating Leverage (OL)

Selling Price = ₹ 14 per unit

Variable Cost = ₹ 9 per unit

$$\text{Fixed Cost} = \text{BEP} \times (\text{Selling price} - \text{Variable cost}) = 20,000 \times (14 - 9) = 20,000 \times 5 = 1,00,000$$

Particulars	For 25,000 units (₹)	For 30,000 units (₹)
Sales (@ ₹14 /unit)	3,50,000	4,20,000
Less: Variable Cost (@ 9 unit)	2,25,000	2,70,000
Contribution	1,25,000	1,50,000
Less: Fixed Cost	1,00,000	1,00,000
Earnings before Interest and tax (EBIT)	25,000	50,000
OL $\left(\frac{\text{Contribution}}{\text{EBIT}} \right)$	$\left(\frac{1,25,000}{25,000} \right)$	$\left(\frac{1,50,000}{50,000} \right)$
OL	5 times	3 times

Question 7

Consider the following information for Strong Ltd:

	₹ in lakh
EBIT	1,120
PBT	320
Fixed Cost	700

Calculate the percentage of change in earnings per share, if sales increased by 5 per cent.

Answer

Percentage change in earning per share to the percentage change in sales is calculated through degree of combined leverage,.

Hence, Computation of percentage of change in earnings per share, if sales increased by 5%

$$\text{Degree of Combined leverage(DCL)} = \frac{\% \text{ change in Earning per share (EPS)}}{\% \text{ change in sales}}$$

Moreover, Degree of operating leverage (DOL) × Degree of Financial Leverage (DFL) = Degree of combined leverage (DCL)

$$\text{Or, DOL} \times \text{DFL} = \frac{\% \text{ change in Earning per share (EPS)}}{\% \text{ change in sales}}$$

$$\text{Or, } 1.625 \times 3.5 [\text{Refer to working notes (i) and (ii)}] = \frac{\% \text{ change in Earning per share (EPS)}}{5}$$

$$\text{Or, } 5.687 = \frac{\% \text{ change in Earning per share (EPS)}}{5}$$

$$\text{Or, } \% \text{ change in EPS} = 5.687 \times 5 = 28.4375\%$$

So, If sales is increased by 5 percent, Percentage of change in earning per share will be 28.4375 %

Working Notes:

$$(i) \text{ Degree of operating leverage (DOL)} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{(\text{₹ } 1,120 + \text{₹ } 700 \text{ lakhs})}{\text{₹ } 1,120 \text{ lakhs}} = 1.625$$

$$(ii) \text{ Degree of financial leverage (DFL)} = \frac{\text{EBIT}}{\text{PBT}} = \frac{\text{₹ } 1,120}{\text{₹ } 320} = 3.5$$



Question 8

The data relating to two companies are as given below:

	Company A	Company B
Equity Capital	₹ 6,00,000	₹ 3,50,000
12% Debentures	₹ 4,00,000	₹ 6,50,000
Output (units) per annum	60,000	15,000
Selling price/ unit	₹ 30	₹ 250
Fixed Costs per annum	₹ 7,00,000	₹ 14,00,000
Variable Cost per unit	₹ 10	₹ 75

You are required to calculate the Operating leverage, Financial leverage and Combined leverage of two Companies.

Answer

Computation of degree of Operating leverage, Financial leverage and Combined leverage of two companies

	Company A	Company B
Output units per annum	60,000	15,000
	(₹)	(₹)
Selling price / unit	30	250
Sales revenue	18,00,000 (60,000 units × ₹ 30)	37,50,000 (15,000 units × ₹ 250)
Less: Variable costs	6,00,000 (60,000 units × ₹ 10)	11,25,000 (15,000 units × ₹ 75)
Contribution (C)	12,00,000	26,25,000
Less: Fixed costs	7,00,000	14,00,000
EBIT (Earnings before Interest and tax)	5,00,000	12,25,000
Less: Interest @ 12% on debentures	48,000	78,000
PBT	4,52,000	11,47,000

$$\begin{aligned}
 \text{Operating Leverage} &= \frac{\text{Contribution}}{\text{EBIT}} && \frac{2.4}{(\text{₹ } 12,00,000 / 5,00,000)} && \frac{2.14}{(\text{₹ } 26,25,000 / \text{₹ } 12,25,000)} \\
 \text{Financial Leverage} &= \frac{\text{EBIT}}{\text{PBT}} && \frac{1.11}{(\text{₹ } 5,00,000 / \text{₹ } 4,52,000)} && \frac{1.07}{(\text{₹ } 12,25,000 / \text{₹ } 11,47,000)} \\
 \text{Combined Leverage} &= \text{DOL} \times \text{DFL} && \frac{2.66}{(2.4 \times 1.11)} && \frac{2.29}{(2.14 \times 1.07)}
 \end{aligned}$$

Question 9

The net sales of A Ltd. is ₹ 30 crores. Earnings before interest and tax of the company as a percentage of net sales is 12%. The capital employed comprises ₹ 10 crores of equity, ₹ 2 crores of 13% Cumulative Preference Share Capital and 15% Debentures of ₹ 6 crores. Income-tax rate is 40%.

- Calculate the Return-on-equity for the company and indicate its segments due to the presence of Preference Share Capital and Borrowing (Debentures).
- Calculate the Operating Leverage of the Company given that combined leverage is 3.

Answer

(i) Net Sales : ₹ 30 crores

EBIT = 12% on sales = ₹ 3.6 crores

Return on Capital Employed (pre-tax) = $\frac{\text{EBIT}}{\text{Capital Employed}} = \frac{3.6}{10+2+6} \times 100 = 20\%$

After tax it will be = 20% (1 - 0.4) = 12 %.

Particulars	₹ in crores
EBIT	3.6
Less: Interest on Debt (15% of 6 crores)	0.9
EBT	2.7
Less : Tax @ 40%	1.08
EAT	1.62
Less : Preference dividend	0.26
Earnings available for Equity Shareholders	1.36
Return on equity = $1.36/10 \times 100 = 13.6\%$	

Segments due to the presence of Preference Share capital and Borrowing (Debentures)

Segment of ROE due to preference capital : (12% - 13%) × ₹ 2 Crore = - 2%

Segment of ROE due to Debentures: (12% - 9%) × ₹ 6 Crores = 18 %

Total = - 2 % + 18 % = 16 %

Cost of debenture (after tax) = 15% (1 - 0.4) = 9 %

The weighted average cost of capital is as follows

Source	Proportion	Cost (%)	WACC (%)
(i) Equity	10/18	13.60	7.56
(ii) Preference shares	2/18	13.00	1.44
(iii) Debt	6/18	9.00	3.00
		Total	12.00

(ii) Financial Leverage = $\frac{\text{EBIT}}{\text{EBT}} = \frac{3.6}{2.7} = 1.33$

Combined Leverage = FL × OL

3 = 1.33 × OL Or, OL = $\frac{3}{1.33}$ Or, Operating Leverage = 2.26

Question 10

The following summarises the percentage changes in operating income, percentage changes in revenues, and betas for four pharmaceutical firms.

Firm	Change in revenue	Change in operating income	Beta
PQR Ltd.	27%	25%	1.00
RST Ltd.	25%	32%	1.15
TUV Ltd.	23%	36%	1.30
WXY Ltd.	21%	40%	1.40

Required:

- Calculate the degree of operating leverage for each of these firms. Comment also.
- Use the operating leverage to explain why these firms have different beta.

Answer

- (i) Degree of operating leverage = $\frac{\% \text{ Change in Operating income}}{\% \text{ Change in Revenues}}$
- | | | | | |
|----------|---|-------------|---|--------|
| PQR Ltd. | = | 25% / 27% | = | 0.9259 |
| RST Ltd. | = | 0.32 / 0.25 | = | 1.28 |
| TUV Ltd. | = | 0.36 / 0.23 | = | 1.5652 |
| WXY Ltd. | = | 0.40 / 0.21 | = | 1.9048 |

It is level specific.

- (ii) High operating leverage leads to high beta. So when operating leverage is lowest i.e. 0.9259, Beta is minimum (1) and when operating leverage is maximum i.e. 1.9048, beta is highest i.e. 1.40

Q3

Question 11

A Company had the following Balance Sheet as on March 31, 2006:

Liabilities and Equity	₹ (in crores)	Assets	₹ (in crores)
Equity Share Capital (one crore shares of ₹ 10 each)	10	Fixed Assets (Net)	25
Reserves and Surplus	2	Current Assets	15
15% Debentures	20		
Current Liabilities	8		
	40		40

The additional information given is as under:

Fixed Costs per annum (excluding interest)	₹ 8 crores
Variable operating costs ratio	65%
Total Assets turnover ratio	2.5
Income-tax rate	40%

Required:

Calculate the following and comment:

- Earnings per share
- Operating Leverage
- Financial Leverage
- Combined Leverage.

Answer

Total Assets = ₹ 40 crores

Total Asset Turnover Ratio i.e. $\frac{\text{Total Sales}}{\text{Total Assets}} = 2.5$

Hence, Total Sales = $40 \times 2.5 = ₹ 100 \text{ crores}$

Computation of Profits after Tax (PAT)

	(₹ in crores)
Sales	100
Less: Variable operating cost @ 65%	65
Contribution	35
Less: Fixed cost (other than Interest)	8
EBIT(Earning before interest and tax)	27
Less: Interest on debentures ($15\% \times 20$)	3
EBT(Earning before tax)	24
Less: Tax 40%	9.6
EAT (Earning after tax)	14.4

(i) Earnings per share

$$\therefore \text{EPS} = \frac{\text{₹ 14.4 crores}}{1 \text{ crore equity shares}} = ₹ 14.40$$

(ii) Operating Leverage

$$\text{Operating leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{35}{27} = 1.296$$

It indicates fixed cost in cost structure. It indicates sensitivity of earnings before interest and tax (EBIT) to change in sales at a particular level.

(iii) Financial Leverage

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{27}{24} = 1.125$$

The financial leverage is very comfortable since the debt service obligation is small vis-à-vis EBIT.

(iv) Combined Leverage

$$\text{Combined Leverage} = \frac{\text{Contribution}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{EBT}} = 1.296 \times 1.125 = 1.458$$

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-à-vis change in sales.

The leverages – operating, financial and combined are measures of risk.

Question 12

Annual sales of a company is ₹ 60,00,000. Sales to variable cost ratio is 150 per cent and Fixed cost other than interest is ₹ 5,00,000 per annum. Company has 11 per cent debentures of ₹ 30,00,000.

You are required to calculate the operating, Financial and combined leverage of the company.

Answer

Calculation of Leverages

Particulars	(₹)
Sales	60,00,000
Less: Variable Cost $\left(\text{Sales} \times \frac{100}{150} \right)$	40,00,000
Contribution	20,00,000
Less: Fixed Cost	5,00,000
EBIT	15,00,000
Less: Interest on Debentures	3,30,000
EBT	11,70,000

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{\text{₹ } 20,00,000}{\text{₹ } 15,00,000} = 1.3333$$

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{\text{₹ } 15,00,000}{\text{₹ } 11,70,000} = 1.2821$$

$$\begin{aligned} \text{Combined Leverage} &= \text{OL} \times \text{FL} \text{ or } \frac{\text{Contribution}}{\text{EBT}} \\ &= 1.3333 \times 1.2821 \text{ or } \frac{\text{₹ } 20,00,000}{\text{₹ } 11,70,000} = 1.7094 \end{aligned}$$



Question 13

Delta Ltd. currently has an equity share capital of ₹ 10,00,000 consisting of 1,00,000 Equity share of ₹ 10 each. The company is going through a major expansion plan requiring to raise funds to the tune of ₹ 6,00,000. To finance the expansion the management has following plans:

Plan-I : Issue 60,000 Equity shares of ₹ 10 each.

Plan-II : Issue 40,000 Equity shares of ₹ 10 each and the balance through long-term borrowing at 12% interest p.a.

Plan-III : Issue 30,000 Equity shares of ₹ 10 each and 3,000, 9% Debentures of ₹ 100 each.

Plan-IV : Issue 30,000 Equity shares of ₹ 10 each and the balance through 6% preference shares.

The EBIT of the company is expected to be ₹ 4,00,000 p.a. assume corporate tax rate of 40%.

Required:

(i) Calculate EPS in each of the above plans.

(ii) Ascertain financial leverage in each plan.

Answer

Sources of Capital	Plan I	Plan II	Plan III	Plan IV
Present Equity Shares	1,00,000	1,00,000	1,00,000	1,00,000
New Issue	60,000	40,000	30,000	30,000
Equity share capital (₹)	16,00,000	14,00,000	13,00,000	13,00,000
No. of Equity shares	1,60,000	1,40,000	1,30,000	1,30,000
12% Long term loan (₹)	—	2,00,000	—	—

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9% Debentures (₹)	—	—	3,00,000	—
6% Preference Shares (₹)	—	—	—	3,00,000

Computation of EPS and Financial Leverage

Sources of Capital	Plan I	Plan II	Plan III	Plan IV
EBIT (₹)	4,00,000	4,00,000	4,00,000	4,00,000
Interest on 12% Loan (₹)	—	24,000	—	—
Interest on 9% debentures (₹)	—	—	27,000	—
EBT (₹)	4,00,000	3,76,000	3,73,000	4,00,000
Less: Tax@ 40%	1,60,000	1,50,400	1,49,200	1,60,000
EAT (₹)	2,40,000	2,25,600	2,23,800	2,40,000
Less: Preference Dividends (₹)	—	—	—	18,000
(a) Net Earnings available for equity shares (₹)	2,40,000	2,25,600	2,23,800	2,22,000
(b) No. of equity shares	1,60,000	1,40,000	1,30,000	1,30,000
(c) EPS (a ÷ b) ₹	1.50	1.61	1.72	1.71
Financial leverage- $\left(\frac{\text{EBIT}}{\text{EBIT}-I} \right)$ or $\left(\frac{\text{EBIT}}{\text{EBT}^*} \right)$	1.00	1.06	1.07	1.08

* EBT is Earnings before tax but after interest and preference dividend in case of Plan IV.

Comments: Since the EPS and financial leverage both are highest in plan III, the management could accept it.

Question 14

Z Limited is considering the installation of a new project costing ₹ 80,00,000. Expected annual sales revenue from the project is ₹ 90,00,000 and its variable costs are 60 percent of sales. Expected annual fixed cost other than interest is ₹ 10,00,000. Corporate tax rate is 30 percent. The company wants to arrange the funds through issuing 4,00,000 equity shares of ₹ 10 each and 12 percent debentures of ₹ 40,00,000.

You are required to:

- Calculate the operating, financial and combined leverages and Earnings per Share (EPS).*
- Determine the likely level of EBIT, if EPS is ₹ 4, or ₹ 2, or Zero.*

Answer

(i) Calculation of Leverages and Earnings per Share (EPS)

Income Statement

Particulars	(₹)
Sales Revenue	90,00,000
Less: Variable Cost @ 60%	54,00,000
Contribution	36,00,000
Less: Fixed Cost other than Interest	10,00,000
Earnings before Interest and Tax (EBIT)	26,00,000
Less: Interest (12% on ₹ 40,00,000)	4,80,000
Earnings before tax (EBT)	21,20,000
Less: Tax @ 30%	6,36,000
Earnings after tax (EAT)/ Profit after tax (PAT)	14,84,000

1. Calculation of Operating Leverage (OL)

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{₹ 36,00,000}{26,00,000} = 1.3846$$

2. Calculation of Financial Leverage (FL)

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{₹ 26,00,000}{₹ 21,20,000} = 1.2264$$

3. Calculation of Combined Leverage (CL)

$$\text{Combined Leverage} = \text{OL} \times \text{FL} = 1.3846 \times 1.2264 = 1.6981$$

$$\text{Or, } \frac{\text{Contribution}}{\text{EBT}} = \frac{₹ 36,00,000}{₹ 21,20,000} = 1.6981$$

4. Calculation of Earnings per Share (EPS)

$$\text{EPS} = \frac{\text{EAT / PAT}}{\text{Number of Equity Shares}} = \frac{₹ 14,84,000}{4,00,000} = 3.71$$

(ii) Calculation of likely levels of EBIT at Different EPS

$$\text{EPS} = \frac{(\text{EBIT} - I)(1 - T)}{\text{Number of Equity Shares}}$$

(1) If EPS is ₹ 4

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$$4 = \frac{(EBIT - 4,80,000)(1 - 0.3)}{4,00,000} \text{ Or, } EBIT - ₹ 4,80,000 = \frac{₹ 16,00,000}{0.70}$$

$$EBIT - ₹ 4,80,000 = ₹ 22,85,714 \text{ Or, } EBIT = ₹ 27, 65,714$$

(2) If EPS is ₹ 2

$$2 = \frac{(EBIT - ₹ 4,80,000)(1 - 0.3)}{₹ 4,00,000} \text{ Or, } EBIT - ₹ 4,80,000 = \frac{₹ 8,00,000}{0.70}$$

$$EBIT - ₹ 4,80,000 = ₹ 11,42,857 \text{ Or, } EBIT = ₹ 16, 22,857$$

(3) If EPS is ₹ Zero

$$0 = \frac{(EBIT - ₹ 4,80,000)(1 - 0.3)}{₹ 4,00,000} \text{ Or, } EBIT = ₹ 4,80,000$$



Question 15

The following details of RST Limited for the year ended 31st March, 2015 are given below:

Operating leverage	1.4
Combined leverage	2.8
Fixed Cost (Excluding interest)	₹ 2.04 lakhs
Sales	₹ 30.00 lakhs
12% Debentures of ₹ 100 each	₹ 21.25 lakhs
Equity Share Capital of ₹ 10 each	₹ 17.00 lakhs
Income tax rate	30 per cent

Required:

- Calculate Financial leverage
- Calculate P/V ratio and Earning per Share (EPS)
- If the company belongs to an industry, whose assets turnover is 1.5, does it have a high or low assets turnover?
- At what level of sales the Earning before Tax (EBT) of the company will be equal to zero?

Answer

(i) Financial leverage

$$\text{Combined Leverage} = \text{Operating Leverage (OL)} \times \text{Financial Leverage (FL)}$$

$$2.8 = 1.4 \times \text{FL} \quad \text{Or, } \text{FL} = 2$$

$$\text{Financial Leverage} = 2$$

(ii) P/V Ratio and EPS

$$\text{Operating leverage} = \frac{\text{Contribution (C)}}{C - \text{Fixed Cost (FC)}} \times 100$$

$$1.4 = \frac{C}{C - 2,04,000} \quad \text{Or, } 1.4 (C - 2,04,000) = C$$

$$\text{Or, } 1.4 C - 2,85,600 = C \quad \text{Or, } C = \frac{₹ 2,85,600}{0.4} = ₹ 7,14,000$$

$$\text{Now, P/V ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 = \frac{₹ 7,14,000}{₹ 30,00,000} \times 100 = 23.8\%$$

Therefore, P/V Ratio = 23.8%

$$\text{EPS} = \frac{\text{Profit after tax}}{\text{No. of equity shares}}$$

$$\begin{aligned} \text{EBT} &= \text{Sales} - V - \text{FC} - \text{Interest} \\ &= ₹ 30,00,000 - ₹ 22,86,000 - ₹ 2,04,000 - ₹ 2,55,000 \\ &= ₹ 2,55,000 \end{aligned}$$

$$\begin{aligned} \text{PAT} &= \text{EBT} - \text{Tax} \\ &= ₹ 2,55,000 - ₹ 76,500 = ₹ 1,78,500 \end{aligned}$$

$$\text{EPS} = \frac{₹ 1,78,500}{₹ 1,70,000} = 1.05$$

(iii) Assets turnover

$$\text{Assets turnover} = \frac{\text{Sales}}{\text{Total Assets}} = \frac{₹ 30,00,000}{₹ 38,25,000} = 0.784$$

0.784 < 1.5 means lower than industry turnover.

(iv) EBT zero means 100% reduction in EBT. Since combined leverage is 2.8, sales have to be dropped by $100/2.8 = 35.71\%$. Hence new sales will be

$$₹ 30,00,000 \times (100 - 35.71) = ₹ 19,28,700.$$

Therefore, at ₹ 19,28,700 level of sales, the Earnings before Tax of the company will be equal to zero.



Question 16

From the following financial data of Company A and Company B: Prepare their Income Statements.

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	Company A (₹)	Company B (₹)
Variable Cost	56,000	60% of sales
Fixed Cost	20,000	-
Interest Expenses	12,000	9,000
Financial Leverage	5 : 1	-
Operating Leverage	-	4 : 1
Income Tax Rate	30%	30%
Sales	-	1,05,000

Answer

Income Statements of Company A and Company B

	Company A (₹)	Company B (₹)
Sales	91,000	1,05,000
Less: Variable cost	56,000	63,000
Contribution	35,000	42,000
Less: Fixed Cost	20,000	31,500
Earnings before interest and tax (EBIT)	15,000	10,500
Less: Interest	12,000	9,000
Earnings before tax (EBT)	3,000	1,500
Less: Tax @ 30%	900	450
Earnings after tax (EAT)	2,100	1,050

Working Notes:

Company A

$$(i) \text{ Financial Leverage} = \frac{\text{EBIT}}{\text{EBT i.e EBIT} - \text{Interest}}$$

$$\text{So, } 5 = \frac{\text{EBIT}}{\text{EBIT} - 12,000}$$

$$\text{Or, } 5 (\text{EBIT} - 12,000) = \text{EBIT}$$

$$\text{Or, } 4 \text{ EBIT} = 60,000$$

$$\text{Or, EBIT} = ₹15,000$$

$$(ii) \text{ Contribution} = \text{EBIT} + \text{Fixed Cost} \\ = ₹ 15,000 + ₹ 20,000 = ₹ 35,000$$

$$\begin{aligned}
 \text{(iii) Sales} &= \text{Contribution} + \text{Variable cost} \\
 &= ₹ 35,000 + ₹ 56,000 \\
 &= ₹ 91,000
 \end{aligned}$$

Company B

$$\begin{aligned}
 \text{(i) Contribution} &= 40\% \text{ of Sales (as Variable Cost is 60\% of Sales)} \\
 &= 40\% \text{ of } 1,05,000 = ₹ 42,000
 \end{aligned}$$

$$\begin{aligned}
 \text{(ii) Operating Leverage} &= \frac{\text{Contribution}}{\text{EBIT}} \quad \text{Or, } 4 = \frac{₹ 42,000}{\text{EBIT}} \\
 \text{EBIT} &= \frac{₹ 42,000}{4} = ₹ 10,500
 \end{aligned}$$

$$\text{(iii) Fixed Cost} = \text{Contribution} - \text{EBIT} = 42,000 - 10,500 = ₹ 31,500$$

Question 17

Calculate the operating leverage, financial leverage and combined leverage for the following firms and interpret the results:

	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	10.0
Interest Expense (₹)	75,000	25,000	-

Answer

Estimation of Degree of Operating Leverage (DOL), Degree of Financial Leverage (DFL) and Degree of Combined Leverage (DCL)

	P	Q	R
Output (in units)	2,50,000	1,25,000	7,50,000
	₹	₹	₹
Selling Price (per unit)	7.50	7	10
Sales Revenues (Output × Selling Price)	18,75,000	8,75,000	75,00,000
Less: Variable Cost (Output × Variable Cost)	12,50,000	2,50,000	56,25,000
Contribution Margin	6,25,000	6,25,000	18,75,000
Less: Fixed Cost	5,00,000	2,50,000	10,00,000
Earnings before Interest and Tax (EBIT)	1,25,000	3,75,000	8,75,000

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Less: Interest Expense	75,000	25,000	-
Earnings before Tax (EBT)	50,000	3,50,000	8,75,000
$DOL = \frac{\text{Contribution}}{\text{EBIT}}$	5	1.67	2.14
$DFL = \frac{\text{EBIT}}{\text{EBT}}$	2.5	1.07	1.00
$DCL = DOL \times DFL$	12.5	1.79	2.14
Comment	Aggressive Policy	Moderate Policy	Moderate Policy with no financial leverage

Question 18

Calculate the operating leverage, financial leverage and combined leverage for the following firms:

Particulars	N	S	D
Production (in units)	17,500	6,700	31,800
Fixed costs (₹)	4,00,000	3,50,000	2,50,000
Interest on loan (₹)	1,25,000	75,000	Nil
Selling price per unit (₹)	85	130	37
Variable cost per unit (₹)	38.00	42.50	12.00

Answer

Computation of Degree of Operating Leverage (DOL), Degree of Financial Leverage (DFL) and Degree of Combined Leverage (DCL)

Particulars	Firm N	Firm S	Firm D
Output (Units)	17,500	6,700	31,800
	₹	₹	₹
Selling Price/Unit	85	130	37
Sales Revenue (Output x Selling Price per Unit) (A)	14,87,500	8,71,000	11,76,600
Variable Cost/Unit	38.00	42.50	12.00

Less: Total Variable Cost (Output x Variable Cost per Unit) (B)	6,65,000	2,84,750	3,81,600
Contribution (C) (A-B)	8,22,500	5,86,250	7,95,000
Less: Fixed Cost	4,00,000	3,50,000	2,50,000
Earnings before Interest and Tax (EBIT)	4,22,500	2,36,250	5,45,000
Less: Interest on Loan	1,25,000	75,000	Nil
EBT	2,97,500	1,61,250	5,45,000
Operating Leverage (OL) = $\frac{C}{EBIT}$	$\frac{8,22,500}{4,22,500}$	$\frac{5,86,250}{2,36,250}$	$\frac{7,95,000}{5,45,000}$
	= 1.95	= 2.48	= 1.46
Financial Leverage (FL) $= \frac{EBIT}{PBT}$	$\frac{4,22,500}{2,97,500}$	$\frac{2,36,250}{1,61,250}$	$\frac{5,45,000}{5,45,000}$
	= 1.42	= 1.47	= 1.00
Combined Leverage (CL) = OL x FL	1.95 x 1.42	2.48 x 1.47	1.46 x 1
OR	= 2.77	= 3.65	= 1.46
$CL = \frac{\text{Contribution}}{EBT}$	$\frac{8,22,500}{2,97,500} = 2.77$	$\frac{5,86,250}{1,61,250} = 3.64$	$\frac{7,95,000}{5,45,000} = 1.46$

Question 19

The following information related to XL Company Ltd. for the year ended 31st March, 2016 are available to you:

Equity share capital of ₹ 10 each	₹ 25 lakh
11% Bonds of ₹ 1000 each	₹ 18.5 lakh
Sales	₹ 42 lakh
Fixed cost (Excluding Interest)	₹ 3.48 lakh
Financial leverage	1.39
Profit-Volume Ratio	25.55%
Income Tax Rate Applicable	35%

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You are required to calculate:

- (i) *Operating Leverage;*
- (ii) *Combined Leverage; and*
- (iii) *Earning per Share.*

Answer

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

$$\text{So, } 25.55 = \frac{\text{Contribution}}{\text{₹42,00,000}} \times 100 \quad \text{Or, Contribution} = 42,00,000 \times 25.55$$

$$\text{Contribution} = \text{₹10,73,100}$$

Income Statement

Particulars	(₹)
Sales	42,00,000
Variable Cost (Sales - Contribution)	31,26,900
Contribution	10,73,100
Fixed Cost	3,48,000
EBIT	7,25,000
Interest	2,03,500
EBT(EBIT – Interest)	5,21,600
Tax	1,82,500
Profit after Tax (EBT – Tax)	3,39,040

$$(i) \quad \text{Operating Leverage} = \frac{\text{Contribution}}{\text{Earnings before interest and tax(EBIT)}}$$

$$\begin{aligned} \text{Or, } \frac{\text{Contribution}}{\text{Contribution - Fixed Cost}} &= \frac{\text{₹10,73,100}}{\text{₹10,73,100 - ₹3,48,000}} \\ &= \frac{\text{₹10,73,100}}{\text{₹7,25,100}} = 1.48 \end{aligned}$$

$$\begin{aligned} (ii) \quad \text{Combined Leverage} &= \text{Operating Leverage} \times \text{Financial Leverage} \\ &= 1.48 \times 1.39 = 2.06 \end{aligned}$$

$$\text{Or, } \frac{\text{Contribution}}{\text{EBT}} \quad \text{i.e.} \quad \frac{\text{₹10,73,100}}{\text{₹5,21,600}} = 2.06$$

(iii) Earnings per Share (EPS)

$$\text{EPS} = \frac{\text{PAT}}{\text{No. of Share}} = \frac{\text{₹ 3,39,040}}{\text{₹ 2,50,000}} = 1.3561$$

$$\text{EPS} = 1.36$$

Question 20

The Capital structure of RST Ltd. is as follows:

	(₹)
Equity Share of ₹ 10 each	8,00,000
10% Preference Share of ₹ 100 each	5,00,000
12% Debentures of ₹ 100 each	7,00,000
	20,00,000

Additional Information:

- Profit after tax (Tax Rate 30%) are ₹ 2,80,000
- Operating Expenses (including Depreciation ₹ 96,800) are 1.5 times of EBIT
- Equity Dividend paid is 15%
- Market price of Equity Share is ₹ 23

Calculate:

- (i) Operating and Financial Leverage
- (ii) Cover for preference and equity dividend
- (iii) The Earning Yield Ratio and Price Earning Ratio
- (iv) The Net Fund Flow

Answer

Working Notes:

	(₹)
Net Profit after Tax	2,80,000
Tax @ 30%	1,20,000
EBT	4,00,000
Interest on Debentures	84,000
EBIT	4,84,000
Operating Expenses (1.5 times of EBIT)	7,26,000
Sales	12,10,000

(i) Operating Leverage

$$= \frac{\text{Contribution}}{\text{EBIT}} = \frac{\text{₹ } (12,10,000 - 6,29,200)}{\text{₹ } 4,84,000} = \frac{\text{₹ } 5,80,800}{\text{₹ } 4,84,000} = 1.2 \text{ times}$$

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{4,84,000}{4,00,000} = 1.21 \text{ times}$$

(ii) Cover for Preference Dividend

$$= \frac{\text{PAT}}{\text{Preference Share Dividend}}$$

$$= \frac{\text{₹ } 2,80,000}{\text{₹ } 50,000} = 5.6 \text{ times}$$

Cover for Equity Dividend

$$= \frac{(\text{PAT} - \text{Preference Dividend})}{\text{Equity Share Dividend}} = \frac{\text{₹ } (2,80,000 - 50,000)}{\text{₹ } 1,20,000}$$

$$= \frac{\text{₹ } 2,30,000}{\text{₹ } 1,20,000} = 1.92 \text{ times}$$

(iii) Earning Yield Ratio

$$= \frac{\text{EPS}}{\text{Market Price}} \times 100$$

$$= \left(\frac{\frac{2,30,000}{80,000} \times 100}{23} \right)$$

$$= \frac{2.875}{23} \times 100 = 12.5\%$$

Price – Earnings Ratio (PE Ratio)

$$= \frac{\text{Market Price}}{\text{EPS}} = \frac{23}{2.875}$$

$$= 8 \text{ times}$$

(iv) Net Funds Flow

$$= \text{Net PAT} + \text{Depreciation} - \text{Total Dividend}$$

$$= \text{₹ } 2,80,000 + \text{₹ } 96,800 - \text{₹ } (50,000 + 1,20,000)$$

$$= ₹ 3,76,800 - ₹ 1,70,000$$

$$\text{Net Funds Flow} = ₹ 2,06,800$$

Question 21

Following information are related to four firms of the same industry:

Firm	Change in Revenue	Change in Operating Income	Change in Earning per Share
P	27%	25%	30%
Q	25%	32%	24%
R	23%	36%	21%
S	21%	40%	23%

Find out:

- degree of operating leverage, and
- degree of combined leverage for all the firms.

Answer

Calculation of Degree of Operating leverage and Degree of Combined leverage

Firm	Degree of Operating Leverage (DOL) = $\frac{\% \text{ change in Operating Income}}{\% \text{ change in Revenue}}$	Degree of Combined Leverage (DCL) = $\frac{\% \text{ change in EPS}}{\% \text{ change in Revenue}}$
P	$\frac{25\%}{27\%} = 0.926$	$\frac{30\%}{27\%} = 1.111$
Q	$\frac{32\%}{25\%} = 1.280$	$\frac{24\%}{25\%} = 0.960$
R	$\frac{36\%}{23\%} = 1.565$	$\frac{21\%}{23\%} = 0.913$
S	$\frac{40\%}{21\%} = 1.905$	$\frac{23\%}{21\%} = 1.095$

Question 22

The capital structure of ABC Ltd. as at 31.3.15 consisted of ordinary share capital of ₹ 5,00,000 (face value ₹ 100 each) and 10% debentures of ₹ 5,00,000 (₹ 100 each). In the year ended with March 15, sales decreased from 60,000 units to 50,000 units. During this year and in the

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previous year, the selling price was ₹ 12 per unit; variable cost stood at ₹ 8 per unit and fixed expenses were at ₹ 1,00,000 p.a. The income tax rate was 30%.

You are required to calculate the following:

- The percentage of decrease in earnings per share.
- The degree of operating leverage at 60,000 units and 50,000 units.
- The degree of financial leverage at 60,000 units and 50,000 units.

Answer

Sales in units	60,000 (₹)	50,000 (₹)
Sales Value	7,30,000	6,00,000
Variable Cost	(4,80,000)	(4,00,000)
Contribution	2,40,000	2,00,000
Fixed expenses	(1,00,000)	(1,00,000)
EBIT	1,40,000	1,00,000
Debenture Interest	(50,000)	(50,000)
EBT	90,000	50,000
Tax @ 30%	(27,000)	(15,000)
Profit after tax (PAT)	63,000	35,000

$$(i) \text{ Earnings per share (EPS)} = \frac{63,000}{5,000} = ₹ 12.6 \quad \frac{35,000}{5,000} = ₹ 7$$

$$\text{Decrease in EPS} = 12.6 - 7 = 5.6$$

$$\% \text{ decrease in EPS} = \frac{5.6}{12.6} \times 100 = 44.44\%$$

$$(ii) \text{ Operating leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{₹ 2,40,000}{₹ 1,40,000} = 1.71 \quad \frac{₹ 2,00,000}{₹ 1,00,000} = 2$$

$$(iii) \text{ Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{₹ 1,40,000}{₹ 90,000} = 1.56 \quad \frac{₹ 1,00,000}{₹ 50,000} = 2$$

**Question 23**

From the following details of X Ltd., prepare the Income Statement for the year ended 31st December, 2014:

Financial Leverage	2
Interest	₹ 2,000
Operating Leverage	3
Variable cost as a percentage of sales	75%
Income tax rate	30%

Answer**Workings:**

$$(i) \text{ Financial Leverage} = \frac{\text{EBIT}}{\text{EBIT} - \text{Interest}} \quad \text{Or, } 2 = \frac{\text{EBIT}}{\text{EBIT} - ₹ 2,000}$$

$$\text{Or, EBIT} = ₹ 4,000$$

$$(ii) \text{ Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} \quad \text{Or, } 3 = \frac{\text{Contribution}}{₹ 4,000}$$

$$\text{Or, Contribution} = ₹ 12,000$$

$$(iii) \text{ Sales} = \frac{\text{Contribution}}{\text{P/V Ratio}} = \frac{₹ 12,000}{25\%} = ₹ 48,000$$

$$(iv) \text{ Fixed Cost} = \text{Contribution} - \text{Fixed cost} = \text{EBIT}$$

$$= ₹ 12,000 - \text{Fixed cost} = ₹ 4,000 \quad \text{Or, Fixed cost} = ₹ 8,000$$

Income Statement for the year ended 31st December 2014

Particulars	Amount (₹)
Sales	48,000
Less: Variable Cost (75% of ₹ 48,000)	(36,000)
Contribution	12,000
Less: Fixed Cost (Contribution - EBIT)	(8,000)
Earnings Before Interest and Tax (EBIT)	4,000
Less: Interest	(2,000)
Earnings Before Tax (EBT)	2,000
Less: Income Tax @ 30%	(600)
Earnings After Tax (EAT or PAT)	1,400

**Question 24**

A firm has sales of ₹ 75,00,000 variable cost is 56% and fixed cost is ₹ 6,00,000. It has a debt of ₹ 45,00,000 at 9% and equity of ₹ 55,00,000.

- (i) What is the firm's ROI?
- (ii) Does it have favourable financial leverage?
- (iii) If the firm belongs to an industry whose capital turnover is 3, does it have a high or low capital turnover?
- (iv) What are the operating, financial and combined leverages of the firm?
- (v) If the sales is increased by 10% by what percentage EBIT will increase?
- (vi) At what level of sales the EBT of the firm will be equal to zero?
- (vii) If EBIT increases by 20%, by what percentage EBT will increase?

Answer**Income Statement**

Particulars	Amount (₹)
Sales	75,00,000
Less: Variable cost (56% of 75,00,000)	42,00,000
Contribution	33,00,000
Less: Fixed costs	6,00,000
Earnings before interest and tax (EBIT)	27,00,000
Less: Interest on debt (@ 9% on ₹ 45 lakhs)	4,05,000
Earnings before tax (EBT)	22,95,000

$$\begin{aligned}
 \text{(i) ROI} &= \frac{\text{EBIT}}{\text{Capital employed}} \times 100 = \frac{\text{EBIT}}{\text{Equity} + \text{Debt}} \times 100 \\
 &= \frac{\text{₹ } 27,00,000}{\text{₹ } (55,00,000 + 45,00,000)} \times 100 = 27\%
 \end{aligned}$$

(ROI is calculated on Capital Employed)

- (ii) ROI = 27% and Interest on debt is 9%, hence, it has a favourable financial leverage.

$$\text{(iii) Capital Turnover} = \frac{\text{Net Sales}}{\text{Capital}}$$

$$O_r = \frac{\text{Net Sales}}{\text{Capital}} = \frac{\text{₹ } 75,00,000}{\text{₹ } 1,00,00,000} = 0.75$$

Which is very low as compared to industry average of 3.

(iv) Calculation of Operating, Financial and Combined leverages

$$(a) \text{ Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{\text{₹ } 33,00,000}{\text{₹ } 27,00,000} = 1.22 \text{ (approx)}$$

$$(b) \text{ Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{\text{₹ } 27,00,000}{\text{₹ } 22,95,000} = 1.18 \text{ (approx)}$$

$$(c) \text{ Combined Leverage} = \frac{\text{Contribution}}{\text{EBT}} = \frac{\text{₹ } 33,00,000}{\text{₹ } 22,95,000} = 1.44 \text{ (approx)}$$

$$O_r = \text{Operating Leverage} \times \text{Financial Leverage} = 1.22 \times 1.18 = 1.44 \text{ (approx)}$$

(v) Operating leverage is 1.22. So if sales is increased by 10%.

EBIT will be increased by 1.22×10 i.e. 12.20% (approx)

(vi) Since the combined Leverage is 1.44, sales have to drop by $100/1.44$ i.e. 69.44% to bring EBT to Zero

$$\begin{aligned} \text{Accordingly, New Sales} &= \text{₹ } 75,00,000 \times (1 - 0.6944) \\ &= \text{₹ } 75,00,000 \times 0.3056 \\ &= \text{₹ } 22,92,000 \text{ (approx)} \end{aligned}$$

Hence at ₹ 22,92,000 sales level EBT of the firm will be equal to Zero.

(vii) Financial leverage is 1.18. So, if EBIT increases by 20% then EBT will increase by $1.18 \times 20 = 23.6\%$ (approx)

Ch - 6 - Investment Decision

BASIC CONCEPTS AND FORMULAE

1. Capital Budgeting	- Capital budgeting is the process of evaluating and selecting long-term investments that are in line with the goal of investor's wealth maximization. The capital budgeting decisions are important, crucial and critical business decisions due to substantial expenditure involved; long period for the recovery of benefits; irreversibility of decisions and the complexity involved in capital investment decisions. - One of the most important tasks in capital budgeting is estimating future cash flows for a project. The final decision we make at the end of the capital budgeting process is no better than the accuracy of our cash-flow estimates. - Tax payments like other payments must be properly deducted in deriving the cash flows. That is, cash flows must be defined in post-tax terms.
2. Calculating Cash Flows	It is helpful to place project cash flows into three categories: a) Initial Cash Outflow The initial cash out flow for a project is calculated as follows:- Cost of New Asset(s) + Installation/Set-Up Costs + (-)Increase (Decrease) in Net Working Capital Level - Net Proceeds from sale of Old Asset (<i>If it is a replacement situation</i>) <u>+(-) Taxes (tax saving) due to sale of Old Asset (<i>If it is a replacement situation</i>)</u> = Initial Cash Outflow

	b) Interim Incremental Cash Flows After making the initial cash outflow that is necessary to begin implementing a project, the firm hopes to benefit from the future cash inflows generated by the project. It is calculated as follows:- Net increase (decrease) in Operating Revenue - (+) <u>Net increase (decrease) in Operating Expenses excluding depreciation</u> = Net change in income before taxes - (+) <u>Net increase (decrease) in taxes</u> = Net change in income after taxes + (-) <u>Net increase (decrease) in tax depreciation charges</u> = <u>Incremental net cash flow for the period</u> c) Terminal-Year Incremental Net Cash Flow For the purpose of Terminal Year we will first calculate the incremental net cash flow for the period as calculated in point b) above and further to it we will make adjustments in order to arrive at Terminal-Year Incremental Net Cash flow as follows:- Incremental net cash flow for the period + (-) Final salvage value (disposal costs) of asset - (+) Taxes (tax saving) due to sale or disposal of asset + (-) <u>Decreased (increased) level of Net Working Capital</u> = <u>Terminal Year incremental net cash flow</u>
3. Techniques of Capital Budgeting	(a) Traditional (non-discounted) The most common traditional capital budgeting techniques are Payback Period and Accounting (Book) Rate of Return. (b) Time-adjusted (discounted) The most common time-adjusted capital budgeting techniques are Net Present Value Technique, Profitability Index, Internal Rate of Return Method, Modified Internal Rate of Return and Discounted Payback period.

4. Payback Period	The payback period of an investment is the length of time required for the cumulative total net cash flows from the investment to equal the total initial cash outlays. $\text{Payback period} = \frac{\text{Total initial capital investment}}{\text{Annual expected after-tax net cash flow}}$ Payback Reciprocal: It is the reciprocal of payback period. $\text{Payback Reciprocal} = \frac{\text{Average annual cash in flow}}{\text{Initial investment}}$
5. Accounting (Book) Rate of Return:	The accounting rate of return of an investment measures the average annual net income of the project (incremental income) as a percentage of the investment. $\text{Accounting rate of return} = \frac{\text{Average annual net income}}{\text{Investment}}$
6. Net Present Value Technique:	The net present value method uses a specified discount rate to bring all subsequent net cash inflows after the initial investment to their present values (the time of the initial investment or year 0). Net present value = Present value of net cash flow - Total net initial investment
7. Desirability Factor/Profitability Index	In certain cases we have to compare a number of proposals each involving different amounts of cash inflows, then we use 'Desirability factor', or 'Profitability index'. The desirability factor is calculated as below: $\frac{\text{Sum of discounted cash in flows}}{\text{Initial cash outlay Or Total discounted cash outflow (as the case may)}}$
8. Internal Rate of Return Method	Internal rate of return for an investment proposal is the discount rate that equates the present value of the expected net cash flows with the initial cash outflow.
9. Multiple Internal Rate of Return	In cases where project cash flows change signs or reverse during the life of a project e.g. an initial cash outflow is followed by cash inflows and subsequently followed by a major cash outflow, there may be more than one IRR.

10. Modified Internal Rate of Return (MIRR)

Under this method, all cash flows, apart from the initial investment, are brought to the terminal value using an appropriate discount rate (usually the Cost of Capital). This results in a single stream of cash inflow in the terminal year. The MIRR is obtained by assuming a single outflow in the zeroth year and the terminal cash inflow as mentioned above. The discount rate which equates the present value of the terminal cash in flow to the zeroth year outflow is called the MIRR.

SECTION-A**Question 1**

Do the profitability index and the NPV criterion of evaluating investment proposals lead to the same acceptance-rejection and ranking decisions? In what situations will they give conflicting results?

Answer

In the most of the situations the Net Present Value Method (NPV) and Profitability Index (PI) yield same accept or reject decision. In general items, under PI method a project is acceptable if profitability index value is greater than 1 and rejected if it less than 1. Under NPV method a project is acceptable if Net present value of a project is positive and rejected if it is negative. Clearly a project offering a profitability index greater than 1 must also offer a net present value which is positive. But a conflict may arise between two methods if a choice between mutually exclusive projects has to be made. Consider the following example:

	<i>Project A</i>	<i>Project B</i>
PV of Cash inflows	2,00,000	1,00,000
Initial cash outflows	<u>1,00,000</u>	<u>40,000</u>
Net present value	1,00,000	60,000
P.I	$\frac{2,00,000}{1,00,000} = 2$	$\frac{1,00,000}{40,000} = 2.5$

According to NPV method, project A would be preferred, whereas according to profitability index method project B would be preferred.

This is because Net present value gives ranking on the basis of absolute value of rupees, whereas, profitability index gives ranking on the basis of ratio. Although PI method is based on NPV, it is a better evaluation technique than NPV in a situation of capital rationing.

Question 2

Distinguish between Net Present Value and Internal Rate of Return.

Answer

NPV versus IRR: NPV and IRR methods differ in the sense that the results regarding the choice of an asset under certain circumstances are mutually contradictory under two methods. In case of mutually exclusive investment projects, in certain situations, they may give contradictory results such that if the NPV method finds one proposal acceptable, IRR favours another. The different rankings given by the NPV and IRR methods could be due to size disparity problem, time disparity problem and unequal expected lives.

The net present value is expressed in financial values whereas internal rate of return (IRR) is expressed in percentage terms.

In the net present value cash flows are assumed to be re-invested at cost of capital rate. In IRR reinvestment is assumed to be made at IRR rates.

Question 3

Write a short note on internal rate of return.

Answer

Internal Rate of Return: It is that rate at which discounted cash inflows are equal to the discounted cash outflows. In other words, it is the rate which discounts the cash flows to zero. It can be stated in the form of a ratio as follows:

$$\frac{\text{Cash inflows}}{\text{Cash Outflows}} = 1$$

This rate is to be found by trial and error method. This rate is used in the evaluation of investment proposals. In this method, the discount rate is not known but the cash outflows and cash inflows are known.

In evaluating investment proposals, internal rate of return is compared with a required rate of return, known as cut-off rate. If it is more than cut-off rate the project is treated as acceptable; otherwise project is rejected.

Question 4

What do you understand by desirability factor/profitability index?

Answer**Desirability Factor/Profitability Index**

In certain cases we have to compare a number of proposals each involving different amount of cash inflows. One of the methods of comparing such proposals is to work out what is known as the 'Desirability factor' or 'Profitability index'. In general terms, a project is acceptable if its profitability index value is greater than 1.

6.6 Financial Management

Mathematically, the desirability factor is calculated as below:

$$\frac{\text{Sum of Discounted Cash inflows}}{\text{Initial Cash outlay or Total Discounted Cash outflow (as the case may be)}}$$

Question 5

Write a short note on "Cut - off Rate".

Answer

Cut - off Rate: It is the minimum rate which the management wishes to have from any project. Usually this is based upon the cost of capital. The management gains only if a project gives return of more than the cut - off rate. Therefore, the cut - off rate can be used as the discount rate or the opportunity cost rate.

Question 6

Define Modified Internal Rate of Return method.

Answer

Modified Internal Rate of Return (MIRR): There are several limitations attached with the concept of the conventional Internal Rate of Return. The MIRR addresses some of these deficiencies. For example, it eliminates multiple IRR rates; it addresses the reinvestment rate issue and produces results, which are consistent with the Net Present Value method.

Under this method, all cash flows, apart from the initial investment, are brought to the terminal value using an appropriate discount rate (usually the cost of capital). This results in a single stream of cash inflow in the terminal year. The MIRR is obtained by assuming a single outflow in the zeroth year and the terminal cash inflow as mentioned above. The discount rate which equates the present value of the terminal cash in flow to the zeroth year outflow is called the MIRR.

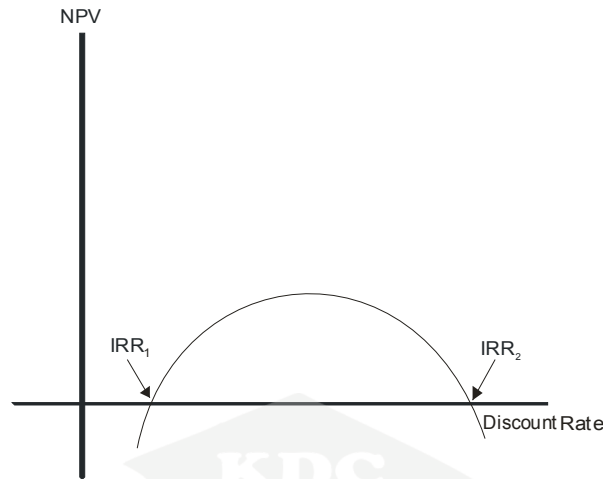
Question 7

Explain the concept of Multiple Internal Rate of Return.

Answer

Multiple Internal Rate of Return (MIRR)

In cases where project cash flows change signs or reverse during the life of a project for example, an initial cash outflow is followed by cash inflows and subsequently followed by a major cash outflow; there may be more than one internal rate of return (IRR). The following graph of discount rate versus net present value (NPV) may be used as an illustration:



In such situations if the cost of capital is less than the two IRRs, a decision can be made easily, however, otherwise the IRR decision rule may turn out to be misleading as the project should only be invested if the cost of capital is between IRR_1 and IRR_2 . To understand the concept of multiple IRRs it is necessary to understand the implicit re-investment assumption in both NPV and IRR techniques.

Question 8

Explain the concept of discounted payback period.

Answer

Concept of Discounted Payback Period

Payback period is time taken to recover the original investment from project cash flows. It is also termed as break even period. The focus of the analysis is on liquidity aspect and it suffers from the limitation of ignoring time value of money and profitability. Discounted payback period considers present value of cash flows, discounted at company's cost of capital to estimate breakeven period i.e. it is that period in which future discounted cash flows equal the initial outflow. The shorter the period, better it is. It also ignores post discounted payback period cash flows.

Question 9

Distinguish between Net Present Value (NPV) and Internal Rate of Return (IRR) methods for evaluating projects.

Answer

Distinguish between Net Present Value (NPV) and Internal Rate of Return (IRR)

NPV and IRR methods differ in the sense that the results regarding the choice of an asset under certain circumstances are mutually contradictory under two methods. In case of mutually

exclusive investment projects, in certain situations, they may give contradictory results such that if the NPV method finds one proposal acceptable, IRR favours another. The different rankings given by the NPV and IRR methods could be due to size disparity problem, time disparity problem and unequal expected lives.

The net present value is expressed in financial values whereas internal rate of return (IRR) is expressed in percentage terms.

In the net present value cash flows are assumed to be re-invested at cost of capital rate. In IRR reinvestment is assumed to be made at IRR rates.

SECTION-B

Question 1

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

Answer

Statement showing the Evaluation of Two Machines

<i>Machines</i>	<i>A</i>	<i>B</i>
Purchase cost (₹): (i)	1,50,000	1,00,000
Life of machines (years)	3	2
Running cost of machine per year (₹): (ii)	40,000	60,000
Cumulative present value factor for 1-3 years @ 10%: (iii)	2.486	-
Cumulative present value factor for 1-2 years @ 10%: (iv)	-	1.735
Present value of running cost of machines (₹): (v)	99,440	1,04,100
	[(ii) × (iii)]	[(ii) × (iv)]
Cash outflow of machines (₹): (vi)=(i) +(v)	2,49,440	2,04,100
Equivalent present value of annual cash outflow	1,00,338	1,17,637
	[(vi) ÷ (iii)]	[(vi) ÷ (iv)]

Decision: Company X should buy machine A since its equivalent cash outflow is less than machine B.

Question 2

A company proposes to install a machine involving a Capital Cost of ₹ 3,60,000. The life of the machine is 5 years and its salvage value at the end of the life is nil. The machine will produce the net operating income after depreciation of ₹ 68,000 per annum. The Company's tax rate is 45%.

The Net Present Value factors for 5 years are as under:

Discounting Rate :	14	15	16	17	18
Cumulative factor :	3.43	3.35	3.27	3.20	3.13

You are required to calculate the internal rate of return of the proposal.

Answer

Computation of cash inflow per annum	₹
Net operating income per annum	68,000
Less: Tax @ 45%	30,600
Profit after tax	37,400
Add: Depreciation (₹ 3,60,000 / 5 years)	72,000
Cash inflow	1,09,400

The IRR of the investment can be found as follows:

$$NPV = - ₹ 3,60,000 + ₹ 1,09,400 (PVA_{F_5, r}) = 0$$

$$\text{or } PVA_{F_5, r} (\text{Cumulative factor}) = \frac{₹ 3,60,000}{₹ 1,09,400} = 3.29$$

Computation of internal rate of return

Discounting rate	15%	16%
Cumulative factor	3.35	3.27
Total NPV(₹)	3,66,490	3,57,738
	(₹ 1,09,400 × 3.35)	(₹ 1,09,400 × 3.27)
Internal outlay (₹)	3,60,000	3,60,000
Surplus (Deficit) (₹)	6,490	(2262)

$$IRR = 15 + \left[\frac{6,490}{6,490 + 2,262} \right] = 15 + 0.74 = 15.74\%$$

**Question 3**

The Management of a Company has two alternative proposals under consideration. Project A requires a capital outlay of ₹ 12,00,000 and project 'B' requires ₹ 18,00,000. Both are estimated to provide a cash flow for five years:

Project A ₹ 4,00,000 per year and Project B ₹ 5,80,000 per year. The cost of capital is 10%. Show which of the two projects is preferable from the view point of (i) Net present value method, (ii) Present value index method (PI method), (iii) Internal rate of return method.

The present values of Re. 1 of 10%, 18% and 20% to be received annually for 5 years being 3.791, 3.127 and 2.991 respectively.

Answer**Recommendations regarding Two Alternative Proposals****(i) Net Present Value Method****Computation of Present Value**

$$\text{Project A} = ₹ 4,00,000 \times 3.791 = ₹ 15,16,400$$

$$\text{Project B} = ₹ 5,80,000 \times 3.791 = ₹ 21,98,780$$

Computation of Net Present Value

$$\text{Project A} = ₹ 15,16,400 - 12,00,000 = ₹ 3,16,400$$

$$\text{Project B} = ₹ 21,98,780 - 18,00,000 = ₹ 3,98,780$$

Advise: Since the net present value of Project B is higher than that of Project A, therefore, Project B should be selected.

(ii) Present Value Index Method

$$\text{Present Value Index} = \frac{\text{Present Value of Cash Inflow}}{\text{Initial Investment}}$$

$$\text{Project A} = \frac{15,16,400}{12,00,000} = 1.264$$

$$\text{Project B} = \frac{21,98,780}{18,00,000} = 1.222$$

Advise: Since the present value index of Project A is higher than that of Project B, therefore, Project A should be selected.

(iii) Internal Rate of Return (IRR)

Project A

$$\text{P.V. Factor} = \frac{\text{Initial Investment}}{\text{Annual Cash Inflow}} = \frac{12,00,000}{4,00,000} = 3$$

PV factor falls between 18% and 20%

Present Value of cash inflow at 18% and 20% will be:

Present Value at 18% = $3.127 \times 4,00,000 = 12,50,800$

Present Value at 20% = $2.991 \times 4,00,000 = 11,96,400$

$$\begin{aligned} \text{IRR} &= 18 + \frac{12,50,800 - 12,00,000}{12,50,800 - 11,96,400} \times (20 - 18) \\ &= 18 + \frac{50,800}{54,400} \times 2 \\ &= 18 + 1.8676 = 19.868\% \end{aligned}$$

Project B

$$\text{P.V. Factor} = \frac{18,00,000}{5,80,000} = 3.103$$

Present Value of cash inflow at 18% and 20% will be:

Present Value at 18% = $3.127 \times 5,80,000 = 18,13,660$

Present Value at 20% = $2.991 \times 5,80,000 = 17,34,780$

$$\begin{aligned} \text{IRR} &= 18 + \frac{18,13,660 - 18,00,000}{18,13,660 - 17,34,780} \times (20 - 18) \\ &= 18 + \frac{13,660}{78,880} \times 2 \\ &= 18 + 0.3463 = 18.346\% \end{aligned}$$

Advise: Since the internal rate of return of Project A is higher than that of Project B, therefore, Project A should be selected.

Question 4

A company wants to invest in a machinery that would cost ₹ 50,000 at the beginning of year 1. It is estimated that the net cash inflows from operations will be ₹ 18,000 per annum for 3 years, if the company opts to service a part of the machine at the end of year 1 at ₹ 10,000. In such a case, the scrap value at the end of year 3 will be ₹ 12,500. However, if the company decides not to service the part, then it will have to be replaced at the end of year 2 at ₹ 15,400. But in

this case, the machine will work for the 4th year also and get operational cash inflow of ₹ 18,000 for the 4th year. It will have to be scrapped at the end of year 4 at ₹ 9,000. Assuming cost of capital at 10% and ignoring taxes, will you recommend the purchase of this machine based on the net present value of its cash flows?

If the supplier gives a discount of ₹ 5,000 for purchase, what would be your decision? (The present value factors at the end of years 0, 1, 2, 3, 4, 5 and 6 are respectively 1, 0.9091, 0.8264, 0.7513, 0.6830, 0.6209 and 0.5644).

Answer

Option I : Purchase Machinery and Service Part at the end of Year 1.

Net Present value of cash flow @ 10% per annum discount rate.

$$\begin{aligned}\text{NPV} &= -50,000 + \frac{18,000}{(1.1)} + \frac{18,000}{(1.1)^2} + \frac{18,000}{(1.1)^3} - \frac{10,000}{(1.1)} + \frac{12,500}{(1.1)^3} \\ &= -50,000 + 18,000 (0.9091 + 0.8264 + 0.7513) - (10,000 \times 0.9091) + (12,500 \times 0.7513) \\ &= -50,000 + (18,000 \times 2.4868) - 9,091 + 9,391 \\ &= -50,000 + 44,762 - 9,091 + 9,391\end{aligned}$$

$$\text{NPV} = -4,938$$

Since, Net Present Value is negative; therefore, this option is not to be considered.

If Supplier gives a discount of ₹ 5,000 then,

$$\text{NPV} = +5,000 - 4,938 = +62$$

In this case, Net Present Value is positive but very small; therefore, this option may not be advisable.

Option II : Purchase Machinery and Replace Part at the end of Year 2.

$$\begin{aligned}\text{NPV} &= -50,000 + \frac{18,000}{(1.1)} + \frac{18,000}{(1.1)^2} + \frac{18,000}{(1.1)^3} - \frac{15,400}{(1.1)^2} + \frac{27,000}{(1.1)^4} \\ &= -50,000 + 18,000 (0.9091 + 0.8264 + 0.7513) - (15,400 \times 0.8264) + (27,000 \times 0.6830) \\ &= -50,000 + 18,000 (2.4868) - (15,400 \times 0.8264) + (27,000 \times 0.6830) \\ &= -50,000 + 44,762 - (15,400 \times 0.8264) + (27,000 \times 0.6830) \\ &= -50,000 + 44,762 - 12,727 + 18,441 \\ &= -62,727 + 63,203 = +476\end{aligned}$$

Net Present Value is positive, but very low as compared to the investment.

If the Supplier gives a discount of ₹ 5,000, then

$$NPV = 5,000 + 476 = 5,476$$

Decision: Option II is worth investing as the net present value is positive and higher as compared to Option I.



Question 5

A company is required to choose between two machines A and B. The two machines are designed differently, but have identical capacity and do exactly the same job. Machine A costs ₹ 6,00,000 and will last for 3 years. It costs ₹ 1,20,000 per year to run.

Machine B is an 'economy' model costing ₹ 4,00,000 but will last only for two years, and costs ₹ 1,80,000 per year to run. These are real cash flows. The costs are forecasted in rupees of constant purchasing power. Opportunity cost of capital is 10%. Which machine company should buy? Ignore tax.

$$PVIF_{0.10, 1} = 0.9091, PVIF_{0.10, 2} = 0.8264, PVIF_{0.10, 3} = 0.7513.$$

Answer

Advise to the Management Regarding Buying of Machines

Statement Showing Evaluation of Two Machines

<i>Machines</i>	<i>A</i>	<i>B</i>
Purchase cost (₹): (i)	6,00,000	4,00,000
Life of machines (years)	3	2
Running cost of machine per year (₹): (ii)	1,20,000	1,80,000
Cumulative present value factor for 1-3 years @ 10%: (iii)	2.4868	-
Cumulative present value factor for 1-2 years @ 10%: (iv)	-	1.7355
Present value of running cost of machines (₹): (v)	2,98,416	3,12,390
	[(ii) × (iii)]	[(ii) × (iv)]
Cash outflow of machines (₹): (vi)=(i) +(v)	8,98,416	7,12,390
Equivalent present value of annual cash outflow	3,61,273.93	4,10,481.13
	[(vi) ÷ (iii)]	[(vi) ÷ (iv)]

Recommendation: The Company should buy Machine A since its equivalent cash outflow is less than Machine B.



Question 6

A company has to make a choice between two machines X and Y. The two machines are designed differently, but have identical capacity and do exactly the same job. Machine 'X' costs

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₹ 5,50,000 and will last for three years. It costs ₹ 1,25,000 per year to run. Machine 'Y' is an economy model costing ₹ 4,00,000, but will last for two years and costs ₹ 1,50,000 per year to run. These are real cash flows. The costs are forecasted in Rupees of constant purchasing power. Opportunity cost of capital is 12%. Ignore taxes. Which machine company should buy?

	$t = 1$	$t = 2$	$t = 3$
$PVIF_{0.12, t}$	0.8929	0.7972	0.7118
$PVIFA_{0.12, 2}$	= 1.6901		
$PVIFA_{0.12, 3}$	= 2.4019		

Answer

Statement showing the Evaluation of Two Machines

Machines	X	Y
Purchase cost (₹): (i)	5,50,000	4,00,000
Life of Machines (years)	3	2
Running Cost of Machine per year (₹): (ii)	1,25,000	1,50,000
Cumulative Present value factor for 1-3 years @ 10%: (iii)	2.4019	-
Cumulative Present value factor for 1-2 years @ 10%: (iv)	-	1.6901
Present Value of Running Cost of Machines (₹): (v)	3,00,237.5	2,53,515
	[(ii) × (iii)]	[(ii) × (iv)]
Cash Outflow of Machines (₹): (vi)=(i) +(v)	8,50,237.5	6,53,515.0
Equivalent Present Value of Annual Cash Outflow		
Equated Annualized Cost = $\frac{\text{PV of Machine Cost}}{\text{PVI FA}_{0.12, t}}$	3,53,985.39	3,86,672.39
	[(vi) ÷ (iii)]	[(vi) ÷ (iv)]

Advise: The Company should buy Machine X since its equivalent cash outflow (₹ 3,53,985.39) is less than that of Machine Y (₹ 3,86,672.39).

Question 7

A Company is considering a proposal of installing a drying equipment. The equipment would involve a Cash outlay of ₹ 6,00,000 and net Working Capital of ₹ 80,000. The expected life of the project is 5 years without any salvage value. Assume that the company is allowed to charge depreciation on straight-line basis for Income-tax purpose. The estimated before-tax cash inflows are given below:

Year	Before-tax Cash inflows (₹ '000)				
	1	2	3	4	5
	240	275	210	180	160

The applicable Income-tax rate to the Company is 35%. If the Company's opportunity Cost of Capital is 12%, calculate the equipment's discounted payback period, payback period, net present value and internal rate of return.

The PV factors at 12%, 14% and 15% are:

Year	1	2	3	4	5
PV factor at 12%	0.8929	0.7972	0.7118	0.6355	0.5674
PV factor at 14%	0.8772	0.7695	0.6750	0.5921	0.5194
PV factor at 15%	0.8696	0.7561	0.6575	0.5718	0.4972

Answer

- (i) Equipment's initial cost = ₹ 6,00,000 + 80,000 = ₹ 6,80,000
(ii) Annual straight line depreciation = ₹ 6,00,000/5 = ₹ 1,20,000.
(iii) Net cash flows can be calculated as follows:
= Before tax CFs × (1 – Tc) + Tc × Depreciation

(₹ '000)						
Year	CFs					
	0	1	2	3	4	5
1. Initial cost	(680)					
2. Before tax CFs		240	275	210	180	160
3. Tax @ 35%		<u>84</u>	<u>96.25</u>	<u>73.5</u>	<u>63</u>	<u>56</u>
4. After tax-CFs		156	178.75	136.5	117	104
5. Depreciation tax shield (Depreciation × Tc)		42	42	42	42	42
6. Working capital released		=	=	=	=	<u>80</u>
7. Net Cash Flow (4 + 5 + 6)		198	220.75	178.5	159	226
8. PVF at 12%	1.00	0.8929	0.7972	0.7118	0.6355	0.5674
9. PV (7 × 8)	(680)	176.79	175.98	127.06	101.04	128.23
10. NPV	29.12					

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	0	1	2	3	4	5
PVF at 15%	1	0.8696	0.7561	0.6575	0.5718	0.4972
PV	(680)	172.18	166.91	117.36	90.92	112.37
NPV	-20.26					

Internal Rate of Return

$$IRR = 12\% + \frac{29.12}{49.38} \times 3\% = 13.77\%$$

Discounted Payback Period

$$\text{Discounted CFs at } K = 12\% \text{ considered} = 176.79 + 175.98 + 127.06 + 101.04 + 12 \times \frac{99.13}{128.24} \\ = 4 \text{ years and } 9.28 \text{ months}$$

Payback Period (NCFs are considered)

$$= 198 + 220.75 + 178.5 + 12 \times \frac{82.75}{159} = 3 \text{ years and } 6.25 \text{ months}$$



Question 8

Company UVW has to make a choice between two identical machines, in terms of Capacity, 'A' and 'B'. They have been designed differently, but do exactly the same job.

Machine 'A' costs ₹ 7,50,000 and will last for three years. It costs ₹ 2,00,000 per year to run.

Machine 'B' is an economy model costing only ₹ 5,00,000, but will last for only two years. It costs ₹ 3,00,000 per year to run.

The cash flows of Machine 'A' and 'B' are real cash flows. The costs are forecasted in rupees of constant purchasing power. Ignore taxes. The opportunity cost of capital is 9%.

Required:

Which machine the company UVW should buy?

The present value (PV) factors at 9% are:

Year	t_1	t_2	t_3
$PVIF_{0.09, t}$	0.9174	0.8417	0.7722

Answer

Statement Showing the Evaluation of Two Machines

Machines	A	B
(i) Purchase Cost	₹ 7,50,000	₹ 5,00,000

(ii) Life of Machine	3 years	2 years
(iii) Running Cost of Machine per year	₹ 2,00,000	₹ 3,00,000
(iv) PVIFA 0.09, 3	2.5313	
PVIFA 0.09, 2		1.7591
(v) PV of Running Cost of Machine	₹ 5,06,260	₹ 5,27,730
(vi) Cash outflows of Machine {(i) + (v)}	₹ 12,56,260	₹ 10,27,730
(vii) Equivalent PV of Annual Cash outflow (vi/iv)	₹ 4,96,290	₹ 5,84,236

Recommendation: Company UVW should buy Machine 'A' since equivalent annual cash outflow is less than that of Machine B.

Question 9

A company is considering the proposal of taking up a new project which requires an investment of ₹ 400 lakhs on machinery and other assets. The project is expected to yield the following earnings (before depreciation and taxes) over the next five years:

Year	Earnings (₹ in lakhs)
1	160
2	160
3	180
4	180
5	150

The cost of raising the additional capital is 12% and assets have to be depreciated at 20% on 'Written Down Value' basis. The scrap value at the end of the five years' period may be taken as zero. Income-tax applicable to the company is 50%.

You are required to calculate the net present value of the project and advise the management to take appropriate decision. Also calculate the Internal Rate of Return of the Project.

Note: Present values of Re. 1 at different rates of interest are as follows:

Year	10%	12%	14%	16%
1	0.91	0.89	0.88	0.86
2	0.83	0.80	0.77	0.74
3	0.75	0.71	0.67	0.64
4	0.68	0.64	0.59	0.55
5	0.62	0.57	0.52	0.48

Answer**(a) (i) Calculation of Net Cash Flow**

(₹ in lakhs)					
Year	Profit before dep. and tax	Depreciation (20% on WDV)	PBT	PAT	Net cash flow
(1)	(2)	(3)	(4)	(5)	(3) + (5)
1	160	$400 \times 20\% = 80$	80	40	120
2	160	$(400 - 80) \times 20\% = 64$	96	48	112
3	180	$(320 - 64) \times 20\% = 51.2$	128.8	64.4	115.6
4	180	$(256 - 51.2) \times 20\% = 40.96$	139.04	69.52	110.48
5	150	$(204.8 - 40.96) = 163.84^*$	-13.84	-6.92	156.92

*this is treated as a short term capital loss.

(ii) Calculation of Net Present Value (NPV)

(₹ in lakhs)							
Year	Net Cash Flow	12%		14%		16%	
		D.F	P.V	D.F	P.V	D.F	P.V
1	120	.89	106.8	.88	105.60	.86	103.2
2	112	.80	89.6	.77	86.24	.74	82.88
3	115.6	.71	82.08	.67	77.45	.64	73.98
4	110.48	.64	70.70	.59	65.18	.55	60.76
5	156.92	.57	89.44	.52	81.60	.48	75.32
			438.62		416.07		396.14
	Less: Initial Investment		400.00		400.00		400.00
	NPV		38.62		16.07		-3.86

(iii) **Advise:** Since Net Present Value of the project at 12% = 38.62 lakhs, therefore the project should be implemented.

(iv) Calculation of Internal Rate of Return (IRR)

$$\begin{aligned}
 \text{IRR} &= 14\% + \frac{16.07 \times 2\%}{16.07 - (-3.86)} \\
 &= 14\% + \frac{32.14}{19.93} = 14\% + 1.61\% = 15.61\%.
 \end{aligned}$$



Question 10

Given below are the data on a capital project 'M'.

Annual cash inflows	₹ 60,000
Useful life	4 years
Internal rate of return	15%
Profitability index	1.064
Salvage value	0

You are required to calculate for this project M :

- (i) Cost of project
- (ii) Payback period
- (iii) Cost of capital
- (iv) Net present value

PV factors at different rates are given below:

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

Answer

- (i) Cost of Project 'M'

At 15% internal rate of return (IRR), the sum of total cash inflows = cost of the project i.e initial cash outlay

Annual cash inflows = ₹ 60,000

Useful life = 4 years

Considering the discount factor table @ 15%, cumulative present value of cash inflows for 4 years is 2.855 (0.869 + 0.756 + 0.658 + 0.572)

Hence, Total Cash inflows for 4 years for Project M is

₹ 60,000 × 2.855 = ₹ 1,71,300

Hence, Cost of the Project = ₹ 1,71,300

- (ii) Payback Period

Payback period = $\frac{\text{Cost of the Project}}{\text{Annual Cash Inflows}} = \frac{₹ 1,71,300}{₹ 60,000} = 2.855 \text{ years}$

(iii) Cost of Capital

$$\text{Profitability index} = \frac{\text{Sum of Discounted Cash inflows}}{\text{Cost of the Project}}$$

$$1.064 = \frac{\text{Sum of Discounted Cash inflows}}{\text{₹ 1,71,300}}$$

$$\therefore \text{Sum of Discounted Cash inflows} = \text{₹ 1,82,263.20}$$

$$\text{Since, Annual Cash Inflows} = \text{₹ 60,000}$$

$$\text{Hence, cumulative discount factor for 4 years} = \frac{\text{₹ 1,82,263.20}}{\text{₹ 60,000}}$$

From the discount factor table, at discount rate of 12%, the cumulative discount factor for 4 years is 3.038 (0.893 + 0.797 + 0.712 + 0.636)

$$\text{Hence, Cost of Capital} = 12\%$$

(iv) Net Present Value (NPV)

$$\text{NPV} = \text{Sum of Present Values of Cash inflows} - \text{Cost of the Project}$$

$$= \text{₹ 1,82,263.20} - \text{₹ 1,71,300} = \text{₹ 10,963.20}$$

$$\text{Net Present Value} = \text{₹ 10,963.20}$$

Question 11

A large profit making company is considering the installation of a machine to process the waste produced by one of its existing manufacturing process to be converted into a marketable product. At present, the waste is removed by a contractor for disposal on payment by the company of ₹ 50 lacs per annum for the next four years. The contract can be terminated upon installation of the aforesaid machine on payment of a compensation of ₹ 30 lacs before the processing operation starts. This compensation is not allowed as deduction for tax purposes.

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

Sales and direct costs of the product emerging from waste processing for 4 years are estimated as under:

(₹ In lacs)

Year	1	2	3	4
Sales	322	322	418	418
Material consumption	30	40	85	85

Wages	75	75	85	100
Other expenses	40	45	54	70
Factory overheads	55	60	110	145
Depreciation (as per income tax rules)	50	38	28	21

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

Present value factors for four years are as under:

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

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

Answer

Statement of Operating Profit

(₹ in lacs)

Years	1	2	3	4
Sales :(A)	<u>322</u>	<u>322</u>	<u>418</u>	<u>418</u>
Material consumption	30	40	85	85
Wages	60	65	85	100
Other expenses	40	45	54	70
Factory overheads (insurance)	30	30	30	30
Loss of rent	10	10	10	10
Interest	32	24	16	8
Depreciation (as per income tax rules)	<u>50</u>	<u>38</u>	<u>28</u>	<u>21</u>
Total cost: (B)	<u>252</u>	<u>252</u>	<u>308</u>	<u>324</u>
Profit (C)=(A)-(B)	70	70	110	94
Tax (50%)	35	35	55	47
Profit after Tax (PAT)	35	35	55	47

Statement of Incremental Cash Flows

(₹ in lacs)

Years	0	1	2	3	4
Material stocks	(20)	(35)	-	-	(55)
Compensation for contract	(30)	-	-	-	-
Contract payment saved	-	50	50	50	50
Tax on contract payment	-	(25)	(25)	(25)	(25)
Incremental profit	-	70	70	110	94
Depreciation added back	-	50	38	28	21
Tax on profits	-	(35)	(35)	(55)	(47)
Loan repayment	-	(50)	(50)	(50)	(50)
Profit on sale of machinery (net)	-	-	-	-	5
Total incremental cash flows	(50)	25	48	58	103
Present value factor	1.00	0.870	0.756	0.658	0.572
Net present value of cash flows	(50)	21.75	36.288	38.164	58.916
Net present value	= ₹ 155.118 – ₹ 50 = 105.118 lacs.				

Advice: Since the net present value of cash flows is ₹ 105.118 lacs which is positive the management should install the machine for processing the waste.

Notes:

1. Material stock increases are taken in cash flows.
2. Idle time wages have also been considered
3. Apportioned factory overheads are not relevant only insurance charges of this project are relevant.
4. Interest calculated at 16% based on 4 equal instalments of loan repayment.
5. Sale of machinery- Net income after deducting removal expenses taken. Tax on Capital gains ignored.
6. Saving in contract payment and income tax thereon considered in the cash flows.

Question 12

A company has to make a choice between two projects namely A and B. The initial capital outlay of two Projects are ₹ 1,35,000 and ₹ 2,40,000 respectively for A and B. There will be no scrap value at the end of the life of both the projects. The opportunity Cost of Capital of the company is 16%. The annual incomes are as under:

Year	Project A	Project B	Discounting factor @ 16%
1	—	60,000	0.862
2	30,000	84,000	0.743
3	1,32,000	96,000	0.641
4	84,000	1,02,000	0.552
5	84,000	90,000	0.476

You are required to calculate for each project:

- Discounted payback period
- Profitability index
- Net present value.

Answer

Working Notes:

(1) Computation of Net Present Values of Projects

Year	Cash flows		Discounting	Discounted	
			factor @ 16 %	Cash flow	
	Project A ₹ (1)	Project B ₹ (2)	(3)	Project A ₹ (3) × (1)	Project B ₹ (3) × (2)
0	1,35,000	2,40,000	1.000	1,35,000	2,40,000
1	—	60,000	0.862	—	51,720
2	30,000	84,000	0.743	22,290	62,412
3	1,32,000	96,000	0.641	84,612	61,536
4	84,000	1,02,000	0.552	46,368	56,304
5	84,000	90,000	0.476	39,984	42,840
Net present value				58,254	34,812

(2) Computation of Cumulative Present Values of Projects Cash inflows

Year	Project A		Project B	
	PV of cash inflows	Cumulative PV	PV of cash inflows	Cumulative PV
	₹	₹	₹	₹
1	—	—	51,720	51,720
2	22,290	22,290	62,412	1,14,132

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3	84,612	1,06,902	61,536	1,75,668
4	46,368	1,53,270	56,304	2,31,972
5	39,984	1,93,254	42,840	2,74,812

(i) **Discounted payback period:** (*Refer to Working note 2*)

Cost of Project A = ₹ 1,35,000

Cost of Project B = ₹ 2,40,000

Cumulative PV of cash inflows of Project A after 4 years = ₹ 1,53,270

Cumulative PV of cash inflows of Project B after 5 years = ₹ 2,74,812

A comparison of projects cost with their cumulative PV clearly shows that the project A's cost will be recovered in less than 4 years and that of project B in less than 5 years. The exact duration of discounted payback period can be computed as follows:

	Project A	Project B
Excess PV of cash inflows over the project cost (₹)	18,270 (₹ 1,53,270 – ₹ 1,35,000)	34,812 (₹ 2,74,812 – ₹ 2,40,000)
Computation of period required to recover excess amount of cumulative PV over project cost (<i>Refer to Working note 2</i>)	0.39 year (₹ 18,270 / ₹ 46,368)	0.81 years (₹ 34,812 / ₹ 42,840)
Discounted payback period	3.61 year (4 – 0.39) years	4.19 years (5 – 0.81) years

(ii) **Profitability Index:**
$$= \frac{\text{Sum of discount cash inflows}}{\text{Initial cash outlay}}$$

Profitability Index (for Project A) = $\frac{₹ 1,93,254}{₹ 1,35,000} = 1.43$

Profitability Index (for Project B) = $\frac{₹ 2,74,812}{₹ 2,40,000} = 1.15$

(iii) **Net present value (for Project A)** = ₹ 58,254

(*Refer to Working note 1*)

Net present value (for Project B) = ₹ 34,812

Question 13

The cash flows of projects C and D are reproduced below:

Project	Cash Flow				NPV at 10%	IRR
	C_0	C_1	C_2	C_3		
C	– ₹ 10,000	+ 2,000	+ 4,000	+ 12,000	+ ₹ 4,139	26.5%
D	– ₹ 10,000	+ 10,000	+ 3,000	+ 3,000	+ ₹ 3,823	37.6%

- (i) Why there is a conflict of rankings?
(ii) Why should you recommend project C in spite of lower internal rate of return?

Time	Period		
	1	2	3
$PVIF_{0.10, t}$	0.9090	0.8264	0.7513
$PVIF_{0.14, t}$	0.8772	0.7695	0.6750
$PVIF_{0.15, t}$	0.8696	0.7561	0.6575
$PVIF_{0.30, t}$	0.7692	0.5917	0.4552
$PVIF_{0.40, t}$	0.7143	0.5102	0.3644

Answer

- (i) Net Present Value at different discounting rates

Project	0%	10%	15%	30%	40%
	₹	₹	₹	₹	₹
C	8,000	4,139	2,654	–632	–2,158
	{₹ 2,000	{₹ 2,000 × 0.909	{₹ 2,000 × 0.8696	{₹ 2,000 × 0.7692	{₹ 2,000 × 0.7143
	+₹ 4,000	+₹ 4,000 × 0.8264	+₹ 4,000 × 0.7561	+₹ 4,000 × 0.5917	+₹ 4,000 × 0.5102
	+₹ 12,000	+₹ 12,000 × 0.7513	+₹ 12,000 × 0.6575	+₹ 12,000 × 0.4552	+₹ 12,000 × 0.3644
	–₹ 10,000}	–₹ 10,000}	–₹ 10,000}	–₹ 10,000}	–₹ 10,000}
Ranking	I	I	II	II	II
D	6,000	3,823	2,937	833	–233
	{₹ 10,000	{₹ 10,000 × 0.909	{₹ 10,000 × 0.8696	{₹ 10,000 × 0.7692	{₹ 10,000 × 0.7143
	+₹ 3,000	+₹ 3,000 × 0.8264	+₹ 3,000 × 0.7561	+₹ 3,000 × 0.5917	+₹ 3,000 × 0.5102
	+₹ 3,000	+₹ 3,000 × 0.7513	+₹ 3,000 × 0.6575	+₹ 3,000 × 0.4552	+₹ 3,000 × 0.3644
	–₹ 10,000}	–₹ 10,000}	–₹ 10,000}	–₹ 10,000}	–₹ 10,000}
Ranking	II	II	I	I	I

The conflict in ranking arises because of skewness in cash flows. In the case of Project C cash flows occur later in the life and in the case of Project D, cash flows are skewed towards the beginning.

At lower discount rate, project C's NPV will be higher than that of project D. As the discount rate increases, Project C's NPV will fall at a faster rate, due to compounding effect.

After break even discount rate, Project D has higher NPV as well as higher IRR.

- (ii) If the opportunity cost of funds is 10%, project C should be accepted because the firm's wealth will increase by ₹ 316 (₹ 4,139 – ₹ 3,823)

The following statement of incremental analysis will substantiate the above point.

Project	Cash Flows (₹)				NPV at 10% ₹	IRR 12.5%
	C_0 ₹	C_1 ₹	C_2	C_3 ₹		
C-D	0	-8,000	1,000	9,000	316 $\{-8,000 \times 0.909$ $+1,000 \times 0.8264$ $+9,000 \times 0.7513\}$	0 $\{-8,000 \times 0.88884$ $+1,000 \times 0.7898$ $+9,000 \times 0.7019\}$

Hence, the project C should be accepted, when opportunity cost of funds is 10%.

Question 14

The cash flows of two mutually exclusive Projects are as under:

	t_0	t_1	t_2	t_3	t_4	t_5	t_6
Project 'P' (₹)	(40,000)	13,000	8,000	14,000	12,000	11,000	15,000
Project 'J' (₹)	(20,000)	7,000	13,000	12,000	—	—	—

Required:

- Estimate the net present value (NPV) of the Project 'P' and 'J' using 15% as the hurdle rate.
- Estimate the internal rate of return (IRR) of the Project 'P' and 'J'.
- Why there is a conflict in the project choice by using NPV and IRR criterion?
- Which criteria you will use in such a situation? Estimate the value at that criterion. Make a project choice.

The present value interest factor values at different rates of discount are as under:

Rate of discount	t_0	t_1	t_2	t_3	t_4	t_5	t_6
0.15	1.00	0.8696	0.7561	0.6575	0.5718	0.4972	0.4323
0.18	1.00	0.8475	0.7182	0.6086	0.5158	0.4371	0.3704
0.20	1.00	0.8333	0.6944	0.5787	0.4823	0.4019	0.3349
0.24	1.00	0.8065	0.6504	0.5245	0.4230	0.3411	0.2751
0.26	1.00	0.7937	0.6299	0.4999	0.3968	0.3149	0.2499

Answer

- (i) Estimation of net present value (NPV) of the Project 'P' and 'J' using 15% as the hurdle rate:

NPV of Project 'P':

$$\begin{aligned}
 &= -40,000 + \frac{13,000}{(1.15)^1} + \frac{8,000}{(1.15)^2} + \frac{14,000}{(1.15)^3} + \frac{12,000}{(1.15)^4} + \frac{11,000}{(1.15)^5} + \frac{15,000}{(1.15)^6} \\
 &= -40,000 + 11,304.35 + 6,049.15 + 9,205.68 + 6,861.45 + 5,469.37 + 6,485.65 \\
 &= ₹ 5,375.65 \quad \text{or} \quad ₹ 5,376
 \end{aligned}$$

NPV of Project 'J':

$$\begin{aligned}
 &= -20,000 + \frac{7,000}{(1.15)^1} + \frac{13,000}{(1.15)^2} + \frac{12,000}{(1.15)^3} \\
 &= -20,000 + 6,086.96 + 9,829.87 + 7,890.58 \\
 &= ₹ 3,807.41
 \end{aligned}$$

- (ii) Estimation of internal rate of return (IRR) of the Project 'P' and 'J'

Internal rate of return r (IRR) is that rate at which the sum of cash inflows after discounting equals to the discounted cash out flows. The value of r in the case of given projects can be determined by using the following formula:

$$CO_0 = \frac{CF_0}{(1+r)^0} + \frac{CF_1}{(1+r)^1} + \dots + \frac{CF_n}{(1+r)^n} + \frac{SV+WC}{(1+r)^n}$$

Where,

CO = Cash flows at the time 0

CF_t = Cash inflow at the end of year t

r = Discount rate

n = Life of the project

SV & WC = Salvage value and working capital at the end of n years.

In the case of project 'P' the value of r (IRR) is given by the following relation:

$$40,000 = \frac{13,000}{(1+r\%)^1} + \frac{8,000}{(1+r\%)^2} + \frac{14,000}{(1+r\%)^3} + \frac{12,000}{(1+r\%)^4} + \frac{11,000}{(1+r\%)^5} + \frac{15,000}{(1+r\%)^6}$$
$$r = 19.73\%$$

Similarly we can determine the internal rate of return for the project 'J'. In the case of project 'J' it comes to:

$$r = 25.20\%$$

- (iii) The conflict between NPV and IRR rule in the case of mutually exclusive project situation arises due to re-investment rate assumption. NPV rule assumes that intermediate cash flows are reinvested at k and IRR assumes that they are reinvested at r . The assumption of NPV rule is more realistic.
- (iv) When there is a conflict in the project choice by using NPV and IRR criterion, we would prefer to use "Equal Annualized Criterion". According to this criterion the net annual cash inflow in the case of Projects 'P' and 'J' respectively would be:

Project 'P' = (Net present value/ cumulative present value of Re.1 p.a.
@15% for 6 years)

$$= (\text{₹ } 5,375.65 / 3.7845) = \text{₹ } 1,420.44$$

Project 'J' = $(\text{₹ } 3807.41 / 2.2832) = \text{₹ } 1667.58$

Advise : Since the cash inflow per annum in the case of project 'J' is more than that of project 'P', so Project J is recommended.



Question 15

MNP Limited is thinking of replacing its existing machine by a new machine which would cost ₹ 60 lakhs. The company's current production is ₹ 80,000 units, and is expected to increase to 1,00,000 units, if the new machine is bought. The selling price of the product would remain unchanged at ₹ 200 per unit. The following is the cost of producing one unit of product using both the existing and new machine:

Unit cost (₹)			
	Existing Machine (80,000 units)	New Machine (1,00,000 units)	Difference
Materials	75.0	63.75	(11.25)
Wages & Salaries	51.25	37.50	(13.75)
Supervision	20.0	25.0	5.0
Repairs and Maintenance	11.25	7.50	(3.75)
Power and Fuel	15.50	14.25	(1.25)
Depreciation	0.25	5.0	4.75
Allocated Corporate Overheads	10.0	12.50	2.50
	<u>183.25</u>	<u>165.50</u>	<u>(17.75)</u>

The existing machine has an accounting book value of ₹ 1,00,000, and it has been fully depreciated for tax purpose. It is estimated that machine will be useful for 5 years. The supplier of the new machine has offered to accept the old machine for ₹ 2,50,000. However, the market price of old machine today is ₹ 1,50,000 and it is expected to be ₹ 35,000 after 5 years. The new machine has a life of 5 years and a salvage value of ₹ 2,50,000 at the end of its economic life. Assume corporate Income tax rate at 40%, and depreciation is charged on straight line basis for Income-tax purposes. Further assume that book profit is treated as ordinary income for tax purpose. The opportunity cost of capital of the Company is 15%.

Required:

- Estimate net present value of the replacement decision.
- Estimate the internal rate of return of the replacement decision.
- Should Company go ahead with the replacement decision? Suggest.

Year (t)	1	2	3	4	5
$PVIF_{0.15,t}$	0.8696	0.7561	0.6575	0.5718	0.4972
$PVIF_{0.20,t}$	0.8333	0.6944	0.5787	0.4823	0.4019
$PVIF_{0.25,t}$	0.80	0.64	0.512	0.4096	0.3277
$PVIF_{0.30,t}$	0.7692	0.5917	0.4552	0.3501	0.2693
$PVIF_{0.35,t}$	0.7407	0.5487	0.4064	0.3011	0.2230

Answer**(i) Initial Cash Outflow:**

	Amount (₹)
Cost of new machine	60,00,000
Less: Sale Price of existing machine	1,50,000
Net of Tax ($₹ 2,50,0100 \times 0.60$)	
	58,50,000

(ii) Terminal Cash Flows:**(a) New Machine**

	Amount (₹)
Salvage value of Machine	2,50,000
Less: Depreciated WDV { $₹ 60,00,000 - (₹ 11,50,000 \times 5 \text{ years})$ }	2,50,000
STCG	Nil
Tax	Nil
Net Salvage Value (cash flows)	2,50,000

(b) Old Machine

Cash realised on disposal of existing machine after ₹ 35,000

Additional cash flows at terminal year = ₹ 2,15,000 (2,50,000-35,000)

(iii) Calculation of Net Cash Flows

Particulars	Existing Machine	New Machine	Incremental
1. Production	80,000 Units	1,00,000 Units	20,000 Units
	(₹)	(₹)	(₹)
2. Selling Price	200	200	
3. Variable Cost	<u>173</u>	<u>148</u>	
4. Earnings before depreciation and Tax per Unit	27	52	

5. Total earnings before depreciation and Tax(1*4)	21,60,000	52,00,000	30,40,000
6. Less: Depreciation ($\frac{60,00,000 - 2,50,000}{5}$)			<u>11,50,000</u>
7. Earning after depreciation before Tax			18,90,000
8. Less: Tax @40%			<u>7,56,000</u>
9. Earning after depreciation and Tax			11,34,000
10 .Add: Depreciation			<u>11,50,000</u>
11. Net Cash inflow			22,84,000

Alternatively

(iii) Computation of additional cash flows (yearly)

Particulars	Amount (₹)	Amount (₹)
Sales	1,60,00,000	2,00,00,000
Material	60,00,000	63,75,000
Wages & Salaries	41,00,000	37,50,000
Supervision	16,00,000	25,00,000
Repair & Maintenance	9,00,000	7,50,000
Power & fuel	12,40,000	14,25,000
Depreciation	--	11,50,000
Total cost	1,38,40,000	1,59,50,000
Profit(Sales – Total cost)	21,60,000	40,50,000
Less: Tax@40%	8,64,000	16,20,000
	12,96,000	24,30,000
Add: Depreciation	**	11,50,000*
	12,96,000	35,80,000
Incremental Cash inflow		22,84,000

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* Calculation of Depreciation $\frac{60,00,000 - 2,50,000}{5} = 11,50,000$

** As mention in the question WDV of Machine is zero for tax purpose hence no depreciation shall be provided in existing machine.

(iv) Computation of NPV @ 15%

	Period	Cash flow (₹)	PVF	PV (₹)
Incremental cash flows	1-5	22,84,000	3.352	76,55,968
Add; Terminal year cash	5	2,15,000	0.4972	1,06,898
				77,62,866
Less: Additional cash outflow	0	58,50,000	1	58,50,000
			NPV	19,12,866

(v) Calculation of IRR

(ii) IRR- Since NPV computed in Part (i) is positive. Let us discount cash flows at higher rate say at 30%

	Period	Cash flow (₹)	PVF	PV (₹)
Incremental cash flows	1-5	22,84,000	2.436	55,63,824
Add: Terminal year cash	5	2,15,000	0.2693	57,900
				55,05,924
Less: Additional cash outflow	0	58,50,000	1	58,50,000
			NPV	- 3,44,076

Now we use interpolation formula

$$15\% + \frac{19,12,866}{19,12,866 - (-3,44,076)} \times 15\%$$

$$15\% + \frac{19,12,866}{22,56,942} \times 15\%$$

$$= 15\% + 12.71\% = 27.71\%$$

Question 16

Consider the following mutually exclusive projects:

Projects	Cash flows (₹)				
	C_0	C_1	C_2	C_3	C_4
A	-10,000	6,000	2,000	2,000	12,000
B	-10,000	2,500	2,500	5,000	7,500
C	-3,500	1,500	2,500	500	5,000
D	-3,000	0	0	3,000	6,000

Required:

- Calculate the payback period for each project.
- If the standard payback period is 2 years, which project will you select? Will your answer differ, if standard payback period is 3 years?
- If the cost of capital is 10%, compute the discounted payback period for each project. Which projects will you recommend, if standard discounted payback period is (i) 2 years; (ii) 3 years?
- Compute NPV of each project. Which project will you recommend on the NPV criterion? The cost of capital is 10%. What will be the appropriate choice criteria in this case? The PV factors at 10% are:

Year	1	2	3	4
PV factor at 10%	0.9091	0.8264	0.7513	0.6830

(PV/F 0.10, t)

Answer

(i) Payback Period of Projects

	C_0	C_1	C_2	C_3	
A	- 10,000 +	6,000 +	2,000 +	2,000	= 3 years
B	- 10,000 +	2,500 +	2,500 +	5,000	= 3 years

$$C \quad -3,500 + 1,500 + 2,500 = 1 \text{ year and } 9.6 \text{ months}$$

$$\text{i.e. } \frac{12}{2,500} \times 2,000$$

$$D \quad -3,000 + 0 + 0 + 3,000 = 3 \text{ years.}$$

(ii) If standard payback period is 2 years, Project C is the only acceptable project. But if standard payback period is 3 years, all the four projects are acceptable.

(iii) Discounted Payback Period (Cash flows discounted at 10%)

$$A \quad -10,000 + 5,454.6 + 1,652.8 + 1,502.6 + 8,196$$

$$3 \text{ years} + \frac{12}{8,196} \times 1,390 = 3 \text{ years and } 2 \text{ months}$$

$$B \quad -10,000 + 2,272.75 + 2,066 + 3,756.5 + 5,122.50$$

$$3 \text{ years} + \frac{12}{5,122.55} \times 1,904.75 = 3 \text{ years and } 4.6 \text{ months}$$

$$C \quad -3,500 + 1,363.65 + 2,066 + 375.65 + 3,415$$

$$2 \text{ years} + \frac{12}{375.65} \times 70.35 = 2 \text{ years and } 2.25 \text{ months}$$

$$D \quad -3,000 + 0 + 0 + 2,253.9 + 4,098$$

$$3 \text{ years} + \frac{12}{4,098} \times 746.10 = 3 \text{ years and } 2.18 \text{ months}$$

If standard discounted payback period is 2 years, no project is acceptable on discounted payback period criterion.

If standard discounted payback period is 3 years, Project 'C' is acceptable on discounted payback period criterion.

(iv) Evaluation of Projects on NPV criterion

$$A = -10,000 + 5,454.6 + 1,652.8 + 1,502.60 + 8,196$$

$$NPV = ₹ 6,806.2$$

$$B = -10,000 + 2,272.75 + 2,066 + 3,756.5 + 5,122.5$$

$$NPV = ₹ 3,217.75$$

$$C = -3,500 + 1,363.65 + 2,066 + 3,75.65 + 3,415$$

$$NPV = ₹ 3,720.3$$

$$D = -3,000 + 0 + 0 + 2,253.9 + 4,098$$

$$NPV = ₹ 3,351.9$$

Ranking of Projects on NPV Criterion

	NPV ₹	Rank
A	6,806.2	I
B	3,217.75	IV
C	3,720.3	II
D	3,351.9	III

Analysis: Project A is acceptable under the NPV method. The NPV technique is superior to any other technique of capital budgeting, whether it is PI or IRR. The best project is the one which adds the most, among available alternatives, to the shareholders wealth. The NPV method, by its very definition, will always select such projects. Therefore, the NPV method gives a better mutually exclusive choice than PI method. The NPV method guarantees the choice of the best alternative.

Question 17

A firm can make investment in either of the following two projects. The firm anticipates its cost of capital to be 10% and the net (after tax) cash flows of the projects for five years are as follows:

(Figures in ₹ '000)

Year	0	1	2	3	4	5
Project-A	(500)	85	200	240	220	70
Project-B	(500)	480	100	70	30	20

The discount factors are as under:

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

Required:

- Calculate the NPV and IRR of each project.
- State with reasons which project you would recommend.
- Explain the inconsistency in ranking of two projects.

Answer

(i) Computation of NPV and IRR

For Project A:

Years	Cash flows ₹ '000	PVF _{10%}	P.V. ₹ '000	PVF _{20%}	P.V. ₹ '000
0	-500	1.00	-500.00	1.00	-500.00
1	85	0.91	77.35	0.83	70.55
2	200	0.83	166.00	0.69	138.00
3	240	0.75	180.00	0.58	139.20
4	220	0.68	149.60	0.48	105.60
5	70	0.62	43.40	0.41	28.70
	NPV		+116.35		-17.95

NPV of Project A at 10% (Cost of Capital) is ₹ 1,16,350.

IRR of Project A may be calculated by interpolation method as under:

NPV at 20% is (-) 17.95 (₹ '000)

NPV at 10% is + 116.35 (₹ '000)

$$\therefore \text{IRR} = 10 + \frac{116.35}{116.35 - (-17.95)} (20 - 10)\% = 18.66\%$$

For Project B:

Years	Cash flows (₹ '000)	PVF 10%	P.V. (₹ '000)	PVF 20%	P.V. (₹ '000)
0	-500	1.00	-500	1.00	-500
1	480	0.91	436.80	0.83	398.40
2	100	0.83	83.00	0.69	69.00
3	70	0.75	52.50	0.58	40.60
4	30	0.68	20.40	0.48	14.40
5	20	0.62	12.40	0.41	8.20
	NPV		+105.10		+ 30.60

NPV of Project B at 10% (Cost of Capital) is ₹ 1,05,100.

IRR of Project B is calculated by interpolation method as under:

NPV at 10% = + 105.10 (₹ '000)

NPV at 20% = + 30.60 (₹ '000)

$$\text{IRR} = 10 + \frac{105.10}{105.10 - 30.60} (20 - 10)\% = 24.10$$

(Note: Though in above solution discounting factors of 10% and 20% have been used. However, instead of 20%, students may assume any rate beyond 20%, say 26%, and then NPV becomes negative. In such a case, the answers of IRR of Project may slightly vary from 24.10%.)

- (ii) The ranking of the projects will be as under:

	NPV	IRR
Project A	1	2
Project B	2	1

There is a conflict in ranking. IRR assumes that the project cash flows are reinvested at IRR whereas the cost of capital is 10%. The two projects are mutually exclusive. In the circumstances, the project which yields the larger NPV will earn larger cash flows. Hence the project with larger NPV should be chosen. Thus Project A qualifies for selection.

- (iii) Inconsistency in ranking arises because if NPV criterion is used, Project A is preferable. If IRR criterion is used, Project B is preferable. The inconsistency is due to the difference in the pattern of cash flows.

Where an inconsistency is experienced, the projects yielding larger NPV is preferred because of larger cash flows which it generates. IRR criterion is rejected because of the following reasons:

- IRR assumes that all cash flows are re-invested at IRR.
- IRR is a percentage but the magnitude of cash flow is important.
- Multiple IRR may arise if the projects have non-conventional cash flows.

Question 18

WX Ltd. has a machine which has been in operation for 3 years. Its remaining estimated useful life is 8 years with no salvage value in the end. Its current market value is ₹ 2,00,000. The company is considering a proposal to purchase a new model of machine to replace the existing machine. The relevant information is as follows:

	Existing Machine	New Machine
Cost of machine	₹ 3,30,000	₹ 10,00,000
Estimated life	11 years	8 years
Salvage value	Nil	₹ 40,000
Annual output	30,000 units	75,000 units

<i>Selling price per unit</i>	<i>₹ 15</i>	<i>₹ 15</i>
<i>Annual operating hours</i>	<i>3,000</i>	<i>3,000</i>
<i>Material cost per unit</i>	<i>₹ 4</i>	<i>₹ 4</i>
<i>Labour cost per hour*</i>	<i>₹ 40</i>	<i>₹ 70</i>
<i>Indirect cash cost per annum</i>	<i>₹ 50,000</i>	<i>₹ 65,000</i>

The company follow the straight line method of depreciation. The corporate tax rate is 30 per cent and WX Ltd. does not make any investment, if it yields less than 12 per cent. Present value of annuity of Re. 1 at 12% rate of discount for 8 years is 4.968. Present value of ₹ 1 at 12% rate of discount, received at the end of 8th year is 0.404. Ignore capital gain tax.

Advise WX Ltd. whether the existing machine should be replaced or not.

* In the question paper this word was wrongly printed as 'unit' instead of word 'hour'. The answer provided here is on the basis of correct word i.e. 'Labour cost per hour'.

Answer

(i) Calculation of Net Initial Cash Outflows:

	₹
Cost of new machine	10,00,000
Less: Sale proceeds of existing machine	<u>2,00,000</u>
Net initial cash outflows	<u>8,00,000</u>

(ii) Calculation of annual depreciation:

$$\text{On old machine} = \frac{\text{₹ } 3,30,000}{11 \text{ years}} = \text{₹ } 30,000 \text{ per annum.}$$

$$\text{On new machine} = \frac{\text{₹ } 10,00,000 - \text{₹ } 40,000}{8 \text{ years}} = \text{₹ } 1,20,000 \text{ per annum.}$$

(iii) Calculation of annual cash inflows from operation:

<i>Particulars</i>	<i>Existing machine</i>	<i>New Machine</i>	<i>Differential</i>
(1)	(2)	(3)	(4) = (3) - (2)
Annual output	30,000 units	75,000 units	45,000 units
	₹	₹	₹
(A) Sales revenue @ ₹ 15 per unit	<u>4,50,000</u>	<u>11,25,000</u>	<u>6,75,000</u>

(B) <i>Less: Cost of Operation</i>			
Material @ ₹ 4 per unit	1,20,000	3,00,000	1,80,000
Labour			
Old = 3,000 × ₹ 40	1,20,000		90,000
New = 3,000 × ₹ 70		2,10,000	
Indirect cash cost	50,000	65,000	15,000
Depreciation	<u>30,000</u>	<u>1,20,000</u>	<u>90,000</u>
Total Cost (B)	<u>3,20,000</u>	<u>6,95,000</u>	<u>3,75,000</u>
Profit Before Tax (A – B)	1,30,000	4,30,000	3,00,000
<i>Less: Tax @ 30%</i>	<u>39,000</u>	<u>1,29,000</u>	<u>90,000</u>
Profit After Tax	91,000	3,01,000	2,10,000
<i>Add: Depreciation</i>	<u>30,000</u>	<u>1,20,000</u>	<u>90,000</u>
Annual Cash Inflows	<u>1,21,000</u>	<u>4,21,000</u>	<u>3,00,000</u>

(iv) Calculation of Net Present Value:

	₹
Present value of annual net cash	
Inflows: 1 – 8 years = ₹ 3,00,000 × 4.968	14,90,400
<i>Add: Present value of salvage value of new machine at the end of 8th year (₹ 40,000 × 0.404)</i>	<u>16,160</u>
Total present value	15,06,560
<i>Less: Net Initial Cash Outflows</i>	<u>8,00,000</u>
NPV	<u>7,06,560</u>

Alternative Solution:

Calculation of Net Present Value (NPV)

Particulars	Period (Year)	Cash Flow (₹)	Present Value Factor (PVF) @ 12%	Present Value (₹)
Purchase of new machine	0	–8,00,000	1.00	–8,00,000
Incremental Annual Cash Inflow	1 – 8	3,00,000	4.968	14,90,400
Salvage value of new machine	8	40,000	0.404	<u>16,160</u>
Net Present Value (NPV)				<u>7,06,560</u>

Advise: Hence, existing machine should be replaced because NPV is positive.

**Question 19**

Given below are the data on a capital project 'M':

Annual cost saving	₹ 60,000
Useful life	4 years
Internal rate of return	15 %
Profitability index	1.064
Salvage value	0

You are required to calculate for this project M:

- (i) Cost of project
- (ii) Payback period
- (iii) Cost of capital
- (iv) Net present value.

Given the following table of discount factors:

Discount factor	15%	14%	13%	12%
1 year	0.869	0.877	0.885	0.893
2 years	0.756	0.769	0.783	0.797
3 years	0.658	0.675	0.693	0.712
4 years	0.572	0.592	0.613	0.636
	2.855	2.913	2.974	3.038

Answer**(a) (i) Cost of Project 'M'**

At 15% internal rate of return (IRR), the sum of total cash inflows = cost of the project i.e initial cash outlay

Annual cost savings = ₹ 60,000

Useful life = 4 years

Considering the discount factor table @ 15%, cumulative present value of cash inflows for 4 years is 2.855

Hence, Total Cash inflows for 4 years for Project M is

$60,000 \times 2.855 = ₹ 1,71,300$

Hence, Cost of the Project = ₹ 1,71,300

(ii) Payback Period

$$\text{Payback period} = \frac{\text{Cost of the Project}}{\text{Annual Cost Savings}} = \frac{₹ 1,71,300}{60,000}$$

$$\text{Payback Period} = 2.855 \text{ years}$$

(iii) Cost of Capital

$$\text{Profitability index} = \frac{\text{Sum of Discounted Cash inflows}}{\text{Cost of the Project}}$$

$$1.064 = \frac{\text{Sum of Discounted Cash inflows}}{1,71,300}$$

$$\therefore \text{Sum of Discounted Cash inflows} = ₹ 1,82,263.20$$

$$\text{Since, Annual Cost Saving} = ₹ 60,000$$

$$\text{Hence, cumulative discount factor for 4 years} = \frac{₹ 1,82,263.20}{60,000}$$

From the discount factor table, at discount rate of 12%, the cumulative discount factor for 4 years is 3.038

$$\text{Hence, Cost of Capital} = 12\%$$

(iv) Net Present Value (NPV)

$$\text{NPV} = \text{Sum of Present Values of Cash inflows} - \text{Cost of the Project}$$

$$= ₹ 1,82,263.20 - 1,71,300 = ₹ 10,963.20$$

$$\text{Net Present Value} = ₹ 10,963.20$$

**Question 20**

PR Engineering Ltd. is considering the purchase of a new machine which will carry out some operations which are at present performed by manual labour. The following information related to the two alternative models – 'MX' and 'MY' are available:

	Machine 'MX'	Machine 'MY'
Cost of Machine	₹ 8,00,000	₹ 10,20,000
Expected Life	6 years	6 years
Scrap Value	₹ 20,000	₹ 30,000

Estimated net income before depreciation and tax:

Year	₹	₹
1	2,50,000	2,70,000

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2	2,30,000	3,60,000
3	1,80,000	3,80,000
4	2,00,000	2,80,000
5	1,80,000	2,60,000
6	1,60,000	1,85,000

Corporate tax rate for this company is 30 percent and company's required rate of return on investment proposals is 10 percent. Depreciation will be charged on straight line basis.

You are required to:

- Calculate the pay-back period of each proposal.
- Calculate the net present value of each proposal, if the P.V. factor at 10% is – 0.909, 0.826, 0.751, 0.683, 0.621 and 0.564.
- Which proposal you would recommend and why?

Answer

(a) Working Notes:

1. Annual Depreciation of Machines

$$\text{Depreciation of Machine 'MX'} = \frac{\text{₹ } 8,00,000 - \text{₹ } 20,000}{6} = \text{₹ } 1,30,000$$

$$\text{Depreciation of Machine 'MY'} = \frac{\text{₹ } 10,20,000 - \text{₹ } 30,000}{6} = \text{₹ } 1,65,000$$

1. Calculation of Cash Inflows

Machine 'MX'	Years					
	1	2	3	4	5	6
Income before Depreciation & Tax	2,50,000	2,30,000	1,80,000	2,00,000	1,80,000	1,60,000
Less: Depreciation	1,30,000	1,30,000	1,30,000	1,30,000	1,30,000	1,30,000
Profit before Tax	1,20,000	1,00,000	50,000	70,000	50,000	30,000
Less : Tax @ 30%	36,000	30,000	15,000	21,000	15,000	9,000
Profit after Tax (PAT)	84,000	70,000	35,000	49,000	35,000	21,000
Add: Depreciation	1,30,000	1,30,000	1,30,000	1,30,000	1,30,000	1,30,000
Cash Inflows	2,14,000	2,00,000	1,65,000	1,79,000	1,65,000	1,51,000

Machine 'MY'	Years					
	1	2	3	4	5	6
Income before Depreciation & Tax	2,70,000	3,60,000	3,80,000	2,80,000	2,60,000	1,85,000
Less: Depreciation	<u>1,65,000</u>	<u>1,65,000</u>	<u>1,65,000</u>	<u>1,65,000</u>	<u>1,65,000</u>	<u>1,65,000</u>
Profit before Tax	1,05,000	1,95,000	2,15,000	1,15,000	95,000	20,000
Less: Tax @ 30%	<u>31,500</u>					<u>6,000</u>
Profit after Tax (PAT)	73,500	<u>58,500</u>	<u>64,500</u>	<u>34,500</u>	<u>28,500</u>	
Add: Depreciation	<u>1,65,000</u>	<u>1,65,000</u>	<u>1,65,000</u>	<u>1,65,000</u>	<u>1,65,000</u>	<u>1,65,000</u>
Cash Inflows	<u>2,38,500</u>	<u>3,01,500</u>	<u>3,15,500</u>	<u>2,45,500</u>	<u>2,31,500</u>	<u>1,79,000</u>

(i) Calculation of Payback Period

Cumulative Cash Inflows

	Years					
	1	2	3	4	5	6
Machine 'MX'	2,14,000	4,14,000	5,79,000	7,58,000	9,23,000	10,74,000
Machine 'MY'	2,38,500	5,40,000	8,55,500	11,01,000	13,32,500	15,11,500

Pay-back Period for 'MX'

$$= 4 + \frac{(8,00,000 - 7,58,000)}{1,65,000}$$

= 4.25 years or 4 years and 3 months.

Pay-back Period for 'MY'

$$= 3 + \frac{(10,20,000 - 8,55,500)}{2,45,500} = 3 + 0.67 = 3.67 \text{ years}$$

Or, 3 years and 8 months.

(ii) Calculation of Net Present Value (NPV)

Year	PV Factor	Machine 'MX'		Machine 'MY'	
		Cash Inflows ₹	Present Value ₹	Cash Inflows ₹	Present Value ₹
0	1.000	(8,00,000)	(8,00,000)	(10,20,000)	(10,20,000)
1	0.909	2,14,000	1,94,526	2,38,500	2,16,797
2	0.826	2,00,000	1,65,200	3,01,500	2,49,039
3	0.751	1,65,000	1,23,915	3,15,500	2,36,941
4	0.683	1,79,000	1,22,257	2,45,500	1,67,677
5	0.621	1,65,000	1,02,465	2,31,500	1,43,762
6	0.564	1,51,000	85,164	1,79,000	1,00,956
Scrap Value	0.564	20,000	11,280	30,000	16,920
Net Present Value (NPV)			4,807		1,12,092

(iii) Recommendation

	Machine 'MX'	Machine 'MY'
Ranking according to Pay-back Period	II	I
Ranking according to Net Present Value (NPV)	II	I

Advise: Since Machine 'MY' has higher ranking than Machine 'MX' according to both parameters, i.e. Payback Period as well as Net Present Value, therefore, Machine 'MY' is recommended.

 Question 21

A Ltd. is considering the purchase of a machine which will perform some operations which are at present performed by workers. Machines X and Y are alternative models. The following details are available:

	Machine X	Machine Y
	(₹)	(₹)
Cost of machine	1,50,000	2,40,000
Estimated life of machine	5 years	6 years
Estimated cost of maintenance p.a.	7,000	11,000
Estimated cost of indirect material, p.a.	6,000	8,000
Estimated savings in scrap p.a.	10,000	15,000

<i>Estimated cost of supervision p.a.</i>	<i>12,000</i>	<i>16,000</i>
<i>Estimated savings in wages pa.</i>	<i>90,000</i>	<i>1,20,000</i>

Depreciation will be charged on straight line basis. The tax rate is 30%. Evaluate the alternatives according to:

(i) *Average rate of return method, and*

(ii) *Present value index method assuming cost of capital being 10%.*

(The present value of ₹ 1.00 @ 10% p.a. for 5 years is 3.79 and for 6 years is 4.354)

Answer

Working Notes:

$$\text{Depreciation on Machine X} = \frac{1,50,000}{5} = ₹ 30,000$$

$$\text{Depreciation on Machine Y} = \frac{2,40,000}{6} = ₹ 40,000$$

<i>Particulars</i>	<i>Machine X (₹)</i>	<i>Machine Y (₹)</i>
<i>Annual Savings:</i>		
Wages	90,000	1,20,000
Scrap	10,000	15,000
Total Savings (A)	1,00,000	1,35,000
<i>Annual Estimated Cash Cost :</i>		
Indirect Material	6,000	8,000
Supervision	12,000	16,000
Maintenance	7,000	11,000
Total Cash Cost (B)	25,000	35,000
Annual Cash Savings (A-B)	75,000	1,00,000
Less : Depreciation	30,000	40,000
Annual Savings Before Tax	45,000	60,000
Less : Tax @ 30%	13,500	18,000
Annual Savings/Profit (After Tax)	31,500	42,000
Add : Depreciation	30,000	40,000
Annual Cash Inflows	61,500	82,000

Evaluation of Alternatives**(i) Average Rate of Return Method (ARR)**

$$\text{ARR} = \frac{\text{Average Annual Net Savings}}{\text{Average Investment}}$$

$$\text{Machine X} = \frac{31,500}{75,000} \times 100 = 42\%$$

$$\text{Machine Y} = \frac{42,000}{1,20,000} \times 100 = 35\%$$

Decision : Machine X is better.

[*Note*: ARR can be computed alternatively taking initial investment as the basis for computation (ARR = Average Annual Net Income/Initial Investment). The value of ARR for Machines X and Y would then change accordingly as 21% and 17.5% respectively]

(ii) Present Value Index Method

$$\text{Present Value of Cash Inflow} = \text{Annual Cash Inflow} \times \text{P.V. Factor @ 10\%}$$

$$\text{Machine X} = 61,500 \times 3.79$$

$$= ₹ 2,33,085$$

$$\text{Machine Y} = 82,000 \times 4.354$$

$$= ₹ 3,57,028$$

$$\text{P.V. Index} = \frac{\text{Present Value of Cash inflow}}{\text{Investment}}$$

$$\text{Machine X} = \frac{2,33,085}{1,50,000} = 1.5539$$

$$\text{Machine Y} = \frac{3,57,028}{2,40,000} = 1.4876$$

Decision : Machine X is better.

 Question 22

XYZ Ltd. is planning to introduce a new product with a project life of 8 years. The project is to be set up in Special Economic Zone (SEZ), qualifies for one time (at starting) tax free subsidy from the State Government of ₹ 25,00,000 on capital investment. Initial equipment cost will be ₹ 1.75 crores. Additional equipment costing ₹ 12,50,000 will be purchased at the end of the third year from the cash inflow of this year. At the end of 8 years, the original equipment will have no resale value, but additional equipment can be sold for ₹ 1,25,000. A working capital of

₹ 20,00,000 will be needed and it will be released at the end of eighth year. The project will be financed with sufficient amount of equity capital.

The sales volumes over eight years have been estimated as follows:

Year	1	2	3	4–5	6–8
Units	72,000	1,08,000	2,60,000	2,70,000	1,80,000

A sales price of ₹ 120 per unit is expected and variable expenses will amount to 60% of sales revenue. Fixed cash operating costs will amount ₹ 18,00,000 per year. The loss of any year will be set off from the profits of subsequent two years. The company is subject to 30 per cent tax rate and considers 12 per cent to be an appropriate after tax cost of capital for this project. The company follows straight line method of depreciation.

Required:

Calculate the net present value of the project and advise the management to take appropriate decision.

Note:

The PV factors at 12% are

Year	1	2	3	4	5	6	7	8
	.893	.797	.712	.636	.567	.507	.452	.404

Answer

(₹'000)

Year	Sales	VC	FC	Dep.	Profit	Tax	PAT	Dep.	Cash inflow
1	86.40	51.84	18	21.875	(5.315)	—	—	21.875	16.56
2	129.60	77.76	18	21.875	11.965	1.995*	9.97	21.875	31.845
3	312.00	187.20	18	21.875	84.925	25.4775	59.4475	21.875	81.3225
4–5	324.00	194.40	18	24.125	87.475	26.2425	61.2325	24.125	85.3575
6–8	216.00	129.60	18	24.125	44.275	13.2825	30.9925	24.125	55.1175

* (30% of 11.965 – 30% of 5.315) = 3.5895 – 1.5945 = 1.995)

	₹
Cost of New Equipment	1,75,00,000
Less: Subsidy	25,00,000

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Add: Working Capital	<u>20,00,000</u>
Outflow	<u>1,70,00,000</u>

Calculation of NPV

Year	Cash inflows	PV factor	NPV
	(₹)		(₹)
1	16,56,000	.893	14,78,808
2	31,84,500	.797	25,38,047
3	81,32,250 – 12,50,000 = 68,82,250	.712	49,00,162
4	85,35,750	.636	54,28,737
5	85,35,750	.567	48,39,770
6	55,11,750	.507	27,94,457
7	55,11,750	.452	24,91,311
8	55,11,750 + 20,00,000 + 1,25,000 = 76,36,750	.404	<u>30,85,247</u>
	Net Present Value		<u>2,75,56,539</u>

NPV	2,75,56,539
Less: Out flow	<u>1,70,00,000</u>
Saving	<u>1,05,56,539</u>

Advise: Since the project has a positive NPV, therefore, it should be accepted.

Question 23

C Ltd. is considering investing in a project. The expected original investment in the project will be ₹ 2,00,000, the life of project will be 5 year with no salvage value. The expected profit after depreciation but before tax during the life of the project will be as following:

Year	1	2	3	4	5
₹	85,000	1,00,000	80,000	80,000	40,000

The project will be depreciated at the rate of 20% on original cost. The company is subjected to 30% tax rate.

Required:

- Calculate payback period and average rate of return (ARR)
- Calculate net present value and net present value index, if cost of capital is 10%.
- Calculate internal rate of return.

Note: The P.V. factors are:

Year	P.V. at 10%	P.V. at 37%	P.V. at 38%	P.V. at 40%
1	.909	.730	.725	.714
2	.826	.533	.525	.510
3	.751	.389	.381	.364
4	.683	.284	.276	.260
5	.621	.207	.200	.186

Answer

Project	Outflow ₹ 2,00,000				
Year	1	2	3	4	5
	₹	₹	₹	₹	₹
Profit after depreciation but before tax	85,000	1,00,000	80,000	80,000	40,000
Less: Tax (30 %)	25,500	30,000	24,000	24,000	12,000
PAT	59,500	70,000	56,000	56,000	28,000
Add: Dep.	40,000	40,000	40,000	40,000	40,000
Net cash inflow	99,500	1,10,000	96,000	96,000	68,000

Average = ₹ 53,900
Average = ₹ 93,900.

(i) Calculation of payback period

$$= 1 + \frac{1,00,500}{1,10,000} = 1.914 \text{ years}$$

(ii) Calculation of ARR

Initial investment	2,00,000	1,60,000	1,20,000	80,000	40,000	
Depreciation	40,000	40,000	40,000	40,000	40,000	
Closing investment	1,60,000	1,20,000	80,000	40,000	0	
Average investment	1,80,000	1,40,000	1,00,000	60,000	20,000	Average=1,00,000

$$\text{ARR} = \text{Average of profit after tax} / \text{Average investment} = \frac{53,900}{1,00,000} = 53.90\%$$

(iii) Calculation of net present Value 10%

Net cash inflow	99,500.00	1,10,000.00	96,000.00	96,000.00	68,000.00	
	0.909	0.826	0.751	0.683	0.621	

6.50 Financial Management

Present value	90,445.50	90,860.00	72,096.00	65,568.00	42,228.00	3,61,197.50
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Net present value = ₹ 3,61,197.50 – ₹ 2,00,000 = ₹ 1,61,197.50

Net present value index = $\frac{\text{NPV}}{\text{PV of Cash Outflows}} = \frac{₹ 1,61,197.50}{₹ 2,00,000} = 0.81$

(iv) Calculation of IRR

Present value factor = Initial investment / Average annual cash inflow

$2,00,000 / 93,900 = 2.13$

It lies in between 38 % and 40%

Net Cash Inflows	99,500.00	1,10,000.00	96,000.00	96,000.00	68,000.00	
Present Value Factor @ 38%	0.725	0.525	0.381	0.276	0.200	
Present value @ 38% (P1)	72,137.50	57,750.00	36,576.00	26,496.00	13,600.00	Total = 2,06,559.50
Net Cash Inflows	99,500.00	1,10,000.00	96,000.00	96,000.00	68,000.00	
Present Value Factor @ 40%	0.714	0.510	0.364	0.260	0.186	
Present value @ 40% (P2)	71,043	56,100	34,944	24,960	12,648	Total = 1,99,695

IRR is calculated by Interpolation:

$$\begin{aligned} \text{IRR} &= \text{LDR} + (\text{P1} - \text{Q}) / \text{P1} - \text{P2} (\text{SDR} - \text{LDR}) \\ &= 38 + (2,06,559.50 - 2,00,000) / (2,06,559.50 - 1,99,695) \times (40 - 38) \\ &= 39.911137\% = 39.91\% \end{aligned}$$

Question 24

A hospital is considering to purchase a diagnostic machine costing ₹ 80,000. The projected life of the machine is 8 years and has an expected salvage value of ₹ 6,000 at the end of 8 years. The annual operating cost of the machine is ₹ 7,500. It is expected to generate revenues of ₹ 40,000 per year for eight years. Presently, the hospital is outsourcing the diagnostic work and is earning commission income of ₹ 12,000 per annum; net of taxes.

Required:

Whether it would be profitable for the hospital to purchase the machine? Give your recommendation under:

- Net Present Value method
- Profitability Index method.

PV factors at 10% are given below:

<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>	<i>Year 4</i>	<i>Year 5</i>	<i>Year 6</i>	<i>Year 7</i>	<i>Year 8</i>
<i>0.909</i>	<i>0.826</i>	<i>0.751</i>	<i>0.683</i>	<i>0.621</i>	<i>0.564</i>	<i>0.513</i>	<i>0.467</i>

Answer

Advise to the Hospital Management

Determination of Cash inflows

Sales Revenue	40,000
Less: Operating Cost	<u>7,500</u>
	32,500
Less: Depreciation (80,000 – 6,000)/8	<u>9,250</u>
Net Income	23,250
Tax @ 30%	<u>6,975</u>
Earnings after Tax (EAT)	16,275
Add: Depreciation	<u>9,250</u>
Cash inflow after tax per annum	25,525
Less: Loss of Commission Income	<u>12,000</u>
Net Cash inflow after tax per annum	13,525
In 8 th Year:	
New Cash inflow after tax	13,525
Add: Salvage Value of Machine	<u>6,000</u>
Net Cash inflow in year 8	<u>19,525</u>

Calculation of Net Present Value (NPV)

<i>Year</i>	<i>CFAT</i>	<i>PV Factor @10%</i>	<i>Present Value of Cash inflows</i>
1 to 7	13,525	4.867	65,826.18
8	19,525	0.467	<u>9,118.18</u>
			74,944.36
Less: Cash Outflows			<u>80,000.00</u>
	NPV		<u>(5,055.64)</u>

$$\text{Profitability Index} = \frac{\text{Sum of discounted cash inflows}}{\text{Present value of cash outflows}} = \frac{74,944.36}{80,000} = 0.937$$

Advise: Since the net present value is negative and profitability index is also less than 1, therefore, the hospital should not purchase the diagnostic machine.

6.52 Financial Management

Note: Since the tax rate is not mentioned in the question, therefore, it is assumed to be 30 percent in the given solution.

Question 25

The management of P Limited is considering selecting a machine out of two mutually exclusive machines. The company's cost of capital is 12 percent and corporate tax rate for the company is 30 percent. Details of the machines are as follows:

	Machine – I	Machine – II
Cost of machine	₹ 10,00,000	₹ 15,00,000
Expected life	5 years	6 years
Annual income before tax and depreciation	₹ 3,45,000	₹ 4,55,000

Depreciation is to be charged on straight line basis.

You are required to:

- Calculate the discounted pay-back period, net present value and internal rate of return for each machine.*
- Advise the management of P Limited as to which machine they should take up.*

The present value factors of Re. 1 are as follows:

Year	1	2	3	4	5	6
At 12%	.893	.797	.712	.636	.567	.507
At 13%	.885	.783	.693	.613	.543	.480
At 14%	.877	.769	.675	.592	.519	.456
At 15%	.870	.756	.658	.572	.497	.432
At 16%	.862	.743	.641	.552	.476	.410

Answer

- Computation of Discounted Payback Period, Net Present Value (NPV) and Internal Rate of Return (IRR) for Two Machines**

Calculation of Cash Inflows

	Machine – I (₹)	Machine – II (₹)
Annual Income before Tax and Depreciation	3,45,000	4,55,000
Less : Depreciation		
Machine – I: 10,00,000 / 5	2,00,000	-

Machine – II: 15,00,000 / 6	-	<u>2,50,000</u>
Income before Tax	1,45,000	2,05,000
Less: Tax @ 30 %	<u>43,500</u>	<u>61,500</u>
Income after Tax	1,01,500	1,43,500
Add: Depreciation	<u>2,00,000</u>	<u>2,50,000</u>
Annual Cash Inflows	<u>3,01,500</u>	<u>3,93,500</u>

Year	P.V. of Re.1 @12%	Machine – I			Machine – II		
		Cash flow	P.V.	Cumulative P.V.	Cash flow	P.V.	Cumulative P.V.
1	0.893	3,01,500	2,69,240	2,69,240	3,93,500	3,51,396	3,51,396
2	0.797	3,01,500	2,40,296	5,09,536	3,93,500	3,13,620	6,65,016
3	0.712	3,01,500	2,14,668	7,24,204	3,93,500	2,80,172	9,45,188
4	0.636	3,01,500	1,91,754	9,15,958	3,93,500	2,50,266	11,95,454
5	0.567	3,01,500	1,70,951	10,86,909	3,93,500	2,23,115	14,18,569
6	0.507	-	-	-	3,93,500	1,99,505	16,18,074

Discounted Payback Period for:

Machine – I

$$\text{Discounted Payback Period} = 4 + \frac{(10,00,000 - 9,15,958)}{1,70,951}$$

$$= 4 + \frac{84,042}{1,70,951} = 4 + 0.4916$$

$$= 4.49 \text{ years or } 4 \text{ years and } 5.9 \text{ months}$$

Machine – II

$$\text{Discounted Payback Period} = 5 + \frac{(15,00,000 - 14,18,569)}{1,99,505} = 5 + \frac{81,431}{1,99,505} = 5 + 0.4082$$

$$= 5.41 \text{ years or } 5 \text{ years and } 4.9 \text{ months}$$

Net Present Value for:

Machine – I

$$\text{NPV} = ₹ 10,86,909 - 10,00,000 = ₹ 86,909$$

Machine – II

$$\text{NPV} = ₹ 16,18,074 - 15,00,000 = ₹ 1,18,074$$

Internal Rate of Return (IRR) for:

Machine – I

$$\text{P.V. Factor} = \frac{\text{Initial Investment}}{\text{Annual Cash Inflow}} = \frac{10,00,000}{3,01,500} = 3.3167$$

PV factor falls between 15% and 16%

Present Value of Cash inflow at 15% and 16% will be:

$$\text{Present Value at 15\%} = 3.353 \times 3,01,500 = 10,10,930$$

$$\text{Present Value at 16\%} = 3.274 \times 3,01,500 = 9,87,111$$

$$\text{IRR} = 15 + \frac{10,10,930 - 10,00,000}{10,10,930 - 9,87,111} \times (16 - 15) = 15 + \frac{10,930}{23,819} \times 1 = 15.4588\% = 15.46\%$$

Machine - II

$$\text{P.V. Factor} = \frac{15,00,000}{3,93,500} = 3.8119$$

Present Value of Cash inflow at 14% and 15% will be:

$$\text{Present Value at 14\%} = 3.888 \times 3,93,500 = 15,29,928$$

$$\text{Present Value at 15\%} = 3.785 \times 3,93,500 = 14,89,398$$

$$\text{IRR} = 14 + \frac{15,29,928 - 15,00,000}{15,29,928 - 14,89,398} \times (15 - 14) = 14 + \frac{29,928}{40,530} \times 1 = 14.7384\% = 4.74\%$$

(ii) Advise to the Management**Ranking of Machines in terms of the Three Methods**

	Machine - I	Machine - II
Discounted Payback Period	I	II
Net Present Value	II	I
Internal Rate of Return	I	II

Advise: Since Machine - I has better ranking than Machine – II, therefore, Machine – I should be selected.

Question 26

ANP Ltd. is providing the following information:

<i>Annual cost of saving</i>	<i>₹ 96,000</i>
<i>Useful life</i>	<i>5 years</i>
<i>Salvage value</i>	<i>zero</i>
<i>Internal rate of return</i>	<i>15%</i>
<i>Profitability index</i>	<i>1.05</i>

Table of discount factor:

<i>Discount factor</i>	<i>Years</i>					
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>Total</i>
<i>15%</i>	<i>0.870</i>	<i>0.756</i>	<i>0.658</i>	<i>0.572</i>	<i>0.497</i>	<i>3.353</i>
<i>14%</i>	<i>0.877</i>	<i>0.769</i>	<i>0.675</i>	<i>0.592</i>	<i>0.519</i>	<i>3.432</i>
<i>13%</i>	<i>0.886</i>	<i>0.783</i>	<i>0.693</i>	<i>0.614</i>	<i>0.544</i>	<i>3.52</i>

You are required to calculate:

- (i) Cost of the project*
- (ii) Payback period*
- (iii) Net present value of cash inflow*
- (iv) Cost of capital.*

Answer**(i) Cost of Project**

At 15% internal rate of return (IRR), the sum of total cash inflows = cost of the project i.e initial cash outlay

Annual cost savings = ₹ 96,000

Useful life = 5 years

Considering the discount factor table @ 15%, cumulative present value of cash inflows for 5 years is 3.353

Hence, Total Cash inflows for 5 years for the Project is

$96,000 \times 3.353 = ₹ 3,21,888$

Hence, Cost of the Project = ₹ 3,21,888

(ii) Payback Period

$$\text{Payback period} = \frac{\text{Cost of the Project}}{\text{Annual Cost Savings}} = \frac{\text{₹ 3,21,888}}{96,000}$$

$$\text{Payback Period} = 3.353 \text{ years}$$

(iii) Net Present Value (NPV)

$$\begin{aligned} \text{NPV} &= \text{Sum of Present Values of Cash inflows} - \text{Cost of the Project} \\ &= \text{₹ 3,37,982.40} - 3,21,888 = \text{₹ 16,094.40} \end{aligned}$$

$$\text{Net Present Value} = \text{₹ 16,094.40}$$

(iv) Cost of Capital

$$\text{Profitability index} = \frac{\text{Sum of Discounted Cash inflows}}{\text{Cost of the Project}}$$

$$1.05 = \frac{\text{Sum of Discounted Cash inflows}}{3,21,888}$$

$$\therefore \text{Sum of Discounted Cash inflows} = \text{₹ 3,37,982.40}$$

$$\text{Since, Annual Cost Saving} = \text{₹ 96,000}$$

$$\text{Hence, cumulative discount factor for 5 years} = \frac{3,37,982.40}{96,000}$$

From the discount factor table, at discount rate of 13%, the cumulative discount factor for 5 years is 3.52

$$\text{Hence, Cost of Capital} = 13\%$$

Question 27

SS Limited is considering the purchase of a new automatic machine which will carry out some operations which are at present performed by manual labour. NM-A₁ and NM-A₂, two alternative models are available in the market. The following details are collected :

		Machine	
		NM-A ₁	NM-A ₂
Cost of Machine	(₹)	20,00,000	25,00,000
Estimated working life		5 Years	5 Years
Estimated saving in direct wages per annum	(₹)	7,00,000	9,00,000
Estimated saving in scrap per annum	(₹)	60,000	1,00,000
Estimated additional cost of indirect material per annum	(₹)	30,000	90,000
Estimated additional cost of indirect labour per annum	(₹)	40,000	50,000

<i>Estimated additional cost of repairs and maintenance per annum</i>	<i>(₹)</i>	<i>45,000</i>	<i>85,000</i>
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Depreciation will be charged on a straight line method. Corporate tax rate is 30 percent and expected rate of return may be 12 percent.

You are required to evaluate the alternatives by calculating the:

- (i) Pay-back Period
- (ii) Accounting (Average) Rate of Return; and
- (iii) Profitability Index or P.V. Index (P.V. factor for ₹ 1 @ 12% 0.893; 0.797; 0.712; 0.636; 0.567; 0.507)

Answer

Evaluation of Alternatives

Working Notes:

$$\begin{aligned}\text{Depreciation on Machine NM-A}_1 &= \frac{20,00,000}{5} \\ &= 4,00,000\end{aligned}$$

$$\text{Depreciation on Machine NM-A}_2 = \frac{25,00,000}{5} = 5,00,000$$

<i>Particulars</i>	<i>Machine NM-A₁ (₹)</i>	<i>Machine NM-A₂ (₹)</i>
Annual Savings:		
Direct Wages	7,00,000	9,00,000
Scraps	60,000	1,00,000
Total Savings (A)	7,60,000	10,00,000
Annual Estimated Cash Cost :		
Indirect Material	30,000	90,000
Indirect Labour	40,000	50,000
Repairs and Maintenance	45,000	85,000
Total Cost (B)	1,15,000	2,25,000
Annual Cash Savings (A-B)	6,45,000	7,75,000
Less: Depreciation	4,00,000	5,00,000
Annual Savings before Tax	2,45,000	2,75,000

Less: Tax @ 30%	73,500	82,500
Annual Savings / Profits after tax	1,71,500	1,92,500
Add: Depreciation	4,00,000	5,00,000
Annual Cash Inflows	5,71,500	6,92,500

(i) Payback Period

$$\text{Machine NM} - A_1 = \frac{\text{Total Initial Capital Investment}}{\text{Annual expected after tax net cashflow}}$$

$$= \frac{20,00,000}{5,71,500} = 3.50 \text{ Years}$$

$$\text{Machine NM} - A_2 = \frac{25,00,000}{6,92,500} = 3.61 \text{ Years}$$

Decision: Machine NM-A₁ is better.

(ii) Accounting (Average) Rate of Return (ARR)

$$\text{ARR} = \frac{\text{Average Annual Net Savings}}{\text{Average investment}} \times 100$$

$$\text{Machine NM} - A_1 = \frac{1,71,500}{10,00,000} \times 100 = 17.15\%$$

$$\text{Machine NM} - A_2 = \frac{1,92,500}{12,50,000} \times 100 = 15.4\%$$

Decision: Machine NM-A₁ is better.

(Note: ARR may be computed alternatively by taking initial investment in the denominator.)

(iii) Profitability Index or P V Index

Present Value Cash Inflow = Annual Cash Inflow x PV factor at 12%

$$\text{Machine NM-A}_1 = 5,71,500 \times 3.605 = ₹ 20,60,258$$

$$\text{Machine NM-A}_2 = 6,92,500 \times 3.605 = ₹ 24,96,463$$

$$\text{PV Index} = \frac{\text{Present Value of Cash Inflow}}{\text{Investment}}$$

$$\text{Machine NM-A}_1 = \frac{20,60,258}{20,00,000} = 1.03$$

$$\text{Machine NM-A}_2 = \frac{24,96,463}{25,00,000} = 0.998 = 1.0 \text{ approx.}$$

Decision: Machine NM-A₁ is better.



Question 28

PQR Company Ltd. is considering to select a machine out of two mutually exclusive machines. The company's cost of capital is 12 per cent and corporate tax rate is 30 per cent. Other information relating to both machines is as follows:

	Machine – I	Machine – II
Cost of Machine	₹ 15,00,000	₹ 20,00,000
Expected Life	5 Yrs.	5 Yrs.
Annual Income (Before Tax and Depreciation)	₹ 6,25,000	₹ 8,75,000

Depreciation is to be charged on straight line basis:

You are required to calculate:

- Discounted Pay Back Period
- Net Present Value
- Profitability Index

The present value factors of ₹ 1 @ 12% are as follows:

Year	01	02	03	04	05
PV factor @ 12%	0.893	0.797	0.712	0.636	0.567

Answer

Working Notes:

$$\text{Depreciation on Machine – I} = \frac{15,00,000}{5} = ₹ 3,00,000$$

$$\text{Depreciation on Machine – II} = \frac{20,00,000}{5} = ₹ 4,00,000$$

Particulars	Machine-I (₹)	Machine – II (₹)
Annual Income (before Tax and Depreciation)	6,25,000	8,75,000
Less: Depreciation	3,00,000	4,00,000
Annual Income (before Tax)	3,25,000	4,75,000

6.60 Financial Management

<i>Less: Tax @ 30%</i>	<i>97,500</i>	<i>1,42,500</i>
<i>Annual Income (after Tax)</i>	<i>2,27,500</i>	<i>3,32,500</i>
<i>Add: Depreciation</i>	<i>3,00,000</i>	<i>4,00,000</i>
<i>Annual Cash Inflows</i>	<i>5,27,500</i>	<i>7,32,500</i>

	Machine – I				Machine - II		
Year	PV of Re 1 @ 12%	Cash flow	PV	Cumulative PV	Cash flow	PV	Cumulative PV
1	0.893	5,27,500	4,71,058	4,71,058	7,32,500	6,54,123	6,54,123
2	0.797	5,27,500	4,20,418	8,91,476	7,32,500	5,83,803	12,37,926
3	0.712	5,27,500	3,75,580	12,67,056	7,32,500	5,21,540	17,59,466
4	0.636	5,27,500	3,35,490	16,02,546	7,32,500	4,65,870	22,25,336
5	0.567	5,27,500	2,99,093	19,01,639	7,32,500	4,15,328	26,40,664

(i) Discounted Payback Period

Machine – I

$$\begin{aligned}
 \text{Discounted Payback Period} &= 3 + \frac{(15,00,000 - 2,67,056)}{3,35,490} \\
 &= 3 + \frac{2,32,944}{3,35,490} \\
 &= 3 + 0.6943 \\
 &= 3.69 \text{ years or } 3 \text{ years } 8.28 \text{ months}
 \end{aligned}$$

Machine – II

$$\begin{aligned}
 \text{Discounted Payback Period} &= 3 + \frac{(20,00,000 - 17,59,466)}{4,65,870} \\
 &= 3 + \frac{2,40,534}{4,65,870} = 3 + 0.5163 \\
 &= 3.52 \text{ years or } 3 \text{ years } 6.24 \text{ months}
 \end{aligned}$$

(ii) Net Present Value (NPV)

Machine – I

$$\text{NPV} = 19,01,639 - 15,00,000 = ₹ 4,01,639$$

Machine – II

$$\text{NPV} = 26,40,664 - 20,00,000 = ₹ 6,40,664$$

(iii) Profitability Index

Machine – I

$$\text{Profitability Index} = \frac{19,01,639}{15,00,000} = 1.268$$

Machine – II

$$\text{Profitability Index} = \frac{26,40,664}{20,00,000} = 1.320$$

Conclusion:

Method	Machine - I	Machine - II	Rank
Discounted Payback Period	3.69 years	3.52 years	II
Net Present Value	₹4,01,639	₹6,40,664	II
Profitability Index	1.268	1.320	II

 Question 29

APZ Limited is considering to select a machine between two machines 'A' and 'B'. The two machines have identical capacity, do exactly the same job, but designed differently.

Machine 'A' costs ₹ 8,00,000, having useful life of three years. It costs ₹ 1,30,000 per year to run.

Machine 'B' is an economy model costing ₹ 6,00,000, having useful life of two years. It costs ₹ 2,50,000 per year to run.

The cash flows of machine 'A' and 'B' are real cash flows. The costs are forecasted in rupees of constant purchasing power. Ignore taxes.

The opportunity cost of capital is 10%.

The present value factors at 10% are :

Year	t_1	t_2	t_3
$PVIF_{0.10,1}$	0.9091	0.8264	0.7513
$PVIFA_{0.10,2} = 1.7355$			
$PVIFA_{0.10,3} = 2.4868$			

Which machine would you recommend the company to buy?

Answer

Statement Showing Evaluation of Two Machines

<i>Particulars</i>	<i>Machine A</i>	<i>Machine B</i>
Purchase Cost (₹) : (i)	8,00,000	6,00,000
Life of Machines (in years)	3	2
Running Cost of Machine per year (₹) : (ii)	1,30,000	2,50,000
Cumulative PVF for 1-3 years @ 10% : (iii)	2.4868	-
Cumulative PVF for 1-2 years @ 10% : (iv)	-	1.7355
Present Value of Running Cost of Machines (₹): (v) = [(ii) × (iii)]	3,23,284	4,33,875
Cash Outflow of Machines (₹) : (vi) = (i) + (v)	11,23,284	10,33,875
Equivalent Present Value of Annual Cash Outflow [(vi) ÷ (iii)]	4,51,698.57 Or 4,51,699	5,95,721.69 Or 5,95,722

Recommendation: APZ Limited should consider buying Machine A since its equivalent Cash outflow is less than Machine B.