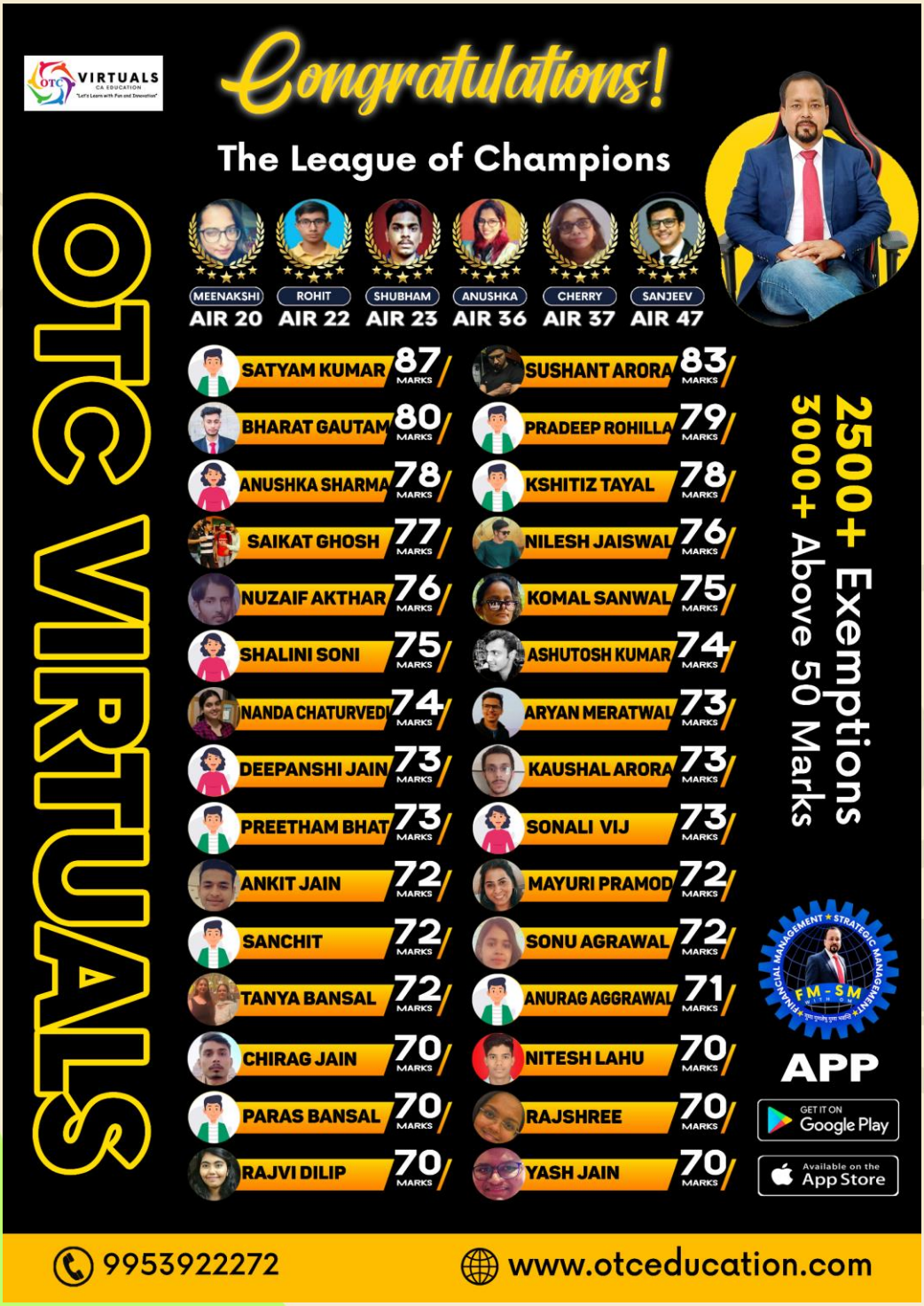
1 CHAPTER

Ratio Analysis

List of Important Questions



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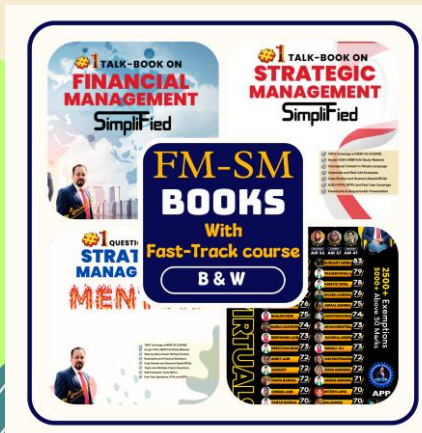


Problem 1: In a meeting held at Solan towards the end of 2018, the Directors of M/s HPCL Ltd. Have taken a decision to diversify. At present HPCL Ltd. Sells all finished goods from its own warehouse.

The Company issued debentures on 01.01.2019 and purchased fixed assets on the same day. The purchase prices have remained stable during the concerned period. Following information is provided to you:

Income Statement

Particulars	*2018*		*2019*	
Cash Sales	30,000		32,000	
Credit Sales	2,70,000	3,00,000	3,42,000	3,74,000
Less: Cost of Goods Sold		2,36,000		2,98,000
Gross profit		64,000		76,000
Less: Operating Expenses:				
Warehousing	13,000		14,000	
Transport	6,000		10,000	
Administrative	19,000		19,000	
Selling	11,000		14,000	
Non Operating Expenses		49,000		59,000
Net Profit				
		15,000		**17,000**

Balance Sheet

Particulars	*2018*		*2019*	
Fixed Assets (Net Block)	-	30,000	-	40,000
Receivables	50,000		82,000	
Cash at Bank	10,000		7,000	
Stock	60,000		94,000	
Total Current Assets (CA)	1,20,000		1,83,000	
Payables	50,000		76,000	
Total Current Liabilities (CL)	50,000		76,000	
Working Capital (CA-CL)		70,000		1,07,000
Total Assets		1,00,000		1,47,000
Represented by:				
Share Capital		75,000		75,000
Reserve and Surplus		25,000		42,000
Debentures		-		30,000
		1,00,000		**1,47,000**

You are required to calculate the following ratios for the years 2018 and 2019.

1. Gross Profit Ratio
2. Operating Expenses to Sales Ratio
3. Capital Turnover ratio
4. Stock Turnover ratio
5. Net Profit to Net worth Ratio, and
6. Receivables Collection Period.

Ratio relating to capital employed should be based on the capital at the end of the year. Give the reasons for change in the ratios for 2 years. Assume opening stock of ₹ 40,000 for the year 2018. Ignore Taxation.

Solution:

	Particulars	2018	2019
(1)	Gross Profit ratio Gross Profit Sales	$\frac{64,000}{3,00,000} \times 100 = 21.3\%$	$\frac{76,000}{3,74,000} \times 100 = 20.3\%$
(2)	Operating Expenses to Sales Operating Expenses Sales	$\frac{49,000}{3,00,000} \times 100 = 16.3\%$	$\frac{57,000}{3,74,000} \times 100 = 15.2\%$
(3)	Operating Profit Ratio Operating Profit Sales	$\frac{15,000}{3,00,000} \times 100 = 5\%$	$\frac{19,000}{3,74,000} \times 100 = 5.08\%$
(4)	Capital Turnover Ratio Sales Capital employed	$\frac{3,00,000}{1,00,000} = 3\%$	$\frac{3,74,000}{1,47,000} = 2.54\%$
(5)	Stock Turnover Ratio COGS Average Stock	$\frac{2,36,000}{50,000} = 4.7\%$	$\frac{2,98,000}{77,000} = 3.9\%$
(6)	Net profit to Net worth Net Profit Net worth	$\frac{15,000}{1,00,000} \times 100 = 15\%$	$\frac{17,000}{1,17,000} \times 100 = 14.53\%$
(7)	Receivable Collection Period Average Receivables Average Daily Credit Sales	$\frac{50,000}{2,70,000} \times 365 = 67.6$ days	$\frac{82,000}{3,42,000} \times 365 = 87.5$ days

Analysis: The decline in the Gross profit ratio could be either due toa reduction in the selling price or increase in the direct expenses (since the purchase price has remained the same). Similarly, there is a decline in the ratio of operating expenses to sales. However, since operating expenses have little bearing with sales, a decline in this ratio cannot be necessarily be interpreted as an increase in operational efficiency. An in-depth analysis reveals that the decline in the warehousing and the administrative expenses has been partly set off by an increase in the transport and the selling expenses. The operating profit ratio has remained the same in spite of a decline in the Gross profit margin ratio. In fact, the company has not benefited at all in terms of operational performance because of the increased sales. The company has not been able to deploy its capital efficiently. This is indicated by a decline in the Capital turnover from 3 S e times in case the capital turnover would have remained at 3 the company would have increased sales and profits by ₹ 67,000 and ₹ 3,350 respectively. The decline in the stock turnover ratio implies that the company has increased its investment in stock. Return on Net worth has declined indicating that the additional capital employed has failed to increase the volume of sales proportionately. The increase in the Average collection period indicates that the company has become liberal in extending credit on sales. However, there Is a corresponding increase in the current assets due to such a policy. It appears as if the decision to expand the business has not shown the desired results.

Problem 2: JKL Limited has the following Balance Sheets as on March 31, 2006 and March 31, 2005:

Balance Sheet (₹ in Lakh)

Particulars	31.03.2006	31.06.2005
Sources of Funds:		
Shareholder's Fund	2,377	1,472
Loan Funds	3,570	3,038
	5,947	**4,555**

Applications of Funds:		
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	(3,937)	(3,794)
	5,947	**4,555**

The Income Statement of the JKL Ltd. For the year ended is as follows (₹ in Lakh):

Particulars	*31.03.2006*	*31.06.2005*
Sales	22,165	13,882
Less: Cost of Goods Sold	20,860	12,544
Gross profit	1,305	1,338
Less Selling, General and Administration Expenses	1,135	752
EBIT	170	586
Less: Interest Expenses	113	105
PBT	57	481
Less: Tax	23	192
PAT	**34**	**289**

Required:

1. Calculate for the years 2005 and 2006:
   a. Inventory turnover ratio
   b. Financial Leverage
   c. Return on Investment (ROI)
   d. Return on Equity (ROE)
   e. Average Collection period.
2. **Give a brief comment on the financial position of JKL Limited.**

Solution:

1. Computation of Ratios

	Particulars	*31.03.2006*	*31.03.2005*
(a)	Inventory turnover ratio		
(b)	Financial Leverage		
(c)	Return on investment		
(d)	Return on equity		
(e)	Average collection period		

2. Brief comment on the financial position of JKL Ltd:

- The inventory turnover ratio is increased from 5.21 times to 7.28 times. This indicates the reduction in investment of stock and increase in sale turnover with reduced stocks.
- The financial leverage of the company is increased from 1.22 times to 2.98 times, which indicates the lower the cushion for paying interest on borrowings. The increase in ratio warns the increase in risk as to over gearing, which constitutes a strain on profits.
- There is a steep fall in ROI from 12.86% to 2.86%, this may be due to increase in finances from fresh issue of share and loan funds for expansion, modernization or new investment proposals, and increase in sales has not resulted in increase of company's profitability.

- The return on equity has also fallen from 19.63% to 1.43%. The current year may not be sufficient for declaration of dividends to shareholders.
- Increase in sale and reduction in investment in debtor's balances has resulted in reduction of average collection period from 30.7 days to 24.6 days.

Problem 3: ABC Company sells plumbing fixtures on terms of 2/10, net 30. Its financial statements over the last 3 years are as follows:

Particulars	*2020-21*	*2021-22*	*2022-23*
	₹	₹	₹
Cash	30,000	20,000	5,000
Accounts receivable	2,00,000	2,60,000	2,90,000
Inventory	4,00,000	4,80,000	6,00,000
	6,30,000	**7,60,000**	**8,95,000**
Net fixed assets	8,00,000	8,00,000	8,00,000
	14,30,000	**15,60,000**	**16,95,000**

	₹	₹	₹
Accounts payable	2,30,000	3,00,000	3,80,000
Accruals	2,00,000	2,10,000	2,25,000
Bank loan (short-term)	1,00,000	1,00,000	1,40,000
	5,30,000	6,10,000	7,45,000
Long-term debt	3,00,000	3,00,000	3,00,000
Common stock	1,00,000	1,00,000	1,00,000
Retained earnings	5,00,000	5,50,000	5,50,000
	14,30,000	***15,60,000***	***16,95,000***

	₹	₹	₹
Sales	40,00,000	43,00,000	38,00,000
Cost of goods sold	32,00,000	36,00,000	33,00,000
Net profit	**3,00,000**	**2,00,000**	**1,00,000**

Considering opening balance of Accounts Receivable and Inventory as 2,00,000 and 4,00,000 respectively as on 01.04.2020, ANALYSE the company's financial condition and performance over the last 3 years. Are there any problems?

Solution:

Ratios	*2020-21*	*2021-22*	*2022-23*
Current ratio (Current Assets / Current Liabilities)	1.19 ₹6,30,000/₹5,30,000	1.25 ₹7,60,000/₹6,10,000	1.20 ₹8,95,000/₹7,45,000
Acid-test ratio (Quick Assets / Current Liabilities)	0.43 ₹2,30,000/₹5,30,000	0.46 ₹2,80,000/₹6,10,000	0.40 ₹2,95,000/₹7,45,000
Receivables turnover ratio (Sales/ Average Receivables) (Refer Working Notes)	20 ₹40,00,000/₹2,00,000	18.70 ₹43,00,000/₹2,30,000	13.82 ₹38,00,000/₹2,75,000
Average collection period (365 / Receivables turnover ratio)	18.25 (365 /20)	19.52 (365/18.70)	26.41 (365/1 3.82)

Inventory turnover ratio (COGS / Average Inventory) (Refer Working Notes)	8 (₹ 32,00,000/₹ 4,00,000)	8.18 (₹ 36,00,000 /₹ 4,40,000)	6.11 (₹ 33,00,000/₹ 5,40,000)
Total debt to net worth (Short term + Long term Debt) / (Common stock + Retained earnings)	1.38 (₹ 8,30,000/₹ 6,00,000)	1.40 (₹ 9,10,000/₹ 6,50,000)	1.61 (₹ 10,45,000/₹ 6,50,000)
Long-term debt to total capitalization	0.33 (₹3,00,000/₹9,00,000)	0.32 (₹3,00,000 /₹9,50,000)	0.32 (₹3,00,000/₹9,50,000)
Gross profit margin (Gross Profit / Sales) {Gross profit = Sales – Cost of Goods sold}	0.20 (₹8,00,000/₹40,00 ,000)	0.16 (₹7,00,000/₹43,00,000)	0.13 (₹5,00,000/₹38,00 ,000)
Net profit margin (Net Profit / Sales)	0.075 (₹3,00,000/₹40,00,000)	0.047 (₹2,00,000/₹43,00,000)	0.026 (₹1,00,000/₹38,00,000)
Total Asset turnover (Sales / Total Assets)	2.80 ₹40,00,000/₹14,30,000	2.76 ₹43,00,000/₹15,60,000)	2.24 (₹38,00,000/₹16,95 ,0000
Return on assets (Net profit/ Total Assets)	0.21 (₹3,00,000/₹14,30,000)	0.13 (₹2,00,000/₹15,60,000)	0.06 (₹1,00,000/₹16,95,0000)
Working Notes			
Average receivables {(Opening + closing)/2}	₹ 2,00,000 + ₹ 2,00,000)/2 = ₹ 2,00,000	₹ 2,00,000 + ₹ 2,60,000)/2 = ₹ 2,30,000	₹ 2,60,000 + ₹ 2,90,000)/2 = ₹ 2,75,000
Average Inventory {(Opening + closing)/2}	₹ 4,00,000 + ₹ 4,00,000)/2 = ₹ 4,00,000	₹ 4,00,000 + ₹ 4,80,000)/2 = ₹ 4,40,000	₹ 4,80,000 + ₹ 6,00,000)/2 = ₹ 5,40,000

Analysis:

The current ratio and quick ratio are less than the ideal ratio (2:1 and 1:1 respectively) indicating that the company is not having enough resources to meet its current obligations.

Receivables are growing slower, although the average collection period is still very reasonable relative to the terms given. Inventory turnover is slowing as well, indicating a relative build-up in inventories. The increase in receivables and inventories, coupled with the fact that net worth has increased very little, has resulted in the total debt-to-net worth ratio increasing to what would have to be regarded on an absolute basis as a high level.

Long-term debt to total capitalization has not changed relatively coupled with the fact that retained earnings of only ₹ 50,000 is made in year 2019-20, and there is no issuance of new long-term debt in year 2019-20 and 2020-21. Both the gross profit and net profit margins have declined substantially.

The relationship between the two suggests that the company has incurred more relative expenses. The build-up in inventories and receivables has resulted in a decline in the asset turnover ratio, and this, coupled with the decline in profitability, has resulted in a sharp decrease in the return on assets ratio.

Problem 4: (ICAI Study Material): Following information are available for Navya Ltd. along with various ratios relevant to the particular industry it belongs to. APPRAISE your comments on strength and weakness of Navya Ltd. comparing its ratios with the given industry norms.

Navya Ltd.

Balance Sheet as at 31.3.2023

Liabilities	*(₹)*	*Assets*	*(₹)*
Equity Share Capital	48,00,000	Fixed Assets	24,20,000
10% Debentures	9,20,000	Cash	8,80,000
Sundry Creditors	6,60,000	Sundry debtors	11,00,000
Bills Payable	8,80,000	Stock	33,00,000
Other current Liabilities	4,40,000		-
Total	**77,00,000**	**Total**	**77,00,000**

Statement of Profitability For the year ending 31.3.2023

Particulars	*(₹)*	*(₹)*
Sales		1,10,00,000
Less: Cost of goods sold:		
Material	41,80,000	
Wages	26,40,000	
Factory Overhead	12,98,000	81,18,000
Gross Profit		
		28,82,000
Less: Selling and Distribution Cost	11,00,000	
Administrative Cost	12,28,000	23,28,000
Earnings before Interest and Taxes		5,54,000
Less: Interest Charges		92,000
Earning before Tax		4,62,000
Less: Taxes @ 50%		2,31,000
Net Profit (PAT)		**2,31,000**

Industry Norms

Ratios	*Norm*
Current Ratio	2.5
Receivables Turnover Ratio	8.0
Inventory Turnover Ratio (based on Sales)	9.0
Total Assets Turnover Ratio	2.0
Net Profit Ratio	3.5%
Return on Total Assets (on EBIT)	7.0%
Return on Net worth (Based on Net profit)	10.5%
Total Debt/Total Assets	60.0%

Solution:

Ratios	Navya Ltd.	Industry Norms
1. Current Ratio = Current Assets/Current Liabilities	₹52,80,000/₹19,80,000= 2.67	2.50
2 Receivable Turnover Ratio = Sales/Debtors	₹1,10,00,000/₹11,00,000= 10.0	8.00
3. Inventory turnover ratio = Sales/Stock	₹1,10,00,000/₹33,00,000 = 3.33	9.00
4. Total Asset Turnover ratio = Sales/Total Assets	₹1,10,00,000/₹77,00,000= 1.43	2.00
5 Net Profit Ratio = Net Profit/Sales	₹2,31,000/₹1,10,00,000= 2.10%	3.50%
6. Return on Total Asset = EBIT/Total Assets	₹5,54,000/₹77,00,000= 7.19%	7%
7. Return on Net worth = Net Profit/Net Worth	₹2,31,000/₹48,00,000 = 4.81%	
8. Total Debt/Total Assets	₹29,00,000/₹77,00,000= 37.66%	60%

Comments:

1. The position of Navya Ltd. is better than the industry norm with respect to Current Ratio and Receivables Turnover Ratio.
2. However, the Inventory turnover ratio and Total Asset Turnover ratio is poor comparing to industry norm indicating that company is inefficient to utilize its inventory and assets.
3. The firm also has its net profit ratio and return on net worth ratio much lower than the industry norm.
4. Total debt to total assets ratio is lower that the industry standard which suggests that the firm is less levered by debt and more by equity resulting in less risky company.

Problem 5: The following information was taken from the financial statements of Gamma Limited (amount in thousands of rupees).

Particulars	Year 1	Year 2	Year 3
Total Assets	750	850	860
Credit Sales	420	520	550
Cost of goods sold	450	595	645
Cash	50	60	55
Debtors	150	165	180
Inventory	130	160	170
Net Fixed Assets	120	250	250
Creditors	75	85	100
Short term debt	125	175	170
Long-term Debt	125	185	175
Equity	200	210	-

You are required to calculate those ratios which indicate the efficient use of assets and discuss potential sources of trouble.

Solution:

The efficient use of assets is indicated by the following key ratios:

(a) Current assets turnover, (b) Debtors' turnover, (c) Inventory turnover, (d) Fixed assets turnover, and (e) Total assets turnover.

Computation of Ratios:

	Year 1	Year 2	Year 3
a. Computation of Ratios: (Cost of goods sold / Total current assets)	1.36	1.55	1.59
b. Debtor's turnover (Credit sales / Average debtors)	2.8*	3.30	3.19
c. Inventory turnover (Cost of goods sold/ Average inventory)	3.46*	4.10	3.91
d. Fixed assets turnover (Cost of goods sold/ Fixed Assets)	3.75	2.38	2.58
e. Total assets turnover (Cost of goods sold/ Total assets)	1.00	0.93	0.98

*** Based on Debtors and Inventory at the end, as their opening balances are not available.**

Comments: The first three ratios indicate the efficiency of Current Assets usage, and the latter two, namely, Fixed assets turnover and Total assets turnover ratio, show the efficiency of utilisation of these. Current assets utilisation appears to be very satisfactory as reflected in the first three types of ratios. No major change is noticeable in their values over a period of time, which is presumably indicative of consistency in Debtors collection period and inventory turnover. There does not seem to be any significant problem regarding utilisation of Current assets.

However, it appears that fixed assets are not being fully utilised. Investments in fixed assets have more than doubled during years 2 and 3. The Fixed assets turnover ratio has sharply fallen to 2.58 in year 3 from 3.75 in year 1. Thus, investment in fixed assets are either excessive, or the capacity of the additional plant is under utilised. This is corroborated by the fact that sales in the latter 2-year have increased by around 15%. Therefore, the remedy lies in utilising the plant capacity by increasing production and sales.

Problem 6: Following figures are available from the accounts of a large industrial unit. Compute relevant ratios assess the efficiency of working capital management for 2012-13 and 2013-2014

Particulars	2011-12	2012-13	2013-14
Inventories	50	52.5	65
Debtors	67	57	77
Other current assets	5	15	20
Cash and bank balance	30	10	15
Total	152 .0	134.5	177
Current liabilities	52	54.5	72
Net working capital	100	80	105
Sales	300	300	340
Total assets	220	200	240

Solution:

Working Notes:

		(₹ crores)
1. Average Inventory		
(Opening Stock + Closing Stock)÷2		
2012-13	(50 + 52.5)÷2	51.25
2013-14	(52.5 + 65)÷2	58.75
2. Average Debtors Turnover		
(Opening Balance + Closing Balance)÷2		
2012-13	(67 + 57)÷2	62
2013-14	(57 + 77)÷2	67

3. Average Working Capital		
(Opening Balance + Closing Balance)÷2		
2012-13	(100 + 80)÷2	90
2013-14	(80 + 105)÷2	92.5
4. Average Current Assets		
(Opening Balance + Closing Balance)÷2		
2011-13	(152 + 134.5)÷2	143.25
2013-14	(134.5 + 177)÷2	155.75

Computation of Ratios for assessment of Working Capital

(₹ crores)

Particulars	*2012-13*	*2013-14*
1. Current Ratio: $\left(\frac{\text{Current assets}}{\text{Current liabilities}}\right)$	$\frac{134.5}{54.5} = 2.47$	$\frac{177}{72} = 2.46$
2. Liquid Ratio: $\left(\frac{\text{Current Assets – Inventory}}{\text{Current Liabilities}}\right)$	$\frac{(134.5\text{-}52.5)}{54.5} = 1.50$	$\frac{(177\text{-}65)}{72} = 1.56$
3. Current Assets to Total Assets: $\left(\frac{\text{Current assets}}{\text{Total assets}}\right)$	$\frac{134.5}{200} = 0.67$	$\frac{177}{240} = 0.74$
4. Inventory turnover ratio: $\frac{\text{Sales}}{\text{Average inventory}}$	$\frac{300}{51.25} = 5.85$	$\frac{340}{58.75} = 5.79$
5. Debtors Turnover ratio: $\left(\frac{\text{Sales}}{\text{Average debtors}}\right)$	$\frac{300}{62} = 4.84$	$\frac{340}{67} = 5.076$
6. Current Assets/Turnover Ratio: $\frac{\text{Sales}}{\text{Average current assets}}$	$\frac{300}{143.25} = 2.09$	$\frac{340}{155.75} = 2.18$
7. Working Capital Turnover Ratio: $\frac{\text{Sales}}{\text{Average net working capital}}$	$\frac{300}{90} = 3.33$	$\frac{340}{92.5} = 3.68$

Problem 7: Based on the following information of the financial ratios prepare Balance Sheet of Achievers Ltd. as of December 31, 2024. Explain your working and assumptions:

Current ratio	2.5
Liquidity ratio	1.5
Net Working capital	₹ 6,00,000
Stock turnover ratio	5
Ratio of gross profit to sales	20%
Turnover ratio to net fixed assets	2
Average debt collection period	2.4 months
Fixed assets to net worth	0.80
Long term debt to capital and reserve	7/25

Solution:

Balance Sheet of Achievers Ltd. as on December 31, 2024

Particulars	Amount (₹)	Particulars	Amount (₹)	Amount (₹)
Capital and Reserve		Fixed Assets		
Share Capital:		Cost less Depreciation		10,00,000
Reserve and Surplus	12,50,000	Current Assets:		
Long Term Debts	3,50,000	Stock-in-Trade	4,00,000	
Current Liabilities	4,00,000	Sundry Debtors	5,00,000	
		Cash	1,00,000	10,00,000
	20,00,000			**20,00,000**

Working Notes:

1. Current Ratio = 2.5
   Suppose if Current Liabilities = x, Current Assets = 2.5x
   Therefore, Net Working Capital = Current Assets – Current Liabilities = 2.5x – x = 1.5x
2. Working Capital = ₹ 6,00,000
   Or $1.5x = ₹\ 6,00,000$
   $$x = \frac{₹\ 6,00,000}{1.5} = ₹\ 4,00,000$$
   Current liabilities = x = ₹ 4,00,000
3. Current assets = 2.5x = 2.5 × ₹ 4,00,000 = ₹ 10,00,000
4. $$\text{Liquidity Ratio} = \frac{\text{Liquid Assets}}{\text{Current Liabilities}} = 1.5$$
   $$\frac{\text{Liquid Assets}}{4,00,000} = 1.5 \quad \text{or} \quad \text{Liquid Assets} = ₹\ 6,00,000$$
5. Stock: Current Assets – Liquid Assets = Stock
   Or ₹ 10,00,000 – ₹ 6,00,000 = Stock Or Stock = ₹ 4,00,000
6. Turnover Ratio= 5
   Stock = ₹ 4,00,000
   Cost of Sales = 5 × 4,00,000 = ₹ 20,00,000
7. Fixed Assets (Net) Turnover Ratio = 2
   Cost of Sales = ₹ 20,00,000
   ∴ Fixed Assets (Net) ₹ 10,00,000
8. Ratio of gross profit to sales = 20% on sales means 25% on cost of sales. Cost of sales being ₹ 20,00,000, Gross Profit will be ₹ 5,00,000 making total sales or turnover of ₹ 25,00,000.
9. Book Debts = 2.4 months
   Hence, $\text{Book Debts} = \frac{25,00,000 \times 2.4}{12} = ₹\ 5,00,000$
10. Cash Balance = Liquid Assets – Debtors = ₹ 6,00,000 — ₹ 5,00,000 = ₹ 1,00,000
11. Fixed Assets to Net Worth = 0.80
    ∵ $\text{Net Worth} = \text{Fixed Assets} \times \frac{100}{80} = ₹\ 10,00,000 \times \frac{100}{80} = ₹\ 12,50,000$
12. Long Term Debts $= \frac{(\text{Net worth} \times 7)}{25} = \frac{(₹\ 12,50,000 \times 7)}{25} = ₹\ 3,50,000$. It has been assumed that stock turnover ratio is on the basis of cost of sales, a candidate may work out this on the assumption that turnover stands for sales.

Problem 8: From the following information, prepare Balance Sheet of a firm:

Stock Turnover Ratio (based on cost of goods sold)	-	7 times
Rate of Gross Profit to Sales	-	25%
Sales to Fixed Assets	-	2 times
Average debt collection period	-	1.5 months
Current Ratio	-	2
Liquidity Ratio	-	1.25
Net Working Capital	-	₹8,00,000
Net Worth to Fixed Assets	-	0.9 times
Reserve and Surplus to Capital	-	0.25 times
Long Term Debts	-	Nil
All Sales are on credit basis.		**(Nov 2014)**

Solution: Working Notes:

1. Net Working Capital = Current Assets – Current Liabilities

$= 2 - 1 = 1$

Current Assets $= \frac{8,00,000 \times 2}{1}$

$= \frac{\text{Net Working Capital} \times 2}{1}$

Current Assets = 16,00,000

Current Liabilities = 16,00,000 – 8,00,000 = 8,00,000

2. Liquid Ratio $= \frac{\text{Liquid Assets}}{\text{Current Liabilities}}$

1.25 $= \frac{\text{Current Assets} - \text{Stock}}{\text{Current Liabilities}}$

1.25 $= \frac{16,00,000 - \text{Stock}}{8,00,000}$

1.25 × 8,00,000 = 16,00,000 – Stock

10,00,000 = 16,00,000 – Stock

Stock = 6,00,000

Liquid Assets = 1.25 × 8,00,000 = 10,00,000

3. Stock Turnover Ratio $= \frac{\text{COGS}}{\text{Stock}}$

7 $= \frac{\text{COGS}}{6,00,000}$

COGS = 42,00,000

4. Sales – Gross Profit = COGS

$\frac{\text{Gross Profit}}{\text{Sales}} = 25\%$

Gross Profit = 25% Sales

Gross Profit = 25% Sales

Sales – 25% Sales = COGS

Sales $= \frac{42,00,000}{0.75} = 56,00,000$

5. Debtors turnover Ratio $= \frac{12}{1.5} = 8$

Debtors $= \frac{\text{Cradit Sales}}{\text{Debtors Turnover}}$

$= \frac{56,00,000}{8} = 7,00,000$

6. $\frac{\text{Sales}}{\text{Fixed Assets}} = 2$

Fixed Assets $= \frac{56,00,000}{8} = 28,00,000$

7. Net worth = Fixed Assets + Current Assets – Long-term Debt – Current Liabilities

= 28,00,000 + 16,00,000 – 0 – 8,00,000

= 36,00,000

8. $\frac{\text{Reserves \& Surplus}}{\text{Capital}} = 0.25$

Net worth = Reserves and Surplus + Capital

Capital $= \frac{36,00,000}{1.25} = 28,80,000$

Reserves and Surplus = 0.25 × 28,80,000

= 7,20,000

9. Cash = Liquid Assets – Debtors

= 10,00,000 – 7,00,000 = 3,00,000

10. Long Term Debts = Nil

Draft Balance Sheet

Liabilities	*Amount (₹)*	*Assets*	*Liabilities (₹)*
Share Capital	28,80,000	Fixed Assets	28,00,000
Reserves and Surplus	7,20,000	Current Assets:	
Long Term Debts	-	Stock	6,00,000
Current Liabilities	8,00,000	Debtors	7,00,000
	-	Cash	3,00,000
	44,00,000		**44,00,000**

(**Note:** The above solution has been worked out by ignoring the Net worth to Fixed assets ratio given in the question in order to match the total of assets and liabilities in the Balance Sheet).

Problem 9: SSR Ltd. Has furnished the following ratios and information relating to the year ended 31st march, 2015.

Sales	₹60 Lacs
Return on Net worth	25%
Rate of Income tax	50%
Share Capital to reserves	7:3
Current Ratio	2
Net-profit to Sales (after tax)	6.25%
Inventory Turnover (Based on cost of goods sold and closing stock)	12
Cost of goods sold	₹18 Lacs
Interest on Debentures (@ 15%)	₹60,000
Sundry Debtors	₹2 Lacs
Sundry Creditors	₹2 Lacs

You are required to:

(i) Calculate the operating expenses for the year ended 31st March, 2015

(ii) Prepare a Balance Sheet as on 31st March, 2015. **(May 2015)**

Solution: Workings:

1. Net Profit = 6.25% of ₹60,00,000 = ₹3,75,000
2. Net worth = $₹3,75,000 \times \frac{100}{25} = ₹15,00,000$

   Share Capital = $₹15,00,000 \times \frac{7}{10} = ₹10,50,000$

   Reserve = $₹15,00,000 \times \frac{3}{10} = ₹4,50,000$

   Debentures = $₹60,000 \times \frac{100}{15} = ₹4,00,000$
3. Sundry Creditors = ₹2,00,000

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

   Current Assets = 2 Current Liabilities

   = 2 × ₹2,00,000 (assumed creditors is the only current liabilities) = ₹4,00,000
4. $\text{Inventory Turnover} = \frac{\text{Cost of Goods Sold}}{\text{Closing Stock}} = 12$

   Hence, Closing Stock = $\frac{₹18,00,000}{12} = ₹1,50,000$

Calculation of Earnings Before Interest and Tax (EBIT)

Particulars	Amount (₹)
Net Profit	3,75,000
Tax @ 50%	3,75,000
Profit Before Tax	7,50,000
Add: Interest on Debentures	60,000
Earnings Before Interest and Tax (EBIT)	8,10,000

(I) *Calculation of Operating Expenses for the year ended 31st March 2015*

Particulars	Amount (₹)	Amount (₹)
Sales		60,00,000
Less: Cost of Goods Sold	18,00,000	
EBIT	8,10,000	26,10,000
Operating Expenses		33,90,000

(ii) Balance Sheet as on 31st March, 2015

Liabilities	Amount (₹)	Amount (₹)	Assets	Amount (₹)	Amount (₹)
Share capital		10,50,000	Fixed Assets (balancing figure)		17,00,000
Reserve		4,50,000	Current Assets:		
Debentures 15%		4,00,000	Closing stock	1,50,000	
Sundry Creditors		2,00,000	Debtors	2,00,000	
			Cash	50,000	4,00,000
		21,00,000			**21,00,000**

Problem 10: Following is the abridged balance sheet of the Trivedi Co. Ltd.

Paid up share capital	5,00,000	Free hold property		4,00,000
Profit and loss account	85,000	Plant and machinery	2,50,000	
Current liabilities	2,00,000	Less: Depreciation	50,000	1,75,000
		Stocks		1,05,000
		Debtors		1,00,000
				5,000
	7,85,000			**7,85,000**

From the following information you are required to prepare profit and loss account and balance sheet as at 31st March 2025:

(a) The composition of the total of the Liabilities side of the company's balance sheet as 31st March 2025 (the paid up share capital remaining the same as at 31st March 2024) was:

Share capital	50 percent	profit and loss A/c	15 percent
7 percent debentures	10 percent	creditors	25 per cent

The debenture were issued on 1st April 2024, interest being paid on 30th September 2024 and 31st March 2025.

(b) During the year ended on 31st March, 2025. Additional plant and machinery had been bought and a further ₹ 25,000 depreciation written off. Freehold property remained unchanged. The total fixed assets then constituted 60 percent of total fixed and current assets.

(c) The current ratio was 1.6:1. The quick assets ratio was 1:1
(d) The debtors (four –fifths of the quick assets) to sales ratio revealed a credit period of two months.
(e) Gross profit was at the rate of 15 percent of selling price and return on net worth as at 31st March, 2025 was 10 percent. Ignore taxation.

Solution:

Balance Sheet as at 31 March, 2025

Liabilities	Amount (₹)	Assets		Amount (₹)
Share Capital	5,00,000	Fixed Assets:		
Reserve and Surplus:		Freehold property		4,00,000
Profit and Loss A/c	1,50,000	Plant and Machinery	3,00,000	
7% Debentures	1,00,000	Less: Depreciation	1,00,000	2,00,000
Creditors	2,50,000	Current Assets:		
		Stock	1,50,000	
		Debtors	2,00,000	
		Bank	50,000	4,00,000
	10,00,000			**10,00,000**

Profit and Loss Account for the year ended March 31, 2025

Dr. Cr.

Particulars	Amount (₹)	Particulars	Amount (₹)
To Opening Stock	1,05,000	By Sales	12,00,000
To Purchases (Balance figure)	10,65,000	By Closing Stock	1,50,000
To Gross Profit	1,80,000		
	13,50,000		13,50,000
To Expenses (Balance figure)	83,000	By Gross Profit b/d	1,80,000
To Debentures Interest	7,000		
To Depreciation	25,000		
To Net Profit	65,000		
	1,80,000		**1,80,000**

(i) Total of Liabilities Side $= \frac{₹\ 5,00,000}{0.50} = ₹\ 10,00,000.$
(ii) Profit and Loss A/c (Cr. Balance) = 15% of ₹ 10,00,000 = ₹ 1,50,000.
(iii) 7% Debentures = 10% of ₹ 10,00,000 = ₹ 1,00,000
(iv) Creditors = 25% of ₹ 10,00,000 = ₹ 2,50,000.
(v) Net fixed Assets = 60% of ₹ 10,00,000 = ₹ 6,00,000.
(vi) Net Plant and Machinery = ₹ 6,00,000 – ₹ 4,00,000 = ₹ 2,00,000.
(vii) Gross Plant and Machinery = ₹ 2,00,000 + (₹ 75,000 + ₹ 25,000) = ₹ 3,00,000
(viii) Current Assets = ₹ 2,50,000 × 1.6 = ₹ 4,00,000.
(ix) Liquid Assets = ₹ 2,50,000 × 1 = ₹ 2,50,000
(x) Stock = ₹ 4,00,000 – ₹ 2,50,000 = ₹ 1,50,000.
(xi) Debtors $= \frac{₹\ 2,50,000}{4} \times 5 = ₹\ 2,00,000$
(xii) Sales $= ₹\ 2,00,000 \times \frac{12}{2} = ₹\ 12,00,000.$
(xiii) Gross profit = 15% of ₹ 12,00,000 = ₹ 1,80,000
(xiv) Net Worth = ₹ 5,00,000 + ₹ 1,50,000 = ₹ 6,50,000.
(xv) Net Profit = 10% of ₹ 6,50,000 = ₹ 65,000.

Problem 11: Equity share capital G Ltd. Has furnished the following information relating to the year ended 31st March 2017 and 31st March, 2018:

Particulars	31st March, 2017	31st March, 2018
Share Capital	40,00,000	40,00,000
Reserve and Surplus	20,00,000	25,00,000
Long term loan	30,00,000	30,00,000

- Net profit ratio: 8%
- Gross profit ratio: 20%
- Long-term loan has been used to finance 40% of the fixed assets.
- Stock turnover with respect to cost of goods sold is 4.
- Debtors represent 90 days sales.
- The company holds cash equivalent to 1 months cost of goods sold.
- Ignore taxation and assume 360 days in year.

You are required to prepare Balance Sheet as on 31st March, 2018 in following format:

Liabilities	₹	Assets	₹
Share Capita	-	Fixed Assets	-
Reserve and Surplus	-	Sundry Debtors	-
Long-Term Loan	-	Closing Stock	-
Sundry Creditors	-	Cash in hand	-

Answer:

Balance Sheet

Liabilities	₹	Assets	₹
Share Capita	40,00,000	Fixed Assets	75,00,000
Reserve and Surplus	25,00,000	Sundry Debtors	15,62,500
Long-Term Loan	30,00,000	Closing Stock	12,50,000
Sundry Creditors	14,37,500	Cash in hand	6,25,000

Working Notes:

1. Net Profit = Change in Reserve and Surplus
   = 25,00,000 – 20,00,000 = ₹ 5,00,000
2. Sales:
   Net Profit ratio = 8% of sales
   ∴ Sales = Net Profit Net Profit ratio = 5,00,000 ÷ 8% = ₹ 62,50,000
3. Cost of Goods Sold = Sales – Gross Profit (20% of Sales)
   = ₹ 62,50,000 – 20% of ₹ 62,50,000 = ₹ 50,00,000
4. Fixed Assets = Long term loan 40%
   = ₹ 30,00,000 ÷ 40% = ₹ 75,00,000

5. Closing Stock = Cost of Goods Sold ÷ Stock Turnover
   = ₹ 50,00,000 ÷ 4 = ₹ 12,50,000
6. Debtors = Sales x Debtors Collection Period (days) / 360 days
   = ₹ 62,50,000 x 90/360 = ₹ 15,62,500
7. Cash Equivalent = COGS x 1.5/12
   = ₹ 50,00,000 x 1.5/12 = ₹ 6,25,000

Problem 12: The following figures and ratios are related to a company:

Sales for the year (all credit)	₹ 30,00,000
Gross profit ratio	25%
Fixed assets turnover (basis on cost of goods sold)	1.5
Stock turnover (basis on cost of goods sold)	6
Liquid ratio	1:1
Current ratio	1.5:1
Debtors collection period	2 months
Reserve and surplus to Share Capital	0.6:1
Capital gearing ratio	0.5
Fixed assets to net worth	1.20:1

You are required to prepare:

1. Balance Sheet of the company on the basis of above details.
2. The statement showing working capital requirement, if the company wants to make a provision for contingencies @ 10% of net working capital including such provision.

(1) Projected Balance Sheet

Liabilities	₹	*Assets*	₹
Share Capital	7,81,250	Fixed Assets	15,00,000
Reserve & Surplus	4,68,750	Stock	3,75,000
Debt	6,25,000	Debtors	5,00,000
Current Liabilities	7,50,000	Cash	2,50,000
	26,25,000		**26,25,000**

a. Cost of Goods Sold = 30,00,000 – 25% = 22,50,000

b. Fixed Assets Turnover Ratio = $\frac{\text{COGS}}{\text{Fixed Assets}}$ = 1.5 times

Fixed Assets = $\frac{22,50,000}{1.5}$ = 15,00,000

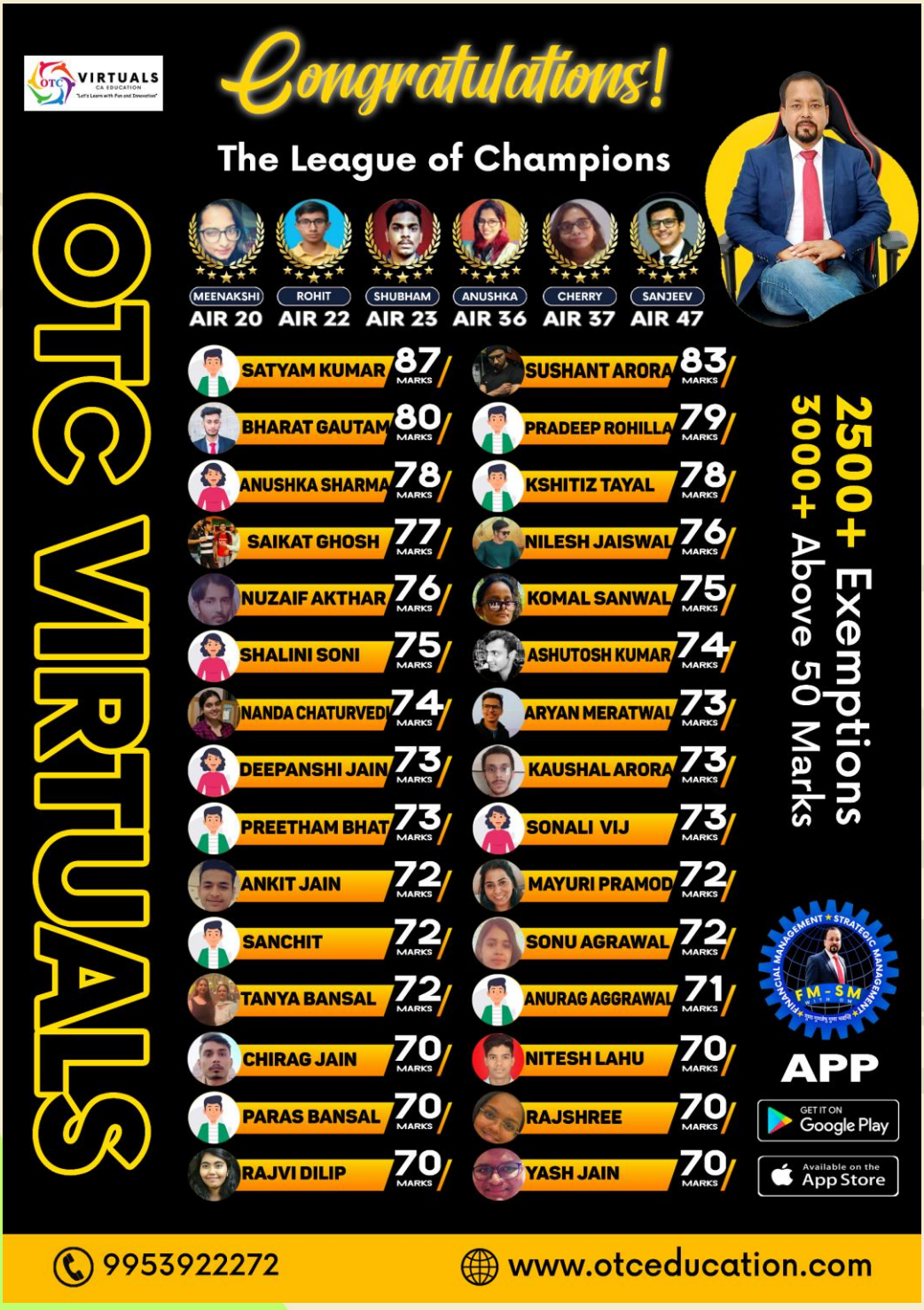
c. Fixed Assets to Net Worth = $\frac{\text{Fixed Assets}}{\text{Net Worth}}$ = 1.2 Times

Net Worth = $\frac{15,00,000}{1.2}$ = 12,50,000

2 CHAPTER

Cost of Capital

List of Important Questions



2 CHAPTER

Cost of Capital

List of Important Questions

Problem 1:

Suppose number of existing shares = 5,20,000

Existing capital structure	Percentage
Equity Share Capital	65%
Preference Share Capital	15%
Debenture	20%
	100%

This same percentage will continue in future. This best earnings per share (EPS).

Year	2003	2004	2005	2006
EPS	2.00	2.40	2.88	3.456

Next dividend per share will be equal to 50% of EPS of year 2006.

Current price per share = ₹ 21.60

15% new Debentures will be issued at market price ₹ 75 (Face value = ₹ 100)

New 13.8% Preference share will be allotted at ₹ 115 (Face value = ₹ 100)

Tax rate 50%. Find average cost of capital if the retained earnings will be used in a project.

Answer:

Based on past earnings we can get growth rate.

Year	EPS	Growth rate
2003	2	
2004	2.4	$\frac{E\ 2004}{E\ 2003} - 1 = \frac{2.4}{2} - 1 = 20\%$
2005	2.88	$\frac{E\ 2005}{E\ 2006} - 1 = \frac{2.88}{2.44} - 1 = 20\%$
2006	3.456	$\frac{E\ 2006}{E\ 2005} - 1 = \frac{3.456}{2.88} - 1 = 20\%$

The growth rate will be 20% p.a.

Next Dividend Per share (D_1) = 50% of EPS of 2006 = 50% of 3.456 = 1.728

Current Price (P_0) = 21.60

$K_e = \frac{D_1}{P_0} + g = \frac{1.728}{21.60} + 0.20 = 0.28 = 28\%$

Interest on Debenture = Face value × Interest rate

= 100 × 15% = ₹ 15

Cost of debts $= \frac{\text{Amount of Interest (1-tax)}}{\text{Market Price}} = \frac{15\ (1-0.50)}{75} \times 100 = 10\%$ p.a.

Cost of preference share $= \frac{\text{Amount of Preference Dividend}}{\text{Market value of Preference Share}} \times 100$

$= \frac{13.8\%\ \text{of face value (₹ 100)}}{₹\ 115} \times 100 = \frac{13.8}{115} \times 100 = 12\%$

If the given capital structure is maintained the cost of retained earnings will be equal to cost of existing equity i.e. 28%.

Overall cost for capital in new project

$$= W_e k_e + W_p K_p + W_d K_d$$
$$= (0.65 \times 28) + (0.15 \times 12) + (0.20 \times 10) = 18.2 + 1.80 + 2 = 22\%$$

Now, calculate the cost of project if the retained earnings of 2006 is used.

No. of equity shares	= 5,20,000 shares
EPS of 2006	= ₹ 3.456
DPS of 2006	= ₹ 1.728
Retained earnings per share	= ₹ 1.728
Total retained earnings	= ₹ 1.728 × 5,20,000 = ₹ 8,98,560
Proportion of equity invested in Project	= Project cost × 65%
₹ 8,98,560	= Project cost × 65%
Project cost	$= \frac{₹\ 8,98,560}{65\%} = ₹\ 13,82,400$

Problem 2: Adani Wilmar wished to raise additional finance of ₹ 10 lakhs for meeting its investment plans it has ₹ 2,10,000 in the form of retained earnings available for investment purposes. Further details are as following: (1) Debt/equity mix 30%/70% (2) Cost of debt: Up to ₹ 1,80,000 10% (before tax); Beyond ₹ 1,80,000 16% (before tax) (3) Earnings per share ₹ 4 (4) Dividend payout 50% of earnings is paid (5) Expected growth rate in dividend 10% (6) Current market price per share ₹ 44 (7) Tax rate 50%.

Required:

(a) To determine the pattern for raising the additional finance.
(b) To determine the post-tax average cost of additional debt.
(c) To determine the cost of retained earnings and cost of equity, and
(d) Compute the overall weighted average after tax cost of additional finance.

Solution:

(a) Pattern of raising additional finance.

Equity 70% of ₹ 10,00,000 = ₹ 7,00,000; Debt 30% of ₹ 10,00,000 = ₹ 3,00,000

The capital structure after raising additional finance:

The capital structure after raising additional finance:	*(₹)*
Equity Capital (7,00,000-2,10,000)	4,90,000
Retained earnings	2,10,000
Debt (Interest @ 10% p.a.)	1,80,000
(Interest @ 16% p.a.) (3,00,000 – 1,80,000)	1,20,000
Total Funds	10,00,000

(b) Determination of post-tax average cost of additional debt

$K_d = I(1\text{-}t)$ Where, I = Interest Rate; T = Corporate tax-rate

On ₹ 1,80,000 = 10%(1-0.5) = 5% of 0.05; On ₹ 1,20,000 = 16% (1-0.5)=8% or 0.08

$$\textbf{Average Cost of Debt} = \frac{1,80,000 \times .05 + 1,20,000 \times .08}{3,00,000} = \textbf{6.2\%}$$

(c) Determination of cost of retained earnings and cost of equity applying Dividend growth model:

K_e = ₹2(1+.10)/ ₹ 44 + 10% = 15%

(d) Computation of overall weighted average after tax cost of additional finance

Particular	₹	*Weights*	*Cost of funds*
Equity (including retained earnings)	7,00,000	0.70	15%
Debt	3,00,000	0.30	6.2%

WACC = (Cost of Equity x % Equity) + (Cost of debt x % Debt)
= (15% x 0.70) + (6.2% x 0.30) = 10.5% + 1.86% = 12.36%
Note: Retained Earnings & Equity and 10% & 16% Debt can be shown separately. Answer will be same.

Problem 3: Concepts Ltd. Issued 20,000 10% convertible debentures of ₹ 100 each with a maturity period of 5 years. At maturity the debentures holders will have the option to convert debentures into equity shares of the company in ration of 1:5 (5 shares for each debenture). The current market price of the equity share is ₹ 20 each and historically the growth rate of the share is 4% per annum. Assuming tax rate is 25%. **Compute the cost of 10% convertible debenture using Approximation Method and Internal Rate of Return Method. PV Factor are as under:**

Year	*1*	*2*	*3*	*4*	*5*
PV Factor @ 10%	0.909	0.826	0.751	0.683	0.621
PV Factor @ 15%	0.870	0.756	0.658	0.572	0.497

Solution:

Determination of Redemption value: Higher of –
(i) The cash value of debentures = ₹ 100
(ii) Value of equity shares = 5 shares x ₹ 20 $(1+0.04)^5$ = 5 shares x ₹ 24.333 = ₹ 121.665 rounded to ₹121.67

₹ 121.67 will be taken as redemption value as it is higher than the cash option and attractive to the investors.

Calculation of Cost of 10% Convertible debenture

(i) Using Approximation Method: $K_d = \dfrac{I(1-t) + \dfrac{(RV - NP)}{n}}{\dfrac{(RV + NP)}{2}} = \dfrac{10(1-0.25) + \dfrac{(121.67 - 100)}{5}}{\dfrac{(121.67 + 100)}{5}} = 10.676\%$

(ii) Using Internal Rate of Return Method

Year	*Cash flows (₹)*	*Discount Factor @ 10%*	*Present Value*	*Discount factor @ 15%*	*Present Value (₹)*
0	100	1.000	(100.00)	1.000	(100.00)
1 to 5	7.5	3.790	28.425	3.353	25.148
5	121.67	0.621	75.557	0.497	60.470
NPV			+3.982		-14.382

$$IRR = L + \frac{NPV_L}{NPV_L - NPV_H}(H - L) = 10\% + \frac{3.982}{3.982 - (-14.382)}(15\% - 10\%) = 0.11084 \text{ or } 11.084\% \text{ (approx.)}$$

Problem 4: ABC Company's Equity Share is quoted in the market at ₹ 25 per Share currently. The Company pays a dividend of ₹ 2 per Share and the Investor's Market expects a growth rate of 6% per year.

You are required to:

(a) Calculate the Company's Cost of Equity Capital.

(b) If the anticipated Growth Rate is 8% per annum, calculate the indicated Market Price per Share.

(c) If the Company issues 10% Debentures of Face Value of ₹ 100 each and realizes ₹ 96 per Debenture while the Debentures are redeemable after 12 years at a premium of 12%, what will be the Cost of Debentures? [Tax = 50%] **[Nov -2016]**

Solution:

(a) Cost of Equity Capital (K_e):

$$K_e \quad \frac{\text{Expected dividend per share}(D_1)}{\text{Market price per share}(P_0)} + \text{Growth rate (g)} \qquad = \frac{₹\ 2 \times 1.06}{₹\ 25} + 0.06 = 0.1448 \text{ or } 14.48\%$$

Note: The cost of equity can be calculated without taking the effect of growth on dividend.

(b) Indicated market price per share when growth rate is 8% p.a.:

$$K_e \quad \frac{\text{Expected dividend per share}(D_1)}{\text{Market price per share}(P_0)} + \text{Growth rate (g)}$$

$$P_o \quad \frac{\text{Expected dividend per share}(D_1)}{\text{Cost of equity }(K_e) - \text{Growth rate(g)}} \qquad = \frac{₹\ 2 \times 1.08}{0.1448 - 0.08} \text{ Or, } P_o = \frac{₹\ 2.16}{0.0648} = ₹\ 33.33$$

(c) Cost of Debenture (K_d) (Using approximation method)

$$K_d = \frac{\text{Interest}(1-\text{tax rate}) + \left(\frac{RV-NP}{12 \text{ Year}}\right)}{\left(\frac{RV+NP}{2}\right)}$$

Where, Tax Rate = 50%

Net Proceeds (NP) = 96%

Redeemable Value (RV) = ₹100 (1.12) = ₹ 112

$$K_d = \frac{10\% \text{ of } ₹\ 100\ (1-0.5) + \left(\frac{₹112-₹96}{12 \text{ Year}}\right)}{\left(\frac{₹112+₹96}{2}\right)} = \frac{₹5+1.33}{₹104} = 0.0608 \text{ or } 6.08\%$$

OR

(Using Present value method or YTM)

Identification of relevant cash flows

Year	Cash flows
0	Current market price (P0) = ₹ 96
1 to 12	Interest net of tax [I(1-t)] = 10% of ₹ 100 (1 – 0.5) = ₹ 5
12	Redemption value (RV) = ₹ 100 (1.12) = ₹ 112

Calculation of Net Present Values (NPV) at two discount rates

Year	Cash flows	Discount factor @ 5%(L)	Present Value	Discount factor @ 10% (H)	Present Value
0	96	1.000	(96.00)	1.000	(96.00)
1 to 12	5	8.863	44.32	6.814	34.07
12	112	0.557	62.38	0.319	35.73
NPV			+10.7		-26.2

Calculation of IPR

$$IPR = L + \frac{NPV_L}{NPV_L - NPV_H}(H-L) = 5\% + \frac{10.7}{10.7-(-26.2)}(10\%-5) = 5\% + \frac{53.5}{36.9} = 6.45\%$$

Therefore, $K_d = 6.45\%$

[Any other low and high rate as discount factor may also be used.]

Problem 5: The following is the Capital Structure of RBT Limited as on 31st March, 2016:

Source of Capital	Book Value	Market Value
Equity Shares at ₹ 10 each	₹ 50,00,000	₹ 1,05,00,000
Retained Earnings	₹ 13,00,000	Nil
11% Preference Shares of ₹ 100 each	₹ 7,00,000	₹ 9,00,000
14% Debentures of ₹ 100 each	₹ 30,00,000	₹ 36,00,000

Market Price of Equity Shares is ₹ 40 per Share and it is expected that a Dividend of ₹ 4 per Share would be declared. The Dividend per Share is expected to grow at the rate of 8% every year. Income Tax Rate applicable to the Company is 40% and Shareholder's Personal Income Tax Rate is 20%.

Required:

1. Cost of Capital for each source of Capital.
2. Weighted Average Cost of Capital on the basis of Book Value Weights.
3. Weighted Average Cost of Capital of on the basis of Market Value Weights. **[Nov -2016]**

Solution:

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

(a) Cost of Equity share capital:

$$K_e = \frac{D_0(1+g)}{\text{Market Price per share}(P_0)} + g = \frac{4(1+0.08)}{₹\,40} + 0.08 = 18.8\%$$

(b) Cost of Preference share capital (Kp) = 11%

(c) Cost of Debentures (Kd) = r (1 – t) = 14% (1 – 0.4) = 8.4%.

(d) Cost of Retained Earnings (Ks)= Ke (1 – tp) = 18.8 (1 – 0.2) = 15.04%

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

Source	*Amount (₹)*	*Weights (a)*	*After tax Cost of Capital (%) (b)*	*WACC (%) (c) = (a) × (b)*
Equity share	50,00,000	0.50	18.80	9.40
Retained earnings	13,00,000	0.13	15.04	1.96
11% Preference share	7,00,000	0.07	11.00	0.77
14% Debentures	30,00,000	0.30	8.40	2.52
	1,00,00,000	**1.00**		**14.65**

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

Source	*Amount (₹)*	*Weights (a)*	*After tax Cost of Capital (%) (b)*	*WACC (%) (c) = (a) × (b)*
Equity share	1,05,00,000	0.70	18.80	13.16
11% Preference share	9,00,000	0.06	11.00	0.66
14% Debentures	36,00,000	0.24	8.40	2.016
	1,50,00,000	**1.000**		**15.836**

Problem 6: The X Company has following Capital Structure at 31st March 2015, which is considered to be optimum.

14% Debentures	₹ 3,00,000
11% Preference Shares	₹ 1,00,000
Equity (1,00,000 Shares)	₹ 16,00,000
Total	₹ 20,00,000

The Company's Share has a current Market Price of ₹ 23.60 per Share. The expected Dividend per Share next year is 50% of 2015 EPS. The following are the Earning Per Share figure for the Company during preceding ten years. The past trends are expected to continue.

Year	*EPS (₹)*	*Year*	*EPS (₹)*
2006	1.00	2011	1.61
2007	1.10	2012	1.82
2008	1.21	2013	1.95
2009	1.33	2014	2.15
2010	1.46	2015	2.36

The Company issued new Debentures carrying 16% Rate of Interest and the Current Market Price of Debenture is ₹ 96. Preference Share ₹ 9.20 (which Dividend of ₹ 1.1 per Share) were also issued. The Company is in 50% tax bracket.

(i) Calculate after-tax cost of (a) New Debt, (b) New Preference Share (c) New Equity Share (assuming New Equity from Retained Earning)
(ii) Calculate Marginal Cost of Capital when no New Shares was issued.
(iii) How much can be spent for Capital Investment before New Ordinary Shares must be sold? Assuming the Retained Earning for next year's investment are 50% of 2015.
(iv) What will be the Marginal Cost of Capital when the funds exceeds the amount calculated in (iii), assuming New Equity is issued at ₹ 20 per Share? **[May -2016]**

Solution:

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

(a) New Debentures (K_d) $= \frac{I(1-t)}{NP} = \frac{₹16(1-.5)}{₹96} \times 100 = 8.33\%$

New Preference Shares (K_d) $= \frac{\text{Preference Dividend}}{\text{Net Proceed}} = \frac{₹1.10}{₹\ 9.20} \times 100 = 11.96\%$

(b) Equity Shares (Consuming New Equity from Retained Earnings) (K_e)

$$= \frac{\text{Expected dividend } (D_1)}{\text{Current market price}(P_0)} + \text{Growth rate (G)} = \frac{50\% \text{ of } ₹\ 2.36}{₹\ 23.60} \times 100 + 10\% = 5\% + 10\% = 15$$

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

$$\frac{\text{EPS in current year - EPS in previous year}}{\text{EPS in previous year}} = \frac{₹\ 2.36 - ₹\ 2.15}{₹\ 2.15} \times 100 = 10\%$$

(Approximate 10% figure is taken because of decimal figures)

[*Alternative calculation of Growth rate:- Growth rate is calculated on basis average growth of EPS i.e. 10 + 10 + 9.92 + 9.77 + 10.27 + 13.04 + 7.14 + 10.25 + 9.76 = 90.15 / 9 =10.01 or 10%]

Or,

The EPS for 2006 is given ₹1 and whereas for 2015 is given at ₹ 2.36. This has resulted in increase of ₹ 1.36 over a period of 9 years.

The growth rate can be calculated by using formula:

$Et = E_0\ (1 + g)^t$

$2.36 = 1\ (1 + g)^9$, using the CVF table, ₹ 1 becomes ₹ 2.36 at the end of 9th year at the compound interest rate of 10%. Therefore, the growth rate is taken at 10%.]

(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)	*Weighted Average Cost of Capital (WACC (%)* (a) × (b)
Debenture	0.15	8.33%	1.25
Preference shares	0.15	11.96%	0.60
Equity shares	0.80	15.00%	12.00
Marginal cost of capital			13.85

(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 ₹ 2.36 × 1,00,000 shares = ₹ 1,18,000

Since, marginal cost of capital is to be maintained at the current level i.e. 13.85%, the retained earnings should be equal to 80% of total additional capital for investment.

$$\text{Thus, investment before issuing equity} = \left(\frac{₹\ 1,18,000}{80} \times 100\right)\ ₹\ 1,47,500$$

The remaining capital of ₹ 29,500 i.e. (₹ 1,47,500 – ₹ 1,18,000) shall be financed by issuing New Debenture and New Preference Shares in the ratio of 3 : 1 (3,00,000 : 1,00,000) respectively.

(iv) If the company spends more than ₹ 1, 47,500 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:

$$\frac{\text{Expected dividend } (D_1)}{\text{Current market price}(P_0)} + \text{Growth rate}(g) = \frac{50\% \text{ of } 2.36}{₹\ 20} \times 100 + 10\% = 5.9\% + 10\% = 15.9\%$$

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

Source of capital	*Weight (a)*	*Cost (%) (b)*	*Weighted Average Cost of Capital [WACC (%)] (a) ×(b)*
Debenture	0.15	8.33	1.25
Preference shares	0.05	11.96	0.60
Equity shares	0.80	15.90	12.72
Marginal cost of capital			**14.57**

Problem 7: 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, ₹ 1000 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 in 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 targe debt to value ration (D/D+E) of 20%. 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.

Solution:

Working Notes:

1. **Computation of Cost of Debentures (K_d)** $= \dfrac{95\,(1-0.30)+\dfrac{(1000-981.05)}{3}}{\dfrac{(1000-981.05)}{2}} = 6.87\,\%$

2. **Computation of Cost of Term Loans (K_t):** $8.5\%(1-0.35) = 5.525\%$

3. **Computation of Cost of Preference Capital (K_p):** $= \dfrac{10.5+\dfrac{(1000-98.15)}{5}}{\dfrac{(1000+98.15)}{5}} = 11\,\%$

4. **Computation of Cos of Equity (K_e)** = Rf + Market Risk Premium x Beta = 5.5% + 8% x 1.1875 = 15%

5. Computation of proportion of Equity Capital, Preference Share, Debentures and Term Loans in the Market Value of Capital Structure:

Components of Capital	*Market Value of Capital Structure*	*(₹ in million) Proportion*
Equity share capital* (150 million share x ₹60)	9,000	81.3000
10.5% Preference Share capital (1 million shares x 98.15)	98.15	0.889
9.5% Debentures (1.5 million debentures x ₹ 981.05)	1,471.575	13.294
8.5% Term loan	500.000	4.517
	11,069.725	100

*We can bifurcate Equity into Equity Share Capital & Reserve & Surplus. Answer will be same as Ke = Kr.

(i) Calculation of WACC using Market Value Weights

Source of capital	Weights	Specific Cost (K%)	Weight x Specific Cost
Equity share capital*	.813	15	.12195
10.5% Preferential share capital	.0089	11	.00097
9.5% Debentures	.1329	6.87	.00913
8.5% Term loans	.04517	5.525	.00250
	1.00		**13.46**

*We can bifurcate Equity into Equity Share Capital & Reserve & Surplus. Answer will be same as Ke = Kr.

(ii) Marginal Cost of Capital (MCC) Schedule:

Ke (New Project) = 5.5% + 8% x 1.4375 = 17%; Kd = 9.5% x (1=0.35) = 6.175% and Kd = 10% x (1-0.35) = 6.5%

$$MCC = 17\% \times \frac{600}{750} + 6.175\,\% \times \frac{100}{750} + 6.5\% \times \frac{50}{750} = 14.86\%$$

Note: Debt to Value ratio = Debt ratio $= \dfrac{\text{Debt}}{\text{Debt+Equity}} = 0.20 \rightarrow \text{Debt} = .20\,(\text{Debt+Equity})$

It means New Debentures Amount will be 20% of Rs 750 = ₹150 and New Equity will be 80% of 750 = ₹600

Note: There may be Alternative Presentation/Solution for the above question. The above solution is as per Institute Recommendation. Hence the same should be preferred for exam.

Problem 8: XYZ Ltd. has the following book value capital structure.

	₹
Equity Capital (in shares of ₹ 10 each, fully paid up-at par)	15 crores
11% Preference capital (in shares of ₹ 100 each, fully paid up-at par)	1crores
Retained earnings	20 crores
Debentures 13.5% (of ₹ 100 each)	10 crores
Term loans 15%	12.5 crores

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 equity share is ₹ 40. Preference stock, redeemable after 10 years, is currently selling at ₹ 75 per share. Debentures, redeemable after 6 years, are selling at ₹ 80 per debentures. Applicable corporate income tax rate is 40%.

Required: = 0.20 → Debt = .20 (Debt+Equity)

(a) Calculate the average cost of capital using
  (i) Book value proportions.
  (ii) Market value proportions.

(b) Define the marginal cost of capital schedule for the company, if it raises ₹ 10 crores next year, given the following information:
The amount will be raised by equity and debt in equal proportions;
The company expects to retain ₹ 1.5 crores earnings next year;
The additional issue of equity shares will result in the net price per share being fixed at 32.
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.

Solution:

(1) (a) Statement showing computation of weighted average cost of capital by using book value proportions:

Source of finance	*Amount (Book values) (₹ in crores)*	*Weight (Book Value Proportion (a)*	*Cost of capital (b)*	*Weighted cost of capital (c) = (a) × (b)*
Equity capital	15	0.256	0.16 (W. N. -1)	0.04096
11% Preference capital	1	0.017	0.1543 (W. N. -2)	0.00262
Retained Earnings 13.5%	20	0.342	0.16 (W. N. -1)	0.05472
13.5% Debenture	10	0.171	0.127 (W. N. -3)	0.02171
15% term loans	12.5	0.214	0.09 (W. N. 4)	0.01926
	58.5	1.00		0.13927

(b) Statement showing computation of weighted average cost of capital by using market value proportion:

Source of finance	*Amount (₹ in crores)*	*Weighted (Market value Proportion)*	*Cost of capital*	*Weighted cost of capital*
		(a)	(b)	(c) = (a) × (b)
Equity capital	60.00 (₹ 1.5 cr × ₹ 40)	0.739	0.16 (W.N.-1)	0.11824
11% Preference capital	0.75 (₹ 1 lacs × ₹ 75)	0.009	0.1543 (W.N.-2)	0.00138
13.5% Debenture	8.00 (₹ 10 lacs × ₹ 80)	0.098	0.127 (W.N.-4)	0.01245
15% term loans	12.50	0.154	0.09 (W.N.-4)	0.01386
Weighted average cost of capital	81.25	1.00		0.14593 Or 14.59%

Note: Since Retained earning are treated as equity capital for purposes of calculation of cost of specific source of finance, the market value of the ordinary shows may be taken to represent the combined market value of equity shares & retained earning. The separate market values of retained earnings & 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 values.

(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)*	*Cost of capital (b)*	*Weighted marginal cost of capital (c) = (a) × (b)*
1. Retained earnings	1.5	0.5	0.16 (W.N.-1)	0.08
Debt	1.5	0.5	0.09 (W.N.-6)	0.045
Weighted marginal cost of capital				0.125 or 12.5%
2. Equity shares	1	0.5	0.1825 (W.N.-6)	0.09125
Debt	1	0.5	0.09 (W.N.-6)	0.045
Weighted marginal cost of capital				0.13625 or 13.625%
3. Equity shares	2.5	0.5	0.1825 (W.N.-5)	0.09125
Debt	2.5	0.5	0.096 (W.N.-6)	0.048
Weighted marginal cost of capital				0.13925 or 13.92%

Working Notes:

1. Cost of Equity Capital & retained earnings (K_e):

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

Where,
- K_e = Cost of equity capital
- D_1 = Expected dividend at the end of year 1
- P_0 = Current market price of equity shares
- g = Growth rate of dividend

Given,
- D_1 = ₹ 3.60
- P_0 = ₹ 40
- g = 7%

$$\therefore k_e = \frac{₹\ 3.60}{₹\ 40} + 0.07 \Rightarrow ke = 16\%$$

$$K_V = K_e = 16\%$$

2. Cost of Preference capital (k_p):

$$k_p = \frac{D + \left(\frac{F - P}{n}\right)}{\left(\frac{F + P}{2}\right)}$$

Where,
- D = Preference dividend
- F = Face value of Preferences hare
- P = Current market Price of Preferences shares.
- n = Redemption period of Preference shares.

Given, D = 11%, F = ₹ 100, P = ₹ 75 & n = 10 years.

$$\therefore k_p = \frac{11 + \left(\frac{100 - 75}{10}\right)}{\left(\frac{100 + 75}{2}\right)} \times 100 = 15.43\%$$

3. Cost of Debenture (k_d):

$$k_d = \frac{r(1-t) + \frac{F-P}{n}}{\frac{F+P}{2}}$$

Where,

r= Interest on debenture.
t= Tax rate applicable to the co.
F= Face value of debenture
P= Current Market Price of debenture
n= Redemption Period of debentures.

Given,

R = 13.5%, t = 40%, F = ₹ 100, P = ₹ 80 & n = 6 years.

$$\therefore\ k_d = \frac{13.5(1-0.40) + \left(\frac{100-80}{6}\right)}{\frac{100+80}{2}} \times 100$$

$= 12.70\%$

4. Cost of term loans (k_d):

$$K_1 = r(1-t)$$

Where,

r = rate of Interest on term loans
t = tax rate applicable to the co.

Given,

r = 15%
t = 40%
$\therefore$ $K_t = 15\%\ (1 - 0.40) = 9\%$

5. Cost of fresh equity share (k_e):

$$k_e = \frac{D_1}{P} + g$$

Given,

$D_1 = 3.60$
P = ₹ 32
g = 7%

$$\therefore\ k_e = \frac{3.60}{32} + 0.07 = 18.25\ \%$$

6. Cost of debt (k_d):

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

(for first ₹ 2.5 crores)
r = 15%
t = 40%
$\therefore$ $k_d = 15\%\ (1 - 0.40) = 9\%$
(for the next 2.5 crores)
r= 16% & t = 40%
$\therefore$ $k_d = 16\%\ (1 - 0.40) = 9.6\%$

Problem 9: Kashi Ltd. is considering raising of funds of about ₹250 lakhs by any of two alternative methods, viz., 14% institutional term loan and 13% non-convertible debentures. The term loan option would attract no major incidental cost and can be ignored. The debentures would have to be issued at a discount of 2.5% and would involve cost of issue of 2% on face value. Advise Kashi Ltd. as to the better option based on the effective cost of capital in each case. Assume a tax rate of 50%.

Solution:

Calculation of Effective Cost of Capital

Particulars	*Option 1 14% Institutional Term Loan (₹ in lakhs)*	*Option 2 13% Non-convertible Debentures (₹ in lakhs)*
(A)Effective capital to be raised Face value	250.00	250.00
Less: Discount	Nil	(6.25)
	250.00	243.75
Less: Cost of issue	Nil	5.00
Effective amount of capital	250.00	238.75
(B)Annual Interest charges on face value of ₹ 250 lakhs	35.0	32.50
Less: Tax benefit on interest @ 50%	17.5	16.25
	17.5	16.25
(C)Effective cost of capital after tax	B/A x 100 = 7.0%	(16.25/238.75) x 100 = 6.81% (approx.)

So, the better option is raising of funds of ₹ 250 lakhs by issue of 13% Non-convertible Debenture

Problem 10: Calculate the WACC using the following data by using (a) Book value weights (b) Market value weights. The capital structure of the company is as under:

Particulars	*(₹)*
Debentures (₹ 100 per debentures)	5,00,000
Preference shares (₹ 100 per share)	5,00,000
Equity shares (₹ 10 per share)	10,00,000
	20,00,000

The market prices of these securities are:

Debentures: ₹ 105 per debentures; Preference shares: ₹ 110 per preference share; Equity shares: ₹ 24 each.

Additional Information:

(i) ₹100 per debentures redeemable at par, 10% coupon rate, 4% floatation costs, 10-year maturity.

(ii) ₹100 per preference share redeemable at par, 5% coupon rate, 2% floatation cost and 10-year maturity.

(iii) Equity share has ₹ 4 floatation cost and market price ₹ 24 per share.

The next year expected dividend is ₹ 1 with annual growth of 5%. The firm has practice of paying all earnings in the form of dividend. Corporate tax rate is 30%.

Use YTM method to calculate cost of debentures & preference shares.

Hint: Assume Issue Price is equal to Market Price

Solution:

(i) **Cost of Equity (Ke)** = $Ke = \frac{D_1}{P_0 - F} + (g) = \frac{1}{24 - 4} + 0.05 = 0.1$ or 10%

(ii) **Cost of Debt (Kd):** Current market price (P_0)-floatation cost = ₹ 105 – 4% of ₹ 105 = 100.8

Calculation of NPV at discount rate of 5% and 7%

Year	*Cash flows (₹)*	*Discount factor @ 5%*	*Present Value*	*Discount factor @ 7%*	*Present Value (₹)*
0	100.8	1.000	(100.8)	1.000	(100.8)
1 to 10	7	7.722	54.05	7.024	49.17
10	100	0.614	61.40	0.508	50.80
NPV			**+14.65**		**-0.83**

Calculation of IRR: IRR = $5\% + \frac{14.65}{14.65 - (0.83)} (7\%-5\%) = 5\% \frac{14.65}{15.48} (7\%-5\%) = 6.89\%$

Cost of Debt (Kd) = 6.89%

(iii) **Cos of Preference shares (Kp):** Current market price (P_0) – floatation cost = ₹ 110 – 2% of 110 = 107.8

Calculation of NPV at discount rate of 3% and 5%

Year	*Cash flows (₹)*	*Discount factor @ 3%*	*Present Value*	*Discount factor @ 5%*	*Present Value (₹)*
0	107.8	1.000	(107.8)	1.000	(107.8)
1 to 10	5	8.530	42.65	7.722	38.61
10	100	0.744	74.40	0.614	61.40
NPV			+9.25		-7.79

Calculation of IRR: IRR = $3\% + \frac{9.25}{9.25-(-7.79)} (5\% - 3\%) = 3\% + \frac{9.25}{17.04} (5\% - 3\%) = 4.08\%$

Cost of Preference Shares (Kp) = 4.08%

(a) **Calculation of WACC using book value weights.**

Source of Capital	*Book Value*	*Weights*	*After tax cost of capital*	*WACC (Ko)*
	(₹)	(a)	(b)	(c) = (a) x (b)
10% Debentures	5,00,000	0.25	0.0689	0.01723
5% Preference shares	5,00,000	0.25	0.0408	0.0102
Equity shares	10,00,000	0.50	0.10	0.05000
	20,00,000	1.00		0.07743

(b) **Calculation of WACC using market value weights**

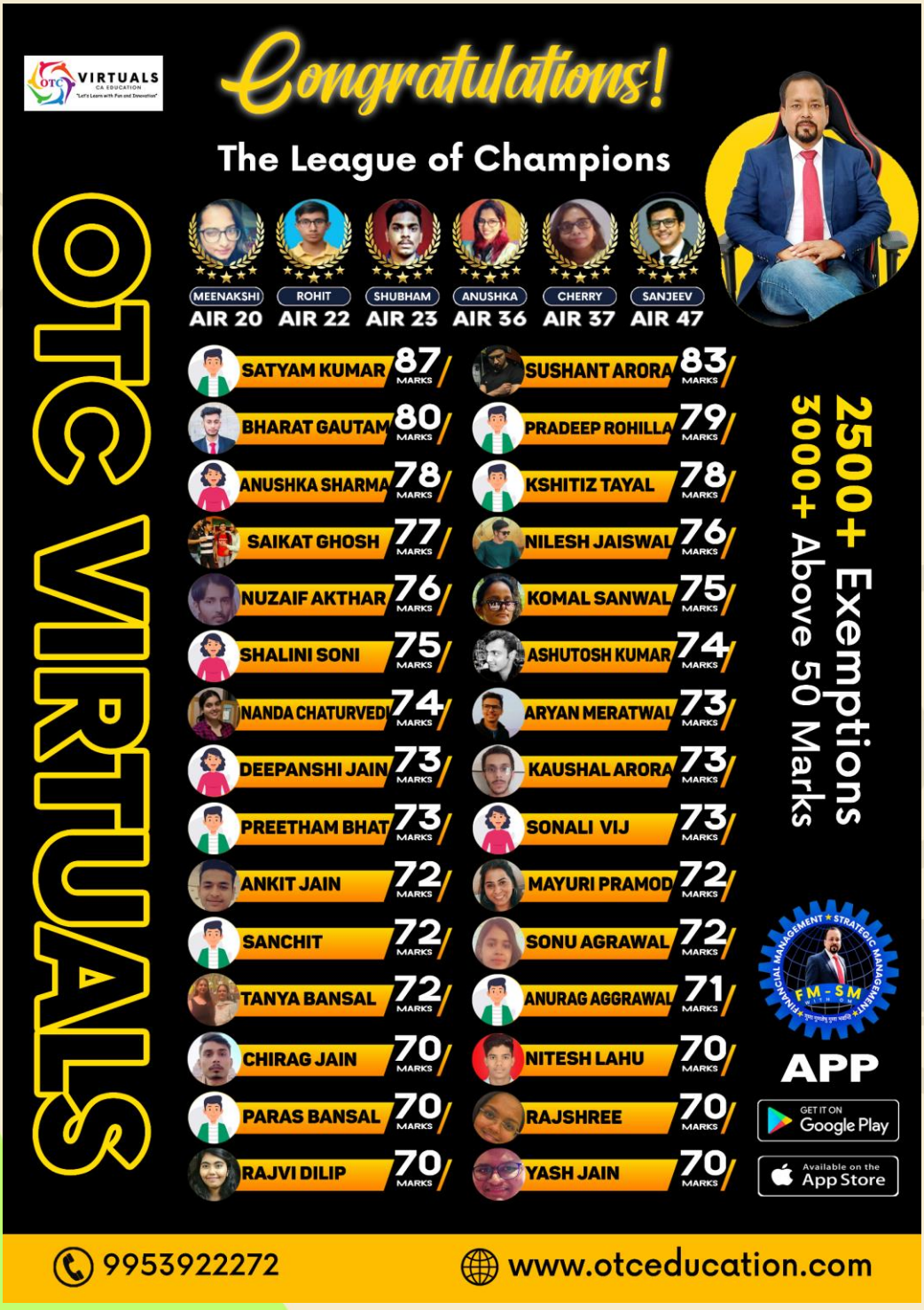
Source of Capital	*Market Value*	*Weights*	*After tax cost of capital*	*WACC (Ko)*
	(₹)	(a)	(b)	(c) = (a) x (b)
10% Debentures (₹ 105 x 5,000)	5,25,000	0.151	0.0689	0.0104
5% Preference shares (₹ 110 x 5,000)	5,50,000	0.158	0.0408	0.0064
Equity shares (₹ 24 x 1,00,000)	24,00,000	0.691	0.10	0.0691
	34,75,000	**1.000**		**0.0859**

WACC (Ko) = 0.0859 or 8.59%

3 CHAPTER

EBIT-EPS Analysis

List of Important Questions



3 CHAPTER

EBIT-EPS Analysis

List of Important Questions

Problem 1: The Sangharsh Ltd. needs ₹ 5,00,000 for construction of a new plant. The following three financial plans are feasible:

(i) The company may issue 50,000 equity shares at ₹ 10 per share.

(ii) The company may issue 25,000 equity shares at ₹ 10 per share and 2,500 debentures of ₹ 100-denomination bearing 8% rate of interest.

(iii) The company may issue 25,000 equity shares at ₹ 10 per share and 2,500 preference shares at ₹ 100 per share bearing 8% rate of dividend.

If the company's earnings before interest and taxes are ₹ 10,000, ₹ 20,000, ₹ 40,000, ₹ 60,000 and ₹ 1,00,000, what are the earnings per share under each of three financial plans? Which alternative would you recommend and why? Assume corporate tax rate to be 50%. **[Similar May - 2019]**

Solution: *Calculation of EPS under the three financial plans for ZBB Ltd.*

(i) First alternative financing plan:

Particulars	*1 (₹)*	*2 (₹)*	*3 (₹)*	*4 (₹)*	*5 (₹)*
EBIT	10,000	20,000	40,000	60,000	1,00,000
Less: Interest	0	0	0	0	0
PBT	10,000	20,000	40,000	60,000	1,00,000
Less: Taxes @ 50%	(5,000)	(10,000)	(20,000)	(30,000)	(50,000)
PAT	5,000	10,000	20,000	30,000	50,000
No. of equity shares	50,000	50,000	50,000	50,000	50,000
EPS (₹)	**0.1**	**0.2**	**0.4**	**0.6**	**1**

(ii) Second alternative financing plan

Particulars	*1 (₹)*	*2 (₹)*	*3 (₹)*	*4 (₹)*	*5 (₹)*
EBIT	10,000	20,000	40,000	60,000	1,00,000
Less: Interest	(20,000)	(20,000)	(20,000)	(20,000)	(20,000)
PBT	(10,000)	0	20,000	40,000	80,000
Less: Taxes @ 50%	(5,000)	0	(10,000)	(20,000)	(40,000)
PAT	(5,000)	0	10,000	20,000	40,000
No. of equity shares	25,000	25,000	25,000	25,000	25,000
EPS (₹)	**(0.20)**	**0**	**0.4**	**0.8**	**1.6**

On loss the company can get tax credit and it is assumed that the tax credit is given immediately.

(iii) Third alternative financing plan

Particulars	*1 (₹)*	*2 (₹)*	*3 (₹)*	*4 (₹)*	*5 (₹)*
EBIT	10,000	20,000	40,000	60,000	1,00,000
Less: Interest	0	0	0	0	0
PBT	10,000	20,000	40,000	60,000	1,00,000
Less: Taxes @ 50%	(5,000)	(10,000)	(20,000)	(30,000)	(50,000)
PAT	5,000	10,000	20,000	30,000	50,000
Less: Preference dividend	(20,000)	(20,000)	(20,000)	(20,000)	(20,000)
Earning for equity Shareholders	(15,000)	(10,000)	0	10,000	30,000
No. of equity shares	25,000	25,000	25,000	25,000	25,000
EPS (₹)	**(0.6)**	**(0.4)**	**0**	**-0.4**	**1.2**

Analysis: From the analysis of the above three alternatives of financing, alternative – II gives more EPS when the EBIT is ₹ 1,00,000 and the company issues 25,000 equity shares of ₹ 10 per share and 2,500 debentures of ₹ 100 @ 8% rate of interest.

Problem 2: A company needs ₹ 12,00,000 for the installation of a new factory which would yield an annual EBIT of ₹ 2,00,000. The company has the objective of maximizing the earnings per share. It is considering the possibility of issuing equity shares plus raising a debt of ₹ 2,00,000, ₹ 6,00,000 or ₹ 10,00,000. The current market price of the share is ₹ 40 and will drop to ₹ 25 per share if the market borrowings were to exceed ₹ 7,50,000. Cost of borrowings are indicated as under:

Upto ₹ 2,50,000	...	10% p.a.
Between ₹ 2,50,001 and ₹ 6,25,000	...	14% p.a.
Between ₹ 6,25,001 and ₹ 10,00,000	...	16% p.a.

Assuming the tax rate to be 50%. Work out the EPS.

Solution:

Particulars	*Plan I (₹)*	*Plan II (₹)*	*Plan III (₹)*
Total financing	12,00,000	12,00,000	12,00,000
- Debt financing	2,00,000	6,00,000	10,00,000
Equity financing	10,00,000	6,00,000	2,00,000
Issue price	40	40	25
Number of shares	25,000	15,000	8,000
Computation of interest:			
10% of ₹ 2,00,000	20,000	—	—
10% of ₹ 2,50,000	—	25,000	25,000
14% of ₹ 3,50,000	—	49,000	—
14% of ₹ 3,75,000	—	—	52,500
14% of ₹ 3,75,000	—	—	60,000
Total interest	**20,000**	**74,000**	**1,37,500**
Calculation of EPS:			
EBIT	2,00,000	2,00,000	2,00,000
Less: Interest	20,000	74,000	1,37,500
Profit before tax	1,80,000	1,26,000	62,500
Less: Tax @ 50%	90,000	63,000	31,250
Profit after tax	**90,000**	**63,000**	**31,250**
Number of shares	25,000	15,000	8,000
EPS (₹) $\left(\frac{\text{Profit after tax}}{\text{No. of shares}}\right)$	**3.6**	**4.2**	**3.91**

The EPS is highest (i.e. ₹ 4.20) under the plan II. The borrowings under this plan i.e. ₹ 6,00,000 is also within limits and the market price would be maintained at ₹ 40.

Problem 3: Ummeed Software Ltd. has appointed you as its finance manager. The company wants to implement a project for which ₹ 30 lakhs is required to be raised from the market as a means of financing the project. The following financing plans and options are at hand:

Particulars	Plan A	Plan B	Plan C
	(No. in thousands)		
Option 1:			
Equity shares	30	30	30
Option 2:			
Equity shares	15	20	10
12% Preference Shares	Nil	10	10
10% Non-Convertible debentures	15	Nil	10

Assuming corporate tax to be 55% and the face value of all the shares and debentures to be ₹ 100 each, calculate the indifference points and earning per share (EPS) of each of the financing plans.

Solution:

Plan A

$$\frac{EBIT\,(1-t)}{N_1} = \frac{(EBIT - Int.)\,(1-t)}{N_2}$$

$$\frac{EBIT\,(1-0.55)}{30{,}000} = \frac{EBIT\,(1-1{,}50{,}000)\,(1-0.55)}{15{,}000}$$

=> By solving the above the equation, the value of EBIT comes to ₹ 3,00,000

Plan B

$$\frac{EBIT\,(1-t)}{N_1} = \frac{EBIT\,(1-t) - PD}{N_2}$$

$$\frac{EBIT\,(1-0.55)}{30{,}000} = \frac{EBIT\,(1-0.55) - 1{,}20{,}000}{20{,}000}$$

=> By solving the above the equation, the value of EBIT comes to ₹ 8,00,000

Plan C

$$\frac{EBIT\,(1-t)}{N_1} = \frac{(EBIT - Int.)\,(1-t) - PD}{N_2}$$

$$\frac{EBIT\,(1-0.55)}{30{,}000} = \frac{(EBIT - 1{,}00{,}000)\,(1-0.55) - 1{,}20{,}000}{10{,}000}$$

=> By solving the above the equation, the value of EBIT comes to ₹ 5,50,000

Options	Plan – A		Plan – B		Plan – C	
	1	2	1	2	1	2
Earnings before interest on taxes	3,00,000	3,00,000	8,00,000	8,00,000	5,50,000	5,50,000
Less: Interest	—	1,50,000	—	—	—	1,00,000
Earning before tax	3,00,000	1,50,000	8,00,000	8,00,000	5,50,000	4,50,000
Less: Tax (55%)	1,65,000	82,500	4,40,000	4,40,000	3,02,500	2,47,500
Earning after tax	1,35,000	67,500	3,60,000	3,60,000	2,47,500	2,02,500
Less: preference dividend	—	—	—	1,20,000	—	1,20,000
Earning to equity shares	1,35,000	67,500	3,60,000	2,40,000	2,47,500	82,500
No. of equity shares	30,000	15,000	30,000	20,000	30,000	10,000
EPS (₹) $\left(\frac{\text{Earning to equity shares}}{\text{No. of equity shares}}\right)$	**4.50**	**4.5**	**12**	**12**	**8.25**	**8.25**

Recommendation: The company is advised to accept Plan B, where EPS is the highest i.e., ₹ 12.00

Problem 4: DMC Corporation currently has 100,000 shares of common stock outstanding with a market price of ₹ 50 per share. It also has ₹ 2 million in 7% bonds (currently selling at par). The company is considering a ₹ 4 million expansion program that it can finance with either (I) all common stock at ₹ 50 per share, or (II) all bonds at 9%. The company estimates that if the expansion program is undertaken, it can attain, in the near future, ₹ 1 million in EBIT.

(a) The company's tax rate is 40%. Calculate the EPS for each plan.
(b) Draw the EBIT - EPS graph.
(c) What is indifference point between the alternatives?
(d) If the expected EBIT for the near future is greater than your answer in (c) what form of financing would you recommend?

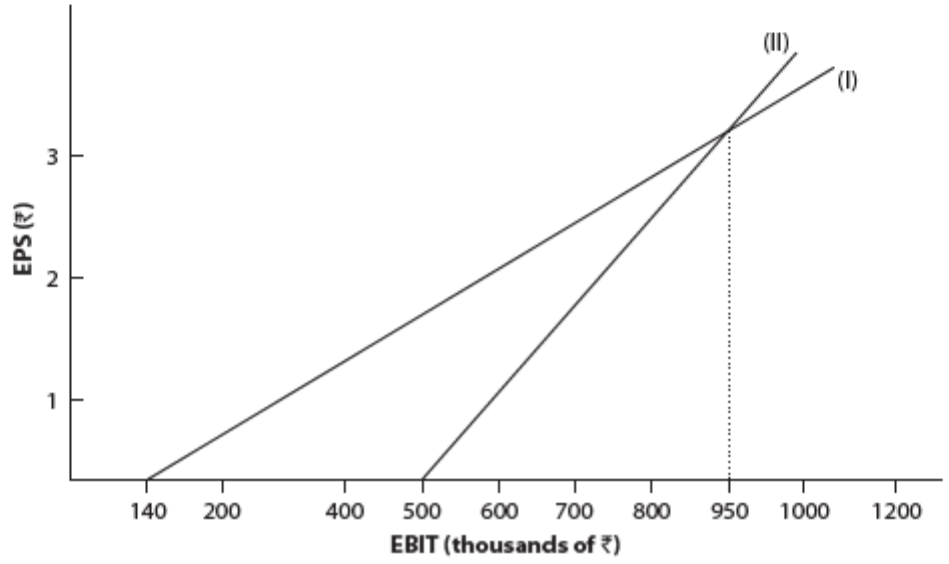
Solution:

(a) The EPS is computed as follows:

Particulars	*(I) All Stock (₹)*	*(II) All Bonds (₹)*
EBIT	10,00,000	10,00,000
Interest	140,000[a]	500,000[b]
EBT	860,000	500,000
Tax (40%)	344,000	200,000
EAT	516,000	300,000
Numbers of shares	180,000[c]	100,000
EPS	**₹ 2.87**	**₹ 3.00**

[a] ₹ 2,000,000 × 7% = ₹ 140,000
[b] ₹ 4,000,000 × 9% = ₹ 360,000
₹ 360,000 + ₹ 140,000 = ₹ 500,000
[c] ₹ 4,000,000 – ₹ 50 per share = 80,000 shares.
Therefore, 100,000 + 80,000 = 180,000 shares

(b) The EBIT – EPS graph is shown below



(c)

$$EPS = \frac{(EBIT - I)(1 - t)}{\text{No. of shares outstanding}}$$

The EBIT - EPS indifference points between plans (I) and (II) are calculated as follows:

$$\text{EPS under Plant (I)} = \text{EPS under plan (II)}$$

$$\frac{(EBIT - 140{,}000)(1 - 0.4)}{1{,}80{,}000} = \frac{(EBIT - 5{,}00{,}000)(1 - 0.4)}{1{,}00{,}000}$$

$$(0.6\,EBIT - 84{,}000)(100{,}000) = (0.6\,EBIT - 300{,}000)(180{,}000)$$

$$48{,}000\,EBIT = 45{,}600{,}000{,}000$$

$$EBIT = ₹\,950{,}000$$

(d) Plan (II), all bonds, is preferred.

Problem 5: Dream Ltd. is planning an expansion programme which will require ₹ 30 crores and can be funded through one of the three following options:

(a) Issue further equity shares of ₹ 100 each at par,

(b) Raise loans at 15% interest,

(c) Issue preference shares at 12%.

Present paid up capital is ₹ 60 crores and average annual EBIT is ₹ 12 crores. Assume I.T. rate at 50%

After the expansion, EBIT is expected to be ₹ 15 crores p.a.

Calculate EPS under the three financing options indicating the alternative giving the highest return to the equity shareholders.

Determine the point of indifference between Equity Share Capital and Debt (i.e. option (a) and (b) above).

Solution: Calculation of EPS under the following three financing options.

Financing option 1 - issue further equity shares of ₹ 100 each at par.

Financing option 2 -Raise loans @ 15% interest.

Financing option 3 - issue of preference shares at 12%.

Calculation of EPS

(₹ crores)

Particulars	*Financing option*		
	1	*2*	*3*
EBIT	15	15	15
Less: Interest	—	4.5	—
EBT	15	10.5	15
Less: Tax 50%	7.50	5.25	7.50
EAT	7.5	5.25	7.5
Less: Preference dividend	—	—	3.6
Earnings available to equity holders (A)	7.5	5.25	3.9
No. of equity shares (In lakhs)			
Existing	60	60	60
New	30	—	—
Total (B)	90	60	60
EPS (₹) (A) – (B)	**8.33**	**8.75**	**6.5**

Analysis: Financing option 2 i.e., raising of loans @ 15% interest gives the highest EPS of ₹ 8.75.

Determination of Indifference point between equity share capital and debt.

Indifference point represents the point where EBIT at which EPS under two financing options is same. The indifference point is calculated by applying the following formula.

$$\frac{(EBIT - I_1)(1 - T)}{N_1} = \frac{(EBIT - I_2)(1 - T)}{N_2}$$

$$\frac{(EBIT - 0)(1 - 0.5)}{0.90} = \frac{(EBIT - 4.5)(1 - 0.50)}{0.60}$$

or $EBIT\ (0.5)\ (0.60) = (EBIT - 4.5)\ (0.50)\ 0.90$

or $0.3\ EBIT = 0.45\ EBIT - 2.025$

or $0.15\ EBIT = 2.025$

$EBIT = 13.5$ crores

Problem 6: 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 combination of proposals to raise its funds. You are given the following proposals of the company:

(i)

Proposals	% of Equity	% of Debts	% of Preference shares
P	100	—	—
Q	50	50	—
R	50	—	50

(ii) Cost of debt – 10%
Cost of preference shares – 10%

(iii) Tax rate – 50%

(iv) Equity shares of the face value of ₹ 10 each will be issued at a premium of ₹ 10 per share.

(v) Total investment to be raised ₹ 40,00,000.

(vi) Expected earning 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:

- Earning per share
- Financial break-even-point
- Compute the EBIT range among the plans for indifference. Also indicate if any of the plans dominate. **[Similar Nov - 2022] [May-2011] 12 marks**

Solution:

(i) Statement showing Earning per share under different proposals

Particulars	Proposal		
	P (₹)	Q (₹)	R (₹)
Expected EBIT	18,00,000	18,00,000	18,00,000
Less: Interest @ 10% of 20,00,000	—	2,00,000	—
EBT	18,00,000	16,00,000	18,00,000
Less: Tax @ 50%	9,00,000	8,00,000	9,00,000
EAT	9,00,000	8,00,000	9,00,000
Less: Pref. dividend	—	—	2,00,000
Earning 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
$\text{EPS} = \left(\frac{\text{Earning for equity shareholders}}{\text{No. of equity shares}}\right)$	**₹ 4.5**	**₹ 8.00**	**₹ 7.00**

Recommendation: Co. should select debt option having highest EPS among different plans.

Calculation of Capital Structure under different proposals.

	P	Q	R
Equity share capital	40,00,000	20,00,000	20,00,000
Preference share capital	—	—	20,00,000
Debts	—	20,00,000	—
	40 Lacs	40 Lacs	40 Lacs

Calculation of Equity Shares issued under different plans:

Face Value = ₹ 10

Issue Price = 10 + 10 = ₹ 20

	P	Q	R
Required Fund:	40 Lacs	20 Lacs	20 Lacs
No. of Equity shares to be issued	$\frac{40\text{ Lacs}}{20}$ = 2 lacs	$\frac{20\text{ Lacs}}{20}$ = 1 lac	$\frac{20\text{ Lacs}}{20}$ = 1 lac

Note: It is assumed that cost of preference share is after Tax.

(ii) **Financial Break even point:**-Required EBIT for EPS

Proposal P: No fixed Financial Cost

Hence, EBIT at FBEP will be zero.

Proposal Q:

Financial B.E.P. = Fixed Financial Cost = 2,00,000

Proposal R:

$$\text{F.B.E.P.} = \frac{\text{Pref. Dividend}}{(1 - \text{Tax})} = \frac{2,00,000}{50} = 4,00,000/-$$

(iii) EBIT at indifference:

EBIT range for indifference between Proposal P & Q:

$$\frac{(E)(1-t)}{N_1} = \frac{(E-i)(1-t)}{N_2}$$

$$\frac{E \times .5}{2,00,000} = \frac{(E-2,00,000)-(1-.5)}{1,00,000}$$

$E = 2E - 4,00,000$

EBIT = 4,00,000/-

Proposal P& R:

$$\frac{(E)(1-t)}{N_1} = \frac{(E-i)(1-t)}{N_2}$$

$$= \frac{(E)(1-.5)}{2,00,000} = \frac{[E(1-.5)-2,00,000]}{1,00,000}$$

$.5E = 2E - 2[.5E-2,00,000]$

$.5E = E-4,00,000$

EBIT = 8,00,000/-

Proposal Q & R = If number of equity shares between different plans are same then, indifference point can't be calculate.

Problem 7: Yoyo Limited presently has ₹ 36,00,000 in debt outstanding bearing an interest rate of 10%. It wishes to finance a ₹ 40,00,000 expansion programme and is considering three alternatives: -additional debt @ 12% interest, -preference shares with 11% dividend -the issue of equity shares at ₹ 16 per share. The company has 8,00,000 shares outstanding and is in 40 percent tax bracket

(a) If earnings before interest and taxes are presently ₹ 15,00,000, what would be earnings per share for the three alternatives, assuming no immediate increase in profitability?

(b) Develop an indifference chart for these alternatives by giving a rough sketch of Graph. What is the indifference point between various plans mathematically.

(c) Which alternatives do you prefer? How much would EBIT need to increase before the next alternative would be best?

Solution:

(a)Particulars	Alternatives		
	Alternative-I	Alternative-II	Alternative-III
	Take additional Debt	Issue 11% Preference Shares	Equity shares
	₹	₹	₹
EBIT	15,00,000	15,00,000	15,00,000
Interest on Debts:			
-on existing debt @10%	(3,60,000)	(3,60,000)	(3,60,000)
-on new debt @12%	(4,80,000)	-	-
Profit before taxes	6,60,000	11,40,000	11,40,000
Taxes @ 40%	(2,64,000)	(4,56,000)	(4,56,000)
Profit after taxes	3,96,000	6,84,000	6,84,000
Preference shares dividend	---	(4,40,000)	---
Earnings available to equity share holders	3,96,000	2,44,000	6,84,000
Number of shares	8,00,000	8,00,000	10,50,000
Earnings per share	0.495	0.305	0.851

(b) Approximation Indifference Points:

$$\text{Plan 1 \& Plan 2: } EPS_{Plan1} = EPS_{Plan2} \text{ OR} = \frac{(EBIT\text{-}3,60,000\text{-}4,80,000)(1\text{-}.40)}{8,00,000} = \frac{(EBIT\text{-}3,60,000)(1\text{-}.40)\text{-}4,40,000}{8,00,000}$$

There is no Indifference Point.

$$\text{Plan 2 \& Plan 3: } EPS_{Plan\,2} = EPS_{Plan\,3}$$

$$= \frac{(EBIT\text{-}3,60,000)(1\text{-}.40)\text{-}4,40,000}{8,00,000} = \frac{(EBIT\text{-}3,60,000)(1\text{-}.40)}{10,50,000} = \text{OR EBIT} = ₹\ 34,40,000$$

$$\text{Plan 1 \& Plan 3: } EPS_{Plan\,1} = EPS_{Plan\,3}$$

$$= \frac{(EBIT\text{-}3,60,000\text{-}4,80,000)(1\text{-}.40)}{8,00,000} = \frac{(EBIT\text{-}3,60,000)(1\text{-}.40)}{10,50,000} = \text{OR EBIT} = ₹\ 23,76,000$$

Breakeven Point Calculation For Graph [EBIT at which EPS is Zero]

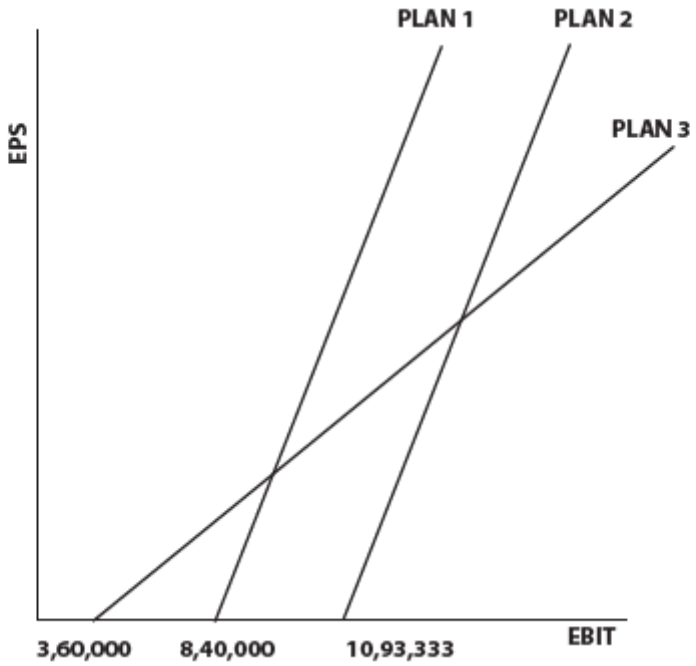
Plan 1: EBIT = Financial Break Even Point = Interest = ₹ 3,60,000 + ₹ 4,80,000 = ₹ 8,40,000

Plan 2: EBIT = Financial Break Even Point = Interest + $\frac{\text{Preference Dividend}}{(1\text{-Tax})} = 3,60,000 + \frac{4,40,000}{(1\text{-}.40)} = ₹10,93,333$

Plan 3: EBIT = Financial Break Even Point = Interest = ₹ 3,60,000

(c) Equity shares option plan is clearly preferable i.e., Plan No. 3 as EPS Of Plan 3 is maximum.
EBIT should increase by ₹ 23,76,000 – 15,00,000 = ₹ 8,76,000 before any other plan proved to be better.

Graph: Indifference Chart



Problem 8: Best of Luck Ltd., a profit making company, has a paid-up capital of ₹ 100 lakhs consisting of 10 lakhs ordinary shares of ₹ 10 each. Currently, it is earning an annual pre-tax profit of ₹ 60 lakhs. The company's shares are listed and are quoted in the range of ₹ 50 to ₹ 80. The management wants to diversify production and has approved a project which will cost ₹ 50 lakhs and which is expected to yield a pre-tax income of ₹ 40 lakhs per annum. To raise this additional capital, the following options are under consideration of the management:

(a) To issue equity share capital for the entire additional amount. It is expected that the new shares (face value of ₹ 10) can be sold at a premium of ₹ 15.

(b) To issue 16% non-convertible debentures of ₹ 100 each for the entire amount.

(c) To issue equity capital for ₹ 25 lakhs (face value of ₹ 10) and 16% nonconvertible debentures for the balance amount. In this case, the company can issue shares at a premium of ₹ 40 each.

ADVISE which option is the most suitable to raise the additional capital, keeping in mind that the management wants to maximize the earnings per share to maintain its goodwill. The company is paying income tax at 50%.

Solution:

Calculation of Earnings per share under the three options:

Particulars	Options		
	Option I: Issue Equity shares only	Option II: Issue 16% Debentures only	Options III: Issue Equity Shares and 16% Debentures of equal amount
Number of Equity Shares	10,00,000		10,00,000
- Existing	2,00,000	10,00,000	50,000
- Newly issued	50,00,000	---	25,00,000
	(10+15)		(10+40)

Total	12,00,000	10,00,000	10,50,000
16% Debentures (₹)	---	50,00,000	25,00,000
Profit Before Interest and Tax:			
- Existing pre-tax profit	60,00,000	60,00,000	60,00,000
- From new Projects	40,00,000	40,00,000	40,00,000
		1,00,00,000	1,00,00,000
Less Interest on 15% Debentures	1,00,00,000	8,00,000	4,00,000
		(16% x ₹50.00.000)	(16% x ₹ 25.00.000)
Profit Before Tax	1,00,00,000	92,00,000	96,00,000
Less: Tax at 50%	50,00,000	46,00,000	48,00,000
Profit After Tax	50,00,000	46,00,000	48,00,000
Earnings Per Share (EPS)	4.17	4.60	4.57
PAT/ No. of Shares	PAT / (No of share)	50,00,000 / 12,00,000	48,00,000 / 10,50,000

Problem 9: Shahji Steel Limited requires ₹ 25,00,000 for a new plant. This plant is expected to yield earnings before interest and taxes of ₹ 5,00,000. While deciding about the financial plan, the company considers the objective of maximizing earnings per share. It has three alternatives to finance the project - by raising debt of ₹ 2,50,000 or ₹ 10,00,000 or ₹ 15,00,000 and the balance, in each case, by issuing equity shares. The company's share is currently selling at ₹ 150 but is expected to decline to ₹ 125 in case the funds are borrowed in excess of ₹ 10,00,000. The funds can be borrowed at the rate of 10 percent upto ₹ 2,50,000, at 15 percent over ₹ 2,50,000 and upto ₹ 10,00,000 and at 20 percent over ₹ 10,00,000. The tax rate applicable to the company is 50 percent. ANALYSE which form of financing should the company choose?

Solution:

Plan I = Raising Debt of ₹ 2.5 lakh + Equity of ₹ 22.5 lakh
Plan II = Raising Debt of ₹ 10 lakh + Equity of ₹ 15 lakh
Plan III = Raising Debt of ₹ 15 lakh + Equity of ₹ 10 lakh

Calculation of Earnings per share (EPS):

Particulars	Financial Plans		
	Plan I	Plan II	Plan III
	₹	₹	₹
Expected EBIT	5,00,000	5,00,000	5,00,000
Less: Interest (a)	(25,000)	(1,37,500)	(2,37,500)
Earnings before taxes	4,75,000	3,62,500	2,62,500
Less: Taxes @50%	(2,37,500)	(1,81,250)	(1,31,250)
Earnings after taxes (EAT)	2,37,500	1,81,250	1,31,250
Number of shares(b)	15,000	10,000	8,000
Earnings per share (EPS)	15.83	18.13	16.41

Financing Plan II (i.e. Raising debt of ₹ 10 lakh and issue of equity share capital of ₹ 15 lakh) is the option which maximizes the earnings per share.

Working Notes:

(a) Calculation of Interest on Debt

Plan		₹	₹
I	(₹ 2,50,000 x 10%)		25,000
II	(₹ 2,50,000 x 10%) (₹ 7,50,000 x 15%)	25,000 1,12,500	1,37,500
III	(₹ 2,50,000 x 10%) (₹ 7,50,000 x 15%) (₹ 5,00,000 x 20%)	25,000 1,12,500 1,00,000	2,37,500

Number of equity shares to be issued

$$\text{Plan I} = \frac{₹\ 22,50,000}{₹\ 150\ \text{(Market price of share)}} = 15,000 \text{ shares}$$

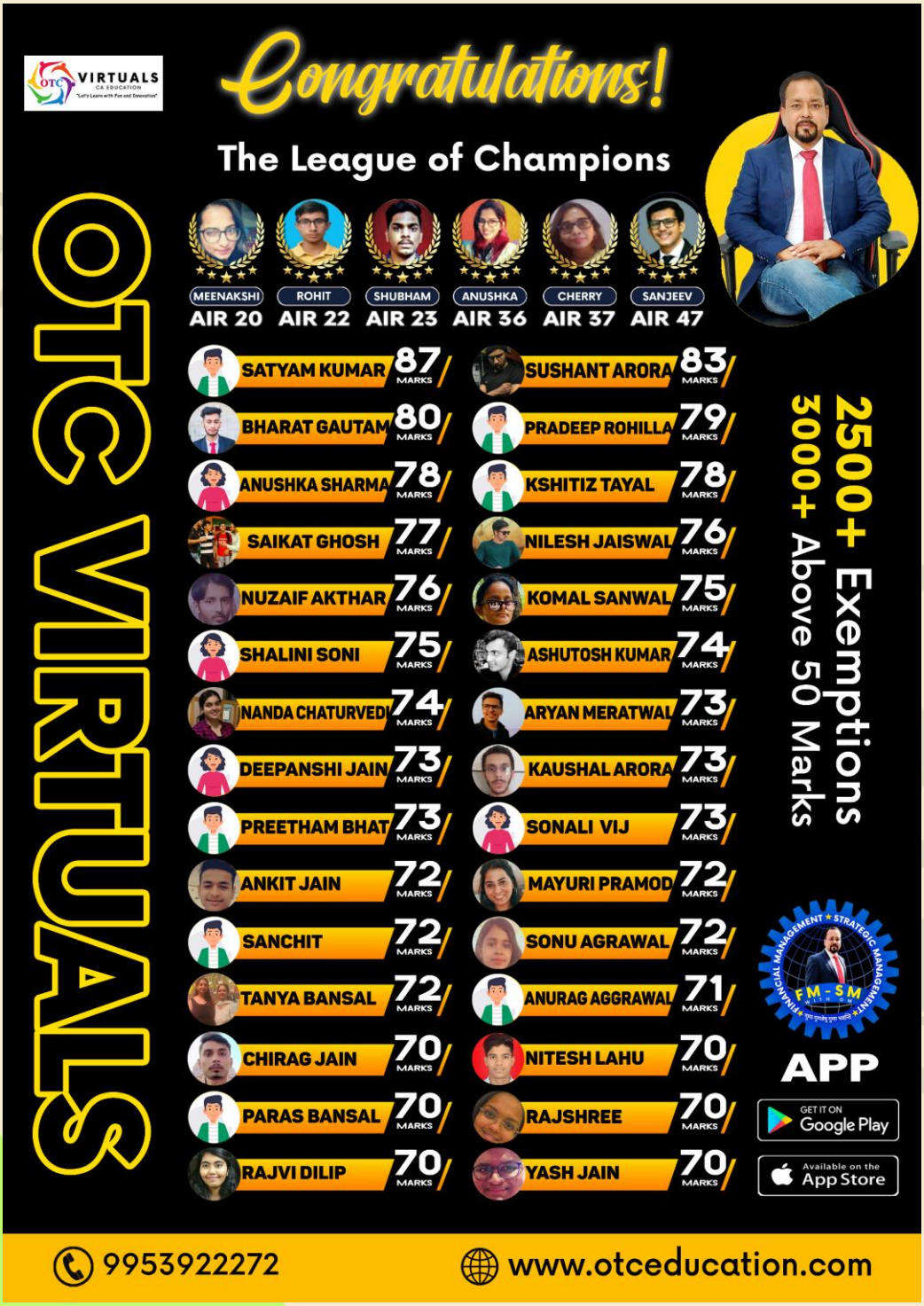
$$\text{Plan II} = \frac{₹\ 15,00,000}{₹\ 150} = 10,000 \text{ shares}$$

$$\text{Plan III} = \frac{₹\ 10,00,000}{₹\ 125} = 8,000 \text{ shares}$$

4 CHAPTER

LEVERAGES

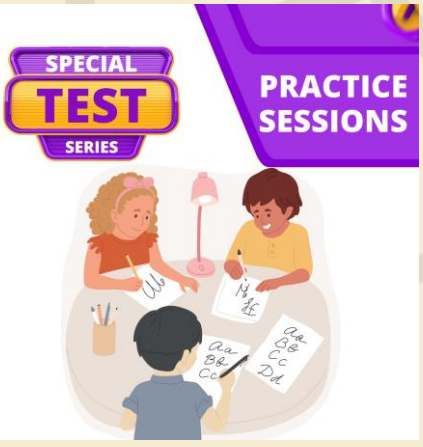
List of Important Questions



4 CHAPTER

LEVERAGES

List of Important Questions



Problem 1:

EBIT	= ₹ 90,000
Interest	= ₹ 15,000
Income tax rate	= 30%
Preference Dividend	= ₹ 9,000
Corporate Dividend tax (DT)	= ₹ 1,500

Find financial leverage. Suppose, EBIT increases by 20%, then how much the earnings for equity will increase

Answer:

	₹
EBIT	90,000
Less: Interest	15,000
EBT	75,000
Less: Tax (30%)	22,500
EAT	52,500
Less: Preference Dividend	9,000
Less: Dividend tax (CDT)	1,500
Earnings after tax for equity	**42,000**

$$\text{Financial leverage} = \frac{\text{EBIT}}{\text{EBT for equity}} = \frac{\text{EBIT}}{\frac{\text{EAT for equity}}{1-\text{tax}}} = \frac{90,000}{\frac{42,000}{1-0.30}} = \frac{90,000}{\frac{42,000}{0.70}} = \frac{90,000}{60,000} = 1.5 \text{ times}$$

Alternatively,

$$\text{Financial leverage} = \frac{\text{EBIT}}{\text{EBIT} - \text{Interest} - \left(\frac{\text{Preference Dividend} + \text{CDT}}{1 - \text{tax rate}}\right)}$$

$$= \frac{90,000}{90,000 - 15,000 - \frac{9,000 + 1,500}{1 - 0.3}} = \frac{90,000}{75,000 - 15,000} = \frac{90,000}{60,000} = 1.5 \text{ times}$$

Suppose EBIT increases by 20% then Earnings for equity will increase by 30% (20% × 1.5 times)

Revised Position	₹
EBIT (90,000 × 120%)	1,08,000
Less: Interest	15,000
EBT	93,000
Less: Tax (30%)	27,900
EAT	65,100
Less: Preference Dividend	9,000
Less: Dividend Tax	1,500
Earning for equity	**54,600**

$$\% \text{ increase in Earning for equity} = \frac{54,600 - 42,000}{42,000} \times 100 = 30\%$$

Problem 2: **Details of a company for the year ended 31st March, 2022 are given below:**

Sales	₹ 86 lakhs
Profit Volume (P/V) Ratio	35%
Fixed Cost excluding interest expenses	₹ 10 lakhs
10% Debt	₹ 55 lakhs
Equity Share Capital of ₹ 10 each	₹ 75 lakhs
Income Tax Rate	40%

Required:

1. Determine company's Return on Capital Employed (Pre-tax) and EPS.
2. Does the company have a favourable financial leverage?
3. Calculate operating and combined leverages of the company.
4. Calculate percentage change in EBIT, if sales increases by 10%.
5. At what level of sales, the Earning before Tax (EBT) of the company will be equal to zero? **[May 2022]**

Solution:

Particulars	*Amount (₹)*
Sales	86,00,000
Less: Variable cost (65% of 86,00,000)	55,90,000
Contribution (35% of 86,00,000)	30,10,000
Less: Fixed costs	10,00,000
Earnings before interest and tax (EBIT)	20,10,000
Less: Interest on debt (@ 10% on ₹ 55 lakhs)	5,50,000
Earnings before tax (EBT)	14,60,000
Tax (40%)	5,84,000
PAT	8,76,000

i. **ROCE (Pre-tax) =** $\frac{\text{EBIT}}{\text{Capital Employed}} \times 100$ $\frac{\text{EBIT}}{\text{Equity + Debt}} \times 100$

$$= \frac{₹\ 20,10,000}{₹\ (75,00,000 + 55,00,000)} \times 100 = 15.46\%$$

EPS (PAT/No. of equity shares) 1.168 or ₹ 1.17

ii. **ROCE is 15.46% and Interest on debt is 10%. Hence, it has a favourable financial leverage.**

iii. **Calculation of Operating, Financial and Combined leverages:**

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{₹\ 30,10,000}{₹\ 20,10,000} = 1.497 \text{ (approx)}$$

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBIT}} = \frac{₹\ 20,10,000}{₹\ 14,60,000} = 1.377 \text{ (approx)}$$

Or, = Operating Leverage × Financial Leverage = 1.497 × 1.377 = 2.06 (approx.)

(iv) Operating leverage is 1.497. So, if sales are increased by 10%
EBIT will be increased by 1.497 × 10% i.e. 14.97% (approx.)

(v) Since the combined Leverage is 2.062, sales have to drop by 100/2.062 i.e. 48.50% to bring EBT to Zero.

Accordingly, New Sales = ₹ 86,00,000 × (1 - 0.4850)
= ₹ 86,00,000 × 0.515
= ₹ 44,29,000 (approx.)

Hence, at ₹ 44,29,000 sales level, EBT of the firm will be equal to Zero.

Problem 3: Information of A Ltd. is given below:

- Earnings after tax: 5% on sales
- Income tax rate: 50%
- Degree of Operating Leverage: 4 times
- 10% Debenture in capital structure: ₹ 3 lakhs
- Variable costs: ₹ 6 lakhs

Required:

(i) From the given data complete following statement:

Sales	XXXX
Less: Variable costs	₹ 6,00,000
Contribution	XXXX
Less: Fixed costs	XXXX
EBIT	XXXX
Less: Interest expenses	XXXX
EBT	XXXX
Less: Income tax	XXXX
EAT	XXXX

(ii) Calculate Financial Leverage and Combined Leverage.

(iii) Calculate the percentage change in earning per share, if sales increased by 5%. **[Dec 2021]**

Solution:

(i) Working Notes:

Earning after tax (EAT)is 5% of sales
Income tax is 50%
So, EBT is 10% of Sales
Since Interest Expenses is ₹ 30,000
EBIT = 10% of Sales + ₹30,000 ..... (Equation i)
Now Degree of operating leverage = 4

So, $\frac{\text{Contribution}}{\text{EBIT}}$

Or, Contribution = 4 EBIT
Or, Sales – Variable Cost = 4
EBIT Or, Sales – ₹ 6,00,000 = 4 EBIT ..... (Equation ii)
Replacing the value of EBIT of equation (i) in Equation (ii)
We get, Sales – ₹ 6,00,000 = 4 (10% of Sales + ₹ 30,000)
Or, Sales – ₹ 6,00,000 = 40% of Sales + ₹ 1,20,000
Or, 60% of Sales = ₹ 7,20,000

$$\text{So, Sales} = \frac{₹\ 7,20,000}{60\%} = ₹\ 12,00,000$$

Contribution = Sales – Variable Cost = ₹ 12,00,000 – ₹ 6,00,000 = ₹ 6,00,000

$$\text{EBIT} = \frac{₹\ 6,00,000}{4} = ₹\ 15,00,000$$

Fixed Cost = Contribution – EBIT = ₹ 6,00,000 – ₹ 1,50,000 = ₹ 4,50,000
EBT = EBIT – Interest = ₹ 1,50,000 – ₹ 30,000 = ₹ 1,20,000
EAT = 50% of ₹ 1,20,000 = ₹ 60,000

Income Statement

Particulars	(₹)
Sales	12,00,000
Less: Variable cost	6,00,000
Contribution	6,00,000
Less: Fixed cost	4,50,000
EBIT	1,50,000
Less: Interest	30,000
EBT	1,20,000
Less: Tax (50%)	60,000
EAT	60,000

(ii) Financial Leverage = $\frac{\text{EBIT}}{\text{EBT}} = \frac{₹\ 1,50,000}{₹\ 1,20,000} = 1.25$ times

Combined Leverage = Operating Leverage × Financial Leverage
= 4×1.25 = 5 times
Or,

$$\text{Combined Leverage} = \frac{\text{Contribution}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{EBT}}$$

$$\text{Combined Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{₹\ 6,00,000}{₹\ 1,20,000} = 5 \text{ times}$$

(iii) Percentage Change in Earnings per share

$$\text{Combined Leverage} = \frac{\text{\% Change in EPS}}{\text{\% change in Sales}} = 5 = \frac{\text{\% Change in EPS}}{5}$$

$\therefore$ % Change in EPS = 25%

Hence, if sales increased by 5 %, EPS will be increased by 25 %.

Problem 4: The capital structures of the progressive Corporation consists of an ordinary share capital of ₹ 10,000,000 (shares of ₹ 100 per value) and ₹ 10,00,000 of 10% debentures. Sales increased by 20% from 1,00,000 units to 1,20,000 units, the selling price is ₹ 10 per unit; variable cost amount to ₹ 6 per unit and fixed expenses amount to ₹ 2,00,000. The income tax rate is assumed to be ₹ 50%.

You are Required to calculate the following :

(i) the percentage increase in earning per share;

(ii) the degree of financial leverage at 1,00,000 units to 1,20,000 units.

(iii) The degree of operating leverage at 1,00,000 units and 1,20,000 units.

(iv) **Comment** on the behavior of operating and financial leverages in relation to increase in production from 1,00,000 units to 1,20,000 units.

[Similar June - 2015]

[Similar May - 2015]

Solution: Statement showing EPS and operating and financial leverages at two levels of operations.

	1,00,000 units	1,20,000 units
Sales @ ₹ 10	10,00,000	12,00,000
Less: Variable costs	6,00,000	7,20,000
Contribution	4,00,000	4,80,000
Less: Fixed Expenses	2,00,000	2,00,000
Operating profit (EBIT)	2,00,000	2,80,000
Less: Interest	1,00,000	1,00,000
Profit before tax (EBT)	1,00,000	1,80,000
Less: 50% Tax	50,000	90,000
Profit after Tax (EAT)	50,000	90,000
No. of ordinary Share (₹ 10,00,000 ÷ ₹ 100)	10,000	10,000
Earning per share [EAT ÷ No. of ordinary shares]	**₹ 5**	**₹ 9**
Percentage increase		**80%**

(ii) $\text{Operating leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{40,00,000}{20,00,000} = 2 \qquad \frac{4,80,000}{2,80,000} = 1.71$

(iii) $\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{2,00,000}{1,00,000} = 2 \qquad \frac{2,80,000}{1,80,000} = 1.55$

Comments:

(i) EPS sale increase from ₹ 1,00,000 to ₹ 1,20,000, following points are distinctly noticed: (a) EPS rises by 80%, (b) Opening leverage comes down from to 1.71, and (c) Financial leverage also declines from 2 to 1.55.

(ii) There is a significant decrease in both business risk and of the company on account of reduction in both the leverage.

(iii) This is the result, because there is increase in sales without increase in fixed operating or financial costs.

Problem 5: The balance sheet of Alpha Numeric Company is given below:

Liabilities	Amount (₹)	Assets	Amount (₹)
Equity capital (₹ 10 per share)	90,000	Net fixed assets	2,25,000
10% Long term Debt	1,20,000	Current assets	75,000
Retained earnings	30,000		
Current liabilities	60,000		
	3,00,000		3,00,000

The company's total assets turnover ratio is 3, its fixed operating cost is ₹ 1,50,000 and its variable operating cost ratio is 50%. The income-tax rate is 50%.

You are required to:

(1) Calculate the different type of leverages for the company.

(2) Determine the likely level of **EBIT if EPS is: (a) ₹ 1 (b) ₹ 2 (c) Re.0.** **[Similar Nov - 2019]**

Solution:

Working Notes: Calculation of Sales

$$\text{Total Assets Turnover Ratio} = \frac{\text{Sales}}{\text{Total assets}} = \frac{\text{Sales}}{₹\ 3,00,000} = 3$$

Sales $= 3 \times ₹\ 3,00,000$

$= ₹\ 9,00,000$

(i) Calculation of Leverages

Income Statement for the year ended

Particulars	Amount (₹)
Sales	9,00,000
Less: Variable cost (50% of sales)	4,50,000
Contribution.	4,50,000
Less: Fixed operating cost	1,50,000
EBIT	3,00,000
Less: Interest (₹ 1,20,000 × 10/100)	12,000
EBT	2,88,000
Less: Tax @ 50%	1,44,000
EAT	**1,44,000**

(a) Operating Leverage $= \frac{\text{Contribution}}{\text{EBIT}} = \frac{₹\ 4,50,000}{₹\ 3,00,000} = 1.50$

(b) Financial Leverage $= \frac{\text{EBIT}}{\text{EBT}} = \frac{₹\ 3,00,000}{₹\ 2,88,000} = 1.04$

(c) Combined Leverage = Operating Leverage × Financial Leverage = 1.50 × 1.04 = 1.56

(ii) Calculation of likely levels of EBIT at different Levels of EPS

$$EPS = \frac{(EBIT - I)(1-T)}{N}$$

(a) Calculation of EBIT If EPS is ₹ 1

$$1 = \frac{(EBIT - 12,000)(1-0.50)}{9,000}$$

$$9,000 = (EBIT - 12,000)(0.50)$$

$$9,000 = 0.50\ EBIT - 6,000$$

$$0.50\ EBIT = 9,000 + 6,000$$

$$EBIT = \frac{15,000}{0.50} = ₹\ 30,000$$

(b) Calculation of EBIT If EPS is ₹ 2

$$2 = \frac{(EBIT - 12,000)(1-0.50)}{9,000}$$

$$9,000 \times 2 = (EBIT\ 12,000)(0.50)$$

$$18,000 = 0.50\ EBIT - 6,000$$

$$0.50\ EBIT = 18,000 + 6,000$$

$$EBIT = \frac{24,000}{0.50} = ₹\ 48,000$$

(c) Calculation of EBIT If EPS Is ₹ 0

$$0 = \frac{(EBIT - 12,000)(1-0.50)}{9,000}$$

$$9,000 \times 0 = (EBIT - 12,000)(0.50)$$

$$0.50\ EBIT - 6000 = 0$$

$$0.50\ EBIT = 6,000$$

$$EBIT = \frac{24,000}{0.50} = ₹\ 12,000$$

Problem 6: A company had the following Balance Sheet as on 31st March, 2014:

Liabilities	(₹) (In crores)	Assets	(₹) (In crores)
Equity Share Capital (50 lakhs shares of ₹10 each)	5		
Reserves and Surplus	1	Fixed Assets (Net)	12.5
15% Debentures	10	Current Assets	7.5
Current Liabilities	4		
	20		20

The additional information given is as under:

Fixed cost per annum (excluding interest)	₹4 crores
Variable operating cost ratio	65%
Total assets turnover ratio	2.5
Income Tax rate	30%

Solution:

Total Assets	= ₹20 crores
Total Asset Turnover Ratio	= 2.5
Hence, Total Sales	= 20 × 2.5 = ₹50 crores

Computation of Profit after Tax (PAT)

Particulars	*(₹in crores)*
Sales	50.00
Less: Variable Operating Cost @ 65%	32.50
Contribution	17.50
Less: Fixed Cost (other than Interest)	4.00
EBIT	13.50
Less: Interest on Debentures (15% × 10)	1.50
PBT	12.00
Less: Tax @ 30%	3.60
PAT	**8.40**

(i) Earnings per Share

$$\text{EPS} = \frac{8.40 \text{ crores}}{\text{Number of Equity Shares}} = \frac{8.40 \text{ crores}}{50,00,000} = ₹16.80$$

It indicates the amount the company earns per share. Investors use this as a guide while valuing the share and making investment decisions. It is also a indicator used in comparing firms within an industry or industry segment.

(ii) Operating Leverage

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{Ebit}} = \frac{17.50}{13.50} = 1.296$$

It indicates the choice of technology and fixed cost in cost structure. It is level specific. When firm operates beyond operating break-even level, then operating leverage is low. It indicates sensitivity of earnings before interest and tax (EBIT) to change in sales at a particular level.

(iii) **Financial Leverage**

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{PBT}}$$

$$= \frac{13.50}{12.00} = 1.125$$

The financial leverage is very comfortable since the debt service obligation is small vis-à-vis EBIT.

(iv) **Combined Leverage**

$$\text{Combined Leverage} = \frac{\text{Contribution}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{PBT}}$$

Or, = Operating Leverage × Financial Leverage = 1.296 × 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.

Problem 7: The following details of RST Limited for the year ended 31March, 2006 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:

(i) Calculate Financial leverage

(ii) Calculate P/V ratio and Earning per Share (EPS)

(iii) If the company belongs to an industry, whose assets turnover is 1.5, does it have a high or low assets leverage?

(iv) At what **level of sales** the **Earning before Tax (EBT)** of the company will **be equal to zero?** **[May-2007]**

Solution:

(i) Financial leverage **[Similar Nov - 2017]**

$$\text{Combined Leverage} = \text{Operating Leverage (OL)} \times \text{Financial Leverage (FL)}$$

$$2.8 = 1.4 \times FL$$

$$FL = 2$$

$$\text{Financial Leverage} = 2$$

(ii) P/V Ratio and EPS

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100$$

$$\text{Operating leverage} = \frac{\text{Contribution}}{\text{Contribution} - \text{Fixed cost}} \times 100$$

$$1.4 = \frac{\text{Contribution}}{\text{Contribution} - 2{,}04{,}000}$$

$$1.4\,(\text{Contribution} - 2{,}04{,}000) = \text{Contribution}$$

$$1.4\ \text{Contribution} - 2{,}85{,}600 = \text{Contribution}$$

$$\text{Contribution} = \frac{2{,}85{,}600}{0.4} = 7{,}14{,}000$$

$$\text{P/V Ratio} = \frac{7{,}14{,}000}{30{,}00{,}000} \times 100$$

Therefore, P/V Ratio = 23.8%

$$\text{EPS} = \frac{\text{Profit after tax}}{\text{No. of equity shares}}$$

EBT = Sales – *Variable cost – FC – Interest
= 30,00,000 – 22,86,000 – 2,04,000 – 2,55,000
= 2,55,000

PAT = EBT – Tax
= 2,55,000 – 76,500 = 1,78,500

$$\text{EPS} = \frac{1{,}78{,}500}{1{,}70{,}000} = 1.05$$

* = 100% – PV Ratio
= 100% – 23.8%
= 76.2% of sales
= 76.2% of 30 lacs
= 22,86,000/-

(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 $\frac{100}{2.8} = 35.7143\%$.

Hence, new sales will be 30,00,000 × (100 – 35.7143)% = ₹19,28,571.

Therefore, at ₹19,28,700 level of sales, the Earnings before Tax of the company will be equal to zero.

Problem 8: A firm has sales of ₹ 75,00,000 variable cost of ₹ 42,00,000 and fixed cost of ₹ 6,00,000. It has a debt of ₹ 45,00,000 at 9% and equity of ₹ 55,00,000.

(i) What are the operating, financial and combined leverages of the firm?

(ii) What is the firm's ROI?

(iii) Does it have favourable financial leverage?

(iv) If the firm belongs to an industry whose asset turnover is 3, does it have a high or low asset leverage?

(v) If the sales drop to ₹ 50,00,000, what will be the new EBIT?

(vi) At what level of sales the EBT of the firm will be equal to zero?

Solution:

(i) $$\text{ROI} = \frac{\text{EBIT}}{\text{Capital employed}} \times 100 = \frac{\text{EBIT}}{\text{Equity + Debt}} \times 100 = \frac{₹\ 27,00,000}{₹\ 55,00,000 + ₹\ 45,00,000} = 27\%$$

(ii) The return on investment of firm is 27% whereas the firm is only paying 9% rate of interest on its debt and hence the firm is enjoying favourable financial leverage.

(iii) $$\text{Asset turnover} = \frac{\text{Net Sales}}{\text{Total assets}}$$

Or, $$= \frac{\text{Net Sales}}{\text{Total investment}} = \frac{₹\ 75,00,000}{₹\ 1,00,00,000} = 0.75$$

As compared to the industry's normal asset turnover of 3 times, the firm's asset turnover ratio is only 0.75, and the investment level of the firm is highly abnormal.

(iv) Calculation of operating, Financial and combined leverages

(a) Operating leverage $= \frac{\text{Contribution}}{\text{EBIT}} = \frac{₹\ 33,00,000}{₹\ 27,00,000} = 1.22$

(b) Financial leverage $= \frac{\text{EBIT}}{\text{EBT}} = \frac{₹\ 27,00,000}{₹\ 22,95,000} = 1.18$

(c) Combined leverage $= \frac{\text{Contribution}}{\text{EBT}} = \frac{₹\ 33,00,000}{₹\ 22,95,000} = 1.44$

Or Operating leverage × Financial leverage = 1.22 × 1.18 = 1.44

(v) New EBIT when sales drop to ₹ 50,00,000

	(₹)
New sales (after 33.33% drop)	50,00,000
Less: Variable cost (₹ 42 lakh – 33.33%)	28,00,000
Contribution	22,00,000
Less: Fixed cost	6,00,000
New EBIT	16,00,000

(vi) Sales level at which EBT of the firm will be equal to zero.

Since the combined leverage is 1.44, sales have to drop by 100/1.44 i.e., 69.44%.

Hence, the new sales will as follows:

= ₹ 75,00,000 × (1 – 69.44%) = ₹ 22,92,000 (approx.)

Working Notes:

Calculations of EBIT and EBT

Particulars	(₹)
Sales	75,00,000
Less: Variable costs	42,00,000
Contribution	33,00,000
Less: Fixed costs	6,00,000
EBIT	27,00,000
Less: Interest on debt @ 9% on ₹ 45 lakhs	4,05,000
EBT	**22,95,000**

Problem 9: The Capital structure of RST Ltd. is as follows:

Particulars	Amount (₹)
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

Note: All operating expenses (excluding depreciation) are variable. **(May 2012, Nov 2014) [Similar Jan - 2021]**

Solution:

Working Notes:

Particulars	Amount (₹)
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**

$$= \frac{\text{Contribution}}{\text{EBIT}} = \frac{(12,10,000 - 6,29,200)}{4,84,000}$$

$$= \frac{5,80,800}{4,84,000} = 1.2 \text{ times}$$

Financial Leverage

$$= \frac{\text{EBIT}}{\text{EBT}} = \frac{4,84,800}{4,00,000}$$

$$= 1.21 \text{ times}$$

OR

Financial Leverage

$$= \frac{\text{EBIT}}{\text{EBT} - \left(\frac{\text{Preference Dividend}}{1 - t}\right)}$$

times

$$= \frac{4,84,000}{4,00,000 - \left(\frac{50,000}{1 - 0.30}\right)} = \frac{4,84,000}{4,00,000 - 71,428.58} = \frac{4,84,000}{3,28,571} = 1.47$$

(ii) **Cover for Preference Dividend** $= \frac{\text{PAT}}{\text{Preference Share Dividend}} = \frac{2,80,000}{50,000} = 5.6 \text{ times}$

Cover for Equity Dividend

$$= \frac{(\text{PAT} - \text{Preference Dividend})}{\text{Equity Share Dividend}} = \frac{(2,80,000 - 50,000)}{1,20,000}$$

$$= \frac{(2,80,000 - 50,000)}{1,20,000} = 1.92 \text{ times}$$

(iii) **Earning Yield Ratio**

$$= \frac{\text{EPS}}{\text{Market Price}} \times 100$$

$$= \frac{230.00}{\frac{80.00}{23}} \times 100 = \frac{2.875}{23} \times 100 = 12.5\%$$

Price – Earnings Ratio (PE Ratio) $= \frac{\text{Market Price}}{\text{EPS}} = \frac{23}{2.875} = 8 \text{ times}$

(iv) **Net Funds Flow**

= Net PAT + Depreciation – Total Dividend
= 2,80,000 + 96,800 – (50,000 + 1,20,000)
= 3,76,800 – 1,70,000 = 2,06,800

Problem 10:

The following data is available for Stone Ltd. :

	₹
Sales	5,00,000
(-) Variable cost @ 40%	2,00,000
Contribution	3,00,000
(-) Fixed cost	2,00,000
EBIT	1,00,000
(-) Interest	25,000
Profit before tax	75,000

Problem 11: Following are the data in respect of ABC Industries for the year ended 31 st March, 2021:

Debt to Total assets ratio	0.40
Long-term debts to equity ratio	30%
Gross profit margin on sales	20%
Accounts receivables period	36 days
Quick ratio	0.9
Inventory holding period	55 days
Cost of goods sold	₹64,00,000

Liabilities	₹	Assets	₹
Equity Share Capital	20,00,000	Fixed assets	
Reserve & Surplus		Inventories	
Long-term debts		Accounts receivables	
Accounts payable		Cash	
Total	50,00,000	Total	

Required:

Complete the Balance Sheet of ABC Industries as on 31st March, 2021. All calculations should be in nearest Rupee. Assume 360 days in a year. [NOV 2022]

Solution:

Working Notes:

1. Total liability = Total Assets = ₹ 50,00,000

   Debt to Total Asset Ratio = 0.40

   $$\frac{\text{Debt}}{\text{Total Assets}} = 0.40$$

   $$\text{Or, } \frac{\text{Debt}}{50,00,000} = 0.40$$

   So, Debt = 20,00,000

2. Total Liabilities = ₹ 50,00,000

   Equity share Capital + Reserves + Debt = ₹ 50,00,000

   So, Reserves = ₹ 50,00,000 - ₹ 20,00,000 - ₹ 20,00,000

   So, Reserves & Surplus = ₹ 10,00,000

3. $$\frac{\text{Long term Debt}}{\text{Equity Shareholder's Fund)}} = 30\%^*$$

   Long Term Debt = ₹ 9,00,000

4. So, Accounts Payable = ₹ 20,00,000 – ₹ 9,00,000
   Accounts Payable = ₹ 11,00,000
5. Gross Profit to sales = 20%
   Cost of Goods Sold = 80% of Sales = ₹ 64,00,000
   Sales = (100/80) × 64,00,000 = 80,00,000

6. Inventory Turnover = $\frac{360}{55}$

$$\frac{\text{COGS}}{\text{Closing inventory}} = \frac{360}{55}$$

$$\frac{64,00,000}{\text{Closing inventory}} = \frac{360}{55}$$

   Closing inventory = 9,77,778

7. Accounts Receivable period = 36 days

$$\frac{\text{Accounts Receivable}}{\text{Credit Sales}} \times 360 = 36$$

$$\text{Accounts Receivable} = \frac{36}{360} \times \text{Credit Sales}$$

$$= \frac{36}{360} \times 80,00,00 \text{ (assumed all sales are on credit)}$$

   Accounts Receivable = ₹ 8,00,000
8. Quick Ratio = 0.9

$$\frac{\text{Quick Assets}}{\text{Current liabilites}} = 0.9$$

$$\frac{\text{Cash+Debetors}}{11,00,000} = 0.9$$

   Cash + 8,00,000 = ₹ 9,90,000
   Cash = ₹ 1,90,000
9. Fixed Assets = Total Assets- Current Assets = 50,00,000 – (9,77,778+8,00,000+1,90,000) = 30,32,222

Balance Sheet of ABC Industries as on 31st March 2021

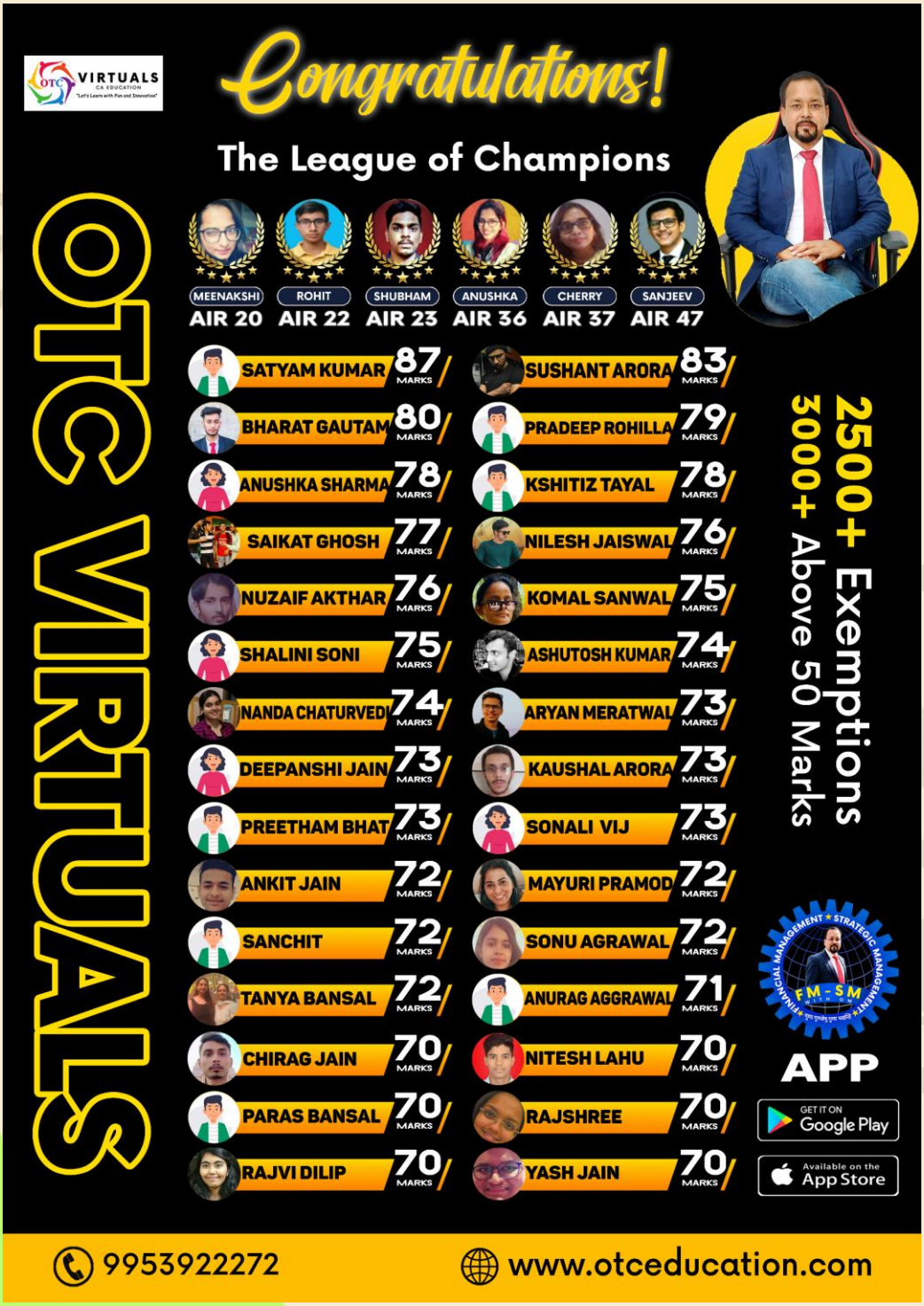
Liabilities	(₹)	Assets	(₹)
Share Capital	20,00,000	Fixed Assets	**30,32,222**
Reserved surplus	**10,00,000**	Current Assets:	
Long Term Debt	**9,00,000**	Inventory	**9,77,778**
Accounts Payable	**11,00,000**	Accounts Receivables	**8,00,000**
		Cash	**1,90,000**
Total	50,00,000	Total	**50,00,000**

(*Note: Equity shareholders' fund represent equity in 'Long term debts to equity ratio'. The question can be solved assuming only share capital as 'equity')

5 CHAPTER

Capital Structure

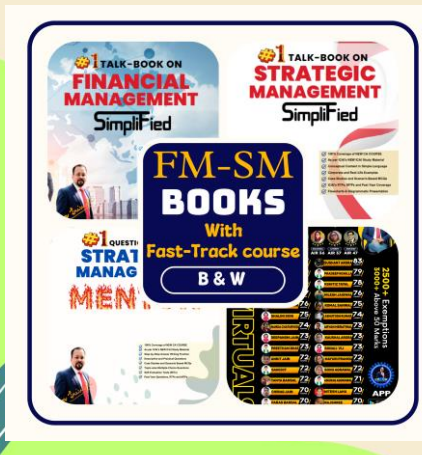
List of Important Questions

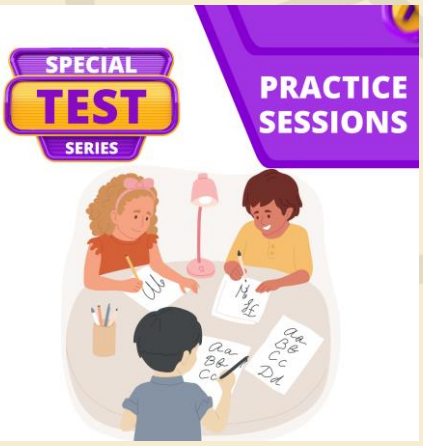


5 CHAPTER

Capital Structure

List of Important Questions





Problem 1: Companies X and Y are identical in all respects including risk factors except for debt/equity, X having issued 10% debentures of ₹ 18 lakhs while Y has issued only equity. Both the companies earn 20% before interest and taxes on their total assets of ₹ 30 lakhs.

Assuming a tax rate of 50% and capitalization rate of 15% for and all equity company, compute the value of companies X and Y using

(i) Net income approach and

(ii) Net operating income approach.

Solution:

(i) Valuation of companies under net income approach.

Particulars	X (₹)	Y (₹)
EBIT @ 20% on ₹ 30,00,000	6,00,000	6,00,000
Less: Interest	1,80,000	—
EBT	4,20,000	6,00,000
Less: Tax @ 50%	2,10,000	3,00,000
EAT (available to equity holders)	2,10,000	3,00,000
Value of equity (capitalized @ 15%) $X = (2,10,000 \times \frac{100}{15})$ $Y = (3,00,000 \times \frac{100}{15})$	14,00,000	20,00,000
Value of debt	18,00,000	—
Total value of company	32,00,000	20,00,000

(ii) Valuation of companies under net operating income approach

Particulars	X (₹)	Y (₹)
Capitalization of earnings at 15% $\left[6,00,000 \frac{(1-0.5)}{0.15}\right]$	20,00,000	20,00,000
Less: Value of debt[18,00,000 (1-0.5)]	9,00,000	—
Value of equity	11,00,000	20,00,000
Add: Value of debt	18,00,000	—
Total value of company	29,00,000	20,00,000

Problem 2: From the following selected data, determine the value of the firms, P and Q belonging homogeneous risk class under (a) the net income (NI) approach, and (b) The net operating income approach.

	Firm P ₹	Firm Q ₹
EBIT	2,75,000	2,25,000
Interest at 15%	75,000	
Equity capitalization rate, Ke	20%	
Corporate tax rate	50%	

Which of the two firms has an optimal capital structure under the (i) NI approach, and (ii) NOI approach?

Solution:

Valuation of the firm (Net income approach)

Particulars	Firm P ₹	Firm Q ₹
EBIT	2,25,000	2,25,000
Less: Interest	75,000	—
Profit before tax	1,50,000	2,25,000
Less: Taxes @ 50%	75,000	1,12,500
PAT (available for equity holders)	75,000	1,12,500
K_e (equity capitalization rate)	0.2	0.2
Market value of equity, (E) (PAT ÷ K_e)	3,75,000	5,62,500
Market value of debt (Interest ÷ K_d)	5,00,000	—
Total market value, (V) = (E) + (D)	8,75,000	5,62,500

$$K_o\,(\text{Firm P}) = \left[K_d\left(\frac{D}{D+E}\right) + K_e\left(\frac{E}{D+E}\right)\right]$$

$$= 7.5\% \times \frac{₹\ 5,00,000}{₹\ 8,75,000} + 20\% \times \frac{3,75,000}{8,75,000}$$

$$= 4.29\% + 8.5\% = 12.86\%$$

K_o (Firm Q) = 20% = K_e as it is not having any debt fund.

$$K_o\,(\text{Firm P}) = \left[K_d\left(\frac{D}{D+E}\right) + K_e\left(\frac{E}{D+E}\right)\right]$$

$$= 7.5\% \times \frac{₹\ 5,00,000}{₹\ 8,75,000} + 20\% \times \frac{3,75,000}{8,75,000}$$

$$= 4.29\% + 8.5\% = 12.86\%$$

K_o (Firm Q) = 20% = K_e as it is not having any debt fund.

Valuation of the firm (Net operating income approach):

Under the NOI approach the value of levered firm is taken as equal to the value of unlevered firm plus the premium for interest tax shield on debt financing. Thus,

Valuation of Firm Q (Unlevered Firm):

$$V_u = \frac{EBIT\,(1-t)}{K_e} = \frac{₹\,2,25,000\,(.5)}{.20} = ₹\,5,62,500$$

Now, the valuation of firm P (Levered Firm) is:

$$V_L = V_u + Debt\,(t) = ₹\,5,62,500 + 5,00,000\,(.50) = ₹\,8,12,500$$

Now the value of equity = ₹ 8,12,500 – 5,00,000 = ₹ 3,12,500, and

The equity capitalization rate $K_e = \frac{₹\,75,000}{3,12500} = 24\%.$

The overall capitalization rate, K_o, may be found as follows:

$$= 7.5\% \times \frac{₹\,5,00,000}{₹\,8,12,500} + 24\% \times \frac{₹\,3,12,500}{₹\,8,12,500} = 4.26\% + 9.23\% = 13.85\%$$

So, the WACC of firm P is 13.85%. Under both the NI approach and NOI approach, the firm P seems to have the optimal capital structure as it is having higher total value than the value of the firm Q.

Problem 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 earning 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. **[Nov-2009] 3 Marks**

Solution:

(i) Calculation of Value of Firm P and Q according to MM Hypothesis

Market Value of Firm P (Unlevered)

$$V_u = \frac{EBIT\,(1-t)}{K_e} = \frac{2,60,000\,(1-0.30)}{10\%} = \frac{₹\,1.82,000}{10\%} = ₹\,18,20,000$$

Market Value of Firm Q (Levered)

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

Problem 4: Following is the information relating to U Ltd. and L Ltd. having same level of risk but different capital structures

Particulars	U Ltd. (₹)	L Ltd. (₹)
Equity	90,000	50,000
Debt	—	50,000
Total value	90,000	1,00,000
Earnings	20,000	20,000
Interest	—	5,000
Net profit	20,000	15,000
K_e (NP + Equity)	22.2%	30%
K_d	—	10%
K_o (Earnings + value)	22.2%	20%

The above values show that the two firms not in equilibrium. Show by different methods, how an investor could profit from the arbitrage process.

Solution: In the given case, L Ltd. is an over valued firm. So, an investor having 5% holding of equity in L. Ltd. decides to make profit by indulging in the arbitrage process. He may be benefited and this can be demonstrated in two ways as follows:

(i) By maintaining his income from a smaller investment:

The current income of the investor is 5% of ₹ 15,000 i.e., 750 p.a. He undertakes the arbitrage process and replace his holding by purchasing equity capital in U Ltd., the effect can be demonstrated as follows:

	₹
Selling price of 5% holding in L Ltd.,	2,500
+ Borrowing @ 10% Interest of an amount 5% of 50,000 Debt.	2,500
Total funds	5,000
Less: Purchase price of 5% equity of U Ltd.,	4,500
Savings of funds	500
Net income from U Ltd.:	
Dividend Income (5% of ₹ 20,000)	1,000
Interest on loan (10% of 2,500)	250
Net income position	750

As far as income is concerned, he is getting the same income level of ₹ 750 but he has been benefited in terms of capital funds of ₹ 500 available with him.

(ii) By earning higher income from same level of investment:

Out of the total funds of ₹ 5,000 (as shown above), he can buy 5,000/90,000 of U Ltd. i.e., 5.555%. He will not be having any capital fund with him. His income position would be as follows:

	₹
Dividend from U Ltd. (5.555% of ₹ 20,000)	1,111
Less: Interest on loan (10% of ₹ 2,500)	250
Net income	861

So, his income has increased from ₹ 750 to ₹ 861, and he is benefited in terms of receiving higher income.

Problem 5: Equipment Company has earnings before interest and taxes (EBIT) of ₹ 10 million. The company currently has outstanding debt of ₹ 20 million at a cost of 7%.

(a) using the net income (N1) approach and a cost of equity of 12.5%; (1) compute the total value of the firm and firm's overall weighted average cost of capital (K_o) and (2) determine the firm's market debt/equity ratio.

(b) Assume that the firm issues an additional ₹ 10 million in debt and uses the proceeds to retire stock; the interest rate and the cost of equity remain the same. (1) Compute the new total value of firm and the firm's overall cost of capital and (2) determine the firm's market debt/equity ratio.

Solution:

(a) EBIT = ₹ 10,000,000

I = ₹ 2,00,00,000 × 7% = ₹ 14,00,000

K_e = 12.5%

(1) The total value of the firm, V_F can be found as follows:

EAE = EBIT – I = ₹ 1,00,00,000 – ₹ 14,00,000 = ₹ 86,00,000

$$V_E = \frac{EAE}{K_e} = \frac{₹\ 86,00,000}{0.125} = ₹\ 6,88,00,000$$

$V_F = V_E + V_D$ = ₹ 6,88,00,000 + ₹ 2,00,00,000 = ₹ 8,88,00,000

Therefore,

$$K_o = \frac{EBIT}{V_F} = \frac{₹\ 1,00,00,000}{8,88,00,000} = ₹\ 11.26\%$$

(2) The firm's market Debt/Equity ratio is

$$\frac{V_D}{V_E} = \frac{₹\ 2,00,00,000}{6,88,00,000} = 0.29$$

(b)

(1) I = ₹ 30,000,000 × 7% = ₹ 2,100,000

EAE = EBIT – I = ₹ 1,00,00,000 – ₹ 21,00,000 = ₹ 79,00,000

$$V_E = \frac{EAE}{K_e} = \frac{₹\ 79,00,000}{0.125} = ₹\ 6,32,00,000$$

$V_F = V_E + V_D$ = ₹ 6,32,00,000 + ₹ 3,00,00,000 = ₹ 9,32,00,000

Therefore,

$$K_o = \frac{EBIT}{VF} = \frac{₹\ 1,00,00,000}{9,32,00,000} = 10.75\%$$

(2) The Debt/Equity ratio = $\frac{V_D}{V_E} = \frac{₹\ 3,00,00,000}{6,32,00,000} = 0.47$

Problem 6: There are two companies U Ltd. and L Ltd., having same NOI of ₹ 20,000 except that L Ltd. is a levered company having a debt of ₹ 1,00,000 @ 7% and cost of equity of U Ltd. & L Ltd. are 10% and 18% respectively. **COMPUTE how arbitrage process will work.**

Solution:

Particulars	Company	
	U Ltd.	L Ltd.
NOI (EBIT)	₹ 20,000	₹ 20,000
Debt (D)	-	₹ 1,00,000
K_d	-	7%
K_e	10%	18%
Value of equity capital (S)	₹ 2,00,000	₹ 72,222

$\left(\frac{\text{EBIT - Interest}}{K_e}\right)$	$\left(\frac{20,000}{0.10}\right)$	$\left(\frac{20,000\text{-}7,000}{0.18}\right)$
Total value of the firm (V) = S+D	₹ 2,00,000	₹ 1,72,222
		(₹ 72,222 + ₹1,00,000)

Arbitrage Process:

If you have 10% shares of unlevered firm i.e. investment of 10% of ₹ 2,00,000 = ₹ 20,000 and Return @ 10% on ₹ 20,000. Investment will be 10% of earnings available for equity i.e. 10% × ₹ 20,000 = ₹ 2,000.

Alternative strategy will be:

Sell your shares in unlevered firm for ₹ 20,000 and buy 10% shares of levered firm's equity plus debt.

10% equity of levered firm	₹ 7,222
10% debt of levered firm	₹ 10,000
Total investment in levered firm	**₹ 17,222**

Surplus cash available = Surplus – Investment = ₹ 20,000 – ₹ 17,222 = ₹ 2,778

Your return on investment is:

7% on debt of ₹ 10,000	₹ 700
10% on equity i.e. 10% of earnings available for equity holders (10% × ₹ 13,000)	₹ 1,300
Total return	₹ 2,000

In both the cases the return received is ₹ 2,000 and still you have excess cash of ₹ 2,778

Hence, you are better off by doing arbitrage i.e. you will start selling unlevered company shares and buy levered company's shares thereby pushing down the value of shares of unlevered firm and increasing the value of levered firm till equilibrium is reached.

In the above example we have not invested entire amount received from "sale of shares of Unlevered company". We also have the same level of earning along with reduced investment. Alternatively, we could have invested entire amount in Levered company. In that case annual earnings would have increased. An example for the same is as follows:

Problem 7: The following data relates to two companies belonging to the same risk class:

Particulars	A Ltd.	B Ltd.
Expected Net Operating Income	₹ 18,00,000	₹ 18,00,000
12% Debt	₹ 54,00,000	-
Equity Capitalization Rate	-	18

Required:

1. Determine the total market value, Equity capitalization rate and weighted average cost of capital for each company assuming no taxes as per M.M. Approach.
2. Determine the total market value, Equity capitalization rate and weighted average cost of capital for each company assuming 40% taxes as per M.M. Approach.

Solution:

(a) Assuming no tax as per MM Approach

Calculation of Value of Firms 'A Ltd.' and 'B Ltd' according to MM Hypothesis

Market Value of 'B Ltd' [Unlevered(u)]

Total Value of Unlevered Firm (V_u) = [NOI/K_e] = 18,00,000/0.18 = ₹ 1,00,00,000

K_e of Unlevered Firm (given) = 0.18

K_o of Unlevered Firm (Same as above = K_e as there is no debt) = 0.18

Market Value of 'A Ltd' [Levered Firm (I)]

Total Value of Levered Firm (V_L) = V_u + (Debt× Nil)

= ₹ 1,00,00,000 + (54,00,000 × nil)

= ₹ 1,00,00,000

Computation of Equity Capitalization Rate and Weighted Average Cost of Capital (WACC)

	Particulars	A Ltd.	B Ltd.
A.	Net Operating Income (NOI)	₹ 18,00,000	₹ 18,00,000
B.	Less: Interest on Deb (I)	₹ 6,48,000	-
C.	Earnings of Equity Shareholders (NI)	₹ 11,52,000	₹ 18,00,000
D.	Overall Capitalization Rate (Ke)	0.18	0.18
E.	Total Value of Firm (V = NOI/Ke)	₹ 1,00,00,000	₹ 1,00,00,000
F.	Less: Market Value of Equity	₹ 54,00,000	-
G.	Market Value of Equity (S)	₹ 46,00,000	₹ 1,00,00,000
H.	Equity Capitalization Rate [Ke = NL/S	0.2504	0.18
I.	Weighted Average Cost of Capital [WACC (Ko)]*Ko = (Ke x S/V) + (Kd x D/V)	0.18	0.18

*Computation of WACC A Ltd

Component of Capital	Amount	Weight	Cost of Capital	WACC
Equity	₹ 46,00,00	0.46	0.2504	0.1152
Debt	₹ 54,00,000	0.54	0.12*	0.0648
Total	₹ 1,00,00,000			0.18

*K_d = 1 (since there is no tax)

WACC = 18%

(a) Assuming 40% taxes as per MM Approach

Calculation of Value of Firms 'A Ltd.' and 'B Ltd' according to MM Hypothesis

Market Value of 'B Ltd' [Unlevered(u)]

Total Value of unlevered Firm (V_u) = [NOI (1 - t)/k_e] = 18,00,000 (1 – 0.40)] / 0.18

= ₹60,00,000

K_e of unlevered Firm (given) = 0.18

K_o of unlevered Firm (Same as above = k_e as there is no debt) = 0.18

Market Value of 'A Ltd' [Levered Firm (I)]

Total Value of Levered Firm (V_L) = V_u + (Debt× Tax)

= ₹ 60,00,000 + (₹ 54,00,000 × 0.4)

= ₹ 81,60,000

Computation of Weighted Average Cost of Capital (WACC) of 'B Ltd.

= 18% (i.e. K_e = K_o)

Computation of Equity Capitalization Rate and Weighted Average Cost of Capital (WACC) of A Ltd

Particulars	A Ltd. (₹)
Net Operating Income (NOI)	18,00,000
Less: Interest on Debt (I)	6,48,000
Earnings Before Tax (EBT)	11,52,000
Less: Tax @ 40%	4,60,800
Earnings for equity shareholders (NI)	6,91,200
Total Value of Firm (V) as calculated above	81,60,000
Less: Market Value of Debt	54,00,000
Market Value of Equity (S)	27,60,000
Equity Capitalization Rate [ke = NI/S]	0.2504
Weighted Average Cost of Capital (ko)* ko = (ke×S/V) + (kd×D/V)	13.23

*Computation of WACC A Ltd

Component of Capital	₹	Weight	Cost of Capital	WACC
Equity	27,60,000	0.338	0.2504	0.0846
Debt	54,00,000	0.662	0.072*	0.0477
Total	81,60,000			0.1323

*K_d= 12% (1- 0.4) = 12% × 0.6 = 7.2%

WACC = 13.23%

Problem 8: Leo Ltd. has a net operating income of ₹ 21,60,000 and the total capitalisation of ₹ 120 lakhs. The company is evaluating the options to introduce debt financing in the capital structure and the following information is available at various levels of debt value.

Debt value (₹)	Interest rate (%)	Equity Capitalisation rate (%)
0	N.A.	12.00
10,00,000	7.00	12.50
20,00,000	7.00	13.00
30,00,000	7.50	13.50
40,00,000	7.50	14.00
50,00,000	8.00	15.00
60,00,000	8.50	16.00
70,00,000	9.00	17.00
80,00,000	10.00	20.00

You are required to COMPUTE the equity capitalization rate if MM approach is followed. Assume that the firm operates in zero tax regime and calculations to be based on book values.

Solution:

$$\text{Value of a Firm} = \frac{NOI}{K_0}$$

$$\therefore 1,20,00,000 = \frac{21,60,000}{K_0}$$

$$\therefore K_0 = \frac{21,60,000}{1,20,00,000} = 18\%$$

$$\text{Under MM approach, } K_e = K_e + \frac{D}{E}(K_0 - K_0)$$

Statement of equity capitalization under MM approach

Debt Value (₹)	Equity Value (₹)	Debt/ Equity	K_d(%)	K_o(%)	$K_o - K_d$ (%)	$K_e = K_o + (K_o - K_d)(D/E)$ (%)
-	1,20,00,000	0.0000	NA	18.00	18.00	18.00
10,00,000	1,10,00,000	0.0909	7.00	18.00	11.00	19.00
20,00,000	1,00,00,000	0.2000	7.00	18.00	11.00	20.20
30,00,000	90,00,000	0.3333	7.50	18.00	10.50	21 .50
40,00,000	80,00,000	0.5000	7.50	18.00	10.50	23.25
50,00,000	70,00,000	0.7143	8.00	18.00	10.00	25.14
60,00,000	60,00,000	1.0000	8.50	18.00	9.50	27.50
70,00,000	50,00,000	1.4000	9.00	18.00	9.00	30.60
80,00,000	40,00,000	2.0000	10.00	18.00	8.00	34.00

Problem 9: The financial advisor of Sun Ltd. is confronted with following two alternative financing plans for raising ₹ 10 lakhs that is needed for plant expansion and modernization

Alternative I: Issue 80% of funds with 14% Debenture [Face value (FV) ₹ 100] at par and redeem at a premium of 10% after 10 years and balance by issuing equity shares at premium.

Alternative II: Raise 10% of funds required by issuing 8% Irredeemable Debentures [Face value (FV) ₹ 100] at par and the remaining by issuing equity shares at current market price of ₹125.

Currently, the firm has an Earnings per share (EPS) of ₹ 21

The modernization and expansion programme is expected to increase the firm's Earnings before Interest and Taxation (EBIT) by ₹ 200,000 annually

The firm's condensed Balance Sheet for the current year is given below:

Liabilities	(₹)	Assets	(₹)
Current Liabilities	5,00,000	Current Assets	16,00,000
10% Long Term Loan	15,00,000	Plan & Equipment (Net)	34,00,000
Reserves & Surplus	10,00,000		
Equity Share Capital (FV: ₹ 100 each)	20,00,000		
TOTAL	**50,00,000**	**TOTAL**	**50,00,000**

However, the finance advisor is concerned about the effect that issuing of debt might have on the firm. The average debt ratio for firms in industry is 35%. He believes if this ratio is exceeded, the P/E ratio of the company will be 7 because of the potentially greater risk.

If the firm increases its equity capital by more than 10 %, he expects the P/E ratio of the company will increase to 8.5 irrespective of the debt ratio.

Assume Tax Rate of 25%. Assume target dividend pay-out under each alternative to be 60% for the next year and growth rate to be 10% for the purpose of calculating Cost of Equity.

SUGGEST with reason which alternative is better on the basis of each of the below given criteria:

i. Earnings per share (EPS) & Market Price per share (MPS)
ii. Financial Leverage
iii. Weighted Average Cost of Capital & Marginal Cost of Capital (using Book Value weights)

Solution:

Calculation of Equity Share capital and Reserves and surplus:

Alternative 1:

$$\text{Equity Share capital} = ₹\,20,00,000 + \frac{₹\,2,00,000 \times 100}{133.3333} = ₹\,21,50,000$$

$$\text{Reserves} = ₹\,10,00,000 + \frac{₹\,2,00,000 \times 33.33333}{133.3333} = ₹\,10,50,000$$

Alternative 2:

$$\text{Equity Share capital} = ₹\,20,00,000 + \frac{₹\,2,00,000 \times 100}{125} = ₹\,27,20,000$$

$$\text{Reserves} = ₹\,10,00,000 + \frac{₹\,2,00,000 \times 25}{125} = ₹\,11,80,000$$

Capital Structure Plans

Capital	Alternative 1 ₹	Alternative 2 ₹
Equity Share capital	21,50,000	27,20,000
Reserves and surplus	10,50,000	11,80,000
10% long term debt	15,00,000	15,00,000
14% Debentures	8,00,000	-
8% Irredeemable Debentures	-	1,00,000
Total Capital Employed	55,00,000	55,00,000

Computation of Present Earnings before interest and tax (EBIT)

EPS (₹)	**21**
No. of equity shares	20,000
Earnings for equity shareholders (I x II) (₹)	4,20,000
Profit Before Tax (III/75%) (₹)	5,60,000
Interest on long term loan (1500000 x 10%) (₹)	1,50,000
EBIT (IV + V) (₹)	7,10,000

EBIT after expansion = ₹ 7,10,000 + ₹ 2,00,000 = ₹ 9,10,000

Evaluation of Financial Plans on the basis of EPS, MPS and Financial Leverage

Particulars	(Amount in ₹)	
	Alternative I	Alternative II
EBIT	9,10,000	9,10,000
Less: Interest: 10% on long term loan	(1,50,000)	(1,50,000)
14% on Debentures	(1,12,000)	Nil
8% on Irredeemable Debentures	Nil	(8000)
PBT	6,48,000	7,52,000
Less: Tax @25%	(1,62,000)	(1,88,000)
PAT	4,86,000	5,64,000
No. of equity shares	21,500	27,200
EPS	**22.60**	**20.74**
Applicable P/E ratio (Working Note 1)	7	8.5
MPS (EPS X P/E ratio)	**158.2**	**176.29**
Financial Leverage EBIT/PBT	**1.40**	**1.21**

Working Note 1

Debt:	Alternative I	Alternative II
₹ 15,00,000 +₹ 8,00,000	23,00,000	-
₹ 15,00,000 +₹ 1,00,000	-	16,00,000
Total capital Employed (₹)	55,00,000	55,00,000
Debt Ratio (Debt/Capital employed)	0.4182	0.2909
	41.82%	29.09%
Change in Equity: ₹ 21,50,000-₹ 20,00,000 ₹ 27,20,000-₹ 20,00,000	1,50,000	7,20,000
Percentage change in equity	7.5%	36%
Applicable P/E ratio	**7**	**8.5**
A) Cost of equity		
EPS ₹	22.60	20.74
DPS (EPS X 60%) ₹	13.56	12.44
Growth (g)	10%	10%
Po (MPS)	158.2	176.29
Ke= Do (1 + g)/ Po		
	= 9.43%	**= 7.76%**
B) Cost of Debt:		
10% long term debt	10% + (1- 0.25)	10% + (1- 0.25)
	7.5%	**7.5%**
14% redeemable debentures		Nil
	= 10.5 + 1/10.5	
	= 10.95%	
8% irredeemable debenture	NA	8000 (1- 0.25)/1,00,00 **= 6%**

Calculation of Weighted Average cost of capital (WACC)

	Alternative 1			Alternative 2		
Capital	**(weight)**	**Cost (%)**	**MACC**	**(weight)**	**Cost (%)**	**MACC**
Equity Share Capital	₹ 1,50,000 (0.15)	9.43	1.41%	₹ 7,20,000 (0.72)	7.76	5.59%
Reserve and Surplus	₹ 50,000 (0.05)	9.43	0.47%	₹ 1,80,000 (0.18)	7.76	1.40%
14% Debenture	₹ 8,00,000 (0.80)	10.95	8.76%	-		0.00%
8% Irredeemable Debentures	-			₹ 1,00,000 (0.10)	6	0.60%
Total Capital Employed	₹ 10,00,000		10.65%	₹ 10,00,000		7.58%

Summary of solution:

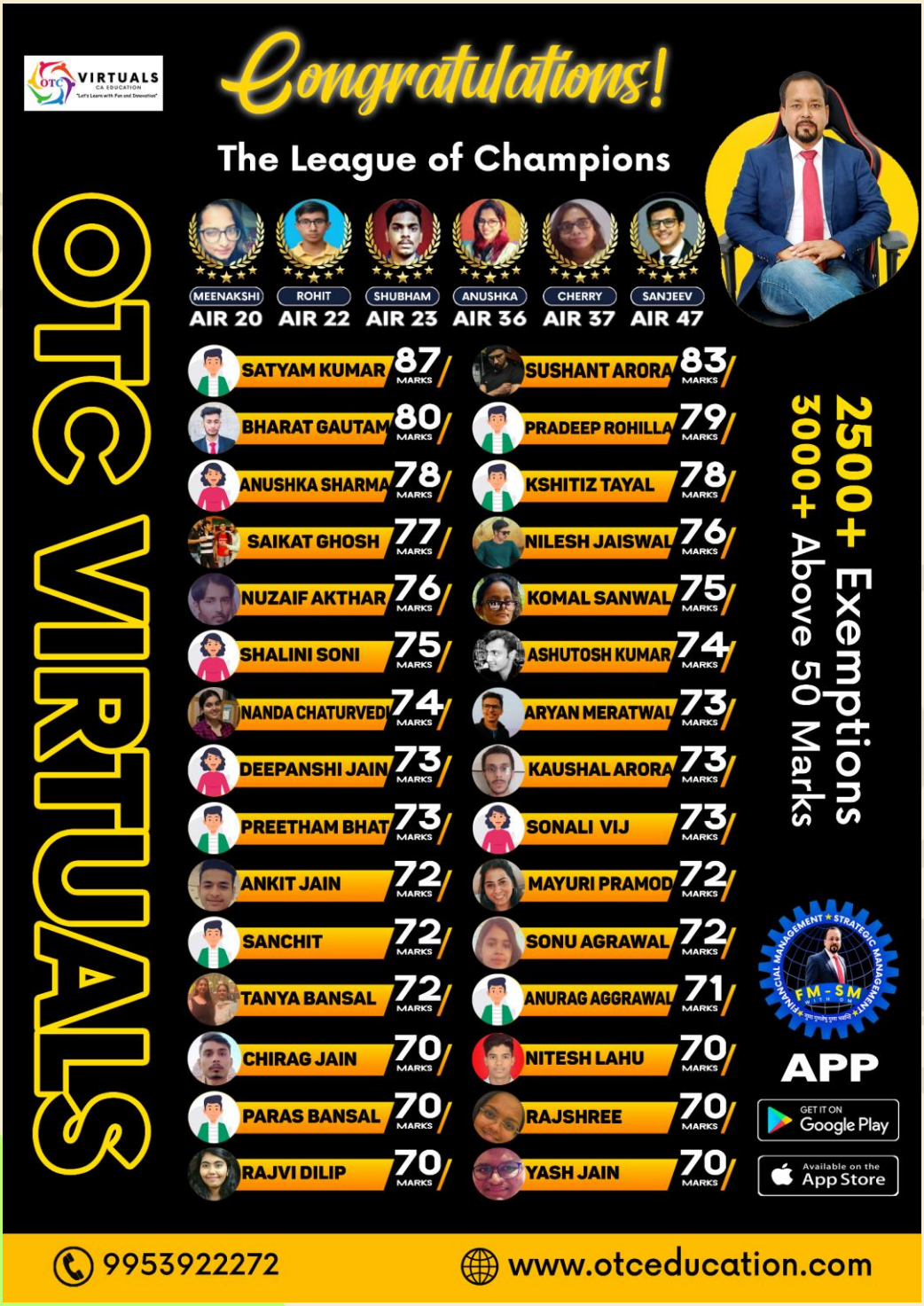
	Alternate I	**Alternate II**
Earnings per share (EPS) ₹	22.60	20.74
Market price per share (MPS) ₹	158.20	176.29
Financial leverage	1.4043	1.2101
Weighted Average cost of capital (WACC)	9.12%	7.66%
Marginal cost of capital (MACC)	**10.65%**	**7.58%**

Alternative I of financing will be preferred under the criteria of EPS, whereas Alternative II of financing will be preferred under the criteria of MPS, Financial leverage, WACC and marginal cost of capital.

6 CHAPTER

Capital Budgeting

List of Important Questions



6 CHAPTER

Capital Budgeting

List of Important Questions

Problem 1: 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 is ₹ 12,000 per annum; net of taxes.

Required: Whether it would be profitable for the hospital to purchase machine. Give your recommendation under:

(i) Net Present Value method

(ii) Profitability Index method.

(iii) PV factors at 10% are given below: **[Nov-2009]**

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467

Solution: Advise to the Hospital Management

Determination of Cash inflows

Particulars	₹
Sales Revenue	40,000
Less: Operating Cost	7,500
	32,500
Less: Depreciation $\frac{(80,000 - 6,000)}{8}$	9,250
Net Income	23,250
Tax @ 30%	6,975
Earnings after Tax (EAT)	16,275
Add: Depreciation	9,250
Cash inflow after tax per annum	25,525
Less: Loss of Commission Income	12,000
Net Cash inflow after tax per annum	13,525
In 8th Year:	
New Cash inflow after tax	13,525
Add: Salvage Value of Machine	6,000
Net Cash inflow in year 8	19,525

Calculation of Net Present Value (NPV)

Year	CFAT (E)	PV Factor @ 10%	Present Value of Cash inflows
1 to 7	13,525	4.867	65,826.18
8	19,525	0.467	9,118.18
			74,944.36
Less: Cash Outflows			80,000.00
NPV			(5,055.64)

$$\text{Profitability Index} = \frac{\text{Sum of discounted cash inflows}}{\text{Initial Cash Outlay or Total Discounted Cash outflows}}$$

$$= \frac{74,944.36}{80,000} = 0.937$$

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.

Note: Since the tax rate is not mentioned in the question, therefore , it is assumed to be 30 percent in the given solution.

Problem 2: Following are the data on a capital project being evaluated by the management of X Ltd.:

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

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

Discount 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
	2.855	2.913	2.974	3.038

Solution:

At IRR, Present Value of Cash Outflows = Present Value of Cash Inflows

Hence, cost of Project = ₹ 40,000 × 2.855 = ₹ 1,14,200

Profitability Index at cost of capital = 1.064

$$1.064 = \frac{\text{Present Value of Cash Inflows at cost of capital}}{1,14,200}$$

Present Value of Cash Inflows at cost of capital = ₹ 1,21,509

Net Present Value at cost of capital = ₹ 1,21,509 – ₹ 1,14,200 = ₹ 7,309

$$\text{Annuity factor at cost of capital (1–4)} = \frac{\text{Present Value of Cash Inflows}}{\text{Annual Cash Inflows}} = \frac{1,21,509}{40,000} = 3.038$$

Reference to cumulative annuity table gives us the cost of capital 12%.

$$\text{Payback Period} = \frac{1,14,200}{40,000} = 2.855 \text{ years}$$

Problem 3: Strong Enterprises Ltd. is a manufacturer of high quality running shoes. Mr. Dazlling, President, is considering the company's ordering, inventory and billing procedures. He estimates that annual savings from computerization include a reduction of ten clerical employees with annual salaries of ₹ 15,000 each, ₹ 8,000 from reduced production delays caused by raw materials inventory problems ₹ 12,000 form lost sales due to inventory stock outs and ₹ 3,000 associated with timely billing procedure. The purchase price of the system is ₹ 2,00,000 and installation costs are ₹ 50,000. These outlays will be capitalized (depreciated) on a straight-line basis to a zero book salvage value which is also its market value at the end of the end of five years. Operation of the new system requires two computer specialists with annual salaries of ₹ 40,000 per person. Also annual maintenance and operating (cash) expenses of ₹ 12,000 are estimated to be required. The company's tax rate is 40% and its required rate of return (cost of capital) for this project is 12%.

You are required to-

(a) Find the project's initial net cash outlay.
(b) Find the project's operating and terminal value cash flows over its 5-year life.
(c) evaluate the project using NPV method.
(d) evaluate the project using PI method.
(e) calculate the project's payback period.
(f) Find the project's cash flows and NPV [parts (a) through (c)] assuming that the system can be sold for ₹ 25,000 at the end of five years even though the book salvage value will be zero and that capital gain is subject to tax.
(g) Find the project's cash flows and NPV [parts (a) though (c)] assuming that the book salvage value for depreciation purposes is ₹ 20,000 even though the machine is worthless in terms of its resale value, and that such loss of ₹ 20,000 (book value) is allowed for tax purposes.

Solution:

(a) Project's initial cash outlay:

Cost	₹ 2,00,000
Installation Expenses	50,000
Total net Cash outlay	2,50,000

Depreciation per year = ₹ 2,50,000 ÷ 5 = ₹ 50,000

(b) Project's operating cash flows its 5-year life:

		₹
Savings		1,50,000
Reduction in clerks salaries		8,000
Reduction in production delays		12,000
Reduction in lost sales		3,000
Gains due to timely billing		1,73,000
Less: Depreciation	50,000	
Less: Additional people cost	80,000	
Less: Maintenance cost	12,000	1,42,000
Profit before tax		31,000
Less tax @ 40%		12,400
Profit after tax		18,600

Cash flow = PAT + Depreciation = ₹ 18,600 + ₹ 50,000 = ₹ 68,600

(b) Evaluation of the project by using NPV Method:

Year	Cash flow	PVAF (12%, 5y)	Total AV (₹)
1- 5	₹ 68,600	3.605	2,47,303
Less: Total initial Cash outlay			(2,50,000)
		NPV =	(2,697)

Since NPV is negative therefore the project is unviable.

(c) Evaluation of the project by using PI Method:

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

$$= \frac{₹\ 2,47,303}{₹\ 2,50,000} = 0.989$$

Since PI is less than 1.0, the project is unviable

(d) **Calculation of the Project's Payback Period:**

Year	Net Cash flow (₹)	Cumulative cash flow (₹)
1	68,600	68,600
2	68,600	1,37,200
3	68,600	2,05,800
4	68,600	3,74,400
5	68,600	3,43,000

Here, the payback period is 3 years plus a fraction of the 4th year as under:

$$\text{Payback period} = 3 \text{ years} + \frac{44,200}{68,600} = 3.64 \text{ years}$$

Therefore, the payback period is 3.64 years.

(e) **Calculation of cash flows and NPV assuming when the system can be sold for ₹ 25,000 at the end of 5- years:** In case the project has a salvage of ₹ 25,000 (book value nil) at the end of five years, the whole of ₹ 25,000 is capital gain and subject to tax at the rate of 40%. The present value of the tax salvage amount is to be added to the current NPV.

Post tax salvage value in year 5 = ₹ 15,000 (i.e. ₹ 25,000 × .60)

Present value of ₹ 15,000 discounted at 12% is (₹ 15,000 × 0.566) = ₹ 8,505.

New NPV is ₹ 8,505 – ₹ 2,697 = ₹ 5,808. Since NPV> 0, the project is viable.

(f) **Project's cash flows and NPV assuming that the book salvage value for depreciation purposes is ₹ 20,000:**

$$\text{Depreciation} = \frac{(₹\ 2,50,000 - ₹\ 20,000)}{5} = ₹\ 46,000 \text{ per year}$$

	₹
Cash inflow for the years 1 to 5 are Savings (Calculated as earlier)	1,73,000
Less: Depreciation	(46,000)
Less: Additional people cost	(80,000)
Less: Maintenance cost	(12,000)
Profit before tax	35,000
Tax @ 40%	14,000
Profit after tax	21,000
Cash inflow (21,000 + 46,000)	67,000

Calculation of NPV: It may by noted that at the end of year 5, the book value of the project would be ₹ 20,000 but realizable value nil. So, the capital loss of ₹ 20,000 will result in tax savings of ₹ 8,000 (i.e. ₹ 20,000 x 40%), as the capital loss is available for tax purpose in view of the information given. So, at the end of year 5, there would be an additional inflow of ₹ 8,000. The NPV may now be calculated as follows:

Years	Cash flows	PVF (12%, n)	PV
1-5	₹ 67,000	3.605	₹ 2,41,535
5	8,000	.567	4,536
PV of inflows			2,46,071
Outflows			2,50,000
NPV			(3,929)

As the NPV of the project is negative, the project is not viable.

Problem 4: Royal Industries is considering the replacement of one of its moulding machines. The existing machine is in good operating condition, but is smaller than required if the firm is to expand its operations. The old machine is 5 years old, has a current salvage value of ₹ 30,000 and a remaining depreciable life of 10 Years. The machine was originally purchased for ₹ 75,000 and is being depreciated on a straight line basis over 10 years, with no salvage value. Cost of new machine is ₹ 1,50,000. The management anticipates that with the expended operations, there will be need for an additional net working capital of ₹ 30,000. The new machine will allow the firm to expand current operations, and thereby increase revenues of ₹ 40,000, and variable operating costs from ₹ 2,00,000 to ₹ 2,10,000. The company's tax rate is 50% and its cost of capital is 10%. Should the company replace its existing machine, given that capital gain taxable at the same rate of tax ?

Solution:

Calculation of Initial Outflow:	₹
Cost of Machine	1,50,000
Add: Additional Working Capital required	30,000
Less: Sale value of existing machine	30,000
	1,50,000
Less: Tax saving @ 50% on Loss on sale i.e. 50% of (₹ 50,000 — 30,000)	10,000
Net Cash outflow	1,40,000
Calculation of annual Inflows:	₹
Increase in Sales Revenues	40,000
Less: Increase in Variable Cost	10,000
Increase in Contribution	30,000
Less: Tax @ 50%	15,000
Add: Tax shield @ 50% on additional Depreciation	5,000
(i.e. 50% of (15,000— 5,000)	20,000
Calculation of Terminal Inflow:	
Working capital Released	₹ 30,000

Calculation of Net Present value:

Years	Cash Flow	PV factor @ 10%	PV(₹)
1-10	₹ 20,000	6.145	1,22,900
10	30,000	.386	11,580
			1,34,480
Less: Cash outflow			1,40,000
Net Present Value			(5,520)

As the NPV of buying the new machine is negative, the firm need not replace the existing machine.

Problem 5: The project cash flows from two mutually exclusive Projects A and B are as under:

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

(i) Advice on project selection with reference to internal rate of return.

(ii) Will it make any difference in project selection, if the cash flow from project B is for 8 years instead of 7 years @ ₹ 7,000 each year?

Solution:

(i) Project selection based on internal rate of return.

The present values of Project A and Project B is calculated as follows:

Discount Rate	P.V. Factor for 7 years	Project A		Project B	
		Cash inflow p.a. (₹)	P.V. (₹)	Cash inflow p.a. (₹)	P.V. (₹)
15%	4.16	6,000	24,960	7,000	29,120
16%	4.04	6,000	24,240	7,000	28,280
17%	3.92	6,000	23,520	7,000	27,440
18%	3.81	6,000	22,860	7,000	26,670
19%	3.71	6,000	22,260	7,000	25,970
20%	3.60	6,000	21,600	7,000	25,200

(a) Project A

Since the original investment in Project A is ₹ 22,000, its IRR will fall between 19% and 20%.

Now, IRR of Project A is calculated as follows, by applying formula for interpretation:

$$\text{Actual IRR} = 19 + \frac{260}{660} \times 1 = 19.4\% \text{ (approx)}$$

(b) Project B

Since the original investment in project is ₹ 27,000, its IRR will fall between 17% to 18%.

P.V. of cash inflows at 17%	27,440
P.V. of cash inflows at 18%	26,670
Difference	770

Now, IRR of Project B is ascertained as below:

$$\text{Actual IRR} = 17 + \frac{27,440 - 27,000}{770} \times 1 = 17.57\% \text{ (approx)}$$

Selection of Project: The IRR of Project A and Project B are 19.4% and 17.6% respectively. A project can be selected based on its higher IRR over the other projects. Hence project A is preferred to which is having a higher IRR of 19.4%.

(ii) Calculation of IRR of Project B whose cash flow from the project is for 8 years instead of 7 years

Discount Factor	P.V. factor for 8 years	Cash inflow each year	P.V. of cash inflows
15%	4.49	7,000	31,340
16%	4.34	7,000	30,380
17%	4.21	7,000	29,470
18%	4.08	7,000	28,560
19%	3.95	7,000	27.650
20%	3.84	7,000	26,880

Since the original investment in Project B is ₹ 27,000, its IRR will fall between 19% to 20%.

	(₹)
P.V. of cash inflows @ 19%	27,650
P.V. of cash inflows @ 20%	26,880
Difference	770

Now, IRR of Project B is calculated as follows:

$$\text{Actual IRR} = 19 + \frac{27,650 - 27,000}{770} \times 1 = 19.8\% \text{ (approx)}$$

Selection of Project: With the change in cash inflow of project B from 7 years to 8 years its IRR is also improved from 17.6% to 19.8% and it is also higher than the IRR of Project A (i.e. 19.4%). Hence, Project B can be selected (based on its 8 years of cash inflows).

Problem 6: Pioneer Steels Ltd., is considering two mutually exclusive projects. Both required an initial cash outlay of ₹ 10,000 each and have a life of five years. The company's required rate of return is 10% and pays tax at a 50% rate. The projects will be depreciated on a straight line basis. The net cash flow expected to be generated by the projects are as follows:

Year	1	2	3	4	5
Project 1	₹ 4,000	4,000	4,000	4,000	4,000
Project 2	₹ 6,000	3,000	2,000	5,000	5,000

You are required to calculate:

(a) The pay back of each project.
(b) The Average rate of return for each project.
(c) The Net present value and Profitability index for each project.
(d) The Internal rate of returns for each project.

Which project should be accepted and why ?

Solution:

Calculation of Cash flows: In the question, it has been mentioned that the depreciation will be provided on straight line basis. It appears that the net cash flows given in the question are the profit before depreciation and tax. These are to be adjusted to find out the cash flows as follows:

Project 1

Year	PBDT (₹)	Dep. (₹)	PBT (₹)	Tax (₹)	PAT (₹)	CF (₹)	Cumulative CF (₹)
1	₹ 4,000	₹ 2,000	₹ 2,000	₹ 1,000	₹ 1,000	₹ 3,000	₹ 3,000
2	4,000	2,000	2,000	1,000	1,000	3,000	6,000
3	4,000	2,000	2,000	1,000	1,000	3,000	9,000
4	4,000	2,000	2,000	1,000	1,000	3,000	12,000
5	4,000	2,000	2,000	1,000	1,000	3,000	15,000

*PBDT – Profit before depreciation and tax

Project 2

	₹	₹	₹	₹	₹	₹	₹
1	6,000	2,000	4,000	2,000	2,000	4,000	4,000
2	3,000	2,000	1,000	5,00	5,00	2,500	6,500
3	2,000	2,000	—	—	—	2,000	8,500
4	5,000	2,000	3,000	1,500	1,500	3,500	12,000
5	5,000	2,000	3,000	1,500	1,500	3,500	15,000

	Project 1	Project 2
Calculation of Payback Period:	$3+\frac{1,000}{3,000}$ years	$3+\frac{1,500}{3,500}$ years
	$=3\frac{1}{3}$ years	$=3\frac{3}{7}$ years
Calculation of Accounting Rate of Return:		
Average Cost	₹ 5,000	₹ 5,000
Average Profit After Tax	₹ 1,000	₹ 1,100
ARR	20%	22%

Calculation of NPV (Cost of Capital 10%):

Project 1:	Annuity of Cash inflows for 5 years	=	₹ 3,000
	$PVAF_{(10\%,5y)}$	=	3.791
	PV of Annuity (₹ 3,000 × 3.791)	=	₹ 11,373
	Less: Cash outflow	=	₹ 10,000
	Net Present Value	=	₹ 1,373

Project 2:

Year	Cash flow	$PVF_{(10\%,n)}$	PV
0	(10,000)	1.000	(10,000)
1	4,000	0.909	3,636
2	2,500	0.826	2,065
3	2,000	0.751	1,502
4	3,500	0.683	2,391
5	3,500	0.621	2,173
Net Present Value			**1,767**

Calculation of Profitability Index:

$$PI = \frac{\text{PV of Inflows}}{\text{PV of outflows}}$$

Project 1 $PI = \frac{₹\ 11,373}{₹\ 10,000} = 1.137$

Project 2 $PI = \frac{₹\ 11,767}{₹\ 10,000} = 1.177$

Calculation of Internal Rate of Return: The IRR of a project is the rate at which the NPV of the project comes to zero. In the above calculation of NPV (at 10%), both projects were found to be having positive NPV. So, the IRR for both the projects are more than 10%. The exact IRR may be ascertained as follows:

Calculation of Internal Rate of Return: The IRR of a project is the rate at which the NPV of the project comes to zero. In the above calculation of NPV (at 10%), both projects were found to be having positive NPV. So, the IRR for both the projects are more than 10%. The exact IRR may be ascertained as follows:

Project 1: In these case, the cash inflows are equal for 5 years, therefore the situation can be presented like this:-

$₹\ 10,000 = ₹\ 3,000 \times PVAF_{(r,5y)}$

$PVAF_{(r,5y)} = 10,000 \div 3,000$

$= 3.333$

In the PVAF table, the value of 3.333 in 5 years row may be found between 15% and 16%.

At 15% NPV $= (₹\ 3,000 \times PVAF_{15\%,5y}) - ₹\ 10,000$

$= (₹\ 3,000 \times 3.352) - ₹\ 10,000$

$= ₹\ 56$

At 16% NPV $= (₹\ 3,000 \times PVAF_{16\%,5y}) - ₹\ 10,000$

$= (₹\ 3,000 \times 3.274) - ₹\ 10,000$

$= ₹\ -178$

The exact IRR may be found by interpolating between 15% & 16%,

$$IRR = 15\% + \frac{56}{(56+178)}\% = 15.24\%$$

Project 2: As the project 2 is having higher NPV and the Inflows are scattered, the NPV may be found at 16% and 17%.

Year	CF (₹)	$PVF_{(16\%,n)}$ (₹)	PV (₹)	$PVF_{(17\%,n)}$ (₹)	PV (₹)
0	(10,000)	1.000	(10,000)	1.000	(10,000)
1	4,000	0.862	3,448	.855	3,420
2	2,500	0.743	1,858	.731	1,828
3	2,000	0.641	1,282	.624	1,248
4	3,500	0.552	1,932	.534	1,869
5	3,500	0.476	1,666	.456	1,596
			186		**–39**

Now, the IRR is $= 16\% + \frac{186}{186 + 39}\% = 16.83\%$

Problem 7: Company X is forced to choose between two machines A and B. The two machines are designed differently, but have identical capacity and do exactly the same job. Machine A costs ₹ 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?

Solution:

Statement showing the evaluation of two machines

Machines	A	B
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.

Problem 8: A firm is considering the introduction of a new product which will have a life of five years. Two alternative of promoting the product have been identified:

Alternative 1: This will involve employing a number of agents. An immediate expenditure of ₹ 5,00,000 will be required to advertise the product. This will produce net annual cash inflows of ₹ 3,00,000 at the end of the each of the subsequent five years. However, the agents will have to be paid ₹ 50,000 each years. On termination of the contract the agent will have to be paid a lump sum of ₹ 1,00,000 at the end of the fifth years.

Alternative 2: Under this alternative, the firm will not employ agent but will sell directly to the consumers. The initial expenditure on advertising will be ₹ 2,50,000. This will bring in cash at the end of each year of ₹ 1,50,000. However this alternative will involve out-of-pocket cost for sales administration to the extent of ₹ 50,000. The firm also proposes to allocate fixed costs worth ₹ 20,000 per year to this product if this alternative is pursued.

Required:

(a) Advice the management as to the method of promotion to be adopted. You may assume that the firm's cost of capital is 20%

(b) Calculate the internal rate of return for alternative 2.

Solution:

Calculation of NPV:

Alternative 1

Outflows: Initial Expenditure (A)		(₹ 5,00,000)
Inflows: Annual cash inflow	₹ 3,00,000	
Less: payment to Agent	50,000	
Net cash inflow	2,50,000	
PVAF (20%, 5Y)	2.991	
Present value of inflows (2,50,000 × 2.991) (B)		7,47,750
Outflow: at the end of year 5 (Payment to agents)	1,80,000	
PVF (20%, 5Y)	402	
Present Value (C)	40,200	(40,200)
Net present value (B) – [(A) + (C)]		₹ 2,07,550

Alternative 2

Outflow: Initial Expenditure (A)		₹ –2,50,000
Inflows: Annual Cash inflow	₹ 1,50,000	
Less: Out of pocket expenses	50,000	
Net inflow	1,00,000	
PVAF (20%, 5Y)	2.991	
Present value of inflows (2.991 × 1,00,000) (B)		2,99,100
Net present value (2,99,100 – 2,50,000) (B) – (A)		49,100

Calculation of Internal rate of return for alternative 2:

₹ 2,50,000 = ₹ 1,00,000 × PVAF (r, 5Y)

PVAF (r, 5Y) = 2,50,000 ÷ 1,00,000 = 2.5

For 5 years in the PVAF table, the value of 2.5 may be traced between 28% and 29%.

At 28% NPV = (1,00,000 × 2.532) – 2,50,000 = ₹ 3,200

At 29% NPV = (1,00,000 × 2.483) – 2,50,000 = ₹ – 1,700

The exact IRR may be found by interpolating between 28% and 29% as follows:

$$IRR = 28 + \frac{3,200}{(3,200 + 1,700)} = 28.65\%$$

Note: The allocated fixed costs in case of Alternative 2 have been ignored because these do not involve any incremental cash outflow.

Problem 9: 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-A1	NM-A2
Cost of Machine (₹)	20,00,000	25,00,000
Estimated working life 5 Years 5 Years	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
Estimated additional cost of repairs and maintenance per annum (₹)	45,000	85,000

Depreciation will be charged on a straight line method. Corporate tax rate is 30 percent and expected rate of return may be 12 percent.

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)

Solution: Evaluation of Alternatives

Working Notes:

Depreciation on Machine NM-A1 = 20,00,000/5 = 4,00,000
Depreciation on Machine NM-A2 = 25,00,000/5 = 5,00,000

Particulars	Machine NM-A1 (₹)	Machine NM-A2 (₹)
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

Machine NM-A1 = Total Initial Capital Investment/Annual expected after tax net cash flow
= 20,00,000/5,71,500
= 3.50 Years

Machine NM- A2 = 25,00,000/6,92,500
= 3.61 Years

Decision: Machine NM-A1 is better.

(ii) Accounting (Average) Rate of Return (ARR)

ARR = Average Annual Net Savings/Average investment x 100

Machine NM-A1 = 1,71,500/10,00,000x100
= 17.15%

Machine NM-A2 = 1,92,500/12,50,000 x 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%

Machine NM-A1 = 5, 71,500 x 3.605 = ₹ 20, 60,258

Machine NM-A2 = 6, 92,500 x 3.605 = ₹ 24, 96,463

PV Index = Present Value of Cash Inflow/Investment

Machine NM-A1 = 20,60,258/20,00,000 = 1.03

Machine NM-A2 = 24,96,463/25,00,000 = 0.9

Decision: Machine NM-A1 is better

Problem 10: ANP Ltd. is providing the following information:

Annual cost of saving	₹ 96,000
Useful life	5 years
Salvage value	zero
Internal rate of return	15%
Profitability index	1.05

Table of discount factor

Discount factor	Years					
	1	2	3	4	5	Total
15%	0.870	0.756	0.658	0.572	0.497	3.353
14%	0.877	0.769	0.675	0.592	0.519	3.432
13%	0.886	0.783	0.693	0.614	0.544	3.52

Required:

(i) Cost of the project
(ii) Payback period
(iii) Net present value of cash inflow
(iv) Cost of capital. **[May 2012]**

Solution:

(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 x 3.353 = ₹ 3,21,888

Hence, Cost of the Project = ₹ 3,21,888

(ii) **Payback Period**

$$\text{Payback period} = \frac{\text{Cost of the Project}}{\text{Annual Cost Savings}} = \frac{₹\ 3,21,888}{96,000}$$

Payback Period = 3.353 years

(iii) **Net Present Value (NPV)**

NPV = Sum of Present Values of Cash inflows – Cost of the Project

= ₹ 3,37,982.40 – 3,21,888 = ₹ 16,094.40

Net Present Value = ₹ 16,094.40

(iv) **Cost of Capital**

$$\text{Profitability index} = \frac{\text{Sum of Discounted Cash inflows}}{\text{Cost of the Project}}$$

$$1.05 = \frac{\text{Sum of Discounted Cash inflows}}{3,21,888}$$

∴ Sum of Discounted Cash inflows = ₹ 3,37,982.40

Since, Annual Cost Saving = ₹ 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

Hence, Cost of Capital = 13%

Problem 11: Given below are the data on a capital project 'M'

Annual cash inflows	₹60,000	Profitability index	1.064
Useful life	4 years	Salvage value	0
Internal rate of return	15%		

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: **(May 2015)**

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

Solution:

(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

$$\text{Payback period} = \frac{\text{Cost of the Project}}{\text{Annual Cash Inflows}} = \frac{₹1,71,300}{₹60,000} = 2.855 \text{ years}$$

(iii) Cost of Capital

$$\text{Profitability index} = \frac{\text{Sum of Discounted Cash inflows}}{\text{Cost of the Project}}$$

$$1.064 = \frac{\text{Sum of Discounted Cash inflows}}{₹1,71,300}$$

∴ Sum of Discounted Cash inflows = ₹1,82,263.20

Since, Annual Cash Inflows = ₹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 (0.893 + 0.797 + 0.712 + 0.636)

Hence, Cost of Capital = 12%

(iv) Net Present Value (NPV)

NPV = Sum of Present Values of Cash inflows – Cost of the Project

= ₹1,82,263.20 – ₹1,71,300 = ₹10,963.20

Net Present Value = ₹10,963.20

Problem 12: Elite Cooker Company is evaluating three investment situations: (1) Produce a new line of aluminium skillets, (2) Expand its existing cooker line to include several new sizes, and (3) Develop a new, higher-quality line of cookers. If only the project in question is undertaken, the expected present values and the amounts of investment required are:

Project	Investment required	Present value of Future Cash-Flows
	₹	₹
1	2,00,000	2,90,000
2	1,15,000	1,85,000
3	2,70,000	4,00,000

If projects 1 and 2 are jointly undertaken, there will be no economies; the investments required and present values will simply be the sum of the parts. With projects 1 and 3, economies are possible in investment because one of the machines acquired can be used in both production processes. The total investment required for projects 1 and 3 combined is ₹ 4,40,000. If projects 2 and 3 are undertaken, there are economies to be achieved in marketing and producing the products but not in investment. The expected present value of future cash flows for projects 2 and 3 is ₹ 6,20,000. If all three projects are undertaken simultaneously, the economies noted will still hold. However, a ₹ 1,25,000 extension on the plant will be necessary, as space is not available for all three projects. CALCULATE NPV of the projects and STATE which project or projects should be chosen?

Solution:

Calculation of NPV

Project	Investment Required	Present value of Future Cash Flows	Net Present value
	₹	₹	₹
1	2,00,000	2,90,000	90,000
2	1,15,000	1,85,000	70,000
3	2,70,000	4,00,000	1,30,000
1 and 2	3,15,000	4,75,000	1,60,000
1 and 3	4,40,000	6,90,000	2,50,000
2 and 3	3,85,000	6,20,000	2,35,000
1, 2 and 3 (Refer Working note)	6,80,000*	9,10,000	2,30,000

Working Note:

(i) Total Investment required if all the three projects are undertaken simultaneously:

	(₹)
Project 1 & 3	4,40,000
Project 2	1,15,000
Plant extension cost	1,25,000
Total	6,80,000

(ii) Total of Present value of Cash flows if all the three projects are undertaken simultaneously:

	(₹)
Project 2 & 3	6,20,000
Project 1	2,90,000
Total	9,10,000

Projects 1 and 3 should be chosen, as they provide the highest net present value.

Problem 13: Ae Bee Cee Ltd. is planning to invest in machinery, for which it has to make a choice between the two identical machines, in terms of Capacity, 'X' and 'Y'. Despite being designed differently, both machines do the same job. Further, details regarding both the machines are given below:

Particulars	Machine 'X'	Machine 'Y'
Purchase Cost of the Machine (₹)	15,00,000	10,00,000
Life (years)	3	2
Running cost per year (₹)	4,00,000	6,00,000

The opportunity cost of capital is 9%.
You are required to IDENTIFY the machine which the company should buy?
The present value (PV) factors at 9% are:

Year	t_1	t_2	t_3
$PVIF_{0.09,t}$	0.917	0.842	0.772

Solution:

Statement Showing the Evaluation of Two Machines

	Particulars	Machine 'X'	Machine 'Y'
(i)	Purchase Cost	₹ 15,00,000	₹ 10,00,000
(ii)	Life of Machine	3 years	2 years
(iii)	Running Cost of Machine per year	₹ 4,00,000	₹ 6,00,000
(iv)	PVIFA (0.09, 3)	2.531	
	PVIFA (0.09, 2)		1.759
(v)	PV of Running Cost of Machine {(iii) × (iv)}	₹ 10,12,400	₹ 10,55,400
(vi)	Cash outflows of Machine {(i) + (v)}	₹ 25,12,400	₹ 20,55,400
(vii)	Equivalent PV of AnnualCash outflow {(vi)/(iv)}	₹ 9,92,651	₹ 11,68,505

Recommendation: Ae Bee Cee Ltd. should buy Machine 'X' since equivalent annual cash outflow is less than that of Machine 'Y'.

Problem 14: XYZ Ltd. is planning to introduce a new product with a project life of 8 years. Initial equipment cost will be ₹ 3.5 crores. Additional equipment costing ₹ 25,00,000 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 ₹ 2,50,000. A working capital of ₹ 40,00,000 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 per year	72,000	1,08,000	2,60,000	2,70,000	1,80,000

A sales price of ₹ 240 per unit is expected and variable expenses will amount to 60% of sales revenue. Fixed cash operating costs will amount ₹ 36,00,000 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.

CALCULATE the net present value of the project and advise the management to take appropriate decision.

Solution:

(a) Calculation of annual cash flows (₹ in lakh)

Year	Sales	VC	FC	Dep.	Profit	Tax	PAT	Dep.	Cash inflow
1	172.80	103.68	36	43.75	(10.63)	-	-	43.75	33.12
2	259.20	155.52	36	43.75	23.93	3.99*	19.94	43.75	63.69
3	624.00	374.40	36	43.75	169.85	50.955	118.895	43.75	162.645
4-5	648.00	388.80	36	48.25	174.95	52.485	122.465	48.25	170.715
6-8	432.00	259.20	36	48.25	88.55	26.565	61.985	48.25	110.235

(b) Calculation of Depreciation:

- On Initial equipment $= \frac{350 \text{ lakh}}{8 \text{ years}} = 43.75 \text{ lakh}$

-On additional equipment $= \frac{(₹25 - ₹ 2.5) \text{ lakh}}{8 \text{ years}} = 4.5 \text{ lakh}$

(c) *Calculation of tax in 2nd Year:

	₹ in lakh
Profit for the year	23.93
Less: Set off of unabsorbed depreciation in 1st year	(10.63)
Taxable profit	13.30
Tax @30%	3.99

(d) Calculation of Initial cash outflow

	₹ in lakh
Cost of New Equipment	350
Add: Working Capital	40
Outflow	390

Calculation of NPV (₹ in lakh)

Year	Cash flows	PV factor @12%	PV of cash- flows	Remark
0	(390)	1	(390)	Initial equipment cost
1	33.12	0.893	29.57	
2	63.69	0.797	50.76	
3	162.645	0.712	115.8	
3	(25)	0.712	(17.8)	Additional equipment cost
4	170.715	0.636	108.57	
5	170.715	0.567	96.79	
6	110.235	0.507	55.89	
7	110.235	0.452	49.83	
8	110.235	0.404	44.53	
8	40	0.404	16.16	Release of working capital
8	2.5	0.404	1.01	Additional equipment salvage value
Net Present Value			**161.11**	

Advise: Since the project has a positive NPV, therefore, it should be accepted.

Problem 15: 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 ₹ 150 lakh per annum for the next four years. The contract can be terminated upon installation of the aforesaid machine on payment of a compensation of ₹ 90 lakh 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 ₹ 600 lakh. At the end of the 4th year, the machine can be sold for ₹ 60 lakh and the cost of dismantling and removal will be ₹ 45 lakh.

Sales and direct costs of the product emerging from waste processing for 4 years are estimated as under:

(₹ in lakh)

Year	1	2	3	4
Sales	966	966	1,254	1,254
Material consumption	90	120	255	255
Wages	225	225	255	300
Other expenses	120	135	162	210
Factory overheads	165	180	330	435
Depreciation (as per income tax rules)	150	114	84	63

Initial stock of materials required before commencement of the processing operations is ₹ 60 lakh 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 ₹ 165 lakh 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 ₹ 30 lakh per annum. Labour costs include wages of 40 workers, whose transfer to this process will reduce idle time payments of ₹ 45 lakh in the year- 1 and ₹ 30 lakh in the year- 2. Factory overheads include apportionment of general factory overheads except to the extent of insurance charges of ₹ 90 lakh per annum payable on this venture. The company's tax rate is 30%.

Consider cost of capital @ 14%, the present value factors of which is given below for four years:

Year	1	2	3	4
PV factors @14%	0.877	0.769	0.674	0.592

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

Solution:

Statement of Operating Profit from processing of waste **(₹ in lakhs)**

Year	1	2	3	4
Sales (A)	966	966	1,254	1,254
Material consumption	90	120	255	255
Wages	180	195	255	300
Other expenses	120	135	162	210
Factory overheads (insurance only)	90	90	90	90
Loss of rent on storage space (opportunity cost)	30	30	30	30
Depreciation (as per income tax rules)	150	114	84	63
Total cost (B)	660	684	876	948
Profit {(C)=(A) - (B)}	306	282	378	306
Less: Tax (30%)	91.8	84.6	113.4	91.8
Profit after Tax (PAT)	214.2	197.4	264.6	214.2

Statement of Incremental Cash Flows (₹ in lakhs)

Year	0	1	2	3	4
Cost of Machine	(600)				
Material stock	(60)	(105)	-	-	165
Compensation for contract	(90)	-	-	-	-
Contract payment saved	-	150	150	150	150
Tax on contract payment	-	(45)	(45)	(45)	(45)
Incremental profit	-	306	282	378	306
Depreciation added back	-	150	114	84	63
Tax on profits	-	(91.8)	(84.6)	(113.4)	(91.8)
Profit on sale of machinery (net)	-	-	-	-	15
Total incremental cash flows Present value factor	(750)	364.2	416.4	453.6	562.2
	1.00	0.877	0.769	0.674	0.592
Present value of cash flows	(750)	319.40	320.21	305.73	332.82
Net present value	528.16				

Advice: Since the net present value of cash flows is ₹ 528.16 lakh 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. Sale of machinery - Net income after deducting removal expenses taken. Tax on Capital gains is ignored.
5. Saving in contract payment and income tax thereon is considered in the cash flows.

Problem 16: Xavly Ltd. has a machine which has been in operation for 3 years. The machine has a remaining estimated useful life of 5 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	8 years	5 years
Salvage value	Nil	₹ 40,000
Annual output	30,000 units	75,000 units
Selling price per unit	₹ 15	₹ 15
Annual operating hours	3,000	3,000
Material cost per unit	₹ 4	₹ 4
Labour cost per hour	₹ 40	₹ 70
Indirect cash cost per annum	₹ 50,000	₹ 65,000

The company uses written down value of depreciation @ 20% and it has several other machines in the block of assets. The Income tax rate is 30 per cent and Xavly Ltd. does not make any investment, if it yields less than 12 per cent.

ADVISE Xavly Ltd. whether the existing machine should be replaced or not.

PV factors @12%:

Year	1	2	3	4	5
PVF	0.893	0.797	0.712	0.636	0.567

Solution:

(i) Calculation of Net Initial Cash Outflows:

	₹
Cost of new machine	10,00,000
Less: Sale proceeds of existing machine	2,00,000
Net initial cash outflows	**8,00,000**

(ii) Calculation of Base for depreciation

Particulars		₹
WDV of Existing Machine		
Cost of existing machine		3,30,000
Less: Depreciation for year 1	66,000	
Depreciation for Year 2	52,800	
Depreciation for Year 3	42,240	1,61,040
WDV of Existing Machine (i)		**1,68,960**
Depreciation base of New Machine		
Cost of new machine		10,00,000
Add: WDV of existing machine		1,68,960
Less: Sales value of existing machine		2,00,000
Depreciation base of New Machine (ii)		**9,68,960**
Base for incremental depreciation [(ii) – (i)]		**8,00,000**

(iii) Calculation of annual Profit Before Tax and depreciation

Particulars	Existing machine	New Machine	Differential
(1)	(2)	(3)	(4)=(3)–(2)
Annual output	30,000 units	75,000 units	45,000 units
	₹	₹	₹
(A) Sales revenue @ ₹ 15 per unit	4,50,000	11,25,000	6,75,000
(B) Less: Cost of Operation			
Material @ ₹ 4 per unit	1,20,000	3,00,000	1,80,000
Labour			
Old = 3,000 x ₹ 40	1,20,000		90,000
New = 3,000 x ₹ 70		2,10,000	
Indirect cash cost	50,000	65,000	15,000
Total Cost (B)	2,90,000	5,75,000	2,85,000
Profit Before Tax and depreciation (PBTD) (A – B)	**1,60,000**	**5,50,000**	**3,90,000**

(iv) Calculation of Incremental Net Present Value:

Year	PBTD	Dep. @ 20%	PBT	Tax @ 30%	Net cash flow	PVF @ 12%	PV
(1)	(2)	(3)	(4=2-3)	(5)	(6=4-5+3)	(7)	(8=6 x 7)
1	3,90,000	1,60,000	2,30,000	69,000.00	3,21,000.00	0.893	2,86,653.00
2	3,90,000	1,28,000	2,62,000	78,600.00	3,11,400.00	0.797	2,48,185.80
3	3,90,000	1,02,400	2,87,600	86,280.00	3,03,720.00	0.712	2,16,248.64
4	3,90,000	81,920	3,08,080	92,424.00	2,97,576.00	0.636	1,89,258.34
5	3,90,000	65,536	3,24,464	97,339.20	2,92,660.80	0.567	1,65,938.67
							11,06,284.45
Add: PV of Salvage Value of new machine (₹ 40,000 x 0.567)							**22,680.00**
Less: Initial Cash Outflow							**8,00,000.00**
NPV							**3,28,964.45**

Advice: Since the incremental NPV is positive, existing machine should be replaced.

Problem 17: Manoranjan Ltd is a News broadcasting channel having its broadcasting Centre in Mumbai. There are total 200 employees in the organisation including top management. As a part of employee benefit expenses, the company serves tea or coffee to its employees, which is outsourced from a third-party. The company offers tea or coffee three times a day to each of its employees. 120 employees prefer tea all three times, 40 employees prefer coffee all three times and remaining prefer tea only once in a day. The third-party charges ₹ 10 for each cup of tea and ₹ 15 for each cup of coffee. The company works for 200 days in a year.

Looking at the substantial amount of expenditure on tea and coffee, the finance department has proposed to the management an installation of a master tea and coffee vending machine which will cost ₹ 10,00,000 with a useful life of five years. Upon purchasing the machine, the company will have to enter into an annual maintenance contract with the vendor, which will require a payment of ₹ 75,000 every year. The machine would require electricity consumption of 500 units p.m. and current incremental cost of electricity for the company is ₹ 12 per unit. Apart from these running costs, the company will have to incur the following consumables expenditure also:

1. Packets of Coffee beans at a cost of ₹ 90 per packet.
2. Packet of tea powder at a cost of ₹ 70 per packet.
3. Sugar at a cost of ₹ 50 per Kg.
4. Milk at a cost of ₹ 50 per litre.
5. Paper cup at a cost of 20 paise per cup

Each packet of coffee beans would produce 200 cups of coffee and same goes for tea powder packet. Each cup of tea or coffee would consist of 10g of sugar on an average and 100 ml of milk.

The company anticipate that due to ready availability of tea and coffee through vending machines its employees would end up consuming more tea and coffee.

It estimates that the consumption will increase by on an average 20% for all class of employees. Also, the paper cups consumption will be 10% more than the actual cups served due to leakages in them.

The company is in the 25% tax bracket and has a current cost of capital at 12% per annum. Straight line method of depreciation is allowed for the purpose of taxation. You as a financial consultant is required to ADVISE on the feasibility of acquiring the vending machine.

PV factors @ 12%:

Year	1	2	3	4	5
PVF	0.8929	0.7972	0.7118	0.6355	0.5674

Solution:

(A) Computation of CFAT (Year 1 to 5)

Particulars		Amount (₹)
(a) Savings in existing Tea & Coffee charges	(120 × 10 ×3) + (40 ×15 × 3) + (40 ×10 × 1) x 200 days	11,60,000
(b) AMC of machine		(75,000)
(c) Electricity charges	500 ×12 ×12	(72,000)
(d) Coffee Beans	(W.N.) 144 × 90	(12,960)
(e) Tea Powder	(W.N.) 480 × 70	(33,600)
(f) Sugar	(W.N.) 1248 × 50	(62,400)
(g) Milk	(W.N.) 12480 × 50	(6,24,000)
(h) Paper Cup	(W.N.) 1,37,280 × 0.2	(27,456)
(i) Depreciation	10,00,000/5	(2,00,000)
Profit before Tax		**52,584**
(-) Tax @ 25%		**(13,146)**
Profit after Tax		**39,438**
Depreciation		**2,00,000**
CFAT		**2,39,438**

(B) Computation of NPV

Year	Particulars	CF	PVF @ 12%	PV
0	Cost of machine	(10,00,00)	1	(10,00,000)
1-5	CFAT	2,39,438	3.6048	8,63,126
Net Present Value				**(1,36,874)**

Since NPV of the machine is negative, it should not be purchased.

Working Note:

Computation of Qty of consumable

No. of Tea Cups = [(120 × 3 × 200 days) + (40 × 1 × 200 days) × 1.2 = 96,000

No. of Coffee cups = 40 × 3 × 200 days × 1.2 = 28,800

$$\text{No. of coffee beans packet} = \frac{28,800}{200} = 144$$

$$\text{No. of Tea Powder Packets} = \frac{96,000}{200} = 480$$

$$\text{Qty of Sugar} = \frac{(96,000+28,800)\ 6,000}{1,000\ g} = 1248 \text{ kgs}$$

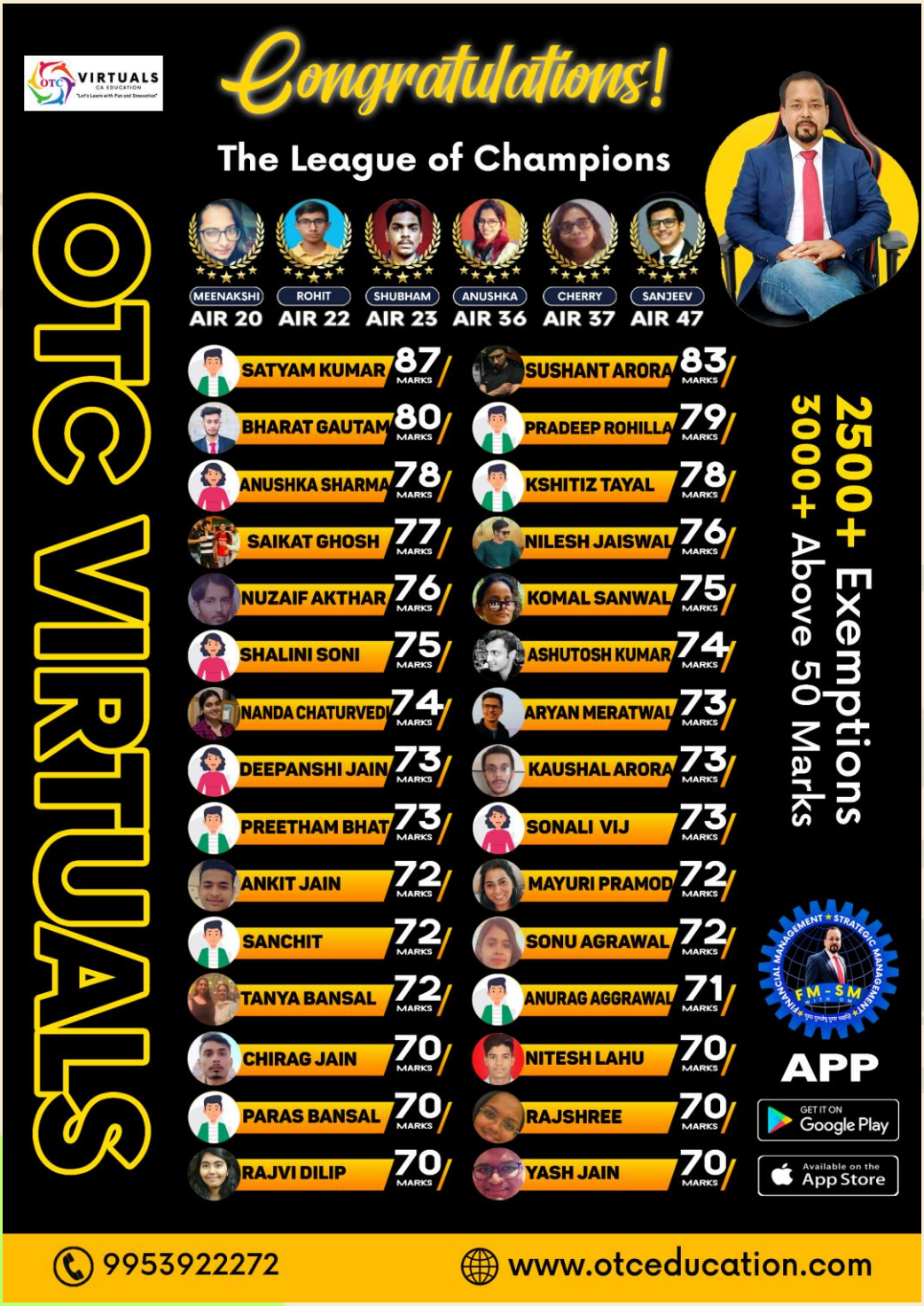
$$\text{Qty of Milk} = \frac{(96,000+28,000)\ 6,000}{1,000\ ml} = 12,480 \text{ liters}$$

No. of paper cups = (96,000 + 28,800) × 1.1 = **1,37,280**

7 CHAPTER

Dividend Decisions

List of Important Questions



7 CHAPTER

Dividend Decisions

List of Important Questions

Problem 1: In December, 2011 AB Co.'s share was sold for ₹ 146 per share. A long term earnings growth rate of 7.5% is anticipated. AB Co. is expected to pay dividend of ₹ 3.36 per share.

Required:

(i) What rate of return an investor can expect to earn assuming that dividends are expected to grow along with earnings at 7.5% per year in perpetuity?

(ii) It is expected that AB Co. will earn about 10% on book Equity and shall retain 60% of earnings. In this case, whether, there would be any change in growth rate and cost of Equity?

Solution:

(i) According to Dividend Discount Model approach the firm's expected or required return on equity is computed as follows:

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

Where,

Ke = Cost of equity share capital

D_1 = Expected dividend at the end of year 1

P_0 = Current market price of the share.

g = Expected growth rate of dividend.

Therefore, $K_e = \frac{3.36}{146} + 7.5\% = 0.0230 + 0.075 = 0.098$

Or, $K_e = 9.80\%$

(ii) With rate of return on retained earnings (r) 10% and retention ratio (b) 60%, new growth rate will be as follows:

$$g = br \text{ i.e. } = 0.10 \times 0.60 = 0.06$$

Accordingly dividend will also get changed and to calculate this, first we shall calculate previous retention ratio (b_1) and then EPS assuming that rate of return on retained earnings (r) is same.

With previous Growth Rate of 7.5% and r =10% the retention ratio comes out to be:

$$0.075 = b_1 \times 0.10$$

$$b_1 = 0.75 \text{ and payout ratio} = 0.25$$

With 0.25 payout ratio the EPS will be as follows:

$$\frac{3.36}{0.25} = 13.44$$

With new 0.40 (1 – 0.60) payout ratio the new dividend will be $D_1 = 13.44 \times 0.40 = 5.376$

Accordingly new K_e will be

$$K_e = \frac{5.376}{146} + 6.0\%$$

or, $K_e = 9.68\%$

Problem 2: Valuation based on dividend

The following information are available for XYZ CO.

- No of shares outstanding is 1 lakh
- EPS is ₹ 4
- DPS is ₹ 2.4
- Equity capitalization rate : 12%
- Rate of return on investment : 15%

(i) As per Walter's model, what will be Market value per Share ?

(ii) To keep Share price at ₹ 40, what should be payout ratio ?

(iii) As per Walter's model, what is optimum payout ratio?

(iv) Market Value at that payout ratio?

Solution:

(i) According to Walter's model,

$$P = \frac{D + (E - D)\left(\frac{r}{Ke}\right)}{Ke}$$

$$= \frac{\left[2.4 + (4 - 2.4) \times \left(\frac{0.15}{0.12}\right)\right]}{0.12} = \frac{4.4}{0.12} = ₹\ 36.67$$

(ii) Let Payout ratio is x

Then, $$40 = \frac{\left\{4X + (4 - 4X) \times \left(\frac{0.15}{0.12}\right)\right\}}{0.12}$$

Or $$4.8 = 4X + 5 - 5X$$

Or $$X = 0.2$$

Thus, required Payout ratio is 20%.

(iii) According to Walter's model, when return on investment is more than the cost of equity price of share increases as dividend pay out ratio decreases. Hence, optimum pay out ratio in the present case should be nil.

(iv) At nil payout ratio, $P = \frac{\left(4 \times \frac{0.15}{0.12}\right)}{0.12} = ₹\ 41.66$

Problem 3: The following figures are collected from the annual report of XYZ Ltd.:

Particulars	Amount (₹)
Net Profit	30 lakhs
Outstanding 12% preference shares	100 lakhs
No. of equity shares	3 lakhs
Return on Investment	20%

What should be the approximate dividend pay-out ratio so as to keep the share price at ₹ 42 by using Walter model?

Solution:

Particulars	₹ in lakhs
Net Profit	30
Less: Preference dividend	12
Earning for equity shareholders	18
Therefore earning per share	$\frac{₹\ 18\ lakhs}{3\ lakhs} = ₹\ 6.00$

Cost of capital i.e. (k_e) **(Assumed) 16%***

Let, the dividend payout ratio be X and so the share price will be:

$$P = \frac{D}{K_e} + \frac{\frac{r(E-D)}{K_e}}{K_e}$$

Here D = 6X; E = ₹ 6; r = 0.20 and K_e = 0.16 and P = ₹ 42

Hence $₹\ 42 = \frac{6X}{0.16} + \frac{0.2\ (6 - 6X)}{0.16 \times 0.16}$

Or, $₹\ 42 = 37.50X + 46.875\ (1 - X)$

$9.375X = 4.875$

$X = 0.52$

So, the required dividend payout ratio will be = 52%

*Students can assume any percentage other than 16%.

Problem 4: The earnings per share of a company is ₹ 10 and the rate of capitalisation applicable to it is 10 per cent. The company has three options of paying dividend i.e. (i) 50%,(ii) 75% and (iii) 100%. Calculate the market price of the share as per Walter's model if it can earn a return of (a) 15, (b) 10 and (c) 5 per cent on its retained earnings.

Solution:

$$P = \frac{D + \frac{r}{k_e}(E - D)}{k_e}$$

Where

P = Price of Share

R = Rate of Earning

K_e = Rate of Capitalisation or Cost of Equity

	(i) DP ratio 50%	(ii) DP ratio 75%	(iii) DP ratio 100%
(a) Price of Share if r =15%	$\frac{5 + \left(\frac{0.15}{0.10}\right)(10 - 5)}{0.10}$ $= \frac{12.5}{0.10} = ₹\ 125$	$\frac{7.5 + \left(\frac{0.15}{0.10}\right)(10 - 7.5)}{0.10}$ $= \frac{11.25}{0.10} = ₹\ 112.5$	$\frac{10 + \left(\frac{0.15}{0.10}\right)(10 - 10)}{0.10}$ $= \frac{10}{0.10} = ₹\ 100$

(b) Price of Share if r = 10%	$\frac{5+\left(\frac{0.10}{0.10}\right)(10-5)}{0.10}$ $=\frac{10}{0.10}=₹\ 100$	$\frac{7.5+\left(\frac{0.10}{0.10}\right)(10-7.5)}{0.10}$ $=\frac{10}{0.1}=₹\ 100$	$\frac{10+\left(\frac{0.10}{0.10}\right)(10-10)}{0.10}$ $=\frac{10}{0.1}=₹\ 100$
(c) Price of Share if r = 5%	$\frac{5+\left(\frac{0.05}{0.10}\right)(10-5)}{0.10}$ $=\frac{7.5}{0.10}=₹\ 75$	$\frac{7.5+\left(\frac{0.05}{0.10}\right)(10-7.5)}{0.10}$ $=\frac{8.75}{0.10}=₹\ 87.5$	$\frac{10+\left(\frac{0.05}{0.10}\right)(10-10)}{0.10}$ $=\frac{10}{0.1}=₹\ 100$

Problem 5: Following are details regarding three companies A Ltd., B Ltd. and C Ltd.:

Details	A Ltd.	B Ltd.	C Ltd.
Internal Rate of Return (r)	15%	5%	10%
Cost of Equity Capital (Ke)	10%	10%	10%
Earning Per Share (EPS)	₹ 8	₹ 8	₹ 8

Calculate the value or price of an equity share of each of these companies applying Walter's formulae when (D/P ratio) is (i) 25% (ii) 50% and (iii) 75% What conclusions do you draw?

Solution:

DP Ratio / Company	25%	50%	75%
	As per walter: $Po=\frac{DPS}{K_e}+\frac{\frac{r}{K_e}(EPS-DPS)}{K_e}$		
A Ltd.	$Po=\frac{2}{0.10}+\frac{\frac{0.15}{0.10}(8-2)}{0.10}$ $=₹\ 110$	$Po=\frac{4}{0.10}+\frac{\frac{0.15}{0.10}(8-4)}{0.10}$ $=₹\ 100$	$Po=\frac{6}{0.10}+\frac{\frac{0.15}{0.10}(8-6)}{0.10}$ $=₹\ 90$
B Ltd.	$Po=\frac{2}{0.10}+\frac{\frac{0.05}{0.10}(8-2)}{0.10}=₹\ 50$	$Po=\frac{4}{0.10}+\frac{\frac{0.05}{0.10}(8-4)}{0.10}=₹\ 60$	$Po=\frac{6}{0.10}+\frac{\frac{0.05}{0.10}(8-6)}{0.10}=₹\ 70$
C Ltd.	$Po=\frac{2}{0.10}+\frac{\frac{0.10}{0.10}(8-2)}{0.10}=₹\ 80$	$Po=\frac{4}{0.10}+\frac{\frac{0.10}{0.10}(8-4)}{0.10}=₹\ 80$	$Po=\frac{6}{0.10}+\frac{\frac{0.10}{0.10}(8-6)}{0.10}=₹80$

Conclusion

	r	Ke	Nature	25%	50%	75%
A	15%	10%	Growth	110	100	90
B	5%	10%	Decline	50	60	70
C	10%	10%	Normal	80	80	80

Problem 6: Zumo & Co. is a watch manufacturing company and is all equity financed and has paid up capital ₹10,00,000 (₹10 per shares)

The other data related to the company is as follows:

Year	EPS (₹)	Net Dividend per share (₹)	Share Price (₹)
2004	4.20	1.70	25.20
2005	4.60	1.80	18.40
2006	5.10	2.00	25.50
2007	5.50	2.20	27.50
2008	6.20	2.50	37.20

Zumo & Co. has hired one management consultant, Vidal Consultants to analyze the future earnings and other related item for the forthcoming years.

As per Vidal Consultants's report

(1) The earnings and dividend will grow at 25% for the next two years.
(2) Earnings are likely at rate of 10% from 3rd year and onwards.
(3) Further if there is reduction in earnings growth occurs dividend payout ratio will increase to 50%

Assuming the tax rate as 33% (not expected to change in the foreseeable future) calculate the estimated share price and P/E Ratio which analysts now expect for Zumo & Co., using the dividend valuation model.

You may further assume that post tax cost of capital is 18%.

Solution:

(a) The formula for the Dividend valuation Model is

$$P_0 = \frac{D_1}{K_e - g}$$ where, K_e = Cost of Capital, g = Growth rate, D_1 = Dividend at the end of year 1

On the basis of the information given, the following projection can be made:

Year	DPS (₹)	PVF @18%	PV of DPS (₹)
2009	3.13	0.847	2.65
2010	3.91	0.718	2.81
2011	5.33*	0.609	3.25
			8.71

* Payout Ratio changed to 50%.

After 2011, the perpetuity value assuming 10% constant annual growth, is:

$$D_1 = ₹\ 5.33 \times 110\% = ₹\ 5.863$$

Therefore P_0 from the end of 2011

$$\frac{₹\ 5.863}{0.18 - 0.10} = ₹73.29$$

This must be discounted back to the present value, using the 3 year discount factor after 18%.

	₹
Present Value of P_0 (₹ 73.29 × 0.609)	44.63
Add: Dividends 2009 to 2011	8.71
Expected Market Price of Share	53.34

(b) P/E Ratio

$$\text{PE Ratio} = \frac{\text{Expected Market Price of Share } (P_1)}{\text{Earning Per Share}}$$

$$= \frac{₹\ 53.34}{₹\ 6.20} = 8.60$$

Problem 7: The MNC Ltd.'s available information is:

Ke = 15%; EPS = ₹ 30; Productivity of Retained Earnings (r) = (i) 14%; (ii) 15% and (iii) 16%

You are required to calculate market price of a share of the MNC Ltd., as per Gordon Model if:

(i) b = 40 % (ii) b = 60% and (iii) b = 80%

What conclusion can you draw?

Solution:

As per growth model-

$$P_0 = \left[\frac{\text{EPS}\ (1 - b)}{\text{Ke} - b \times r}\right]$$

(i) r = 14%

b = 40%

$$P_0 = \frac{30(1 - 0.40)}{0.15 - 0.40 \times 0.14} = \mathbf{191.4}$$

b = 60%

$$P_0 = \frac{30(1 - 0.60)}{0.15 - 0.60 \times 0.14} = 181.81$$

b = 80%

$$P_0 = \frac{30(1 - 0.80)}{0.15 - 0.80 \times 0.14} = 157.89$$

(ii) r = 15%

b = 40%

$$P_0 = \frac{30(1 - 0.40)}{0.15 - 0.40 \times 0.15} = ₹\ 200$$

b = 60%

$$P_0 = \frac{30(1 - 0.60)}{0.15 - 0.60 \times 0.15} = ₹\ 200$$

b = 80%

$$P_0 = \frac{30(1 - 0.80)}{0.15 - 0.80 \times 0.15} = ₹\ 200$$

(iii) r = 16%

b = 40%

$$P_0 = \frac{30(1 - 0.40)}{0.15 - 0.40 \times 0.16} = 209.30$$

b = 60%

$$P_0 = \frac{30(1 - 0.60)}{0.15 - 0.60 \times 0.16} = 222.22$$

b = 80%

$$P_0 = \frac{30(1 - 0.80)}{0.15 - 0.80 \times 0.16} = 272.72$$

Conclusion

Case	r	Ke	Nature	40%	60%	80%
(i)	14%	15%	Decline	**191.49**	181.82	157.80
(ii)	15%	15%	Normal	200	200	200
(iii)	16%	15%	Growth	209.30	222.22	**272.72**

Problem 7: X Ltd., has 8 lakhs equity shares outstanding at the beginning of the year 2003. The current market price per share is ₹ 120. The Board of Directors of the company is contemplating ₹ 6.4 per share as dividend. The rate of capitalisation, appropriate to the risk-class to which the company belongs, is 9.6%:

(i) Based on M-M Approach, calculate the market price of the share of the company, when the dividend is – (a) declared; and (b) not declared.

(ii) How many new shares are to be issued by the company, if the company desires to fund an investment budget of ₹ 3.20 crores by the end of the year assuming net income for the year will be ₹ 1.60 crores?

Solution: Modigliani and Miller (M-M) – Dividend Irrelevancy Model:

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

Where,

P_0 = Existing market price per share i.e. ₹ 120

P_0 = Market price of share at the year-end (to be determined)

D_1 = Contemplated dividend per share i.e. ₹ 6.4

K_e = Capitalisation rate i.e. 9.6%.

(i) (a) Calculation of share price when dividend is declared:

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$120 = \frac{P_1 + 6.4}{1 + 0.096}$$

$$120 \times 1.096 = P_1 + 6.4$$

$$P_1 = 120 \times 1.096 - 6.4$$

$$= 125.12$$

(b) Calculation of share price when dividend is not declared:

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$120 = \frac{P_1 + 0}{1 + 0.096}$$

$$120 \times 1.096 = P_1 + 0$$

$$P_1 = 131.52$$

(ii) Calculation of No. of shares to be issued:

(₹ in lakhs)

Particulars	If dividend declared	If dividend not declared
Net Income	160.00	160.00
Less: Dividend paid	51.20	—
Retained earnings	108.80	160.00
Investment budget	320.00	320.00
Amount to be raised by issue of new shares (i)	211.20	160.00
Market price per share (ii)	125.12	131.52
No. of new shares to be issued (ii)	1,68,797.95	1,21,654.50
Or say	1,68,798.00	1,21,655.00

Problem 8: RST Ltd. has a capital of ₹ 10,00,000 in equity shares of ₹ 100 each. The shares are currently quoted at par. The company proposes to declare a dividend of ₹ 10 per share at the end of the current financial year. The capitalization rate for the risk class of which the company belongs is 12%. What will be the market price of the share at the end of the year, if

(i) a dividend is not declared ?

(ii) a dividend is declared ?

(iii) assuming that the company pays the dividend and has net profits of ₹ 5,00,000 and makes new investments of ₹ 10,00,000 during the period, how many new shares must be issued? Use the MM model.

Solution: As per MM model, the current market price of equity share is:

$$P_0 = \frac{1}{1 + k_e} \times (D_1 + P_1)$$

(i) If the dividend is not declared:

$$100 = \frac{1}{1 + 0.12}(0 + P_1)$$

$$100 = \frac{P_1}{1.12}$$

$$P_1 = ₹\ 112$$

The Market price of the equity share at the end of the year would be ₹ 112.

(ii) If the dividend is declared:

$$100 = \frac{1}{1 + 0.12}(10 + P_1)$$

$$100 = \frac{P_1}{1.12}$$

$$P_1 = ₹\ 112$$

The Market price of the equity share at the end of the year would be ₹ 112.

(ii) If the dividend is declared:

$$100 = \frac{1}{1 + 0.12}(10 + P_1)$$

$$100 = \frac{10 + P_1}{1.12}$$

The market price of the equity share at the end of the year would be ₹ 102.

(iii) In case the firm pays dividend of ₹ 10 per share out of total profits of ₹ 5,00,000 and plans to make new investment of ₹ 10,00,000, the number of shares to be issued may be found as follows:

Total Earnings	₹ 5,00,000
- Dividends paid	1,00,000
Retained earnings	4,00,000
Total funds required	10,00,000
Fresh funds to be raised	6,00,000
Market price of the share	102

Number of shares to be issued $\left(\frac{₹\ 6,00,000}{102}\right) = 5,882.35$

or, the firm would issue 5,883 shares at the rate of ₹ 102

Problem 9:

The following information pertains to M/s XY Ltd.

Earnings of the Company	₹ 5,00,000
Dividend Payout ratio	60%
No. of shares outstanding	1,00,000
Equity capitalization rate	12%
Rate of return on investment	15%

CALCULATE:

1. Market value per share as per Walter's model.
2. Optimum dividend payout ratio according to Walter's model and the market value of Company's share at that payout ratio.

Solution:

i. As per Walter's model:

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e}$$

Where,

P = Market price per share.

E = Earnings per share = ₹ 5

D = Dividend per share = ₹ 3

R = Return earned on investment = 15%

K_e = Cost of equity capital = 12%

$$P = \frac{3 + \frac{0.15}{0.12}(5 - 3)}{0.12} = ₹ 45.83$$

$$P = \frac{3 + \frac{0.15}{0.12}(5 - 0)}{0.12} = ₹ 52.08$$

ii. According to Walter's model, when the return on investment is more than the cost of equity capital, the price per share increases as the dividend pay-out ratio decreases. Hence, the optimum dividend pay-out ratio in this case is nil. So, at a pay-out ratio of zero, the market value of the company's share will be:

Problem 10:

Aakash Ltd. has 10 lakh equity shares outstanding at the start of the accounting year. The existing market price per share is ₹ 150. Expected dividend is ₹ 8 per share. The rate of capitalization appropriate to the risk class to which the company belongs is 10%.

i. CALCULATE the market price per share when expected dividends are: (a) declared, and (b) not declared, based on the Miller – Modigliani approach.

ii. CALCULATE number of shares to be issued by the company at the end of the accounting year on the assumption that the net income for the year is ₹ 3 crore, investment budget is ₹ 6 crores, when (a) Dividends are declared, and (b) Dividends are not declared.

iii. PROOF that the market value of the shares at the end of the accounting year will remain unchanged irrespective of whether (a) Dividends are declared, or (ii) Dividends are not declared.

Solution:

i. Calculation of market price per share

According to Miller – Modigliani (MM) Approach:

$$P_0 = \frac{D_1 + D_1}{1 + K_e}$$

Where,

Existing market price (P0) = ₹ 150

Expected dividend per share (D1) = ₹ 8

Capitalization rate (ke) = 0.10

Market price at year end (P1) = to be determined

(a) If expected dividends are declared, then

$$₹ 150 = \frac{P_1 + 8}{1 + 0.10}$$

∴ P1 = ₹ 157

(b) If expected dividends are not declared, then

$$₹ 150 = \frac{P_1 + 0}{1 + 0.10}$$

∴ P1 = ₹ 165

ii. Calculation of number of shares to be issued

	(a) Dividends are declared (₹ lakh)	(b) Dividends are not Declared (₹ lakh)
Net income	300	300
Total dividends	(80)	-
Retained earnings	220	300
Investment budget	600	600
Amount to be raised by new issues	380	300
Relevant market price (₹ per share)	157	165
No. of new shares to be issued (in lakh)(₹ 380 ÷ 157; ₹ 300 ÷ 165)	2.42	1.82

iii. Calculation of market value of the shares

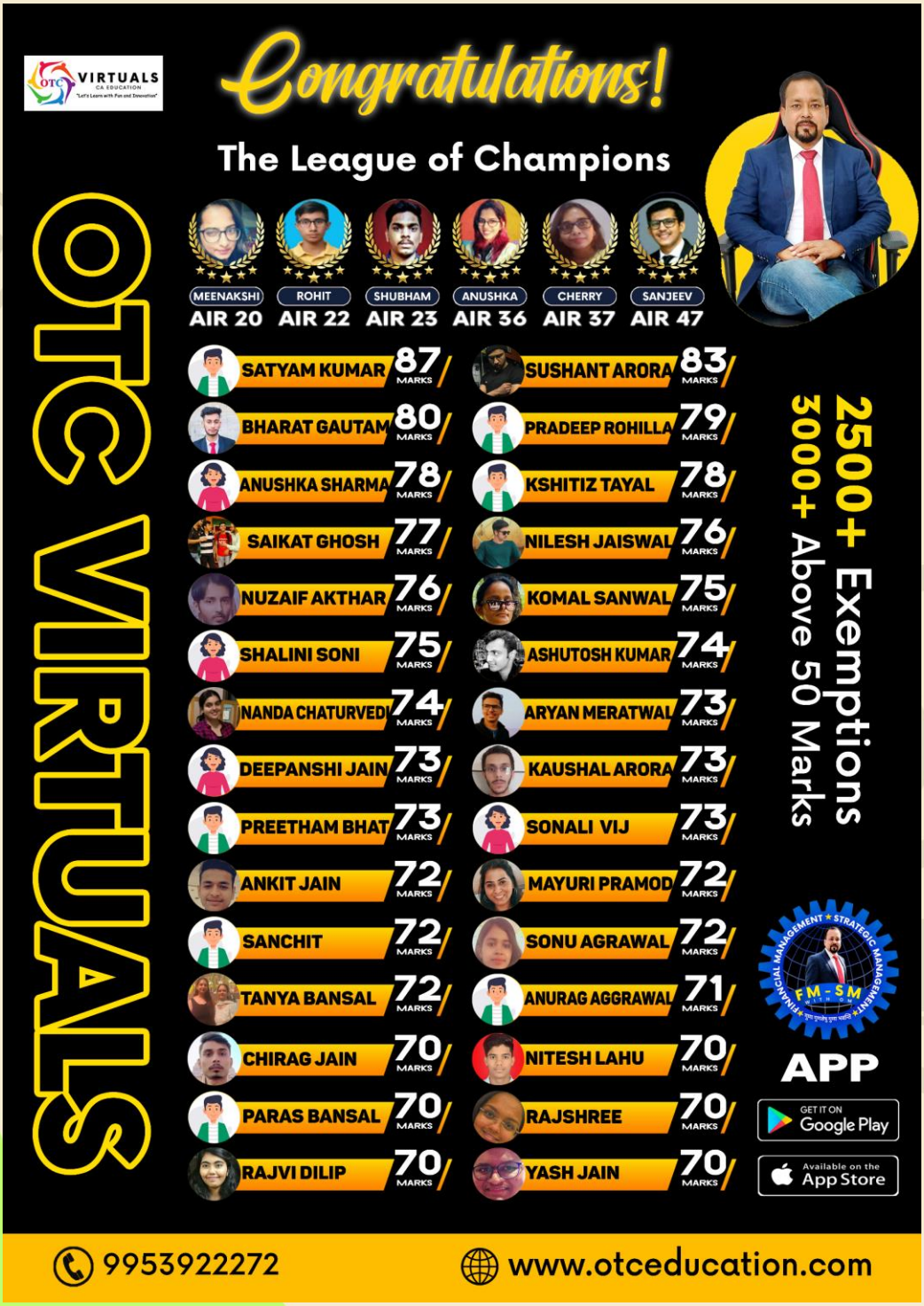
	(a) Dividends are declared	(b) Dividends are not Declared
Existing shares (in lakhs)	10.00	10.00
New shares (in lakhs)	2.42	1.82
Total shares (in lakhs)	12.42	11.82
Market price per share (₹)	157	165
Total market value of shares at the end of the year (₹ in lakh)	**12.42 × 157 = 1,950 (approx.)**	**11.82 × 165 = 1,950 (approx.)**

Hence, it is proved that the total market value of shares remains unchanged irrespective of whether dividends are declared, or not declared.

8 CHAPTER

Working Capital Management

List of Important Questions



8 CHAPTER

Working Capital Management

UNIT 1: Management of Working Capital

List of Important Questions

Problem 1: AB Ltd. provides the following particulars relating to its working:

	Amount in ₹ (Per unit)
Cost/Profit per unit:	
Raw material cost	84
Direct labour cost	36
Overheads (All variable)	36
Total cost	156
Profit	44
Selling price	200
(i) Average amount of back up stock:	
Raw material	1 month
Work-in-progress (50% complete)	½ month
Finished goods	1 month
(ii) Average allowed by suppliers	1 month
(iii) Credit allowed to customers	2 months
(iv) Average time lag in the payment of:	
Wages	½ month
Overhead expenses	1-½ months
(v) d cash in hand and at bank ₹ 3,00,000.	
(vi) 25% of the output is sold for cash.	

For an expected sale of 1,00,000 units, work out the working capital requirement assuming that production is carried on evenly throughout the year and wages and overheads accrue similarly.

Solution:

Statement of Working Capital requirement

	Amount (₹)	Amount (₹)
I. Current Assets:		
Cash		3,00,000
Raw material (1,00,000 × 84) ÷ 24		7,00,000
Work in progress:		
Raw material (1,00,000 × 84) ÷ 24	3,50,000	
Labour [(1,00,000 × 36) ÷ 24)] 50%	75,000	
Overhead [(1,00,000 × 36) ÷ 24)] 50%	75,000	5,00,000
Finished goods (1,00,000 × 156) ÷ 12		13,00,000
Debtors (1,00,000 × 75% × 156) ÷ 6		19,50,000
Total current assets (CA)		47,50,000
II. Current liabilities:		
Creditors (1,00,000 × 84) ÷ 12		7,00,000
O/S Wages (1,00,000 × 36) ÷ 24		1,50,000
O/S Overheads (1,00,000 × 36) ÷ 12] × 1.5		4,50,000
Total current liabilities (CL)		13,00,000
Net working capital requirement (CA-CL)		34,50,000

Problem 2: Prepare an estimate of net working capital requirement for the CNP Ltd. adding 1096 for contingencies form the information given below:

Estimated cost per unit of production ₹ 170, includes raw materials ₹ 80, direct labour ₹ 30 and overheads (exclusive of depreciation) ₹60. Selling price is ₹ 200 per unit.

Level of activity per annum 1,04,000 units. Raw material in stock: average 4 weeks; work-in-progress (assume 50% completion stage): average 2 weeks; finished goods in stock; average 4 weeks; credit allowed by suppliers; average 4 weeks; credit allowed to debtors: average 8 weeks; lag in payment of wage: average 1.5 weeks, and cash at bank is expected to be ₹ 25000.

Required

You may assume that production is carried on evenly throughout the year (52 weeks) and wages and overheads accrue similarly. All sales are on credit basis only. You may state your assumptions, if any.

Solution:

Working Notes:

Particulars			Amount (₹)
1. Raw material stock	4 weeks	1,04,000 units × ₹ 80 × 4/52	6,40,000
2. Work-in-progress –	2 weeks (50% completion stage)		
Raw materials		(1,04,000 × ₹ 80 × 2/52)	3,20,000
Direct Labour		(1,04,000 × ₹ 15 × 2/52)	60,000
Overheads	(50% of ₹ 60)	(1,04,000 × ₹ 30 × 2/52)	1,20,000
		Total	5,00,000
3. Finished stock	4 weeks	1,04,000 units × ₹ 170 × 4/52	13,60,000
4. Debtors	8 weeks	1,04,000 units × ₹ 200 × 8/52	32,00,000
5. Creditors for raw materials	4 weeks	1,04,000 units × ₹ 80 × 4/52	6,40,000
4. Creditors for wages	1.5 weeks	1,04,000 units × ₹ 30 × 1.5/52	90,000

Estimation of Net Working Capital requirement

Particulars		Amount (₹)
Current Assets		
Inventory		
Raw material		6,40,000
Work-in-progress		5,00,000
Finished goods		13,60,000
Sundry Debtors		32,00,000
Cash at Bank		25,000
	(A)	57,25,000
Current Liabilities		
Creditors for Raw Materials		6,40,000
Creditors for wages		90,000

	(B)	7,30,000
Net Working Capital	(A) – (B)	49,95,000
Add: 10% Contingencies		4,99,000
Total Working Capital requirement		54,94,500

Assumption: Debtors balance is calculated based on selling price not on cost price.

Problem 3: A company newly commencing business in 1991 has the under mentioned projected Profit & Loss A/c:-

	₹	₹
Sales		42,00,000
Cost of goods sold		30,60,000
Gross profit		11,40,000
Administrative expenses	2,80,000	
Selling expenses	2,60,000	5,40,000
Profit before tax		6,00,000
Provision for taxation		2,00,000
		4,00,000
Profit after tax		
The cost of goods sold has been arrived at as under:-		
Material used	16,80,000	
Wages and manufacturing expenses	12,50,000	
Depreciation	4,70,000	34,00,000
Less: Stock of finished goods (10% of goods produced not yet sold)		3,40,000
		30,60,000

The figures given above relate only to finished goods and not to work-in progress. Goods equal to 15% of the year's production (in terms of physical units) will be in process on the average requiring full materials but only 40% of the other expenses. The company believes in keeping material equal to two months consumption in stock.

All expenses will be paid one month in arrear; Suppliers of material will extend $1\frac{1}{2}$ month's credit; Sales will be 20% for cash and the rest at two months' credit; 90% of the income-tax with be paid in advance in quarterly installments. The company wishes to keep ₹ 1,00,000 in cash.

Prepare an estimate of the requirement of

(i) working capital and

(ii) cash cost of working capital.

Solution:

Working Notes:

(i) Work-in-progress

Particulars		Amount (₹)
Raw material	(15% of 16,80,000)	2,52,000
Wages and manufacturing expenses	(15% of 12,50,000) × 40%	75,000
Depreciation	(15% of 4,70,000) × 40%	28,200
		3,55,200

(ii) Raw Material Stock (1/6th of Material consumption)

Particulars	Amount (₹)
Finished goods	16,80,000
Work - in - progress	2,52,000
	19,32,000
1/6th of ₹ 19,32,000	3,22,000

(iii) Sundry Debtors

80% of two months sales = 42,00,000 × 80/100 × 2/12 = ₹ 5,60,000

(iv) Creditors for raw material

$\left(1\frac{1}{2}\text{ month of total purchase of raw material for the year}\right)$

Particulars	Amount (₹)
Finished goods	16,80,000
Work - in - progress	2,52,000
Raw material stock	3,22,000
	22,54,000

(v) Creditors for Wages and Manufacturing expenses) (1 month arrear)

Particulars	Amount (₹)
For cost of goods sold	12,50,000
For work - in - progress	75,000
	13,25,000

= 13,25,000 × 1/12 = ₹ 1,10,416

(v) Creditors for administrative and selling expenses = 5,40,000 × $\frac{1}{12}$ = ₹ 45,000

1. Estimate of requirement of Working Capital

Particulars	Amount (₹)	Amount (₹)
Current Assets		
1. Finished Stock		
Raw Materials	1,68,000	
Wages & Manufacturing expenses	1,25,000	
Depreciation	47,000	3,40,000
2. Work - in - progress		
Raw materials	2,52,000	
Wages & Manufacturing expenses	75,000	
Depreciation	28,200	3,55,200
3. Raw Material Stock		3,22,000
4. Sundry Debtors:		
Material	2,01,600	
Wages & Manufacturing expenses	1,50,000	
Depreciation	56,400	
Administrative & Selling expenses	72,000	
Profit	80,000	5,60,000

	Profit	80,000	5,60,000
5.	Cash in hand		1,00,000
	Total		16,77,000
***Less:* Current Liabilities**			
	Creditors for Purchases	2,81,750	
	Wages & Manufacturing expenses	1,10,416	
	Administrative & Selling expenses	45,000	
	Provision for Taxation	20,000	4,57,166
	Working Capital requirement		12,20,034

2. Estimate of requirement of Cash Cost of Working Capital

Particulars	Amount (₹)	Amount (₹)	Amount (₹)
Working Capital requirement (as per statement (i) above)			12,20,034
Less: Cash not required for depreciation and profit included in the cost of current assets:			
(i) Depreciation			
Finished Stock	47,000		
Work-in-progress	28,200		
Sundry debtors	56,400	1,31,600	
(ii) Profit included in debtors		80,000	2,11,600
Cash Cost of Working Capital			10,08,434

Problem 4: A newly formed company has applied to the Commercial Bank for the first time for Financing its working capital requirements. The following information is available about the projections for the current year:

Elements of cost:	Per unit ₹
Raw material	40
Direct labour	15
Overhead	30
Total cost	85
Profit	15
Sales	100

Other information: Raw material in stock: average 4 weeks consumption, Work - in progress (completion stage, 50 percent), on an average half a month. Finished goods in stock: on an average, one month. Credit allowed by suppliers is one month. Credit allowed to debtors is two months.

Average time lag in payment of wages is 1.5 weeks and 4 weeks in overhead expenses. Cash in hand and at bank is desired to be maintained at ₹ 50,000. All Sales are on credit basis only.

Required:

(i) Prepare statement showing estimate of working capital needed to finance an activity level of 96,000 units of production. Assume that production is carried on evenly throughout the year, and wages and overhead accrue similarly. For the calculation purpose 4 weeks may be taken as equivalent to a month and 52 weeks in a year.

(ii) From the above information calculate the maximum permissible bank finance by all the three methods for working capital as per Tondon Committee norms; assume the core current assets constitute 25% of the current assets. **[Nov-2007]**

Solution:

Calculation of Working Capital Requirement

(A) Current Assets

S.No.	Particulars	₹
(i)	Stock of material for 4 weeks $\left(96{,}000 \times 40 \times \frac{4}{52}\right)$	2,95,385
(ii)	Work in progress for $\frac{1}{2}$ month	
	Raw Material $\left(96{,}000 \times 40 \times \frac{2}{52} \times 0.50\right)$	73,846
	Labour $\left(96{,}000 \times 15 \times \frac{2}{52} \times 0.50\right)$	27,692
	Overhead $\left(96{,}000 \times 30 \times \frac{2}{52} \times 0.50\right)$	55,385
(iii)	Finished stock $\left(96{,}000 \times 85 \times \frac{4}{52}\right)$	6,27,692
(iv)	Debtors for 2 months $\left(96{,}000 \times 85 \times \frac{8}{52}\right)$	12,55,385
	Cash in hand or at bank	50,000
	Investment in Current Assets	23,85,385
(B)	Current Liabilities	
(i)	Creditors for one month $\left(96{,}000 \times 40 \times \frac{4}{52}\right)$	2,95,385
(ii)	Lag in payment of wages $\left(96{,}000 \times 15 \times \frac{1.5}{52}\right)$	41,538
(ii)	Lag in payment of wages $\left(96{,}000 \times 30 \times \frac{4}{52}\right)$	2,21,538
	Total Current Liabilities	**5,58,461**

(B) Current Liabilities

S.No.	Particulars	₹
(i)	Creditors for one month $\left(96{,}000 \times 40 \times \frac{4}{52}\right)$	2,95,385
(ii)	Lag in payment of wages $\left(96{,}000 \times 15 \times \frac{1.5}{52}\right)$	41,538
(ii)	Lag in payment of wages $\left(96{,}000 \times 30 \times \frac{4}{52}\right)$	2,21,538
	Total Current Liabilities	**5,58,461**

(ii) Maximum Permissible bank Finance

(i) Method I:

$0.75\ (CA - CL) = 0.75\ (23{,}85{,}385 - 5{,}58{,}461) = 0.75\ (18{,}26{,}924) = ₹\ 13{,}70{,}193$

(ii) Method II:

$(.75\ CA) - CL = (.75 \times 23{,}85{,}385) - 5{,}58{,}461 = 17{,}89{,}039 - 5{,}58{,}461 = ₹\ 12{,}30{,}578$

(iii) Method III:

[.75 of soft core current assets] – CL = [.75 (23,85,385 – 5,96,346) – 5,58,461]

= .75 (17,89,039) – 5,58461 = 13,41,779, – 5,58,461 = ₹ 7,83,318

Problem 5: The management of MNP Company Ltd. is planning to expand its business and consult you to prepare an estimated working capital statement. The records of the company reveals the following annual information:

	₹
Sales – Domestic at one month's credit	24,00,000
Export at three month's credit (Sales price 10% below Domestic price)	10,80,000
Material used (suppliers extend two months credit)	9,00,000
Lag in payment of wages – ½ month	7,20,000
Leg in payment of manufacturing expenses (cash) -1 month	10,80,000
Lag in payment of Adm. expenses – 1 month	2,40,000
Sales promotion expenses payable quarterly in advance	1,50,000
Income tax payable in four installments of which one falls in the Next financial year	2,25,000

Rate of gross profit is 20%

Ignore work-in-progress and depreciation

The company keeps one month's stock of raw materials and finished goods (each) and believes in keeping ₹ 2,50,000 available to it including the overdraft limit of ₹ 75,000 not yet utilized by the company.

The management is also of the option to make 12% margin for contingencies on computed figure.

Required:

Prepare the estimated working capital statement for next year. **[May-2011]**

Solution:

Statement Showing estimated working Capital Requirement (cash cost basis)

	Particulars		(₹)
(A)	**Current Assets:**		
	Raw Material	$9,00,000 \times \frac{1}{12}$	75,000
	Finished hoods	$27,00,000 \times \frac{1}{12}$	2,25,000
	Sales promotion	$1,50,000 \times \frac{1}{4}$	37,500
	Debtors:		
	Domestic	$20,60,000 \times \frac{1}{12}$	1,71,667
	Export	$10,30,000 \times \frac{3}{12}$	2,57,500
	Cash:	2,50,000 – 75,000	1,75,000
		Total (A)	9,41,667

(B)	**Current Liabilities:**		
	Wages	$7,20,000 \times \frac{1}{12}$	30,000
	Miscellaneous Expenses.	$10,80,000 \times \frac{1}{12}$	90,000
	Administrative Expenses	$2,40,000 \times \frac{1}{12}$	20,000
	Income Tax	$2,25,000 \times \frac{1}{4}$	56,250
	Overdraft		Nil
	Creditors	$9,00,000 \times \frac{2}{12}$	1,50,000
		Total (b)	3,46,250
	Net working capital A-B		5,95,417
	Add: Margin for contingencies @ 12%		71,450
	Total W.C.		**6,66,867**

Working Notes:

(i) Calculation of Cash cost of production:

Raw material	9,00,000
Wages	7,20,000
Miscellaneous expenses	10,80,000
Cash cost of Production	27,00,000

(ii) Calculation of Cash cost of production:

Cost of Production	27,00,000
Add: Administrative Expenses	2,40,000
Sales Promotion Expenses	1,50,000
Cash cost of sales	**30,90,000**

(iii) Calculation of Cash cost of Debtors:

Export sales = 10,80,000 (10% below domestic sales price)

Export sales equivelant to Domestic sales:- $10,80,000 \times \frac{100}{90} = 12,00,000$

(iv) Apportionment of cash cost of sales between Domestic foreign Debtors:

$$\text{Domestic Debtors} = 30,90,000 \times \frac{24,00,000}{36,00,000} = 20,60,000$$

$$\text{Foreign Debtors} = 30,90,000 \times \frac{12,00,000}{36,00,000} = 10,30,000$$

Problem 6: From the following information of XYZ Ltd., calculate:

(i) Net operating cycle period.

(ii) Number of operating cycles in a year:

1. Raw material inventory consumed during the year	6,00,000
2. Average stock of raw material	50,000
3. Work-in-progress inventory	500,000
4. Average work-in-progress inventory	30,000
5. Finished goods inventory	8,00,000
6. Average finished goods stock held	40,000
7. Average collection period from debtors	45 days
8. Average credit period availed	30 days
9. No of days in a year	360 days

Solution:

(i) Statement Showing Computation of Net Operating Cycle Period

Particulars	Days
I. Raw Material conversion period $\left(\frac{50,000}{6,00,000} \times 360\right)$	30
II. Work-in-Progress Conversion period $\left(\frac{30,000}{5,00,000} \times 360\right)$	22
III. Finished goods conversion period $\left(\frac{40,000}{8,00,000} \times 360\right)$	18
IV. Average collection period from debtors	45
Less: V. Average credit period awaited	(30)
Operating Cycle	85

(ii) No. of operating cycle in a year $= \frac{360}{85} = 4.24$ cycle in a year

Problem 7: An engineering company is considering its working capital investment for the year end 2003-04. The estimated fixed assets and current liabilities for the next year are ₹ 6.63 crore and ₹ 5.967 crore respectively. The sales and earnings before interest and taxes (EBIT) depend on investment in its current assets- particularly inventory and receivables. The company is examining the following alternative working capital policies:

(₹ in crore)

Working capital policy	Investment in C.Assets	Estimated sales	EBIT
Conservative	11.475	31.365	3.1365
Moderate	9.945	29.325	2.9325
Aggressive	6.63	25.5	2.55

You are required to calculate the following for each policy:

(i) Rate of return on total assets.

(ii) Net working capital position.

(iii) Current assets to fixed assets ratio.

(iv) Discuss the risk- return trade off of each working capital policy.

Solution:

(i) Return on total Assets = $\frac{\text{EBIT}}{\text{Total Assets}} \times 100$

Conservative	Moderate	Aggressive
$\frac{3.1365}{(6.63 + 11.475)} \times 100$ = 17.32%	$\frac{2.9325}{6.63 + 9.945} \times 100$ = 17.69%	$\frac{2.55}{6.63 + 6.63} \times 100$ = 19.23%

(ii) Net Working Capital = CA – CL

	Conservative	Moderate	Aggressive
Current Assets	11.475	9.945	6.63
Less: Current Liabilities	(5.967)	(5.967)	(5.967)
Net Working Capital	5.508	3.978	0.663

(iii) Current Assets to fixed Assets ratio = $\frac{\text{C.A}}{\text{FA}}$

Conservative	Moderate	Aggressive
11.475	9.945	6.63
6.63	6.63	6.63
1.73 : 1	1.5 : 1	1:1

(iv) The current ratio is a measure of short term solvency of an entity and hence a measure of risk. Rate of return on total assets is a measure of return Lower current ratio implies higher risk. Higher the risk higher the return. The expected risk and return are minimum in case of conservative investment policy and maximum in case of aggressive investment policy. The firm can improve profitability by reducing investment in working capital.

Problem 8: The following information is provided by the DPS Limited for the year ending 31st March, 2013.

Raw material storage period	55 days
Work-in Progress conversion period	18 days
Finished Goods storage period	22 days
Debt collection period	45 days
Creditors payment period	60 days
Annual Operating cost (including depreciation of ₹ 2,10,000)	₹ 2,10,000
[1 year = 360 days]	

Required:

(i) Operating Cycle period.

(ii) Number of Operating Cycle in a year.

(iii) Amount of working capital required for the company on a cash cost basis.

(iv) The company is a market leader in its product, there is virtually no competitor in the market. Based on a market research it is planing to discontinue dales on credit and deliver products based on pre-payments. Thereby, it can reduce its working capital requirement substantially. What would be the reduction in working capital requirement due to such decision? **[May 2013]**

Solution:

(i) Calculation of Operating Cycle Period

Operating Cycle Period = R + W + F + D – C = 55 + 18 + 22 + 45 – 60 = 80 days

(ii) Number of Operating Cycle in a Year

= 360/Operating Cycle Period = 360/80 = 4.5

(iii) Amount of Working Capital Required

= Annual Operating Cost/Number of Operating Cycle

= 18,90,000 / 4.5 = 4,20,000

(iv) Reduction in Working Capital

Operating Cycle Period = R + W + F – C = 55 + 18 + 22 – 60 = 35

Amount of Working Capital Required = 18,90,000/360x35 = 1,83,750

Reduction in Working Capital = 4,20,000 – 1,83,750 = 2,36,250

Problem 9: STN Ltd. is a readymade garment manufacturing company. Its production cycle indicates that materials are introduced in the beginning of the production phase; wages and overhead accrue evenly throughout the period of cycle. The following figures for the 12 months ending 31st December 2011 are given.

Production of shirts	54,000 units
Selling price per unit	₹ 200
Duration of the production cycle	1 month
Raw material inventory held	2 month's consumption
Finished goods stock held for	1 month

Credit allowed to debtors is 1.5 months and credit allowed by creditors is 1 month.

Wages are paid in the next month following the month of accrual.

In the work-in-progress 50% of wages and overheads are supposed to be conversion costs.

The ratios of cost to sales price are-raw materials 60% direct wages 10% and overheads 20%. Cash is to be held to the extent of 40% of current liabilities and safety margin of 15% will be maintained.

Calculate amount of working capital required for the company on a cash cost basis. **[May 2012]**

Solution: Computation of Amount of Working Capital required on a Cash Cost basis

Working Notes:

1. **Raw material inventory:** The cost of materials for the whole year is 60% of the Sales value.

   Hence it is 54,000 units × ₹ 200 × $\frac{60}{100}$ = ₹ 64,80,000. The monthly consumption of raw material would be ₹ 5,40,000. Raw material requirements would be for two months; hence raw materials in stock would be ₹ 10,80,000.

2. **Debtors:** Total Cash Cost of Sales = 97,20,000 × $\frac{1.5}{12}$ = ₹ 12,15,000

3. **Work-in-process:** (Each unit of production is expected to be in process for one month).

	₹
(a) Raw materials in work-in-process (being one month's raw material requirements)	5,40,000
(b) Labour costs in work-in-process (It is stated that it accrues evenly during the month. Thus, on the first day of each month it would be zero and on the last day of month the work-in-process would include one month's labour costs. On an average therefore, it would be equivalent to ½ of the month's labour costs)	45,000
(c) Overheads	90,000
(For ½ month as explained above) Total work-in-process	6,75,000

4. **Finished goods inventory:**

(1 month's cost of production)	
Raw materials	5,40,000
Labour	90,000
Overheads	1,80,000
	8,10,000

5. **Creditors:** Suppliers allow a one month's credit period. Hence, the average amount of creditors would be ₹ 5,40,000 being one month's purchase of raw materials.
6. **Direct Wages payable:** The direct wages for the whole year is 54,000 units × ₹ 200 × 10% = 10,80,000. The monthly direct wages would be 90,000 (10,80,000 ÷ 12). Hence, wages payable would be ₹ 90,000.

Statement of Working Capital Required

	Amount (₹)	**Amount (₹)**
Current Assets		
Raw materials inventory (Refer to working note 1)	10,80,000	
Debtors (Refer to working note 2)	12,15,000	
Working–in-process (Refer to working note 3)	6,75,000	
Finished goods inventory (Refer to working note 4)	8,10,000	
Cash	2,52,000	40,32,000
Current Liabilities		
Creditors (Refer to working note 5)	5,40,000	
Direct wages payable (Refer to working note 6)	90,000	6,30,000
Estimated working capital requirements (before safety margin of 15%)		34,02,000
Add: Safety margin of 15%		5,10,300
Estimated Working Capital Requirements		**39,12,300**

Problem 10:

Samreen Enterprises has been operating its manufacturing facilities till 31.3.2022 on a single shift working with the following cost structure:

	Per unit (₹)
Cost of Materials	6.00
Wages (out of which 40% fixed)	5.00
Overheads (out of which 80% fixed)	5.00
Profit	2.00
Selling Price	18.00
Sales during 2020-21 – ₹ 4,32,000	

As at 31.3.2022 the company held:

	(₹)
Stock of raw materials (at cost)	36,000
Work-in-progress (valued at prime cost)	22,000
Finished goods (valued at total cost)	72,000
Sundry debtors	1,08,000

In view of increased market demand, it is proposed to double production by working an extra shift. It is expected that a 10% discount will be available from suppliers of raw materials in view of increased volume of business. Selling price will remain the same. The credit period allowed to customers will remain unaltered. Credit availed of from suppliers will continue to remain at the present level i.e., 2 months. Lag in payment of wages and expenses will continue to remain half a month.

You are required to PREPARE the additional working capital requirements, if the policy to increase output is implemented.

Solution:

This question can be solved using two approaches:

i. To assess the impact of double shift for long term as a matter of production policy.
ii. To assess the impact of double shift to mitigate the immediate demand for next year only.

The first approach is more appropriate and fulfilling the requirement of the question

i. Assessment of impact of double shift for long term as a matter of production policy:

Comparative Statement of Working Capital Requirement

	Single Shift (24,000)			Double Shift (48,000)		
	Unit	Rate (₹)	Amount (₹)	Unit	Rate (₹)	Amount (₹)
Current Assets						
Inventories:						
Raw Materials	6,000	6	36,000	12,000	5.4	64,800
Work-in-Progress	2,000	11	22,000	2,000	9.4	18,800
Finished Goods	4,500	16	72,000	9,000	12.4	1,11,600
Sundry Debtors	6,000	16	96,000	12,000	12.4	1,48,800
Total Current Assets: (A)			**2,26,000**			**3,44,000**

Current Liabilities						
Creditors for Materials	4,000	6	24,000	8,000	5.4	43,200
Creditors for Wages	1,000	5	5,000	2,000	4	8,000
Creditors for Expenses	1,000	5	5,000	2,000	3	6,000
Total Current Liabilities: (B)			34,000			57,200
Working Capital: (A) – (B)			**1,92,000**			**2,86,800**

Additional Working Capital requirement = ₹ 2,86,800 – ₹ 1,92,000 = ₹ 94,800

Workings:

1. **Statement of cost at single shift and double shift working**

	24,000 units		48,000 Units	
	Per unit (₹)	**Total (₹)**	**Per unit (₹)**	**Total (₹)**
Raw materials	6.00	1,44,000	5.40	2,59,200
1. Wages - Variable	3.00	72,000	3.00	1,44,000
Fixed	2.00	48,000	1.00	48,000
Overheads - Variable	1.00	24,000	1.00	48,000
Fixed	4.00	96,000	2.00	96,000
Total cost	16.00	3,84,000	12.40	5,95,200
Profit	2.00	48,000	5.60	2,68,800
	18.00	**4,32,000**	**18.00**	**8,64,000**

2. **Sales in units 2020-21**

$$= \frac{\text{Sales}}{\text{Unit selling price}} = \frac{₹\ 4,32,000}{₹\ 18} = 24,000 \text{ units}$$

3. **Stock of Raw Materials in units on 31.3.2021**

$$= \frac{\text{Value of Stock}}{\text{cost per unit}} = \frac{₹\ 36,000}{6} = 6,000 \text{ units}$$

4. **Stock work-in-progress in units on 31.3.2021**

$$= \frac{\text{Value of work-in-progress}}{\text{Prime Cost per unit}} = \frac{₹\ 22,000}{₹6 + ₹5} = 2,000 \text{ units}$$

5. **Stock of finished goods in units 2020-21**

$$= \frac{\text{Value of Stock}}{\text{cost per unit}} = \frac{₹\ 36,000}{6} = 6,000 \text{ units}$$

ii. Assessment of the impact of double shift to mitigate the immediate demand for next year only & not as part of policy implementation.

In this approach, working capital shall be computed as if we are calculating the same for the next / second year with double production. Whereas, in the first approach to implement double-shift as part of policy implementation, we calculated comparative analysis of working capital requirement for single & double shift within the same year.

Workings:

6. Calculation of no. of units to be sold:

No. of units to be Produced	48,000
Add: Opening stock of finished goods	4,500
Less: Closing stock of finished goods	(9,000)
No. of units to be Sold	43,500

7. Calculation of Material to be consumed and materials to be purchased in units:

No. of units Produced	48,000
Add: Closing stock of WIP	2,000
Less: Opening stock of WIP	(2,000)
Raw Materials to be consumed in units	48,000
Add: Closing stock of Raw material	12,000
Less: Opening stock of Raw material	(6,000)
Raw Materials to be purchased (in units)	54,000

8. Credit allowed by suppliers:

$$= \frac{\text{No.of units of purchased} \times \text{Cost per unit}}{12 \text{ month}} \times \frac{54{,}000 \times ₹\ 5.40}{12 \text{ month}} \times 2 \text{ months} = ₹\ 48{,}600$$

Comparative Statement of Working Capital Requirement

	Single Shift (Current Year – 24,000 units)			Double Shift (Next Year – 48,000 units)		
	Unit	Rate (₹)	Amount (₹)	Unit	Rate (₹)	Amount (₹)
Current Assets						
Inventories:						
Raw Materials	6,000	6.00	36,000	12,000	5.40	64,800
Work-in-Progress	2,000	11.00	22,000	2,000	9.40	18,800
Finished Goods	4,500	16.00	72,000	9,000	12.40	1,11,600
Sundry Debtors	6,000	16.00	96,000	12,000	12.40	1,48,800
Total Current Assets: (A)			**2,26,000**			**3,44,000**

Current Liabilities						
Creditors for Materials	4,000	6.00	24,000	9,000	5.40	48,600
Creditors for Wages	1,000	5.00	5,000	2,000	4.00	8,000
Creditors for Expenses	1,000	5.00	5,000	2,000	3.00	6,000
Total Current Liabilities: (B)			34,000			62,600
Working Capital: (A) – (B)			**1,92,000**			**2,81,400**

Additional Working Capital requirement = ₹ 2,81,400 – ₹ 1,92,000 = ₹ 89,400

8 CHAPTER

Working Capital Management

UNIT 2: Treasury and Cash Management

List of Important Questions

Problem 1: Gold stone Ltd. has given the following particulars. You are required to prepare a cash budget for three months 31st December 2011.

(i)

Months	Sales	Materials	Wages	Overheads
August	40,000	20,400	7,600	3,800
September	42,000	20,000	7,600	4,200
October	46,000	19,600	8,000	4,600
November	50,000	20,000	8,400	4,800
December	60,000	21,600	9,000	5,000

Credit terms are:

(ii) Sales/debtors – 10% sales are on cash basis. 50% of the credit sales are collected next month and the balance following months:

Creditors – Materials 2 months
– Wages 1/5 month.
– Overheads ½ month.

(iii) Cash balance on 1st October 2011 is expected to be ₹ 8,000

(iv) A machinery will be installed in August 2011 at a cost of ₹ 1,00,000 the monthly installment of ₹ 5,000 is payable from October onwards.

(v) Dividend at 10% on preference share capital of ₹ 3,00,000 will be paid on 1st December 2011

(vi) Advance to be received for sale of vehicle ₹ 20,000 in December, 2011.

(vii) Income tax (advance) to be paid in December ₹ 5,000.

Solution:

Cash budget for three months – October to December 2011

Particulars	October (₹)	November (₹)	December (₹)
Opening cash balance	8,000	11,780	18,360
Receipts			
Cash sales	4,600	5,000	6,000
Collection form debtors	36,900	39,600	43,200
Advance from sale of vehicle			20,000
Total	**49,500**	**56,380**	**87,560**
Payments			
Materials (creditors)	20,400	20,000	19,600
Wages	7,920	8,320	8,880
Overheads	4,400	4,700	4,900
Machinery (monthly installment)	5,000	5,000	5,000
Preference dividend			30,000
Income tax advance			5,000
Total	37,720	38,020	73,380
Closing balance	**11,780**	**18,360**	**14,180**

Working Notes:

(i) Cash collected from debtors:

Particulars		August (₹)	September (₹)	October (₹)	November (₹)	December (₹)
Cash sales	10%	4,000	4,200	4,600	5,000	6,000
Credit sales	90%	36,000	37,800	41,400	45,000	54,000
Collections (debtors)						
1st Month	50%			18,900	20,700	22,500
2nd Month	50%			18,000	18,900	20,700
Total				36,900	39,600	43,200

(ii) Since the period of credit allowed by suppliers is two months the payment for purchase of August will be October and so on.

(iii) $4/5^{th}$ of the wages is paid in the month itself and $1/5^{th}$ will be paid in the next month and so on.

(iv) ½ of the overheads is paid in the month itself and ½ will be paid in next month and so on.

Problem 2: Prepare monthly cash budgets for six months beginning from April, 2004, on the basis of the following information:

(i) Estimated monthly sales are as follows:

	₹		₹
January	1,00,000	June	80,000
February	1,20,000	July	1,00,000
March	1,40,000	August	80,000
April	80,000	September	60,000
May	60,000	October	1,00,000

(ii) Wages and salaries are estimated to be payable as follows:

April	9,000	July	10,000
May	8,000	August	9,000
June	10,000	September	9,000

(iii) Of the sales 80% is on credit and 20% for cash. 75% of credit sales are collected within one month and the balance in two months. There are no bad debt losses.

(iv) Purchase amount of 80% of sales and are made & paid for in the month preceding the sales.

(v) The firm has 10% Debentures of ₹ 1,20,000. Interest on these has to be paid quarterly in January, April and so on.

(vi) The firm is to make an advance payment of tax of ₹ 5,000 in July, 2004.

(vii) The firm had a cash balance of ₹ 20,000 on April 1, 2004, which is the minimum desired level of cash balance. Any cash surplus/deficit above/below this level is made up by temporary investments/liquidation of temporary investments or temporary borrowings at the end of each month (interest on these to be ignored).

Solution:

Cash budget for Apr. to Sep. 2004

	Jan.	Feb.	Mar.	Apr.	May	June
Receipts						
Cash sales	16,000	12,000	16,000	20,000	16,000	12,000
From Debtors	1,08,000	76,000	52,000	60,000	76,000	68,000
(A)	1,24,000	88,000	68,000	80,000	92,000	80,000
Payments						
Purchases	48,000	64,000	80,000	64,000	48,000	80,000
Wages & Salaries	9,000	8,000	10,000	10,000	9,000	9,000
Deb. interest	3,000	–	–	3,000	–	–
Adv. Tax	–	–	–	5,000	–	–
(B)	60,000	72,000	90,000	82,000	57,000	89,000
Net Receipts **(A – B)**	64,000	16,000	(22,000)	(2,000)	35,000	(9,000)
Op. Cash Bal.	20,000	20,000	20,000	20,000	20,000	20,000
	84,000	36,000	(2,000)	18,000	55,000	11,000
Invest. In Securities	(64,000)	(16,000)	–	–	(35,000)	–
Temporary borrowings	–	–	22,000	2,000	–	9,000
Closing Cash bal.	20,000	20,000	20,000	22,000	20,000	20,000

Problem 3: Prepare Cash budget for July-December from the following information:

(i) The estimated sales, expenses etc. are as follows: **(₹ lakhs)**

	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Sales	35	40	40	50	50	60	65
Purchases	14	16	17	20	20	25	28
Wages & Salaries	12	14	14	18	18	20	22
Miscellaneous Expenses	5	6	6	6	7	7	7
Interest Received	2	–	–	2	–	–	2
Sales of Shares	–	–	20	–	–	–	–

(ii) 20% of the sales are on cash and the balance on credit.

(iii) 1% of the credit sales are returned by customers, 2% of the total accounts receivable constitute bad debt losses. 50% of the good accounts receivable are collected in the month of the sales, and the rest in the next month.

(iv) The time lag in the payment of miscellaneous expenses and purchases is one month. Wages and salaries are paid fortnightly with a time lag of 15 days.

(v) The company keeps a minimum cash balance of ₹ 5 lakhs. Cash in excess of ₹ 7 lakhs is invested in Government securities in the multiple of ₹ 1 lakh. Shortfalls in the minimum cash balance are made good by borrowings from banks. Ignore interest received and paid.

Solution:

Cash Budget for July to December

(₹ in lakhs)

	July	Aug.	Sept.	Oct.	Nov.	Dec.
Receipts						
Cash in hand	5.00	7.10	7.14	7.06	7.86	7.54
Collection from Debtors (Note 1)	29.10	31.04	34.92	38.80	42.68	48.50
Interest received	–	–	2.00	–	–	2.00
Sale of shares	–	20.00	–	–	–	–
(A)	**42.10**	**66.14**	**54.06**	**55.86**	**62.54**	**71.04**
Payments						
Creditors for supply (Time lag 1 month)	14.00	16.00	17.00	20.00	20.00	25.00
Wages and Salaries	13.00	14.00	16.00	18.00	19.00	21.00
Misc. Exp. (Time lag 1 month)	5.00	6.00	6.00	6.00	7.00	7.00
Total Payments (B)	**32.00**	**36.00**	**39.00**	**44.00**	**46.00**	**53.00**
Minimum Cash Balance **(B1)**	5.00	5.00	5.00	5.00	5.00	5.00
Total Cash needed	37.00	41.00	44.00	49.00	51.00	58.00
Surplus/Deficiency **(B2)**	5.10	25.14	10.06	6.86	11.54	13.04
Financing & Investment **(B1 + B2 – 7.00)(D)**	(3.00)	(23.00)	(8.00)	(4.00)	(9.00)	(11.00)
Closing Cash Balance **(A-B-D)**	**7.10**	**7.14**	**7.06**	**7.86**	**7.54**	**7.04**

Working Notes:

1. Collection from Debtors

Particulars	(₹ In lakhs)						
	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Sales	35.00	40.00	40.00	50.00	50.00	60.00	65.00
Cash Sales (20%)	7.00	8.00	8.00	10.00	10.00	12.00	13.00
Credit Sales (80%)	28.00	32.00	32.00	40.00	40.00	48.00	62.00
Returns	0.28	0.32	0.32	0.40	0.40	0.48	0.52
Bad Debt (2%)*	0.56	0.64	0.64	0.80	0.80	0.96	1.04
Debts recoverable	27.16	31.04	31.04	38.80	38.80	46.56	50.44
Collection 50% in the month of sales	13.58	15.52	15.52	19.40	19.40	23.28	25.22
		13.58	15.52	15.52	19.40	19.40	23.28
Total collection in a month		**29.10**	**31.04**	**34.92**	**38.80**	**42.68**	**48.50**

2. Payment of Wages and Salaries (Fortnightly with a lag of 15 days)

Particulars	(₹ in lakhs)					
	July	Aug.	Sept.	Oct.	Nov.	Dec.
½ to be paid same month	7	7	9	9	10	11
½ relating to previous month	6	7	7	9	9	10
Total Wages and Salaries paid	13	14	16	18	19	21

Problem 4: The following particulars have been obtained in respect of retail business of Lucky Ltd., for the three months ending March, 2018:

1. Working capital as on 1st January, 2018 has been estimated as follows:

	₹
Cash and bank balances	10,900
Debtors	51,400
Creditors	42,200
Outstanding expenses	4,000
Dividend due	9,700
Tax due	6,400
Stock	26,000

2. Budgeted Profit Statement at the end of each month:

	2018		
	January	February	March
	₹	₹	₹
Sales	42,000	36,000	34,000
Cost of Sales	32,700	28,100	26,600
Gross Profit	9,300	7,900	7,400
Administrative, Selling & Distribution Expenses	6,300	5,400	5,100
Net Profit before tax	3,000	2,500	2,300

3. Budgeted balances at the end of each month:

	2018		
	January	February	March
	₹	₹	₹
Stock	24,000	22,000	20,000
Debtors	52,000	50,000	47,000
Creditors	40,000	39,000	38,000
Outstanding Expenses	4,000	4,000	4,000
Dividend Due	9,700	–	–
Tax due	6,400	6,400	6,400

Note: Depreciation amounting to ₹ 1,700 has been included in the budgeted expenditure of each month.

You are required to prepare a cash budget on receipts and payments basis by months upto March, 2000. Workings should form part of the answer.

Solution:

Statement showing Cash Budget for Jan., Feb. & March 2018

	January	February	March
Cash and Bank balance (opening)	10,900	14,800	12,300
Add: Receipt from debtors (Note 1)	41,400	38,000	37,000
Total (A)	**52,300**	**52,800**	**49,300**
Payment			
Account payable for materials & expenses (Note 2)	37,500	30,800	29,000
Dividend	–	9,700	–
Total (B)	**37,500**	**40,500**	**29,000**
Closing Cash and Bank balance (A) – (B)	**14,800**	**12,300**	**20,300**

Working Notes:

	Particulars	January (₹)	February (₹)	March (₹)
1.	**Receipt from debtors**			
	Opening balance	51,400	52,000	50,000
	Add: Credit sales during this month	42,000	36,000	34,000
		93,400	88,000	84,000
	Less: Closing balance	52,000	50,000	47,000
	Receipt from debtors	41,400	38,000	37,000
2.	**Payment to creditors for material and expenses**			
	Opening Balance:			
	Creditors	42,200	40,000	39,000
	Expenses	4,000	4,000	4,000
	Total	46,200	44,000	43,000
	Add: Cost of sales (Note 3)	29,000	24,400	22,900
	Adm. S & D expenses	6,300	5,400	5,100
		81,500	73,800	71,000
	Less: Closing balance:			
	Creditors	40,000	39,000	38,000
	Expenses	4,000	4,000	4,000
	Payment during this month	37,500	30,800	29,000
3.	**Cost of sales**			
	Cost of sales (given)	32,700	28,100	26,600
	Add: Closing stock	24,000	22,000	20,000
		56,700	50,100	46,600
	Less: Opening stock	26,000	24,000	22,000
		30,700	26,100	24,600
	Less: Depreciation (being non-cash item)	1,700	1,700	1,700
	Expenses for the month	**29,000**	**24,400**	**22,900**

Problem 5:

Prachi Ltd is a manufacturing company producing and selling a range of cleaning products to wholesale customers. It has three suppliers and two customers. Prachi Ltd relies on its cleared funds forecast to manage its cash.

You are an accounting technician for the company and have been asked to prepare a cleared funds forecast for the period Saturday 9 August to Wednesday 13 August 20X2 inclusive. You have been provided with the following information:

1. **Receipts from customers**

	Credit terms	Payment method	9 Aug 20X2 sales	9 Jul 20X2 sales
W Ltd	1 calendar month	BACS	₹ 150,000	₹ 130,000
X Ltd	None	Cheque	₹ 180,000	₹ 160,000

(a) Receipt of money by BACS (**Bankers' Automated Clearing Services**) is instantaneous.

(b) X Ltd's cheque will be paid into Prachi Ltd's bank account on the same day as the sale is made and will clear on the third day following this (excluding day of payment).

2. **Payments to suppliers**

Supplier name	Credit terms	Payment method	9 Aug 20X2 purchases	9 Jul 20X2 purchases	9 Jun 20X2 purchases
A Ltd	1 calendar month	Standing order	₹ 65,000	₹ 55,000	₹ 45,000
B Ltd	2 calendar months	Cheque	₹ 85,000	₹ 80,000	₹ 75,000
C Ltd	None	Cheque	₹ 95,000	₹ 90,000	₹ 85,000

(a) Prachi Ltd has set up a standing order for ₹ 45,000 a month to pay for supplies from A Ltd. This will leave Prachi's bank account on 9 August. Every few months, an adjustment is made to reflect the actual cost of supplies purchased (you do NOT need to make this adjustment).

(b) Prachi Ltd will send out, by post, cheques to B Ltd and C Ltd on 9 August. The amounts will leave its bank account on the second day following this (excluding the day of posting).

3. **Wages and salaries**

	July 20X2	August 20X2
Weekly wages	₹ 12,000	₹ 13,000
Monthly salaries	₹ 56,000	₹ 59,000

(a) Factory workers are paid cash wages (weekly). They will be paid one week's wages, on 13 August, for the last week's work done in July (i.e. they work a week in hand).

(b) All the office workers are paid salaries (monthly) by BACS. Salaries for July will be paid on 9 August.

4. Other miscellaneous payments

(a) Every Saturday morning, the petty cashier withdraws ₹ 200 from the company bank account for the petty cash. The money leaves Prachi's bank account straight away.

(b) The room cleaner is paid ₹ 30 from petty cash every Monday morning.

(c) Office stationery will be ordered by telephone on Sunday 10 August to the value of ₹ 300. This is paid for by company debit card. Such payments are generally seen to leave the company account on the next working day

(d) Five new softwares will be ordered over the Internet on 12 August at a total cost of ₹ 6,500. A cheque will be sent out on the same day. The amount will leave Prachi Ltd's bank account on the second day following this (excluding the day of posting).

5. Other information

The balance on Prachi's bank account will be ₹ 200,000 on 9 August 20X2. This represents both the book balance and the cleared funds

PREPARE a cleared funds forecast for the period Saturday 7th August to Wednesday 13th August 20X2 inclusive using the information provided. Show clearly the uncleared funds float each day.

Solution:

Cleared Funds Forecast

	9 Aug (Saturday)	10 Aug (Sunday)	11 Aug (Monday)	12 Aug (Tuesday)	13Aug (Wednesday)
Receipts	₹	₹	₹	₹	₹
W Ltd	1,30,000	0	0	0	0
X Ltd	0	0	0	1,80,000	0
(a)	**1,30,000**	**0**	**0**	**1,80,000**	**0**
Payments					
A Ltd	45,000	0	0	0	0
B Ltd	0	0	75,000	0	0
C Ltd	0	0	95,000	0	0
Wages	0	0	0	0	12,000
Salaries	56,000	0	0	0	0
Petty Cash	200	0	0	0	0
Stationery	0	0	300	0	0
(b)	**1,01,200**	**0**	**1,70,300**	**0**	**12,000**
Cleared excess Receipts					
over payments (a) – (b)	28,800	0	(1,70,300)	1,80,000	(12,000)
Cleared balance b/f	2,00,000	2,28,800	2,28,800	58,500	2,38,500
Cleared balance c/f (c)	2,28,800	2,28,800	58,500	2,38,500	2,26,500

Uncleared funds float					
Receipts	1,80,000	1,80,000	1,80,000	0	0
Payments	(1,70,000)	(1,70,300)	0	(6,500)	(6,500)
(d)	**10,000**	**9,700**	**180,000**	**(6,500)**	**(6,500)**
Total book balance c/f	**2,38,800**	**2,38,500**	**2,38,500**	**2,32,000**	**2,20,000**
(c)+ (d)					

Problem 6:

From the following information relating to a departmental store, you are required to PREPARE for the three months ending 31st March, 2022:

i. Month-wise cash budget on receipts and payments basis; and

ii. Statement of Sources and uses of funds for the three months period.

It is anticipated that the working capital & other account balances at 1st January, 2022 will be as follows:

	₹ in '000
Cash in hand and at bank	545
Short term investments	300
Debtors	2,570
Stock	1,300
Trade creditors	2,110
Other creditors	200
Dividends payable	485
Tax due	320
Plant	800

Budgeted Profit Statement:	**₹ in '000**		
	January	**February**	**March**
Sales	2,100	1,800	1,700
Cost of goods sold	1,635	1,405	1,330
Gross Profit	465	395	370
Administrative, Sellingand Distribution Expenses	315	270	255
Net Profit before tax	**150**	**125**	**115**

Budgeted balances at the end of each months	**₹ in '000**		
	31st Jan.	**28th Feb.**	**31st March**
Short term investments	700	---	200
Debtors	2,600	2,500	2,350
Stock	1,200	1,100	1,000
Trade creditors	2,000	1,950	1,900
Other creditors	200	200	200
Dividends payable	485	--	--
Tax due	320	320	320
Plant (depreciation ignored)	**800**	**1,600**	**1,550**

Depreciation amount to ₹ 60,000 is included in the budgeted expenditure for each month.

Solution:

WORKING

				₹ in '000
		Jan.	**Feb.**	**March**
(1)	**Payments to creditors:**			
	Cost of goods sold	1,635	1,405	1,330
	Add: Closing Stocks	1,200	1,100	1,000
		2,835	2,505	2,330
	Less: Opening Stocks	1,300	1,200	1,100
	Purchases	1,535	1,305	1,230
	Add: Trade Creditors, Opening balance	2,110	2,000	1,950
		3,645	3,305	3,180
	Less: Trade Creditors, closing balance	2,000	1,950	1,900
	Payment	1,645	1,355	1,280
(2)	**Receipts from debtors:**			
	Debtors, Opening balances	2,570	2,600	2,500
	Add: Sales	2,100	1,800	1,700
		4,670	4,400	4,200
	Less: Debtors, closing balance	2,600	2,500	2,350
	Receipt	**2,070**	**1,900**	**1,850**

Cash Budget

(a) 3 months ending 31st March, 2022

(₹ in 000)			
	January, 2022	**February, 2022**	**March, 2022**
Opening cash balances	**545**	**315**	**65**
Add: Receipts:			
From Debtors	2,070	1,900	1,850
Sale of Investments	---	700	----
Sale of Plant	---	---	50
Total (A)	2,615	2,915	1,965
Deduct: Payments			
Creditors	1,645	1,355	1,280
Expenses	255	210	195
Capital Expenditure	---	800	---
Payment of dividend	---	485	---
Purchase of investments	400	---	200
Total payments (B)	2,300	2,850	1,675
Closing cash balance (A-B)	**315**	**65**	**290**

Statement of Sources and uses of Funds for the three month period ending 31st March, 2022

	₹ '000	₹ '000
Sources:		
Funds from operation:		
Net profit (150+125+115)	390	
Add: Depreciation (60×3)	180	570
Sale of plant		50
		620
Decrease in Working Capital		665
(Refer Statement of changes in working capital)		
Total		**1,285**
Uses:		
Purchase of plant		800
Payment by dividends		485
Total		**1,285**

Statement of Changes in Working Capital

	January,22	March,22	Increase	Decrease
	₹' 000	₹' 000	₹' 000	₹' 000
Current Assets				
Cash in hand and at Bank	545	290		255
Short term Investments	300	200		100
Debtors	2,570	2,350		220
Stock	1,300	1,000		300
	4,715	3,840		
Current Liabilities				
Trade Creditors	2,110	1,900	210	---
Other Creditors	200	200	---	---
Tax Due	320	320	---	---
	2,630	2,420		
Working Capital	2,085	1,420		
Decrease	-	665	665	
	2,085	**2,085**	**875**	**875**

8 CHAPTER Working Capital Management

UNIT 4: Management of Receivables

List of Important Questions

Problem 1: The present credit terms of P Company are 1/10 net 30. Its annual sales are ₹ 80 lakhs, its average collection period is 20 days. Its variable costs and average total costs to sales are 0.85 and 0.95 respectively and its cost of capital is 10%. The proportion of sales on which customers currently take discount is 0.5. P Company is considering relaxing its discount terms to 2/10 net 30. Such relaxation is expected to increase sales by ₹ 5 lakhs, reduce the average collection period to 14 days and increase the proportion of discount sales to 0.8.

What will be the effect of relaxing the discount policy on company's profit? Take year as 360 days.

Solution:

Working Notes:

Calculation reduction in investment in receivables (₹)

Present investment in receivables	$\left(₹\ 80\ \text{lakhs} \times 0.95 \times \frac{20\ \text{days}}{360\ \text{days}}\right)$	4,22,222
Proposed investment in receivables		
	$[(₹\ 80\ \text{lakhs} \times 0.95) + (₹\ 5\ \text{lakhs} \times 0.85)] \times \left(\frac{14\ \text{days}}{360\ \text{days}}\right)$	3,12,083
Reduction in investment in receivables		1,10,139

Calculations of increase in discount (₹)

Present discount	$\left(₹\ 80\ \text{lakhs} \times \frac{1}{100} \times 0.5\right)$	40,000
Proposed discount	$\left(₹\ 85\ \text{lakhs} \times \frac{2}{100} \times 0.8\right)$	1,36,000
Net increase in amount		96,000

Statement showing evaluation of effect of relaxing the discount policy on company's profit

		(₹)
Increase in contribution	$\left(₹\ 5\ \text{lakhs} \times \frac{15}{100}\right)$	75,000
Cost of savings on investment in receivables	$\left(₹\ 1,10,139 \times \frac{10}{100}\right)$	11,014
Total incremental cost		86,014
Less: Net increase in discount		96,000
Incremental loss		9,986

Analysis: These will be an incremental loss by relaxing the discount policy. Hence, it is not suggested to release the company's present discount policy.

Problem 2: As a part of the strategy to increase sales and profits, the sales manager of a company proposes to sell goods to a group of new customers with 10% risk of non-payment. This group would require one and a half months credit and is likely to increase sales by ₹ 1,00,000 p.a. production and selling expenses amount to 80% of sales and the income-tax rate is 50%. The company's minimum required rate of return (after tax) is 25%.

Should the sales manager's proposal be accepted?

Solution:

Extension of credit to group of new customer; profitability of additional sales

Particulars	(₹)
Increase in sales per annum	1,00,000
Less: Bad debts @ 10%	10,000
Net sales revenue	90,000
Less: Production and selling expenses (80% of sales)	80,000
Profit before tax	10,000
Less: Income tax @ 50%	5,000
Profit after tax	**5,000**

Average investment in additional receivables

Period of credit = 1 ½ month

Receivable turn over $= \frac{12}{1\frac{1}{2}} = 8$

Average amount of receivable $= \frac{₹\ 1,00,000}{8} = ₹\ 12,500$

Average investment in receivable (at cost) $= ₹\ 12,500 \times \left(\frac{80}{100}\right) = ₹\ 10,000$

Available rate of return $= \frac{₹\ 5,000}{₹\ 10,000} \times 100 = 50\%$

Since the rate of return is higher than the desired rate of return of 25%, the proposal is to be accepted.

Acceptable degree of risk of non-payment

(a) When rate of return is 30% (after tax)

Required profit after tax on investment = ₹ 10,000 × 30% = ₹ 3,000

Required amount of PBT $= \frac{3,000}{50} \times 100 = ₹\ 6,000$

Net sales revenue required = ₹ 80,000 + 6,000 = ₹ 86,000

Acceptable amount of bad debts losses = ₹ 1,00,000 – ₹ 86,000 = ₹ 14,000

Acceptable degree of risk of non- payment $= \frac{₹\ 14,000}{₹\ 1,00,000} \times 100 = 14\%$

(b) When rate of return is 40% (after tax)

Required amount of profit after tax on Investment = ₹ 10,000 × 40% = ₹ 4,000

Required amount of PBT $= \left(\frac{₹\ 4,000}{50}\right) \times 100 = ₹\ 8,000$

Sales required = ₹ 80,000 + ₹ 8,000 = ₹ 88,000

Acceptable amount of bad debts = ₹ 1,00,000 – ₹ 88,000 = ₹ 12,000

Acceptable degree of risk of non-payment = 12% (calculation as above)

(c) When rate of return is 60% (after tax)

Required amount of profit after tax on Investment	= ₹ 10,000 × 60%	= ₹ 6,000
Required amount of PBT	$= \left(\frac{₹\ 6,000}{50}\right) \times 100$	= ₹ 12,000
Sales required	= ₹ 80,000 + ₹ 12,000	= ₹ 92,000
Acceptable bad debts losses	= ₹ 1,00,000 – ₹ 92,000	= ₹ 8,000

Acceptable degree of risk of non – payment = 8% (calculation as above)

Problem 3: The Sales Manager of AB Limited suggests that if credit period is given for 1.5 months then sales may likely to increases by ₹ 1,20,000 per annum. Cost of sales amounted to 90% of sales. The risk of non-payment is 5%. Income tax rate is 30%. The expected return on investment is ₹ 3,375 (after tax).

Should the company accept. The suggestion of sales manager? **[May-2008]**

Solution:

Credit period	=	1.5 Months
Increase in Sales	=	1,20,000
Less: Cost of Production		1,08,000
Contribution		12,000
Less: Bad Debts		6,000
		6,000
Less: Tax @ 30%		1,800
Profit after tax		4,200

Working Notes:

Turnover (credit)	90,00,000
Less: Factor Reserve 12% of 90 lacs	10,80,000
	79,20,000
Less: Commission 4% of 90 lacs	3,60,000
	75,60,000

Conclusion: Since, Net Profit is ₹ 4,200 & expected return is 3,375, therefore as PAT is positive hence, the suggestion of the sales manager may be accepted.

Problem 4: The Marketing Manager of XY Ltd. is giving a proposal to the Board of Directors of the company that an increase in credit period allowed to customers from the present one month to two months will bring a 25% increase in sales volume in the next year.

The following operational data of the company for the current year are taken from the records of the company:

	₹
Selling price	21 p.u.
Variable cost	14 p.u.
Total cost	18 p.u
Sales value	18,90,000

Required:

The Board, by forwarding the above proposal and data requests you to give your expert opinion on the adoption of the new credit policy in next year subject to a condition that the company's required rate of return on investments is 40%. **[May-2011]**

Solution: Alternative 1: Total Approach

Evaluation of Credit Policy

Particulars	Existing 1 Month Credit (₹)	Proposed 2 Month Credit (₹)
No. of units sold (WN'1')	90,000	1,12,500
Sales @ 21 p.u.	18,90,000	23,62,500
Less: V.C. @ 14 P.U.	12,60,000	15,75,000
Less: F.C. [WN '2']	3,60,000	3,60,000
Profit	2,70,000	4,27,500
Less: Cost of Investment [W.N. '3']	54,000	1,29,000
Net Benefit	**2,16,000**	**2,98,500**

Recommendation:

Company should adopt new credit policy having higher profit than profit under existing credit policy.

Working Note:

1. Calculation of No. of units sold in existing and proposed credit policy = S.V. ÷ S.P.P.U.
   Existing = 18,90,000 ÷ 21 = 90,000 units
   Proposed = 90,000 + 25% of 90,000 = 1,12,500 units
2. Calculation of Fixed Cost:-
   Total Cost – V.C. = F.C. per unit
   18 – 14 = Rs. 4 P.U.
   Total Fixed Cost = 4 × 90,000 (Existing) = 3,60,000
   Fixed Cost will remain same in proposed credit policy
3. Calculation of cost of investment in debtors:

Existing $= [\text{V.C.} + \text{F.C.}] \times \frac{\text{Credit Period}}{12} \times 40\%$

$= [12,60,000 + 3,60,000] \times \frac{1}{12} = 54,000$

Proposed: $= [15,75,000 + 3,60,000] + \frac{1}{12} \times 40\% = 1,29,000$

Alternative 2:

Incremental Approach

Particulars	Amount (₹)
Incremental contribution @ ₹ 7 of 22,500 units [WN:1]	1,57,500
Less: incremental cost of investment [WN ii]	75,000
Incremental profit	82,500

Company have incremental benefit on proposed policy, Hence, proposed credit policy should be adopt Contribution.

Working Note:

1. **Calculation of incremental**

Existing units	=	18,90,000 ÷ 21
	=	90,000 units
Incremental units	=	90,000 × 25%
	=	22,500 units
Contribution per unit	=	S.P. – V.C.
	=	21 – 14
	=	7 per unit
Contribution on Incremental Units	=	22,500 × 7
	=	1,57,500

2. **Incremental Cost of investment**

Existing Cost	=	90,000 units @ 18 p.u. = 16,20,000
Incremental Cost	=	22,500 units @ 14 p.u. (only V.C.) = 3,15,000
Existing credit period	=	1 month
Proposed credit period	=	2 months

3. **Incremental cost of investment:**

(a) On existing debtors = $16,20,000 \times \frac{2-1}{12} \times 40\%$

(b) On incremental debtors = $3,15,000 \times \frac{2}{12} \times 40\% = 21,000$

a + b = 54,000 + 21,000 = 75,000/-

Problem 6: Under an advance factoring arrangement Bharat Factors Ltd. (BFL) has advanced a sum of ₹ 14 lakh against the receivables purchased from ABC Ltd. The Factoring agreement provides for an advance payment of 80% (maintaining 'factor reserve of 20% to provide for disputes and deduction relating to the bills assigned) of the value of factored receivables and for guaranteed payment after three months from the date of purchasing the receivables. The advance carries a rate of interest of 20% per annum compounded quarterly and the factoring commission is 1.5% of the value of factored receivables. Both the interest and commission are collected up-front.

Required:

(i) Compute the amount of advance payable to ABC Ltd.

(ii) Calculator per annum the effective cost of funds made available to ABC Ltd.

(iii) Calculate the effective cost of funds made available to ABC Ltd. assuming that the interest is collected in arrear and commission is collected in advance.

Solution:

(i) Computation of advance payable to ABC Ltd:

	(₹ in lacs)
Value of factored receivable (i.e. 14/0.8)	17.50
Maximum permissible advance	14.00
Less: commission @ 1.5 per cent (i.e. 17.50 × 0.015)	0.26
Less: discount charge (14 × 0.2 × 90/360)	0.70
Funds made available to ABC Ltd.	13.04

Problem 7: The turnover of PQR Ltd. is ₹ 120 lakhs of which 75 per cent is on credit. The variable cost ratio is 80 per cent. The credit terms are 2/10, net 30. On the current level of sales, the bad debts are 1 per cent. The company spends ₹ 1,20,000 per annum on administering its credit sales. The cost includes salaries of staff who handle credit checking, collection etc. These are avoidable costs. The past experience indicates that 60 per cent of the customers avail of the cash discount, the remaining customers pay on an average 60 days after the date of sale.

The Book debts (receivable) of the company are presently being financed in the ratio of 1 : 1 by a mix of bank borrowings and owned funds which cost per annum 15 per cent and 14 per cent respectively.

A factoring firm has offered to buy the firm's receivables. The main elements of such deal structured by the factor are:

(i) Factor reserve, 12 per cent
(ii) Guaranteed payment, 25 days
(iii) Interest charges, 15 per cent, and
(iv) Commission 4 per cent of the value of receivables.

Assume 360 days in a year.

Required:

What advise would you give to PQR Ltd. - whether to continue with the in house management of receivables or accept the factoring firm's offer? **[May-2007]**

Solution: In-house Decision

	₹
Cash discount (₹ 90 lakhs × .60 × .02)	1,08,000
Bad debts losses (90,00,000 × .01)	90,000
Administration cost	1,20,000
Cost of funds in receivables*	1,08,750
	4,26,750

*Average collection period [(10 ×.6) + (60 days × .40)] = 30 days

Average investments in debtors $= \frac{90}{12} \times \frac{30}{360} = 7.5$ lakhs

Cost of Bank funds $\left(₹\ 7.5 \times \frac{1}{2} \times .15\right)$	56,250
Cost of Owned funds $\left(₹\ 7.5 \times \frac{1}{2} \times 1.4\right)$	52,500
	1,08,750

Offer Alternative

Factoring commission (₹ 90 lakhs × .04)	3,60,000
Interest charges 75,60,000 × 15% × $\frac{25}{360}$	78,750
Cost of owned funds invested in receivables (90,00,000 – 75,60,000) × .14 × $\frac{25}{360}$	14,000
	4,52,750

Decision: PQR should not go for the factoring alternative as the cost of factoring is more.

Cost of In-house Decision	4,26,750
Cost of Factoring Firm	4,52,750
Net loss	(26,000)

Problem 8: A firm has a total sales of ₹ 12,00,000 and its average collection period is 90 days. The past experience indicates that bad debt losses are 1.5% on sale. The expenditure incurred by the firm in administering receivable collection effort are ₹ 50,000. A factor is prepared to buy the firm's receivables by charging 2% commission. The factor will pay advance on receivables to this firm at an interest rate of 16% p.a. after withholding 10% as reserve. Calculate effective cost of factoring to the firm. Assume 360 days in a year. **[May-2009]**

Solution: Computation of Effective Cost of factoring

Average level of Receivable = $12,00,000 \times \frac{90}{360}$

= 3,00,000

Factoring commission = $3,00,000 \times \frac{2}{100}$

= 6,000

Factoring Reserve = $3,00,000 \times \frac{10}{100}$

= 30,000

Amount available for Advance = ₹ 3,00,000 – (6,000 + 30,0000)

Factor will deduct his interest @ 16%:-

Interest = $\frac{₹\ 2,64,000 \times 16 \times 90}{360 \times 100} = ₹\ 10,560$

Advance to be paid = ₹ 2,64,000 – ₹ 10,560 = ₹ 2,53,440

Effective cost of factoring to the firm:

Total commission (6,000 × 4)	24,000
Total interest (10,560 × 4)	42,240
Total cost	66,240
less: Existing cost	50,000
Elective cost	16,240

Effective cost = $\frac{16,240}{2,53,440} \times 100 = 6.4078\%$

Problem 9: A firm has a total sales of ₹ 200 lakhs of which 80% is on credit. It is offering credit terms of 2/40, net 120. Of the total, 50% of customers avail of discount and the balance pay in 120 days. Past experience indicates that bad debt losses are around 1% of credit sales. The firm spends about ₹ 2,40,000 per annum to administer its credit sales. These are avoidable as a factor is prepared to buy the firm's receivables. He will charge 2% commission. He will pay advance against receivables to the firm at an interest rate of 18% after withholding 10% as reserve.

Required:

(i) What is the effective cost of factoring? Consider year as 360 days.

(ii) If bank finance for working capital is available at 14% interest, should the firm avail of factoring service?

[Nov - 2015]

Solution: **The detailed calculations have been shown for better understanding of the students.**

Total Sales	₹ 200 lakhs
Credit Sales (80%)	₹ 160 lakhs
Receivables for 40 days	₹ 80 lakhs
Receivables for 120 days	₹ 80 lakhs
Average collection period [(40 x 0.5) + (120 × 0.5)]	80 days
Average level of Receivables (₹ 1,60,00,000 × 80/360)	₹ 35,55,556
Factoring Commission (₹ 35,55,556 × 2/100)	₹ 71,111
Factoring Reserve (₹ 35,55,556 × 10/100)	₹ 3,55,556
Amount available for advance {₹ 35,55,556 - (3,55,556 + 71,111)}	₹ 31,28,889

Factor will deduct his interest @ 18% :

$$\text{Interest} = \frac{₹\ 31,28,889 \times 18 \times 80}{100 \times 360} = ₹\ 1,25,156$$

Advance to be paid (₹ 31,28,889 – ₹ 1,25,156) = ₹ 30,03,733

(i) Calculation of Effective Cost of Factoring

Annual Cost of Factoring to the Firm:	₹
Factoring commission (₹ 71,111 × 360/80)	3,20,000
Interest charges (₹ 1,25,156 × 360/80)	5,63,200
Total (A)	8,83,200

Firm's Savings on taking Factoring Service:	₹
Cost of credit administration saved	2,40,000
Bad Debts (₹ 160,00,000 x 1/100) avoided	1,60,000
Total (B)	4,00,000
Net Cost to the firm (A – B) (₹ 8,83,200 – ₹ 4,00,000)	4,83,200

$$\text{Effective cost of factoring} = \frac{₹\ 4,83,200}{₹30,03,733} \times 100 = 16.09^{*}\ \%$$

* If cost of factoring is calculated on the basis of total amount available for advance, then, it will be

$$\frac{₹\ 4,83,200}{₹31,28,889} \times 100 = 15.44\%$$

(ii) If Bank finance for working capital is available at 14%, firm will not avail factoring service as 14 % is less than 16.08% (or 15.44%)

Problem 10: Pollock Co. Pvt. Ltd., which is operating for the last 5 years, has approached Sudershan Industries for grant of credit limit on account of goods bought from the latter, annexing Balance Sheet and Income Statement for the last 2 years as below:

Pollock Co. Pvt. Ltd. – Balance Sheet (₹ '000)

Particulars	Current Year (₹)	Last Year (₹)	Particulars	Current Year (₹)	Last Year (₹)
Share Capital Equity (₹ 10)	600	600	Plant and Equipment (less Depr.)	1,500	1,400
			Land	750	750
Share Premium	400	400	Total Fixed Assets	2,250	2,150
Retained Earnings	900	700	Inventories	580	300
Total Equity	1,900	1,700	Account Receivables	350	200
First Mortgage	200	300	Marketable Securities	120	120
Second Mortgage	—	200	Cash	100	80
Bonds	300	300	Total Current Assets	1,150	700
Long-term Liabilities	500	800			
Account Payable	300	60			
Notes Payable	600	220			
Secured Liabilities	100	70			
Total Current Liabilities	1,000	350			
Total	3,400	2,850	Total	3,400	2,850

Pollock Co. Pvt. Ltd. – Income Statement (₹ '000)

Particulars	Current Year (₹)		Last Year (₹)	
Sales	5,980		5,780	
Income from Investments	20	6,000	20	5,800
Opening inventory	300		400	
Total Manufacturing Costs	4,200		3,200	
Ending Inventory	–580	3,920	–300	3,300
		2,080		2,500
General and Admin. Expenses		950		750
Operating Income		1,130		1,750
Interest Expenses.		60		62
Earnings before Taxes		1,070		1,688
Income Tax		480		674
Net income after Taxes		590		1,014
Dividend declared and paid				250

Sudershan Industries has established the following broad guidelines for granting credit limits to its customers:

(i) Limit credit limit to 10% of net worth and 20% of the net working capital.

(ii) Not to give credit in excess of ₹ 1,00,000 to any single customer.

Required:

You are required to detail the steps required for establishing credit limits to Pollock Co. Pvt. Ltd. In this case, what you consider to be reasonable credit limit ?

Solution:

Working Notes: **(₹ 000)**

I. Liquidity Ratios:

Particulars	Current Year	Last Year
1. Current Ratio $\frac{\text{Current assets}}{\text{current liabilities}}$	$\frac{1150}{1000} = 11.5$	$\frac{700}{350} = 2.00$
2. Acid Test Ratio $\frac{\text{Current assets – Inven.}}{\text{current Liabilities}}$	$\frac{570}{1000} = 0.57$	$\frac{400}{350} = 1.14$
3. Inventory turnover $\frac{\text{Cost of goods sold}}{\text{Inventories}}$	$\frac{3920}{580} = 6.758$	$\frac{3300}{300} = 11$
4. Debtors turnover $\frac{\text{Sales}}{\text{Receivables}}$	$\frac{5980}{350} = 17.09$	$\frac{5780}{200} = 28.9$

II. Profitability Ratios:

Particulars	Current Year	Last Year
1. Profit margin $\left(\frac{\text{EBIT}}{\text{Sales}}\right) \times 100$	$\left(\frac{1130}{5980}\right) \times 100 = 18.9\%$	$\left(\frac{1750}{5780}\right) \times 100 = 30.28\%$
2. Return on investment $\left(\frac{\text{EBIT}}{\text{Total assets}}\right) \times 100$	$\left(\frac{1130}{3400}\right) \times 100 = 33.24\%$	$\left(\frac{1750}{2850}\right) \times 100 = 61.40\%$
3. Return on equity $\left(\frac{\text{EAT}}{\text{Equity}}\right) \times 100$	$\left(\frac{590}{1900}\right) \times 100 = 31.05\%$	$\left(\frac{1014}{1700}\right) \times 100 = 59.65\%$

III. Composition of current assets:

Particular	Current year		Last year	
	₹ 000	%	₹ 000	%
Inventories	580	50.43	300	42.86
Accounts receivable	350	30.43	200	28.57
Market securities	120	10.44	120	17.14

Cash	100	8.7	80	11.43
Total	1,150	100	700	100

IV. Working Capital:

Particulars	Current year ₹ 000	Last year ₹ 000
Current assets	1150	700
Less: Current liabilities	1000	350
Working capital	150	350

***Less:* Analysis to Pollock Co. Pvt. Ltd. on credit worthiness:**

1. The cost of goods sold has increased by ₹ 6,20,000 (i.e. ₹ 39,20,000 – ₹ 33,00,000) but the corresponding sales increase amounted to ₹ 2,00,000 only.
2. Current ratio and quick ratio gives an indication of adverse liquidity position.
3. Inventory turnover ratio has slipped from 11 times to 6.76 times, is an indication of poor sales and inefficient inventory control system.
4. Debtors turnover ratio has declined form 28.9 to 17.09 indicates liberal credit policy extended to customers and amounting of debtors balances.
5. Profit margin has declined form 30.28% to 18.9%.
6. Return on investment has declined form 61.40% to 33.24%.
7. Return on equity has also drastically declined from 59.65% to 31.05%.
8. Current liabilities have substantially been increased by ₹ 6,50,000 (i.e., ₹ 10,00,000 – ₹ 3,50,000) during the current year.
9. The composition of current assets gives an indication of locking up of working capital in inventories.
10. The quick assets viz. Marketable securities and cash balances have declined during the current year. Accept;
11. The long-term liabilities have reduced from ₹ 8,00,000 to ₹ 5,00,000, short-term funds might have used for (a), repayment of long-term liabilities.
12. The company has skipped the payment of dividend for the current year.
13. General and administration expenses have increased by ₹ 2,00,000 (i.e. 9,50,000 – ₹ 7,50,000) during the, current year.

Board guidelines of Sudarshan Industries for granting credit limits to its customers:

(i) Credit limit to 10% of net worth and 20% of the net working capital.
(ii) Not to give credit in excess of ₹ 1,00,000 to any single customer.

Credit limits to Pollock Co. Pvt. Ltd.	Amount (₹)
I. Net worth of Pollock Co. Pvt. Ltd.	19,00,000
Credit limit – 10% of net worth $\left(\frac{₹\ 19,00,000 \times 10}{100}\right)$	1,90,000
II. Net working capital of Pollock Co. Pvt. Ltd.	1,50,000
Credit limit – 20% of networking capital $\left(\frac{₹\ 1,50,000 \times 20}{100}\right)$	30,000
III. Maximum credit limit to any single customer	1,00,000

Analysis: Pollock Co. Pvt. Ltd. may be allowed a credit limit of ₹ 30,000, with constant appraisal of its performance and financial position.

Problem 11: PTX Limited is considering a change in its present credit policy. Currently it is evaluating two policies. The company is required to give a return of 20% on the investment in new accounts receivables. The company's variable costs are 70% of the selling price. Information regarding present and proposed policies is as follows:

Particulars	Present Policy	Policy Option 1	Policy Option 2
Annual Credit Sales (₹)	30,00,000	42,00,000	45,00,000
Debtors turnover ratio	4 times	3 times	2.4 times
Loss due to bad debts	3% of sales	5% of sales	6% of sales

Note: *Return on investment in new accounts receivable is based on cost of investment in debtors.*

Which option would you recommend? **(Nov. 2013)**

Solution: Statement of Evaluation of Credit Policies of PTX Limited (*based on Total Cost Approach*)

Particulars	Present Policy	Policy Option I	Policy Option II
Sales Revenue	30,00,000	42,00,000	4,50,0000
Less: Variable Cost @70% Contribution	21,00,000	29,40,000	31,50,000
	9,00,000	12,60,000	13,50,000
Less: Other Relevant Costs			
Bad Debt Losses	(90,000)	(2,10,000)	(2,70,000)
Investment Cost (VC ÷ DTR) × 20%	(1,05,000)	(1,96,000)	(2,62,500)
Profit	7,05,000	8,54,000	8,17,500

Recommendation: PTX Limited is advised to adopt Policy Option I.

(Note: In the above solution, investment in accounts receivable is based on total cost of goods sold on credit. Since fixed costs are not given in the problem, therefore, it is assumed that there are no fixed costs and investment in receivables is determined with reference to variable costs only. The above solution may alternatively be worked out on the basis of incremental approach. However, the recommendation would remain the same.)

Problem 12: PQR Ltd. having an annual sales of ₹30 lakhs, is re-considering its present collection policy. At present, the average collection period is 50 days and the bad debt losses are 5% of sales. The company is incurring an expenditure of ₹30,000 on account of collection of receivables.

The alternative policies are as under:

Particulars	Alternative I	Alternative II
Average Collection Period	40 days	30 days
Bad Debt Losses	4% of sales	3% of sales
Collection Expenses	₹60,000	₹95,000

Required:

Evaluate the alternatives on the basis of incremental approach and state which alternative is more beneficial. **(Nov 2014)**

Solution: Evaluation of Alternative Collection Programmes

Particulars		Present Policy	Alternative I	Alternative II
		(₹)	(₹)	(₹)
Sales Revenues		30,00,000	30,00,000	30,00,000
Average Collection Period (ACP) (days)		50	40	30
Receivables (₹) $\left(\text{Sales} \times \frac{\text{ACP}}{360}\right)$		4,16,667	3,33,333	2,50,000
Reduction in Receivables from Present Level (₹)		–	83,334	1,66,667
Savings in Interest @ 10% p.a.	**(A)**	–	₹8,333	₹16,667
% of Bad Debt Loss		5%	4%	3%
Amount (₹)		1,50,000	1,20,000	90,000
Reduction in Bad Debts from Present Level	**(B)**	–	30,000	60,000
Incremental Benefits from Present Level	**(C) = (A) + (B)**	–	38,333	76,667
Collection Expenses (₹)		30,000	60,000	95,000
Incremental Collection Expenses from Present Level (D)		–	30,000	65,000
Incremental Net Benefit	**(C – D)**	–	**₹8,333**	**₹11,667**

Conclusion: From the analysis it is apparent that Alternative I has a benefit of ₹8,333 and Alternative II has a benefit of ₹11,667 over present level. Alternative II has a benefit of ₹3,334 more than Alternative I. Hence Alternative II is more viable.

(**Note:** In absence of Cost of Sales, sales has been taken for purpose of calculating investment in receivables. Cost of Funds has been assumed to be 10%. 1 year = 360 days.)

Problem 13:

A trader whose current sales are in the region of ₹ 6 lakhs per annum and an average collection period of 30 days wants to pursue a more liberal policy to improve sales. A study made by a management consultant reveals the following information:

Credit Policy	Increase in collection period	Increase in sales	Present default anticipated
A	10 days	₹ 30,000	1.5%
B	20 days	₹ 48,000	2%
C	30 days	₹ 75,000	3%
D	45 days	₹ 90,000	4%

The selling price per unit is ₹ 3. Average cost per unit is ₹ 2.25 and variable costs per unit are ₹ 2. The current bad debt loss is 1%. Required return on additional investment is 20%. Assume a 360 days year.

ANALYSE which of the above policies would you recommend for adoption?

Solution:

(a) Statement showing the Evaluation of Debtors Policies (Total Approach)

	Particulars	Present Policy 30 days	Proposed Policy A 40 days	Proposed Policy B 50 days	Proposed Policy C 60 days	Proposed Policy D 75 days
		₹	₹	₹	₹	₹
A.	**Expected Profit:**					
	(a) Credit Sales	6,00,000	6,30,000	6,48,000	6,75,000	6,90,000
	(b) Total Cost other than Bad Debts					
	(i)Variable Costs [Sales × 2/ 3]	4,00,000	4,20,000	4,32,000	4,50,000	4,60,000
	(ii)Fixed Costs	50,000	50,000	50,000	50,000	50,000
		4,50,000	4,70,000	4,82,000	5,00,000	5,10,000
	(c) Bad Debts	6,000	9,450	12,960	20,250	27,600
	(d) Expected Profit [(a) – (b) – (c)]	1,44,000	1,50,550	1,53,040	1,54,750	1,52,400
B.	Opportunity Cost of Investments in Receivables	7,500	10,444	13,389	16,667	21,250
C.	**Net Benefits (A – B)**	**1,36,500**	**1,40,106**	**1,39,651**	**1,38,083**	**1,31,150**

Recommendation: The Proposed Policy A (i.e. increase in collection period by 10 days or total 40 days) should be adopted since the net benefits under this policy are higher as compared to other policies.

Working Notes:

i. Calculation of Fixed Cost = [Average Cost per unit – Variable Cost per unit] × No. of Units sold
= [₹ 2.25 - ₹ 2.00] × (₹ 6,00,000/3)
= ₹ 0.25 × 2,00,000 = ₹ 50,000

ii. Calculation of Opportunity Cost of Average Investments

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection period}}{360} \times \frac{\text{Rate of Return}}{100}$$

$$\text{Present Policy} = 4,50,000 \times \frac{30}{360} \times \frac{20}{100} = 7,500$$

$$\text{Policy A} = 4,70,000 \times \frac{40}{360} \times \frac{20}{100} = 10,444$$

$$\text{Policy B} = 4,82,000 \times \frac{50}{360} \times \frac{20}{100} = 13,389$$

$$\text{Policy C} = 5,00,000 \times \frac{60}{360} \times \frac{20}{100} = 16,667$$

$$\text{Policy D} = 5,10,000 \times \frac{75}{360} \times \frac{20}{100} = 21,250$$

B. Another method of solving the problem is **Incremental Approach**. Here we assume that sales are all credit sales.

	Particulars	Present Policy 30 days	Proposed Policy A 40 days	Proposed Policy B 50 days	Proposed Policy C 60 days	Proposed Policy D 75 days
		₹	₹	₹	₹	₹
A.	**Incremental Expected Profit:**					
	(a) Incremental Credit Sales	---	30,000	48,000	75,000	90,000
	(b) Incremental Costs					
	(i) Variable Costs	---	20,000	32,000	50,000	60,000
	(ii)Fixed Costs	---	-	-	-	-
	(c) Incremental Bad Debt Losses	---	3,450	6,960	14,250	21,600
	(d) Incremental Expected Profit (a – b –c)]		6,550	9,040	10,750	8,400
B.	**Required Return on Incremental Investments:**					
	(a) Cost of Credit Sales	4,50,000	4,70,000	4,82,000	5,00,000	5,10,000
	(b) Collection period	30	40	50	60	75
	(c) Investment in Receivable (a × b/360)	37,500	52,222	66,944	83,333	1,06,250
	(d) Incremental Investment in Receivables	---	14,722	29,444	45,833	68,750
	(e) Required Rate of Return (in %)		20	20	20	20
	(f) Required Return on Incremental Investments (d× e)	---	**2,944**	**5,889**	**9,167**	**13,750**
C.	**Net Benefits (A – B)**	**---**	**3,606**	**3,151**	**1,583**	**-5,350**

Recommendation: The Proposed Policy A should be adopted since the net benefits under this policy are higher than those under other policies.

C. Another method of solving the problem is by computing the **Expected Rate of Return.**

$$\text{Policy A} = 4{,}70{,}000 \times \frac{₹6{,}550}{₹14{,}722} \times 100 = 44.49\%$$

$$\text{Policy B} = 4{,}82{,}000 \times \frac{₹9{,}040}{₹29{,}444} \times 100 = 30.70\%$$

$$\text{Policy C} = 5{,}00{,}000 \times \frac{₹10{,}750}{₹45{,}833} \times 100 = 23.45\%$$

$$\text{Policy D} = 5{,}10{,}000 \times \frac{₹8{,}400}{₹68{,}750} \times 100 = 12.22\%$$

Recommendation: The Proposed Policy A should be adopted since the Expected Rate of Return (44.49%) is more than the Required Rate of Return (20%) and is highest among the given policies compared.

Problem 14:

A Factoring firm has credit sales of ₹ 360 lakhs and its average collection period is 30 days. The financial controller estimates, bad debt losses are around 2% of credit sales. The firm spends ₹ 1,40,000 annually on debtor's administration. This cost comprises of telephonic and fax bills along with salaries of staff members. These are the avoidable costs. A Factoring firm has offered to buy the firm's receivables. The factor will charge 1% commission and will pay an advance against receivables on an interest @15% p.a. after withholding 10% as reserve. ANALYSE what should the firm do?

Assume 360 days in a year.

Solution:

Working notes:

$$\text{Average level of receivables} = ₹\ 360 \text{ lakhs} \times \frac{30}{360} \quad 30 \text{ lakhs}$$

Factoring Commission	= 1% of ₹ 30,00,000 = ₹ 30,000
Reserve	= 10% of ₹ 30,00,000 = ₹ 3,00,000
Total (i)	= ₹ 3,30,000

Thus, the amount available for advance is

Average level of receivables	₹ 30,00,000
Less: Total (i) from above	₹ 3,30,000
(ii)	₹ 26,70,000
Less: Interest @ 15% p.a. for 30 days	₹ 33,375
Net Amount of Advance available.	₹ 26,36,625

Evaluation of Factoring Proposal

	Particulars	₹	₹
A.	**Savings (Benefit) to the firm**		
	Cost of Credit administration	₹ 1,40,000	₹ 1,40,000
	Cost of bad-debt losses	(0.02 × 360 lakhs)	₹ 7,20,000
	Total		₹ 8,60,000
B.	Cost to the Firm:		
	Factoring Commission [Annual credit Sales × % of Commission (or calculated annually)]	₹ 30,000 × 360/30	₹ 3,60,000
	Interest Charges	₹ 33,375 × 360/30	₹ 4,00,500
	Total		₹ 7,60,500
C.	**Net Benefits to the Firm: (A-B)**		**₹ 99,500**

Advice: Since the savings to the firm exceeds the cost to the firm on account of factoring, therefore, the proposal is acceptable.

8 CHAPTER

Working Capital Management

UNIT 5: Management of Payables (Creditors)

List of Important Questions

Problem 1: Suppose ABC Ltd. has been offered credit terms from its major supplier of 2/10, net 45. Hence the company has the choice of paying ₹ 10 per ₹ 100 or to invest ₹ 98 for an additional 35 days and eventually pay the supplier ₹ 100 per ₹ 100. The decision as to whether the discount should be accepted depends on the opportunity cost of investing ₹ 98 for 35 days. ANALYSE what should the company do?

Solution:

If the company does not avail the cash discount and pays the amount after 45 days, the implied cost of interest per annum would be approximately:

$$\left(\frac{100}{100 - d}\right)^{\frac{365}{1}} - 1 = 23.5\%$$

Now let us assume that ABC Ltd. can invest the additional cash and can obtain an annual return of 25% and if the amount of invoice is ₹ 10,000. The alternatives are as follows:

	Refuse discount	Accept discount
	₹	₹
Payment to supplier	10,000	9,800
Return from investing ₹ 9,800 between day 10 and day 45: $\frac{35}{365} \times ₹9,800 \times 25\%$	(235)	
Net Cost	9,765	9,800

Advise: Thus, it is better for the company to refuse the discount, as return on cash retained is more than the saving on account of discount.

Problem 2: The Dolce Company purchases raw materials on terms of 2/10, net 30. A review of the company's records by the owner, Mr. Gautam, revealed that payments are usually made 15 days after purchases are made. When asked why the firm did not take advantage of its discounts, the accountant, Mr. Rohit, replied that it cost only 2 per cent for these funds, whereas a bank loan would cost the company 12 per cent.

(a) ANALYSE what mistake is Rohit making?

(b) If the firm could not borrow from the bank and was forced to resort to the use of trade credit funds, what suggestion might be made to Rohit that would reduce the annual interest cost? IDENTIFY.

Solution:

(a) Rohit's argument of comparing 2% discount with 12% bank loan rate is not rational as 2% discount can be earned by making payment 5 days in advance i.e. within 10 days rather 15 days as payments are made presently. Whereas 12% bank loan rate is for a year.

Assume that the purchase value is ₹100, the discount can be earned by making payment within 10 days is ₹2, therefore, net payment would be ₹98 only. Annualized benefit

$$\frac{d}{100 - d} \times \frac{365 \text{ days}}{t}$$

This means cost of not taking cash discount is 149%.

(b) If the bank loan facility could not be available, then in this case the company should resort to utilise maximum credit period as possible.

Therefore, payment should be made in 30 days to reduce the interest cost.

8 CHAPTER

Working Capital Management

Miscellaneous Questions for Practice

List of Important Questions

Practical Problems and Solutions

Problem 1: Following information is forecasted by R Limited for the year ending 31st March, 2022:

	Balance as at 31st March, 2022 (₹ in lakh)	Balance as at 31st March, 2021 (₹ in lakh)
Raw Material	65	45
Work-in-progress	51	35
Finished goods	70	60
Receivables	135	112
Payables	71	68
Annual purchases of raw material (all credit)	400	
Annual cost of production	450	
Annual cost of goods sold	525	
Annual operating cost	325	
Annual sales (all credit)	585	

You may take one year as equal to 365 days. You are required to CALCULATE:

(i) Net operating cycle period.

(ii) Number of operating cycles in the year.

(iii) Amount of working capital requirement.

Solution:

1. Working Notes:

Raw Material Storage Period (R)

$$\frac{\text{Average Stock of Raw Material}}{\text{Annual Consumption of Raw Materia}} \times 365$$

$$\frac{\frac{₹45+₹65}{2}}{₹380} \times 365 = 52.83 \text{ or } 53 \text{ days}$$

Annual Consumption of Raw Material = Opening Stock + Purchases - Closing Stock

= ₹45 + ₹400 – ₹65 = ₹380 lakh

2. Work – in - Progress (WIP) Conversion Period (W)

$$\frac{\text{Average Stock of WIP}}{\text{Annual Cost of Production}} \times 365$$

$$\frac{\frac{₹35+₹51}{2}}{₹450} \times 365 = 34.87 \text{ or } 35 \text{ days}$$

3. Finished Stock Storage Period (F)

$$\frac{\text{Average Stock of Finished Goods}}{\text{Cost of Goods Sold}} \times 365$$

$$\frac{\frac{₹60+₹70}{2}}{₹525} \times 365 = 45.19 \text{ or } 45 \text{ days.}$$

4. Receivables (Debtors) Collection Period (D)

$$\frac{\text{Average Receivables}}{\text{Annual Credit Sales}} \times 365$$

$$\frac{\frac{₹112+₹135}{2}}{₹585} \times 365 = 77.05 \text{ or } 77 \text{ days}$$

5. Payables (Creditors) Payment Period (C)

$$\frac{\text{Average Payables for materials}}{\text{Annual Credit purchases}} \times 365$$

$$\frac{\frac{₹68+₹71}{2}}{₹400} \times 365 = 63.41 \text{ or } 64 \text{ days}$$

(i) Net Operating Cycle Period

= R + W + F + D - C

= 53 + 35 + 45 + 77 – 64 = 146 days

(ii) Number of Operating Cycles in the Year

$$\frac{365}{\text{Operating Cycle Period}} \times 365$$

$$\frac{365}{\text{Operating Cycle Period}} = \frac{365}{146} = 2.5 \text{ times}$$

(iii) Amount of Working Capital Required

$$\frac{\text{Annual Operating Cost}}{\text{Number of Operating Cycles}} = \frac{₹\ 325}{2.50} = ₹\ 130 \text{ lakh}$$

Problem 2: The following data relating to an auto component manufacturing company is available for the year 2021-22:

Raw material held in storage	20 days
Receivables' collection period	30 days
Conversion process period	10 days
(raw material – 100%, other costs – 50% complete)	
Finished goods storage period	45 days
Credit period from suppliers	60 days
Advance payment to suppliers	5 days
Total cash operating expenses per annum	₹ 800 lakhs

75% of the total cash operating expenses are for raw material. 360 days are assumed in a year.

You are required to CALCULATE:

(i) Each item of current assets and current liabilities,

(ii) The working capital requirement, if the company wants to maintain a cash balance of ₹ 10 lakhs at all times.

Solution:

Since WIP is 100% complete in terms of material and 50% complete in terms of other cost, the same has been considered for number of days for WIP inventory i.e. 10 days for material and 5 days for other costs respectively.

Particulars	*For Raw Material*	*For Other Costs*	*Total*
Cash Operating expenses	$\frac{75}{100} \times 800 = 600$	$\frac{25}{100} \times 800 = 200$	800.00
Raw Material Stock Holding	$\frac{20}{360} \times 600 = 33.33$	-	33.33
WIP Conversion	$\frac{10}{360} \times 600 = 16.67$	$\frac{5}{360} \times 200 = 2.78$	19.45
Finished Goods Stock Holding	$\frac{45}{360} \times 600 = 75$	$\frac{45}{360} \times 200 = 25$	100.00
Receivable Collection Period	$\frac{30}{360} \times 600 = 50$	$\frac{30}{360} \times 200 = 16.67$	66.67
Advance to suppliers	$\frac{5}{360} \times 600 = 8.33$	-	8.33
Credit Period from suppliers	$\frac{60}{360} \times 600 = 100$	-	100.00

Computation of working capital

	₹ in lakhs
Raw Material Stock	33.33
WIP	19.45
Finished Goods stock	100.00
Receivables	66.67
Advance to Suppliers	8.33
Cash	10.00
	237.78
Less: Payables (Creditors)	100.00
Working capital	133.78

Problem 3: The following figures and ratios are related to a company:

(i) Sales for the year (all credit)	₹ 90,00,000
(ii) Gross Profit ratio	35 percent
(iii) Fixed assets turnover (based on cost of goods sold)	1.5
(iv) Stock turnover (based on cost of goods sold)	6
(v) Liquid ratio	1.5:1
(vi) Current ratio	2.5:1
(vii) Receivables (Debtors) collection period	1 month
(viii) Reserves and surplus to Share capital	1:1.5
(ix) Capital gearing ratio	0.7875
(x) Fixed assets to net worth	1.3 : 1

You are required to PREPARE:

(a) Balance Sheet of the company on the basis of above details.

(b) The statement showing working capital requirement, if the company wants to make a provision for contingencies @15 percent of net working capital.

Solution: Working Notes:

(i) Cost of Goods Sold = Sales – Gross Profit (35% of Sales)
= ₹ 90,00,000 – ₹ 31,50,000
= ₹ 58,50,000

(ii) Closing Stock = Cost of Goods Sold / Stock Turnover
= ₹ 58,50,000/6 = ₹ 9,75,000

(iii) Fixed Assets = Cost of Goods Sold / Fixed Assets Turnover
= ₹ 58,50,000/1.5
= ₹ 39,00,000

(iv) Current Assets and Current Liabilities

Current Ratio = 2.5 and Liquid Ratio = 1.5

CA / CL = 2.5 ... (i)

(CA – Inventories) / CL = 1.5 ...(ii)

By subtracting equation (ii) from (i), we get, Inventories / CL = 1

Current Liabilities= Inventories (stock) = ₹ 9,75,000

∴ Current Assets = ₹ 9,75,000 × 2.5 = ₹ 24,37,500

Or

Current Ratio / Quick Ratio = Current Assets / Quick Assets

2.5 / 1.5 = Current Assets / (Current Assets – Inventory)

2.5/1.5 Current Assets – 2.5/1.5 x ₹ 9,75,000 = Current Assets

Hence, Current Assets = ₹ 24,37,500

(v) Liquid Assets (Receivables and Cash)
= Current Assets – Inventories (Stock)
= ₹ 24,37,500 – ₹ 9,75,000
= ₹14,62,500

(vi) Receivables (Debtors) = Sales × Debtors Collection period /12
= ₹ 90,00,000 × 1/12
= ₹ 7,50,000

(vii) Cash = Liquid Assets – Receivables (Debtors)
= ₹14,62,500 – ₹ 7,50,000 = ₹ 7,12,500

(viii) Net worth = Fixed Assets /1.3
= ₹ 39,00,000/1.3 = ₹ 30,00,000

(ix) Reserves and Surplus

Reserves and Surplus / Share Capital = 1/1.5

Share Capital= 1.5 Reserves and Surplus... (i)

Now, Reserves and Surplus + Share Capital = Net worth ... (ii) From (i) and (ii), we get,

2.5 Reserves and Surplus= Net worth

Reserves and Surplus= ₹ 30,00,000 / 2.5 = ₹ 12,00,000

(x) Share Capital = Net worth – Reserves and Surplus
= ₹ 30,00,000 – ₹ 12,00,000
= ₹ 18,00,000

(xi) Long-term Debts

Capital Gearing Ratio = Long-term Debts / Equity Shareholders' Fund

Long-term Debts = ₹ 30,00,000 × 0.7875 = ₹ 23,62,500

(a) Balance Sheet of the Company

Particulars	Figures as the end of 31-03-2021 (₹)	Figures as the end of 31-03-2020 (₹)
I. EQUITY AND LIABILITIES		
Shareholders' funds		
(a) Share capital	18,00,000	-
(b) Reserves and surplus	12,00,000	-
Non-current liabilities		
(a) Long-term borrowings	23,62,500	-
Current liabilities	9,75,000	-
TOTAL	**63,37,500**	-
II. ASSETS		
Non-current assets		
Fixed assets	39,00,000	-
Current assets		
Inventories	9,75,000	-
Trade receivables	7,50,000	-
Cash and cash equivalents	7,12,500	-
TOTAL	**63,37,500**	-

(b) Statement Showing Working Capital Requirement

	(₹)	(₹)
A. Current Assets		
(i) Inventories (Stocks)		9,75,000
(ii) Receivables (Debtors)		7,50,000
(iii) Cash in hand & at bank		7,12,500
Total Current Assets		24,37,500
B. Current Liabilities:		
Total Current Liabilities		9,75,000
Net Working Capital (A – B)		14,62,500
Add: Provision for contingencies (15% of Net Working Capital)		2,19,375
Working capital requirement		16,81,875

Problem 4: PQ Ltd., a company newly commencing business in 2021-22 has the following projected Profit and Loss Account:

	(₹)	(₹)
Sales		2,10,000
Cost of goods sold		1,53,000
Gross Profit		57,000

Administrative Expenses	14,000	
Selling Expenses	13,000	27,000
Profit before tax		30,000
Provision for taxation		10,000
Profit after tax		20,000
The cost of goods sold has been arrived at as under:		
Materials used	84,000	
Wages and manufacturing Expenses	62,500	
Depreciation	23,500	
	1,70,000	
Less: Stock of Finished goods		
(10% of goods produced not yet sold)	17,000	
	1,53,000	

The figure given above relate only to finished goods and not to work-in- progress. Goods equal to 15% of the year's production (in terms of physical units) will be in process on the average requiring full materials but only 40% of the other expenses. The company believes in keeping materials equal to two months' consumption in stock.

All expenses will be paid one month in advance. Suppliers of materials will extend 1-1/2 months credit. Sales will be 20% for cash and the rest at two months' credit. 70% of the Income tax will be paid in advance in quarterly instalments. The company wishes to keep ₹ 8,000 in cash. 10% has to be added to the estimated figure for unforeseen contingencies.

PREPARE an estimate of working capital.

Note: All workings should form part of the answer.

Solution:

Statement showing the requirements of Working Capital

Particulars	(₹)	(₹)
A. Current Assets:		
Inventory:		
Stock of Raw material (₹ 96,600 × 2/12)	16,100	
Stock of Work-in-progress (As per Working Note)	16,350	
Stock of Finished goods (₹ 1,46,500 × 10/100)	14,650	
Receivables (Debtors) (₹1,27,080 × 2/12)	21,180	
Cash in Hand	8,000	
Prepaid Expenses:		
Wages & Mfg. Expenses (₹ 66,250 × 1/12)	5,521	
Administrative expenses (₹ 14,000 × 1/12)	1,167	
Selling & Distribution Expenses (₹13,000 × 1/12)	1,083	
Advance taxes paid {(70% of ₹10,000) × 3/12}	1,750	
Gross Working Capital	85,801	85,801

B. Current Liabilities:		
Payables for Raw materials (₹1,12,700 × 1.5/12)	14,088	
Provision for Taxation (Net of Advance Tax) (₹10,000 × 30/100)	3,000	
Total Current Liabilities	17,088	17,088
C. Excess of CA over CL		68,713
Add: 10% for unforeseen contingencies		6,871
Net Working Capital requirements		**75,584**

Working Notes:

(i) Calculation of Stock of Work-in-progress

Particulars	(₹)
Raw Material (₹ 84,000 × 15%)	12,600
Wages & Mfg. Expenses (₹ 62,500 × 15% × 40%)	3,750
Total	**16,350**

(ii) Calculation of Stock of Finished Goods and Cost of Sales

Particulars	(₹)
Direct material Cost [₹ 84,000 + ₹ 12,600]	96,600
Wages & Mfg. Expenses [₹62,500 + ₹ 3,750]	66,250
Depreciation	0
Gross Factory Cost	1,62,850
Less: Closing W.I.P	(16,350)
Cost of goods produced	1,46,500
Add: Administrative Expenses	14,000
	1,60,500
Less: Closing stock	(14,650)
Cost of Goods Sold	1,45,850
Add: Selling and Distribution Expenses	13,000
Total Cash Cost of Sales	1,58,850
Debtors (80% of cash cost of sales)	1,27,080

(iii) Calculation of Credit Purchase

Particulars	(₹)
Raw material consumed	96,600
Add: Closing Stock	16,100
Less: Opening Stock	-
Purchases	1,12,700

Problem 5: M.A. Limited is commencing a new project for manufacture of a plastic component. The following cost information has been ascertained for annual production of 12,000 units which is the full capacity:

	Costs per unit (₹)
Materials	40.00
Direct labour and variable expenses	20.00
Fixed manufacturing expenses	6.00
Depreciation	10.00
Fixed administration expenses	4.00
	80.00

The selling price per unit is expected to be ₹ 96 and the selling expenses ₹ 5 per unit, 80% of which is variable.

In the first two years of operations, production and sales are expected to be as follows:

Year	Production (No. of units)	Sales (No. of units)
1	6,000	5,000
2	9,000	8,500

To assess the working capital requirements, the following additional information is available:

(a) Stock of materials — 2.25 months' average consumption
(b) Work-in-process — Nil
(c) Debtors — 1 month's average sales.
(d) Cash balance — ₹ 10,000
(e) Creditors for supply of materials — 1 month's average purchase during the year.
(f) Creditors for expenses — 1 month's average of all expenses during the year.

PREPARE, for the two years:

(i) A projected statement of Profit/Loss (Ignoring taxation); and
(ii) A projected statement of working capital requirements.

Solution:

(i) M.A. Limited

Projected Statement of Profit / Loss (Ignoring Taxation)

	Year 1	Year 2
Production (Units)	6,000	9,000
Sales (Units)	5,000	8,500
	(₹)	(₹)
Sales revenue (A) (Sales unit × ₹ 96)	4,80,000	8,16,000
Cost of production:		
Materials cost (Units produced × ₹ 40)	2,40,000	3,60,000
Direct labour and variable expenses (Units produced × ₹ 20)	1,20,000	1,80,000
Fixed manufacturing expenses (Production Capacity: 12,000 units × ₹ 6)	72,000	72,000
Depreciation (Production Capacity : 12,000 units × ₹ 10)	1,20,000	1,20,000
Fixed administration expenses (Production Capacity : 12,000 units × ₹ 4)	48,000	48,000
Total Costs of Production	6,00,000	7,80,000
Add: Opening stock of finished goods (Year 1 : Nil; Year 2 : 1,000 units)	---	1,00,000
Cost of Goods available for sale (Year 1: 6,000 units; Year 2: 10,000 units)	6,00,000	8,80,000
Less: Closing stock of finished goods at average cost (year 1: 1000 units, year 2 : 1500 units) (Cost of Production × Closing stock/ units produced)	(1,00,000)	(1,32,000)
Cost of Goods Sold	5,00,000	7,48,000
Add: Selling expenses – Variable (Sales unit × ₹ 4)	20,000	34,000
Add: Selling expenses - Fixed(12,000 units × ₹ 1)	12,000	12,000
Cost of Sales : (B)	5,32,000	7,94,000
Profit (+) / Loss (-): (A - B)	(-) 52,000	(+) 22,000

Working Notes:

(i) Calculation of creditors for supply of materials:

	Year 1 (₹)	Year 2 (₹)
Materials consumed during the year	2,40,000	3,60,000
Add: Closing stock (2.25 month's average consumption)	45,000	67,500
	2,85,000	**4,27,500**
Less: Opening Stock	---	45,000
Purchases during the year	2,85,000	3,82,500
Average purchases per month (Creditors)	23,750	31,875

(ii) Creditors for expenses:

	Year 1 (₹)	Year 2 (₹)
Direct labour and variable expenses	1,20,000	1,80,000
Fixed manufacturing expenses	72,000	72,000
Fixed administration expenses	48,000	48,000
Selling expenses (variable + fixed)	32,000	46,000
Total (including	2,72,000	3,46,000
Average per month	22,667	28,833

(ii) Projected Statement of Working Capital requirements

	Year 1 (₹)	Year 2 (₹)
Current Assets:		
Inventories:		
- Stock of materials (2.25 month's average consumption)	45,000	67,500
- Finished goods	1,00,000	1,32,000
Debtors (1 month's average sales) (including profit)	40,000	68,000
Cash	10,000	10,000
Total Current Assets/ Gross working capital (A)	**1,95,000**	**2,77,500**
Current Liabilities:		
Creditors for supply of materials (Refer to working note 1)	23,750	31,875
Creditors for expenses (Refer to working note 2)	22,667	28,833
Total Current Liabilities: (B)	46,417	60,708
Estimated Working Capital Requirements: (A-B)	1,48,583	2,16,792

Projected Statement of Working Capital Requirement (Cash Cost Basis)

	Year 1 (₹)	Year 2 (₹)
(A) Current Assets		
Inventories:		
- Stock of Raw Material (6,000 units × ₹ 40 × 2.25/12); (9,000 units × ₹ 40 × 2.25 /12)	45,000	67,500
- Finished Goods (Refer working note 3)	80,000	1,11,000
Receivables (Debtors) (Refer working note 4)	36,000	56,250
Minimum Cash balance	10,000	10,000
Total Current Assets/ Gross working capital (A)	1,71,000	2,44,750

(B) Current Liabilities		
Creditors for raw material (Refer working note 1)	23,750	31,875
Creditors for Expenses (Refer working note 2)	22,667	28,833
Total Current Liabilities	46,417	60,708
Net Working Capital (A – B)	1,24,583	1,84,042

Working Note:

(i) Cash Cost of Production:

	Year 1 (₹)	**Year 2 (₹)**
Cost of Production as per projected Statement of P&L	6,00,000	7,80,000
Less: Depreciation	1,20,000	1,20,000
Cash Cost of Production	4,80,000	6,60,000
Add: Opening Stock at Average Cost:	--	80,000
Cash Cost of Goods Available for sale	4,80,000	7,40,000
Less : Closing Stock at Avg. Cost $\left(\frac{₹\ 4,80,000 \times 1,000}{6,000}\right)$; $\left(\frac{₹\ 7,\ 40,000 \times 1,500}{10,000}\right)$	(80,000)	(1,11,000)
Cash Cost of Goods Sold	**4,00,000**	**6,29,000**

(ii) Receivables (Debtors)

	Year 1 (₹)	**Year 2 (₹)**
Cash Cost of Goods Sold	4,00,000	6,29,000
Add : Variable Expenses @ ₹ 4	20,000	34,000
Add : Total Fixed Selling expenses (12,000 units × ₹1)	12,000	12,000
Cash Cost of Debtors	4,32,000	6,75,000
Average Debtors	36,000	56,250

Problem 6: Aneja Limited, a newly formed company, has applied to a commercial bank for the first time for financing its working capital requirements. The following information is available about the projections for the current year:

Estimated level of activity: 1,04,000 completed units of production plus 4,000 units of work-in-progress. Based on the above activity, estimated cost per unit is:

Raw material	₹ 80 per unit
Direct wages	₹ 30 per unit
Overheads (exclusive of depreciation)	₹ 60 per unit
Total cost	₹ 170 per unit
Selling price	₹ 200 per unit

Raw materials in stock: Average 4 weeks consumption, work-in-progress (assume 50% completion stage in respect of conversion cost) (materials issued at the start of the processing).

Finished goods in stock	8,000 units
Credit allowed by suppliers	Average 4 weeks
Credit allowed to debtors/receivables	Average 8 weeks
Lag in payment of wages	Average 1.5 weeks

Cash at banks (for smooth operation) is expected to be ₹ 25,000.

Assume that production is carried on evenly throughout the year (52 weeks) and wages and overheads accrue similarly. All sales are on credit basis only.

You are required to CALCULATE the net working capital required.

Solution:

Calculation of Net Working Capital requirement:

	(₹)	(₹)
A. Current Assets:		
Inventories:		
- Raw material stock (Refer to Working note 3)	6,64,615	
- Work in progress stock (Refer to Working note 2)	5,00,000	
- Finished goods stock (Refer to Working note 4)	13,60,000	
Receivables (Debtors) (Refer to Working note 5)	25,10,769	
Cash and Bank balance	25,000	
Gross Working Capital	50,60,384	50,60,384
B. Current Liabilities:		
Creditors for raw materials (Refer to Working note 6)	7,15,740	
Creditors for wages (Refer to Working note 7)	91,731	
	8,07,471	8,07,471
Net Working Capital (A - B)		**42,52,913**

Working Notes:

1. **Annual cost of production**

	(₹)
Raw material requirements {(1,04,000 units × ₹ 80)+ ₹3,20,000}	86,40,000
Direct wages {(1,04,000 units × ₹ 30) + ₹60,000}	31,80,000
Overheads (exclusive of depreciation) {(1,04,000 × ₹ 60)+ ₹1,20,000}	63,60,000
Gross Factory Cost	1,81,80,000
Less: Closing W.I.P	(5,00,000)
Cost of Goods Produced	1,76,80,000
Less: Closing Stock of Finished Goods (₹1,76,80,000 × 8,000/1,04,000)	(13,60,000)
Total Cash Cost of Sales	1,63,20,000

2. **Work in progress stock**

	(₹)
Raw material requirements (4,000 units × ₹ 80)	3,20,000
Direct wages (50% × 4,000 units × ₹ 30)	60,000
Overheads (50% × 4,000 units × ₹ 60)	1,20,000
	5,00,000

4. Raw material stock

It is given that raw material in stock is average 4 weeks consumption. Since, the company is newly formed, the raw material requirement for production and work in progress will be issued and consumed during the year.

Hence, the raw material consumption for the year (52 weeks) is as follows:

	(₹)
For Finished goods (1,04,000 × ₹ 80)	83,20,000
For Work in progress (4,000 × ₹ 80)	3,20,000
	86,40,000

$$\frac{₹\ 86,40,000}{52\ \text{weeks}} \times 4\ \text{weeks} \qquad \text{i.e. } ₹\ 6,64,615$$

4. Finished goods stock: 8,000 units @ ₹ 170 per unit = ₹ 13,60,000

5. Debtors for sale: $1,63,20,000 \times \frac{8}{52}$ = ₹ 25,10,769

6. Creditors for raw material:

Material Consumed (₹ 83,20,000 + ₹ 3,20,000)	₹ 86,40,000
Add: Closing stock of raw material	₹ 6,64,615
Purchases of Raw Material	₹ 93,04,615

$$\text{Credit allowed by suppliers} = \frac{₹\ 93,04,615}{52\ \text{weeks}} \times 4\ \text{weeks} = ₹\ 7,15,740$$

7. $\text{Creditors for wages} = \frac{₹\ 31,80,000}{52\ \text{weeks}} \times 1.5\ \text{weeks} = ₹\ ₹\ 91,731$

Problem 7: The management of Trux Company Ltd. is planning to expand its business and consults you to prepare an estimated working capital statement. The records of the company reveals the following annual information:

	(₹)
Sales – Domestic at one month's credit	18,00,000
Export at three month's credit (sales price 10% below domestic price)	8,10,000
Materials used (suppliers extend two months credit)	6,75,000
Lag in payment of wages – ½ month	5,40,000
Lag in payment of manufacturing expenses (cash) – 1 month	7,65,000
Lag in payment of Administration Expenses – 1 month	1,80,000
Selling expenses payable quarterly in advance	1,12,500
Income tax payable in four installments, of which one falls in the next financial year	1,68,000

Rate of gross profit is 20%. Ignore work-in-progress and depreciation.

The company keeps one month's stock of raw materials and finished goods (each) and believes in keeping ₹ 2,50,000 available to it including the overdraft limit of ₹ 75,000 not yet utilized by the company.

The management is also of the opinion to make 10% margin for contingencies on computed figure.

You are required to PREPARE the estimated working capital statement for the next year.

Solution:

Preparation of Statement of Working Capital Requirement for Trux Company Ltd.

	(₹)	(₹)
A. Current Assets		
(i) Inventories:		
Material (1 month) $\left(\frac{₹\ 6,75,000}{12\ \text{months}} \times 1\ \text{months}\right)$	56,250	
Finished goods (1 month) $\left(\frac{₹\ 21,60,000}{12\ \text{months}} \times 1\ \text{months}\right)$	1,80,000	2,36,250
(ii)Receivables (Debtors)		
For Domestic Sales $\left(\frac{₹\ 15,17,586}{12\ \text{months}} \times 1\ \text{months}\right)$	1,26,466	
For Export Sales $\left(\frac{₹\ 7,54,914}{12\ \text{months}} \times 3\ \text{months}\right)$	1,88,729	3,15,195
(iii) Prepayment of Selling expenses $\left(\frac{₹\ 1,12,500}{12\ \text{months}} \times 3\ \text{months}\right)$		28,125
(iii) Cash in hand & at bank (net of overdraft) Total Current Assets		1,75,000 7,54,570
B. Current Liabilities:		
(i) Payables (Creditors) for materials (2 months) $\left(\frac{₹\ 6,75,000}{12\ \text{months}} \times 2\ \text{months}\right)$		1,12,500
(ii) Outstanding wages (0.5 months) $\left(\frac{₹\ 5,40,000}{12\ \text{months}} \times 05\ \text{months}\right)$		22,500
(iii) Outstanding manufacturing expenses $\left(\frac{₹\ 7,65,000}{12\ \text{months}} \times 1\ \text{months}\right)$		63,750
(iv) Outstanding administrative expenses $\left(\frac{₹\ 1,80,000}{12\ \text{months}} \times 1\ \text{months}\right)$		15,000
(v) Income tax payable Total Current Liabilities		42,000 2,55,750
Net Working Capital (A – B) Add: 10% contingency margin		4,98,820 49,882
Total Working Capital required		**5,48,702**

Working Notes:

1. Calculation of Cost of Goods Sold and Cost of Sales

	Domestic (₹)	Export (₹)	Total (₹)
Domestic Sales	18,00,000	8,10,000	26,10,000
Less: Gross profit @ 20% on domestic sales and 11.11% on export sales (Working note-2)	3,60,000	90,000	4,50,000
Cost of Goods Sold	14,40,000	7,20,000	21,60,000
Add: Selling expenses (Working note-3)	77,586	34,914	1,12,500
Cash Cost of Sales	15,17,586	7,54,914	22,72,500

2. **Calculation of gross profit on Export Sales**

   Let domestic selling price is ₹ 100. Gross profit is ₹ 20, and then cost per unit is ₹ 80

   Export price is 10% less than the domestic price i.e. ₹ 100–(1-0.1)= ₹ 90

   Now, gross profit will be = ₹ 90 - ₹ 80 = ₹ 10

   So, Gross profit ratio at export price will be $= \frac{₹\ 10}{₹\ 90} \times 100 = 11.11\%$

3. **Apportionment of Selling expenses between Domestic and Exports sales:**

   Apportionment on the basis of sales value:

   Domestic Sales $= \frac{₹\ 1,12,500}{₹\ 26,10,000} \times ₹\ 18,00,000 = 77,586$

   Exports Sales $= \frac{₹\ 1,12,500}{₹\ 26,10,000} \times ₹\ 18,10,000 = 34,914$

4. **Assumptions**
   1. It is assumed that administrative expenses is related to production activities.
   2. Value of opening and closing stocks are equal.

Problem 8: The following information relates to Zeta Limited, a publishing company:

The selling price of a book is ₹ 15, and sales are made on credit through a book club and invoiced on the last day of the month.

Variable costs of production per book are materials (₹ 5), labour (₹ 4), and overhead (₹ 2)

The sales manager has forecasted the following volumes:

Month	No. of Books
November	1,000
December	1,000
January	1,000
February	1,250
March	1,500
April	2,000
May	1,900
June	2,200
July	2,200
August	2,300

Customers are expected to pay as follows:

One month after the sale	40%
Two months after the sale	60%

The company produces the books two months before they are sold and the creditors for materials are paid two months after production.

Variable overheads are paid in the month following production and are expected to increase by 25% in April; 75% of wages are paid in the month of production and 25% in the following month. A wage increase of 12.5% will take place on 1st March.

The company is going through a restructuring and will sell one of its freehold properties in May for ₹ 25,000, but it is also planning to buy a new printing press in May for ₹ 10,000. Depreciation is currently ₹ 1,000 per month, and will rise to ₹ 1,500 after the purchase of the new machine.

The company's corporation tax (of ₹ 10,000) is due for payment in March.

The company presently has a cash balance at bank on 31 December 2021, of ₹ 1,500.

You are required to PREPARE a cash budget for the six months from January to June, 2022.

Solution:

Workings:

1. Sale receipts

Month	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Forecast sales (S)	1,000	1,000	1,000	1,250	1,500	2,000	1,900	2,200
	₹	₹	₹	₹	₹	₹	₹	₹
S×15	15,000	15,000	15,000	18,750	22,500	30,000	28,500	33,000
Debtors pay:								
1month 40%		6,000	6,000	6,000	7,500	9,000	12,000	11,400
2month 60%		-	9,000	9,000	9,000	11,250	13,500	18,000
	-	-	15,000	15,000	16,500	20,250	25,500	29,400

2. Payment for materials – books produced two months before sale

Month	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Qty produced (Q)	1,000	1,250	1,500	2,000	1,900	2,200	2,200	2,300
	₹	₹	₹	₹	₹	₹	₹	₹
Materials (Q×5)	5,000	6,250	7,500	10,000	9,500	11,000	11,000	11,500
Paid (2 months after)	-	-	5,000	6,250	7,500	10,000	9,500	11,000

3. Variable overheads

Month	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Qty produced (Q)	1,000	1,250	1,500	2,000	1,900	2,200	2,200	2,300
	₹	₹	₹	₹	₹	₹	₹	₹
Var. overhead (Q×2)	2,000	2,500	3,000	4,000	3,800			
Var. overhead (Q×2.50)						5,500	5,500	5,750
Paid one month later		2,000	2,500	3,000	4,000	3,800	5,500	5,500

4. Wages payments

Month	Dec	Jan	Feb	Mar	Apr	May	Jun
Qty produced (Q)	1,250	1,500	2,000	1,900	2,200	2,200	2,300
	₹	₹	₹	₹	₹	₹	₹
Wages (Q × 4)	5,000	6,000	8,000				
Wages (Q × 4.50)				8,550	9,900	9,900	10,350
75% this month	3,750	4,500	6,000	6,412	7,425	7,425	7,762
25% this month		1,250	1,500	2,000	2,138	2,475	2,475
		5,750	7,500	8,412	9,563	9,900	10,237

Cash budget – six months ended June

	Jan	Feb	Mar	Apr	May	Jun
	₹	₹	₹	₹	₹	₹
Receipts:						
Sales receipts	15,000	15,000	16,500	20,250	25,500	29,400
Freehold property	-	-	-	-	25,000	-
	15,000	15,000	16,500	20,250	50,500	29,400
Payments:						
Materials	5,000	6,250	7,500	10,000	9,500	11,000
Var. overheads	2,500	3,000	4,000	3,800	5,500	5,500
Wages	5,750	7,500	8,412	9,563	9,900	10,237
Printing press	-	-	-	-	10,000	-
Corporation tax	-	-	10,000	-	-	-
	13,250	**16,750**	**29,912**	**23,363**	**34,900**	**26,737**
Net cash flow	1,750	-1,750	-13,412	-3,113	15,600	2,663
Balance b/f	1,500	3,250	1,500	-11,912	-15,025	575
Cumulative cash flow	3,250	1,500	-11,912	-15,025	575	3,238

Problem 9: From the information and the assumption that the cash balance in hand on 1st January 2022 is ₹ 72,500, PREPARE a cash budget.

Assume that 50 per cent of total sales are cash sales. Assets are to be acquired in the months of February and April. Therefore, provisions should be made for the payment of ₹ 8,000 and ₹ 25,000 for the same. An application has been made to the bank for the grant of a loan of ₹ 30,000 and it is hoped that the loan amount will be received in the month of May.

It is anticipated that a dividend of ₹ 35,000 will be paid in June. Debtors are allowed one month's credit. Creditors for materials purchased and overheads grant one month's credit. Sales commission at 3 per cent on sales is paid to the salesman each month.

Month	Sales (₹)	Materials Purchases (₹)	Salaries & Wages (₹)	Production Overheads (₹)	Office and Selling Overheads (₹)
January	72,000	25,000	10,000	6,000	5,500
February	97,000	31,000	12,100	6,300	6,700
March	86,000	25,500	10,600	6,000	7,500
April	88,600	30,600	25,000	6,500	8,900
May	1,02,500	37,000	22,000	8,000	11,000
June	1,08,700	38,800	23,000	8,200	11,500

Solution:

(a) Cash Budget

	Jan ₹	Feb ₹	Mar ₹	Apr ₹	May ₹	June ₹	Total ₹
Receipts							
Cash sales	36,000	48,500	43,000	44,300	51,250	54,350	2,77,400
Collections from debtors	-	36,000	48,500	43,000	44,300	51,250	2,23,050
Bank loan	-	-	-	-	30,000	-	30,000
Total	36,000	84,500	91,500	87,300	1,25,550	1,05,600	5,30,450
Payments							
Materials	-	25,000	31,000	25,500	30,600	37,000	1,49,100
Salaries and wages	10,000	12,100	10,600	25,000	22,000	23,000	1,02,700
Production overheads	-	6,000	6,300	6,000	6,500	8,000	32,800
Office & selling overheads	-	5,500	6,700	7,500	8,900	11,000	39,600
Sales commission	2,160	2,910	2,580	2,658	3,075	3,261	16,644
Capital expenditure	-	8,000	-	25,000	-	-	33,000
Dividend	-	-	-	-	-	35,000	35,000
Total	12,160	59,510	57,180	91,658	71,075	1,17,261	4,08,844
Net cash flow	23,840	24,990	34,320	(4,358)	54,475	(11,661)	1,21,606
Balance, beginning of month	72,500	96,340	1,21,330	1,55,650	1,51,292	2,05,767	72,500
Balance, end of month	96,340	1,21,330	1,55,650	1,51,292	2,05,767	1,94,106	1,94,196

Problem 10: Consider the balance sheet of Maya Limited as on 31 December, 2022. The company has received a large order and anticipates the need to go to its bank to increase its borrowings. As a result, it has to forecast its cash requirements for January, February and March, 2023. Typically, the company collects 20 per cent of its sales in the month of sale, 70 per cent in the subsequent month, and 10 per cent in the second month after the sale. All sales are credit sales.

Equity & liabilities	Amount (₹ in '000)	Assets	Amount (₹ in '000)
Equity shares capital	100	Net fixed assets	1,836
Retained earnings	1,439	Inventories	545
Long-term borrowings	450	Accounts receivables	530
Accounts payables	360	Cash and bank	50
Loan from banks	400		
Other liabilities	212		
	2,961		2,961

Purchases of raw materials are made in the month prior to the sale and amounts to 60 per cent of sales. Payments for these purchases occur in the month after the purchase. Labour costs, including overtime, are expected to be ₹ 1,50,000 in January, ₹ 2,00,000 in February, and ₹ 1,60,000 in March. Selling, administrative, taxes, and other

cash expenses are expected to be ₹ 1,00,000 per month for January through March. Actual sales in November and December and projected sales for January through April are as follows (in thousands):

Month	₹	Month	₹	Month	₹
November	500	January	600	March	650
December	600	February	1,000	April	750

On the basis of this information:

(a) PREPARE a cash budget and DETERMINE the amount of additional bank borrowings necessary to maintain a cash balance of ₹ 50,000 at all times for the months of January, February, and March.

(b) PREPARE a pro forma balance sheet for March 31.

Solution:

(a) Cash Budget **(in thousands)**

	Nov.	Dec.	Jan.	Feb.	Mar.
	₹	₹	₹	₹	₹
Opening Balance (A)			50	50	50
Sales	500	600	600	1,000	650
Receipts:					
Collections, current month's sales			120	200	130
Collections, previous month's sales			420	420	700
Collections, previous 2 month's sales			50	60	60
Total (B)			**590**	**680**	**890**
Purchases		360	600	390	450
Payments:					
Payment for purchases			360	600	390
Labour costs			150	200	160
Other expenses			100	100	100
Total (C)			**610**	**900**	**650**
Surplus/Deficit (D) = (A + B – C)			30	(170)	290
Minimum cash balance (E)			50	50	50
Additional borrowings (F) = (E - D)			20	220	(240)

			Jan.	Feb.	Mar.
			₹	₹	₹
Additional borrowings			20	220	(240)
Cumulative borrowings (Opening balance of 400)			420	640	400

The amount of financing peaks in February owing to the need to pay for purchases made the previous month and higher labour costs. In March, substantial collections are made on the prior month's billings, causing large net cash inflow sufficient to pay off the additional borrowings.

(b) Pro forma Balance Sheet, 31st March, 2023

Equity & liabilities	Amount (₹ in '000)	Assets	Amount (₹ in '000)
Equity shares capital	100	Net fixed assets	1,836
Retained earnings	1,529	Inventories	635
Long-term borrowings	450	Accounts receivables	620
Accounts payables	450	Cash and bank	50
Loan from banks	400		
Other liabilities	212		
	3,141		3,141

Accounts receivable = Sales in March × 0.8 + Sales in February × 0.1
= ₹ 650 × 0.8 + ₹ 1,000 × 0.1 = ₹ 620

Inventories = ₹ 545 + Total purchases from January to March – Total sales from January to March ´0.6
= ₹ 545 + (₹ 600 + ₹ 390 + ₹ 450) – (₹ 600 + ₹ 1000 + ₹ 650) × 0.6 = ₹ 635

Accounts payable = Purchases in March = ₹ 450

Retained earnings = ₹ 1,439 + Sales – Payment for purchases – Labour costs and – Other expenses, all for January to March
= ₹ 1,439 + (₹ 600 + ₹ 1000 + ₹ 650) – (₹ 360 + ₹ 600 + ₹ 390) – (₹ 150 + ₹ 200 + ₹ 160) – (₹ 100 + ₹ 100 + ₹ 100) = ₹ 1,529

Problem 11: PQR Ltd. having an annual sales of ₹ 30 lakhs, is re-considering its present collection policy. At present, the average collection period is 50 days and the bad debt losses are 5% of sales. The company is incurring an expenditure of ₹ 30,000 on account of collection of receivables. Cost of funds is 10 percent.

The alternative policies are as under:

	Alternative I	Alternative II
Average Collection Period	40 days	30 days
Bad Debt Losses	4% of sales	3% of sales
Collection Expenses	₹ 60,000	₹ 95,000

DETERMINE the alternatives on the basis of incremental approach and state which alternative is more beneficial.

Solution:

Evaluation of Alternative Collection Programmes

	Present Policy	Alternative I	Alternative II
	₹	₹	₹
Sales Revenues	30,00,000	30,00,000	30,00,000
Average Collection Period (ACP) (days)	50	40	30
Receivables $\left(\text{Sales} \times \frac{\text{₹ ACP}}{360}\right)$	4,16,667	3,33,333	2,50,000
Reduction in Receivables from Present Level (₹)	–	83,334	1,66,667
Savings in Interest @ 10% p.a. (A)	–	₹ 8,333	₹ 16,667
% of Bad Debt Loss	5%	4%	3%

Amount (₹)	**1,50,000**	**1,20,000**	**90,000**
Reduction in Bad Debts from Present Level (B)	–	30,000	60,000
Incremental Benefits from Present Level **(C) = (A) + (B)**	–	38,333	76,667
Collection Expenses (₹)	30,000	60,000	95,000
Incremental Collection Expenses from Present Level **(D)**	–	30,000	65,000
Incremental Net Benefit **(C – D)**	–	₹ 8,333	₹ 11,667

Conclusion: From the analysis it is apparent that Alternative I has a benefit of ₹ 8,333 and Alternative II has a benefit of ₹ 11,667 over present level. Alternative II has a benefit of ₹ 3,334 more than Alternative I. Hence Alternative II is more viable.

(Note: In absence of Cost of Sales, sales has been taken for purpose of calculating investment in receivables. 1 year = 360 days.)

Problem 12: As a part of the strategy to increase sales and profits, the sales manager of a company proposes to sell goods to a group of new customers with 10% risk of non-payment. This group would require one and a half months credit and is likely to increase sales by ₹ 1,00,000 p.a. Production and Selling expenses amount to 80% of sales and the income-tax rate is 50%. The company's minimum required rate of return (after tax) is 25%.

Should the sales manager's proposal be accepted? ANALYSE

Also COMPUTE the degree of risk of non-payment that the company should be willing to assume if the required rate of return (after tax) were (i) 30%, (ii) 40% and (iii) 60%.

Solution:

Statement showing the Evaluation of Proposal

	Particulars	₹
A.	**Expected Profit:**	
	Net Sales	1,00,000
	Less: Production and Selling Expenses @ 80%	(80,000)
	Profit before providing for Bad Debts	20,000
	Less: Bad Debts @10%	(10,000)
	Profit before Tax	10,000
	Less: Tax @ 50%	(5,000)
	Profit after Tax	5,000
B.	**Opportunity Cost of Investment in Receivables**	(2,500)
C.	**Net Benefits (A – B)**	2,500

Advise: The sales manager's proposal should be accepted.

Working Note: Calculation of Opportunity Cost of Funds

$$\text{Opportunity Cost} = \text{Total Cost of Credit Sales} \times \frac{\text{Collection period}}{12} \times \frac{\text{Required Rate of Return}}{100}$$

$$= ₹\ 80{,}000 \times \frac{1.5}{12} \times \frac{25}{100} = ₹\ 2{,}500$$

Statement showing the Acceptable Degree of Risk of Non-payment

Particulars	**Required Rate of Return**		
	30%	**40%**	**60%**
Sales	1,00,000	1,00,000	1,00,000
Less: Production and Sales Expenses	80,000	80,000	80,000
Profit before providing for Bad Debts	20,000	20,000	20,000

Less: Bad Debts (assume X)	X	X	X
Profit before tax	20,000 – X	20,000 – X	20,000 – X
Less: Tax @ 50%	(20,000 – X) 0.5	(20,000 – X) 0.5	(20,000 – X) 0.5
Profit after Tax	10,000 –0.5X	10,000 –0.5X	10,000 –0.5X
Required Return (given)	30% of 10,000* = ₹ 3,000	40% of 10,000* = ₹ 4,000	60% of 10,000* = ₹ 6,000

$$*\text{Average Debtors} = \text{Total Cost of Credit Sales} \times \frac{\text{Collection period}}{12}$$

$$= ₹\ 80{,}000 \times \frac{1.5}{12}$$

Computation of the value and percentage of X in each case is as follows:

Case I 10,000 – 0.5x = 3,000
0.5x = 7,000
X = 7,000/0.5 = ₹ 14,000
Bad Debts as % of sales = ₹ 14,000/₹1,00,000 × 100 = 14%
Case II 10,000 – 0.5x = 4,000
0.5x = 6,000
X = 6,000/0.5 = ₹ 12,000
Bad Debts as % of sales = ₹ 12,000/₹1,00,000 × 100 = 12%
Case III 10,000 – 0.5x = 6,000
0.5x = 4,000
X = 4,000/0.5 = ₹ 8,000
Bad Debts as % of sales = ₹ 8,000/₹1,00,000 × 100 = 8%

Thus, it is found that the Acceptable Degree of risk of non-payment is 14%, 12% and 8% if required rate of return (after tax) is 30%, 40% and 60% respectively.

Problem 13: Slow Payers are regular customers of Goods Dealers Ltd. and have approached the sellers for extension of credit facility for enabling them to purchase goods. On an analysis of past performance and on the basis of information supplied, the following pattern of payment schedule emerges in regard to Slow Payers:

Pattern of Payment Schedule	
At the end of 30 days	15% of the bill
At the end of 60 days	34% of the bill
At the end of 90 days	30% of the bill
At the end of 100 days	20% of the bill
Non-recovery	1% of the bill

Slow Payers want to enter into a firm commitment for purchase of goods of ₹ 15 lakhs in 2021-22, deliveries to be made in equal quantities on the first day of each quarter in the calendar year. The price per unit of commodity is ₹ 150 on which a profit of ₹ 5 per unit is expected to be made. It is anticipated by Goods Dealers Ltd., that taking up of this contract would mean an extra recurring expenditure of ₹ 5,000 per annum. If the opportunity cost of funds in the hands of Goods Dealers is 24% per annum, would you as the finance manager of the seller recommend the grant of credit to Slow Payers?

ANALYSE. Workings should form part of your answer. Assume year of 365 days.

Solution:

Statement showing the Evaluation of Debtors Policies

Particulars	Proposed Policy ₹
A. Expected Profit:	
(a) Credit Sales	15,00,000
(b) Total Cost	
(i) Variable Costs	14,50,000
(ii) Recurring Costs	5,000
	14,55,000
(c) Bad Debts	15,000
(d) Expected Profit [(a) – (b) – (c)]	30,000
B. Opportunity Cost of Investments in Receivables	68,787
C. Net Benefits (A – B)	(38,787)

Recommendation: The Proposed Policy should not be adopted since the net benefits under this policy are negative

Working Note: Calculation of Opportunity Cost of Average Investments

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection period}}{365} \times \frac{\text{Rate of Return}}{100}$$

Particulars	15%	34%	30%	20%	Total
A. Total Cost	2,18,250	4,94,700	4,36,500	2,91,000	14,40,450
B. Collection period	30/365	60/365	90/365	100/365	
C. Required Rate of Return	24%	24%	24%	24%	
D. Opportunity Cost (A × B × C)	4,305	19,517	25,831	19,134	68,787

Problem 14: PREPARE a working capital estimate to finance an activity level of 52,000 units a year (52 weeks) based on the following data:

Raw Materials - ₹ 400 per unit
Direct Wages - ₹ 150 per unit
Overheads (Manufacturing) - ₹200 per unit
Overheads (Selling & Distribution) - ₹100 per unit

Selling Price - ₹ 1,000 per unit, Raw materials & Finished Goods remain in stock for 4 weeks, Work in process takes 4 weeks. Debtors are allowed 8 weeks for payment whereas creditors allow us 4 weeks.

Minimum cash balance expected is ₹50,000. Receivables are valued at Selling Price.

Solution:

Cost Structure for 52,000 units	
Particulars	**Amount (₹)**
Raw Material @ ₹ 400P	2,08,00,000
Direct Wages @ ₹ 150	78,00,000
Manufacturing Overheads @ ₹ 200	1,04,00,000
Selling and Distribution OH @ ₹ 100	52,00,000
Total Cost	4,42,00,000
Sales @ ₹ 1,000	5,20,00,000

Particulars	Calculation	Amount (₹)
A. Current Assets:		
Raw Material Stock	₹ 2,08,00,000 $\times \frac{4}{52}$	16,00,000
Work in Progress (WIP) Stock**	$= ₹\ 2,08,00,000 + \frac{(78,00,000+1,04,00,000)}{2} \times \frac{4}{52}$	23,00,000
Finished Goods Stock	₹ 4,42,00,000 $\times \frac{4}{52}$	34,00,000
Receivables	₹ 5,20,00,000 $\times \frac{8}{52}$	80,00,000
Cash		50,000
	Total Current Assets	1,53,50,000
B. Current Liabilities:		
Creditors	₹ 2,08,00,000 $\times \frac{4}{52}$	16,00,000
C. Working Capital Estimates(A-B)		**1,37,50,000**