SSEI
Sanjay Saraf Educational Institute Pvt. Ltd.
A positive NPV Training Center

CA INTER

FINANCIAL MANAGEMENT

SUPER 50

-By Sanjay Saraf Sir

SSEI TELEGRAM CHANNEL

SSEI QFORUM

SSEI DIRECT

SSEI CA INTER ACADEMIC DISCUSSION

TELEGRAM CHANNEL FOR CA

TELEGRAM CHANNEL FOR CFA

TELEGRAM CHANNEL FOR FRM & STOCK MARKET

Financial Analysis and Planning

Question 1.

X Co. has made plans for the next year. It is estimated that the company will employ total assets of ₹ 8,00,000; 50 per cent of the assets being financed by borrowed capital at an interest cost of 8 per cent per year. The direct costs for the year are estimated at ₹ 4,80,000 and all other operating expenses are estimated at ₹ 80,000. the goods will be sold to customers at 150 per cent of the direct costs. Tax rate is assumed to be 50 per cent.

You are required to calculate:

i. net profit margin

ii. return on assets

iii. asset turnover and

iv. return on owners' equity.

Answer :

The net profit is calculated as follows:

Particulars	₹	₹
Sales (150% of ₹ 4,80,000)		7,20,000
Direct costs		4,80,000
Gross profit		2,40,000
Operating expenses	80,000	
Interest changes (8% of ₹ 4,00,000)	32,000	1,12,000
Profit before taxes		1,28,000
Taxes (@ 50%)		64,000
Net profit after taxes		**64,000**

i. **Net profit margin =** $\frac{\text{Profit after taxes}}{\text{Sales}} = \frac{64,000}{7,20,000} =$ 0.89 or 8.9%

Net profit margin = $\frac{\text{EBIT}(1 - T)}{\text{Sales}} = \frac{₹1,60,000(1- 0.5)}{7,20,000} =$ 0.111 or 11.1%

ii. **Return on assets =** $\frac{\text{EBIT}(1 - T)}{\text{Assets}} = \frac{₹ 1,60,000(1- 0.5)}{8,00,000} =$ 0.10 or 10%

iii. **Asset turnover =** $\frac{\text{Sales}}{\text{Assets}} = \frac{₹7,20,000}{₹8,00,000} =$ 0.9 times

iv. **Return on equity =** $\frac{\text{Net Profit after taxes}}{\text{Owners' equity}} = \frac{₹64,000}{50\% \text{ of } ₹8,00,000}$

$= \frac{₹64,000}{₹4,00,000} =$ 0.16 or 16%

Question 2.

Following informations are available for Navya Ltd. along with various ratio relevant to the particulars industry it belongs to. Gives your comments on strength and weakness of Navya Ltd. comparing its ratios with the given industry norms.

Navya Ltd.
Balance Sheet as at 31.3.2017

Liabilities	Amount (₹)	Assets	Amount (₹)
Equity Share Capital	48,00,000	Fixed Assets	24,20,000
10% Debentures	9,20,0000	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 31.3.2017

Particulars	Amount (₹)	Amount (₹)
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 Assets/Current Liabilities	2.5
Sales/ debtors	8.0
Sales/ Stock	9.0
Sales/ Total Assets	2.0
Net Profit/ Sales	3.5%
Net profit /Total Assets	7.0%
Net Profit/ Net Worth	10.5%
Total Debt/Total Assets	60.0%

Answer :

Ratios	Navya Ltd.	Industry Norms
1. $\frac{\text{Current Assets}}{\text{Current Liabilities}}$	$\frac{52,800}{19,800} = 2.60$	2.50
2. $\frac{\text{Sales}}{\text{Debtors}}$	$\frac{1,10,000}{11,000} = 10.0$	8.00
3. $\frac{\text{Sales}}{\text{Stock}}$	$\frac{1,10,000}{33,000} = 3.33$	9.00
4. $\frac{\text{Sales}}{\text{Total Assets}}$	$\frac{1,10,000}{77,000} = 1.43$	2.00
5. $\frac{\text{Net Profit}}{\text{Sales}}$	$\frac{2,32,000}{1,10,000} = 2.11\%$	3.50%
6. $\frac{\text{Net Profit}}{\text{Total Assets}}$	$\frac{2,32,000}{77,000} = 3.01\%$	7%
7. $\frac{\text{Net Profit}}{\text{Net Worth}}$	$\frac{2,32,000}{49,86,000} = 4.65\%$	10.5%
8. $\frac{\text{Total Debt}}{\text{Total Assets}}$	$\frac{29,000}{77,000} = 37.66\%$	60%

Comments:

1. The position of Navya Ltd. is better than the industry norm with respect to Current Ratios and the Sales to Debtors Ratio.

2. However, the position of sales to stock and sales to total assets is poor comparing to industry norm.

3. The firm also has its net profit ratios , net profit to total assets and net profit to total worth ratio much lower than the industry norm.

4. Total debt to total assets ratio suggest that, the firm is geared at lower level and debt are used to Asset.

Question 3.

Using the following information, complete this balance sheet:

Long-term debt to net worth	0.5 to 1
Total asset turnover	2.5 ×
Average collection period*	18 days
Inventory turnover	9 ×
Gross profit margin	10%
Acid-test ratio	1 to 1

*Assume a 360-day year and all sales on credit.

	₹		₹
Cash	-	Notes and payables	1,00,000
Accounts receivable	-	Long-term debt	-
Inventory	-	Common stock	1,00,000
Plant and equipment	-	Retained earnings	1,00,000
Total assets	-	Total liabilities and equity	-

Answer :

$$\frac{\text{Long-term debt}}{\text{Net worth}} = 0.5 = \frac{\text{Long-term debt}}{2{,}00{,}000}$$

Long-term debt = ₹ 1,00,000

Total liabilities and net worth = ₹ 4,00,000

Total assets = ₹ 4,00,000

$$\frac{\text{Sales}}{\text{Total assets}} = 2.5 = \frac{\text{Sales}}{4{,}00{,}000} = \text{Sales} = ₹10{,}00{,}000$$

Cost of goods sold = (0.9) (₹ 10,00,000) = ₹ 9,00,000.

$$\frac{\text{Cost of goods sold}}{\text{Inventory}} = \frac{9{,}00{,}000}{\text{Inventory}} = 9 = \text{Inventory} = ₹1{,}00{,}000$$

$$\frac{\text{Receivables} \times 360}{10{,}00{,}000} = 18 \text{ days}$$

Receivables = ₹ 50,000

$$\frac{\text{Cash} + 50{,}000}{1{,}00{,}000} = 1$$

Cash = ₹ 50,000

Plant and equipment = ₹ 2,00,000.

Balance Sheet

Liabilities	Amount (₹)	Assets	Amount (₹)
Cash	50,000	Notes and payables	1,00,000
Accounts receivable	50,000	Long-term debt	1,00,000
Inventory	1,00,000	Common stock	1,00,000
Plant and equipment	2,00,000	Retained earnings	1,00,000
Total assets	4,00,000	Total liabilities and equity	4,00,000

Question 4.

The following accounting information and financial ratios of PQR Ltd. relate to the year ended 31st December, 2013:

	2013
I. Accounting Information:	
Gross Profit	15% of Sales
Net profit	8% of sales
Raw materials consumed	20% of works cost
Direct wages	10% of works cost
Stock of raw materials	3 months' usage
Stock of finished goods	6% of works cost
Debt collection period	60 days
All sales are on credit	
II. Financial Ratios:	
Fixed assets to sales	1 : 3
Fixed assets to Current assets	13 : 11
Current ratio	2 : 1
Long-term loans to Current liabilities	2 : 1
Capital to Reserves and Surplus	1 : 4

If value of fixed assets as on 31st December, 2012 amounted to ₹ 26 lakhs, prepare a summarised Profit and Loss Account of the company for the year ended 31st December, 2013 and also the Balance Sheet as on 31st December, 2013.

Answer :

a. Working Notes:

i. Calculation of Sales = $\frac{\text{Fixed Assets}}{\text{Sales}} = \frac{1}{3}$

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

ii. Calculation of Current Assets = $\frac{\text{Fixed Assets}}{\text{Current Assets}} = \frac{13}{11}$

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

iii. Calculation of Raw Material Consumption and Direct Wages

	₹
Sales	78,00,000
Less: Gross Profit	11,70,000
Works Cost	66,30,000

Raw Material Consumption (20% of Works Cost) ₹ 13,26,000

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

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

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

v. Calculation of Stock of Finished Goods (= 6% of Works Cost)

$= 66,30,000 \times \frac{6}{12} =$ ₹3,97,800

vi. Calculation of Current Liabilities

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

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

vii. Calculation of Receivables

Average collection period = $\frac{\text{Receivables}}{\text{Credit Sales}} \times 365$

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

viii. Calculation of Long term Loan

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

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

ix. Calculation of Cash Balance

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

x. Calculation of Net worth

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

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

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

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

Profit and Loss Account of PQR Ltd.
for the year ended 31st December, 2013

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

Balance Sheet of PQR Ltd.
as at 31st December, 2013

Liabilities	Amount (₹)	Assets	Amount (₹)
Share Capital	3,00,000	Fixed Assets	26,00,000
Reserves and Surplus	12,00,000	**Current Assets:**	
Long term loans	22,00,000	Stock of Raw Material	3,31,500
Current liabilities	11,00,000	Stock of Finished Goods	3,97,800
		Receivables	12,82,192
		Cash	1,88,508
	48,00,000		**48,00,000**

Question 5.

The capital structure of Beta Limited is as follows:

Equity share capital of Rs. 10 each	8,00,000
9% preference share capital of Rs. 10 each	3,00,000
	11,00,000

Additional information: Profit (after tax at 35 per cent), ₹ 2,70,000; Depreciation, ₹ 60,000; Equity dividend paid, 20 per cent; Market price of equity shares, ₹ 40.

You are required to compute the following, showing the necessary workings:

a. Dividend yield on the equity shares

b. Cover for the preference and equity dividends

c. Earnings per shares

d. Price-earnings ratio.

Answer :

a. Dividend yield on the equity shares

$$\frac{\text{Dividend per share}}{\text{Market price per share}} \times 100 = \frac{₹2(0.20 \times ₹10)}{₹40} \times 100 = 5 \text{ percent}$$

b. Dividend coverage ratio

i. $$\text{Preference} = \frac{\text{Profit after taxes}}{\text{Dividend payable to preference shareholders}}$$

$$= \frac{₹2,70,000}{₹\ 27,000\ (= 0.09 \times ₹\ 3,00,000)} = 10 \text{ times}$$

ii. $$\text{Equity} = \frac{\text{Profit after taxes - Preference share dividend}}{\text{Dividend payable to equity shareholders at current rate of Rs. 2 per share}}$$

$$= \frac{₹\ 2,70,000 - ₹\ 27,000}{₹\ 1,60,000\ (80,000 \text{ shares} \times ₹\ 2)} = 1.52 \text{ times}$$

c. Earnings per equity share $$= \frac{\text{Earnings available to equity shareholders}}{\text{Number of equity shares outs tanding}}$$

$$= \frac{₹2,43,000}{80,000} = ₹3.04 \text{ per share}$$

d. Price-earning (P/E) ratio $$= \frac{\text{Market price per share}}{\text{Equity per share}} = \frac{₹40}{₹3.04} = 13.2 \text{ times}$$

Question 6.

Following figures are available in the books Tirupati Ltd.

Fixed assets turnover ratio	8 times
Capital turnover ratio	2 times
Inventory Turnover	8 times
Receivable turnover	4 times
Payable turnover	6 times
G P Ratio	25%

Gross profit during the year amounts to ₹ 8,00,000. There is no long-term loan or overdraft. Reserve and surplus amount to ₹ 2,00,000. Ending inventory of the year is ₹ 20,000 above the beginning inventory.

Required:

Calculate various assets and liabilities and prepare a Balance sheet of Tirupati Ltd.

Answer :

a. $\text{G.P. ratio} = \frac{\text{Gross Profit}}{\text{Sales}} = 25\%$

$$\text{Sales} = \frac{\text{Gross Profit}}{25} \times 100 = \frac{₹\,8,00,000}{25} \times 100 = ₹\,32,00,000$$

b. Cost of Sales = Sales – Gross profit
= ₹ 32,00,000 - ₹ 8,00,000
= ₹ 24,00,000

c. $\text{Receivable turnover} = \frac{\text{Sales}}{\text{Receivables}} = 4$

$$= \text{Receivables} = \frac{\text{Sales}}{4} = \frac{₹32,00,000}{4} = ₹\,8,00,000$$

d. $\text{Fixed assets turnover} = \frac{\text{Cost of Sales}}{\text{Fixed Assets}} = 8$

$$\text{Fixed assets} = \frac{\text{Cost of Sales}}{8} = \frac{₹\,24,00,000}{8} = ₹\,3,00,000$$

e. $\text{Inventory turnover} = \frac{\text{Cost of Sales}}{\text{Average Stock}} = 8$

$$\text{Average Stock} = \frac{\text{Cost of Sales}}{8} = \frac{₹24,00,000}{8} = = ₹\,3,00,000$$

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

$$\text{Average Stock} = \frac{\text{Opening Stock} + \text{Opening Stock} + 20,000}{2}$$

Average Stock = Opening Stock + ₹ 10,000
Opening Stock = Average Stock - ₹ 10,000
= ₹ 3,00,000 - ₹10,000
= ₹ 2,90,000
Closing Stock = Opening Stock + ₹ 20,000
= ₹ 2,90,000 + ₹ 20,000
= ₹ 3,10,000

f. $\text{Payable turnover} = \frac{\text{Purchases}}{\text{Payables}} = 6$

Purchases = Cost of Sales + Increase in Stock

= ₹ 24,00,000 + ₹ 20,000

= ₹ 24,20,000

$$\text{Payables} = \frac{\text{Purchase}}{6} = \frac{₹24,20,000}{6} = ₹4,03,333$$

g. $$\text{Capital turnover} = \frac{\text{Cost of Sales}}{\text{Capital Employed}} = 2$$

$$\text{Capital Employed} = \frac{\text{Cost of Sales}}{2} = \frac{₹24,00,000}{2} = ₹12,00,000$$

h. Share Capital = Capital Employed – Reserves & Surplus

= ₹ 12,00,000 – ₹ 2,00,000 = ₹ 10,00,000

Balance Sheet of Tirupati Ltd as on……

Liabilities	₹	Assets	₹
Share Capital	10,00,000	Fixed Assets	3,00,000
Reserve & Surplus	2,00,000	Closing Inventories	3,10,000
Payables	4,03,333	Receivables	8,00,000
	16,03,333	Other Current Assets	1,93,333
	16,03,333		16,03,333

(Fixed Asset turnover, inventory turnover capital turnover is calculated on cost of sales)

Introduction to Working Capital Management

Question 7.

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	40.00
Direct labour	15.00
Overhead	30.00
Total cost	85.00
Profit	15.00
Sales	100.00

Other information:

Raw material in stock: average 4 weeks consumption, Work – in progress (completion stage, 50 per cent), 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 1½ 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:

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.

Answer :

Calculation of Working Capital Requirement

	(₹)	(₹)
A. Current Assets		
i. Inventories:		
Raw material (4 weeks) $\left(\frac{₹40\times 96,000}{52 \text{ weeks}}\times 4 \text{ weeks}\right)$	2,95,385	
WIP Inventory (2 weeks)		
- Material $\left(\frac{₹40\times 96,000}{52 \text{ weeks}}\times 2 \text{ weeks}\right)\times 0.5$	73,846	
- Labour $\left(\frac{₹15\times 96,000}{52 \text{ weeks}}\times 2 \text{ weeks}\right)\times 0.5$	27,692	
- Overheads $\left(\frac{₹30\times 96,000}{52 \text{ weeks}}\times 2 \text{ weeks}\right)\times 0.5$	55,385	
Finished goods (4 weeks) $\left(\frac{₹85\times 96,000}{52 \text{ weeks}}\times 4 \text{ weeks}\right)$	6,27,692	10,80,000
ii. Receivables (Debtors) (8 weeks) $\left(\frac{₹85\times 96,000}{52 \text{ weeks}}\times 8 \text{ weeks}\right)$		12,55,385
iii. Cash in hand & at bank		50,000
Total Current Assets		23,85,385

	(₹)	(₹)
B. Current Liabilities:		
i. Payables (Creditors) for materials (4 weeks) $\left(\frac{(₹40\times 96,000)+2,95,385}{52 \text{ weeks}}\times 4 \text{ weeks}\right)$		3,18,107
ii. Outstanding wages (1.5 weeks) $\left(\frac{₹15\times 96,000}{52 \text{ weeks}}\times 1.5 \text{ weeks}\right)$		41,538
iii. Outstanding overheads (4 month) $\left(\frac{₹30\times 96,000}{52 \text{ weeks}}\times 4 \text{ weeks}\right)$		2,21,538
Total Current Liabilities		5,81,183
Net Working Capital Needs (A – B)		**18,04,202**

Question 8.

MNO Ltd. has furnished the following cost data relating to the year ending of 31st March, 2018.

	₹ (in Lakhs)
Sales	450.00
Material consumed	150.00
Direct wages	30.00
Factory overheads (100% variable)	60.00
Office and Administrative overheads (100% variable)	60.00
Selling overheads	50.00

The company wants to make a forecast of working capital needed for the next year and anticipates that:

- Sales will go up by 100%,
- Selling overheads will be ₹ 150 lakhs,
- Stock holdings for the next year will be
  - Raw material for two and half months,
  - Work-in-progress for one month,
  - Finished goods for half month and
  - Book debts for one and half months,
  - Lags in payment will be of 3 months for suppliers,
  - 1 month for wages and half month for factory,
  - Office and Administrative and Selling overheads.

You are required to prepare statement showing working capital requirements for next year.

Answer :

Statement showing the projected Cost and Profitability for the year ending on 31-3-2019

	Year ending 31/3/2018 (₹ in lakhs)	Year ending 31/3/2019 (₹ in lakhs)
A. Sales	450.00	900.00
Direct Materials Consumed	150.00	300.00
Direct Wages	30.00	60.00
Prime Cost	180.00	360.00
Add: Factory overheads	60.00	120.00
Works cost	240.00	480.00
Add: Office & Administrative overheads	60.00	120.00
Cost of Production	300.00	600.00
Less: Closing stock of finished goods (₹ 600 × 0.5/12)	--	(25.00)
Add: Selling overheads	50.00	150.00
B. Total Cost	350.00	725.00
Profit (A – B)	100.00	150.00

Statement showing Working Capital Requirements of MNO Ltd. for the year 31-3-2019

	(₹ in lakhs)	(₹ in lakhs)
A. Current Assets		
i. Inventories:		
Raw material (2.5 months) $\left(\frac{₹150\times 2}{12 \text{ months}}\times 2.5 \text{ months}\right)$	62.50	
WIP Inventory (1 month)		
- Material $\left(\frac{₹150\times 2}{12 \text{ months}}\times 1 \text{ month}\right)$	25.00	
- Labour and Overheads $\left(\frac{₹(30+60)\times 2}{12 \text{ months}}\times 1 \text{ month}\right)\times 0.50$	7.50	
Finished goods (0.5 months) $\left(\frac{₹(30+60+60)\times 2}{12 \text{ months}}\times 0.5 \text{ month}\right)$	25.00	120.00

ii. Receivables (Debtors) (1.5 months) $\left(\frac{₹725}{12 \text{ months}} \times 1.5 \text{ months}\right)$		90.62
Total Current Assets		210.62
B. Current Liabilities:		
i. Payables (Creditors) for materials (3 months) $\left(\frac{₹362.50}{12 \text{months}} \times 3 \text{months}\right)$		90.62
ii. Outstanding wages (1 month) $\left(\frac{₹30 \times 2}{12 \text{ months}} \times 1 \text{ month}\right)$		5.00
iii. Outstanding overheads (0.5 month) $\left(\frac{₹(60+60) \times 2 + ₹150}{12 \text{months}} \times 0.5 \text{month}\right)$		16.25
Total Current Liabilities		111.87
Net Working Capital Needs (A – B)		**98.75**

Working Note:

Value of raw material purchased

	(₹ in lakhs)
Materials consumed	300.00
Add: Closing value of raw material inventory	62.50
Less: Opening value of raw material inventory	--
Value of materials purchased	362.50

Assumptions:

i. There is no opening and closing stock of raw materials in year 2018, hence, no opening stock in 2019.

ii. The value of opening and closing WIP in 2018 is same and there is no change in volume of WIP due to increase in sales in 2019.

iii. WIP inventory is 100% complete in respect of material and 50% in respect of labour and overheads.

iv. Office and Administrative overheads are related with the production process.

v. There is no opening and closing stock of Finished goods in year 2018, hence, no opening stock in 2019.

Question 9.

Day Ltd., a newly formed company has applied to the Private Bank for the first time for financing it's Working Capital Requirements. The following informations are available about the projections for the current year:

Estimated Level of Activity	Completed Units of Production 31200 plus unit of work in progress 12000
Raw Material Cost	₹ 40 per unit
Direct Wages Cost	₹ 15 per unit
Overhead	₹ 40 per unit (inclusive of Depreciation ₹10 per unit)
Selling Price	₹ 130 per unit
Raw Material in Stock	Average 30 days consumption
Work in Progress Stock	Material 100% and Conversion Cost 50%
Finished Goods Stock	24000 Units
Credit Allowed by the supplier	30 days
Credit Allowed to Purchasers	60 days
Direct Wages (Lag in payment)	15 days
Expected Cash Balance	₹ 2,00,000

Assume that production is carried on evenly throughout the year (360 days) and wages and overheads accrue similarly. All sales are on the credit basis. You are required to calculate the Net Working Capital Requirement on Cash Cost Basis.

Answer :

Calculation of Net Working Capital requirement:

	(₹)	(₹)
A. Current Assets:		
Inventories:		
Stock of Raw material (Refer to Working note (iii)	1,44,000	
Stock of Work in progress (Refer to Working note (ii)	7,50,000	
Stock of Finished goods (Refer to Working note (iv)	20,40,000	
Debtors for Sales (Refer to Working note (v)	1,02,000	
Cash	2,00,000	
Gross Working Capital	32,36,000	32,36,000
B. Current Liabilities:		
Creditors for Purchases (Refer to Working note (vi)	1,56,000	
Creditors for wages (Refer to Working note (vii)	23,250	
	1,79,250	1,79,250
Net Working Capital (A - B)		30,56,750

Working Notes:

i. Annual cost of production

	(₹)
Raw material requirements {(31,200 × ₹ 40) + (12,000 × ₹ 40)}	17,28,000
Direct wages {(31,200 ×₹ 15) +(12,000 × ₹ 15 × 0.5)}	5,58,000
Overheads (exclusive of depreciation) {(31,200 × ₹ 30) + (12,000 × ₹ 30 × 0.5)}	11,16,000
Gross Factory Cost	34,02,000
Less: Closing W.I.P [12,000 (₹ 40 + ₹ 7.5 + ₹15)]	(7,50,000)
Cost of Goods Produced	26,52,000
Less: Closing Stock of Finished Goods (₹ 26,52,000 × 24,000/31,200)	(20,40,000)
Total Cash Cost of Sales	6,12,000

ii. Work in progress stock

	(₹)
Raw material requirements (12,000 units × ₹40)	4,80,000
Direct wages (50% × 12,000 units × ₹ 15)	90,000
Overheads (50% × 12,000 units × ₹ 30)	1,80,000
	7,50,000

iii. Raw material stock

It is given that raw material in stock is average 30 days 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 (360 days) is as follows:

	(₹)
For Finished goods (31,200 × ₹ 40)	12,48,000
For Work in progress (12,000 × ₹ 40)	4,80,000
	17,28,000

$$\text{Raw material stock} = \frac{₹17,28,000}{360 \text{ days}} \times 30 \text{ days} = ₹1,44,000$$

iv. Finished goods stock:

24,000 units @ ₹ (40+15+30) per unit = ₹20,40,000

v. Debtors for sale:

$$₹6,12,000 \times \frac{60 \text{ days}}{360 \text{ days}} = ₹1,02,000$$

vi. Creditors for raw material Purchases [Working Note (iii)]:

Annual Material Consumed (₹12,48,000 + ₹4,80,000)	₹17,28,000
Add: Closing stock of raw material	₹ 1,44,000
	₹18,72,000

$$\text{Credit allowed by suppliers} = \frac{₹18,72,000}{360 \text{ days}} \times 30 \text{ days} = ₹1,56,000$$

vii. Creditors for wages:

$$\text{Outstanding wage payment} = \frac{₹5,58,000}{360 \text{days}} \times 15 \text{ days} = ₹23,250$$

Question 10.

Aneja Limited, 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:

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.

Answer :

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)	25,40,769	
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

3. 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

Raw material stock $\frac{₹86,40,000}{52 \text{ weeks}} \times 4$ weeks 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
	93,04,615

Credit allowed by suppliers = $\frac{₹93,04,615}{52 \text{ weeks}} \times 4$ weeks= ₹ 7,15,740

7. Creditors for wages

Outstanding wage payment = $\frac{31,80,000}{52 \text{ weeks}} \times 1.5$ weeks = ₹ 91,731

Question 11.

MN Ltd. is commencing a new project for manufacture of electric toys. The following cost information has been ascertained for annual production of 60,000 units at full capacity:

		Amount per unit (₹)
Raw materials		20
Direct labour		15
Manufacturing overheads:		
Variable	₹15	
Fixed	₹10	25
Selling and Distribution overheads:		
Variable	₹3	
Fixed	₹1	4
Total		64
Profit		16
Selling		80

In the first year of operations expected production and sales are 40,000 units and 35,000 units respectively. To assess the need of working capital, the following additional information is available:

i. Stock of Raw materials	3 months consumption.
ii. Credit allowable for debtors	1½ months.
iii. Credit allowable by creditors	4 months.
iv. Lag in payment of wages	1 month.
v. Lag in payment of overheads	½ month.
vi. Cash in hand and Bank is expected to be ₹ 60,000.	
vii. Provision for contingencies is required @ 10% of working capital requirement including that provision.	

You are required to prepare a projected statement of working capital requirement for the first year of operations. Debtors are taken at cost.

Answer :

Statement Showing Cost and Sales for the First Year

Annual Production Capacity	60,000 units
Production	40,000 units
Sales	35,000 units

Particulars	**₹**
Sales Revenue (₹ 80 × 35,000)	28,00,000
Cost of Production:	
Materials @ ₹ 20 per unit	8,00,000
Direct Labour @ ₹ 15 per unit	6,00,000
Manufacturing Overheads	
Variable @ ₹ 15 per unit	6,00,000
Fixed (based on production capacity 60,000 units × ₹ 10)	6,00,000
Cost of Production	26,00,000
Less: Closing Stock (40,000 – 35,000 = 5,000 units) $\left(₹\frac{26,00,000}{40,000}\times 5,000 \text{ units}\right)$	3,25,000
Cost of Goods Sold	22,75,000
Add: Selling & Distribution Overheads	
Variable @ ₹ 3 × 35,000 units = 1,05,000	
Fixed (Re. 1 × 60,000 units) = 60,000	1,65,000
Cost of Sales	24,40,000
Profit	**3,60,000**

Statement Showing Working Capital Requirement

A. Current Assets	**₹**
Stock of Raw Materials (₹ 8,00,000 × 3/12)	2,00,000
Stock of Finished Goods	3,25,000
Debtors at Cost (₹ 24,40,000 × 3/24)	3,05,000
Cash and Bank	60,000
Total (A)	8,90,000
B. Current Liabilities	**₹**
Creditors for Materials (₹ 10,00,000 × 4/12)	3,33,333
Creditors for Expenses (₹ 13,65,000 × 1/24)	56,875
Outstanding Wages (₹ 6,00,000 × 1/12)	50,000
Total (B)	4,40,208
Working Capital Requirement before Contingencies (A – B)	4,49,792

Add: Provision for Contingencies (₹ 4,49,792 × 1/9)	49,977
Estimated Working Capital Requirement	4,99,769

Workings Notes:

Purchase of Raw Material during the first year	**₹**
Raw Material consumed during the year	8,00,000
Add: Closing Stock of Raw Materials (3 months consumption)	2,00,000
	10,00,000
Less: Opening Stock of Raw Material	Nil
Purchases during the year	10,00,000

Question 12.

The management of MNP Company Ltd. is planning to expand its business and consults you to prepare an estimated working capital statement. The records of the company reveal 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
Materials used (suppliers extend two months credit)	9,00,000
Lag in payment of wages – ½ month	7,20,000
Lag in payment of manufacturing expenses (cash) – 1 month	10,20,000
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 opinion to make 12% margin for contingencies on computed figure.

You are required to prepare the estimated working capital statement for the next year.

Answer :

Preparation of Statement of Working Capital Requirement for MNP Company Ltd

	(₹)	(₹)
A. Current Assets		
i. Inventories:		
Material (1 month) $\left(\frac{₹9,00,000}{12 \text{ months}} \times 1 \text{ month}\right)$	75,000	
Finished goods (1 month) $\left(\frac{₹28,80,000}{12 \text{ months}} \times 1 \text{ month}\right)$	2,40,000	3,15,000
ii. Receivables (Debtors) For Domestic Sales $\left(\frac{₹20,23,448}{12 \text{ months}} \times 1 \text{ month}\right)$	1,68,621	
For Export Sales $\left(\frac{₹10,06,552}{12 \text{ months}} \times 3 \text{ months}\right)$	2,51,638	4,20,259
iii. Prepayment of Sales promotion expenses $\left(\frac{₹1,50,000}{12 \text{ months}} \times 3 \text{ months}\right)$		37,500
iv. Cash in hand & at bank		1,75,000
Total Current Assets		9,47,759
B. Current Liabilities:		
i. Payables (Creditors) for materials (2 months) $\left(\frac{₹9,00,000}{12 \text{ months}} \times 2 \text{ months}\right)$		1,50,000
ii. Outstanding wages (0.5 month) $\left(\frac{₹7,20,000}{12 \text{ months}} \times 0.5 \text{ month}\right)$		30,000
iii. Outstanding manufacturing expenses $\left(\frac{₹10,20,000}{12 \text{ months}} \times 1 \text{ month}\right)$		85,000
iv. Outstanding administrative expenses $\left(\frac{₹2,40,000}{12 \text{ months}} \times 1 \text{ month}\right)$		20,000
v. Income tax payable		56,250

Total Current Liabilities		3,41,250
Net Working Capital (A – B)		6,06,509
Add: 12% contingency margin		72,781
Total Working Capital required		6,79,290

Working Note:

1. Calculation of Cost of Goods Sold and Cost of Sales

	Domestic (₹)	**Export (₹)**	**Total (₹)**
Domestic Sales	24,00,000	10,80,000	34,80,000
Less: Gross profit @ 20% on domestic sales and 11.11% on export sales (Working note-2)	(4,80,000)	(1,20,000)	(6,00,000)
Cost of Goods Sold	19,20,000	9,60,000	28,80,000
Add: Sales promotion expenses (Working note-3)	1,03,448	46,552	1,50,000
Cash Cost of Sales	20,23,448	10,06,552	30,30,000

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

Therefore Gross profit at domestic price will be $\frac{₹10}{₹100}\times 100 = 10\%$

Or, gross profit at export price will be $\frac{₹10}{₹90}\times 100 = 11.11\%$

3. Apportionment of Sales promotion expenses between Domestic and Exports sales:

Apportionment on the basis of sales value:

Domestic Sales = $\frac{₹1,50,000}{₹34,80,000}\times ₹24,00,000 = ₹1,03,448$

Exports Sales = $\frac{₹1,50,000}{₹34,80,000}\times ₹10,80,000 = ₹46,552$

4. Assumptions

i. It is assumed that administrative expenses relating to production activities.
ii. Value of opening and closing stocks are equal.

Question 13.

Day Ltd., a newly formed company has applied to the Private Bank for the first time for financing it's Working Capital Requirements. The following informations are available about the projections for the current year:

Estimated Level of Activity	Completed Units of Production 31200 plus unit of work in progress 12000
Raw Material Cost	₹ 40 per unit
Direct Wages Cost	₹ 15 per unit
Overhead	₹ 40 per unit (inclusive of Depreciation ₹10 per unit)
Selling Price	₹ 130 per unit
Raw Material in Stock	Average 30 days consumption
Work in Progress Stock	Material 100% and Conversion Cost 50%
Finished Goods Stock	24000 Units
Credit Allowed by the supplier	30 days
Credit Allowed to Purchasers	60 days
Direct Wages (Lag in payment)	15 days
Expected Cash Balance	₹ 2,00,000

Assume that production is carried on evenly throughout the year (360 days) and wages and overheads accrue similarly. All sales are on the credit basis. You are required to calculate the Net Working Capital Requirement on Cash Cost Basis.

Answer :

Calculation of Net Working Capital requirement:

	(₹)	(₹)
A. Current Assets:		
Inventories:		
Stock of Raw material (Refer to Working note (iii)	1,44,000	
Stock of Work in progress (Refer to Working note (ii)	7,50,000	
Stock of Finished goods (Refer to Working note (iv)	20,40,000	
Debtors for Sales (Refer to Working note (v)	1,02,000	
Cash	2,00,000	
Gross Working Capital	32,36,000	32,36,000
B. Current Liabilities:		
Creditors for Purchases (Refer to Working note (vi)	1,56,000	
Creditors for wages (Refer to Working note (vii)	23,250	
	1,79,250	1,79,250
Net Working Capital (A - B)		30,56,750

Working Notes:

i. Annual cost of production

	(₹)
Raw material requirements {(31,200 × ₹ 40) + (12,000 × ₹ 40)}	17,28,000
Direct wages {(31,200 ×₹ 15) +(12,000 × ₹ 15 × 0.5)}	5,58,000
Overheads (exclusive of depreciation) {(31,200 × ₹ 30) + (12,000 × ₹ 30 × 0.5)}	11,16,000
Gross Factory Cost	34,02,000
Less: Closing W.I.P [12,000 (₹ 40 + ₹ 7.5 + ₹15)]	(7,50,000)
Cost of Goods Produced	26,52,000
Less: Closing Stock of Finished Goods (₹ 26,52,000 × 24,000/31,200)	(20,40,000)
Total Cash Cost of Sales	6,12,000

ii. Work in progress stock

	(₹)
Raw material requirements (12,000 units × ₹40)	4,80,000
Direct wages (50% × 12,000 units × ₹ 15)	90,000
Overheads (50% × 12,000 units × ₹ 30)	1,80,000
	7,50,000

iii. Raw material stock

It is given that raw material in stock is average 30 days 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 (360 days) is as follows:

	(₹)
For Finished goods (31,200 × ₹ 40)	12,48,000
For Work in progress (12,000 × ₹ 40)	4,80,000
	17,28,000

$$\text{Raw material stock} = \frac{₹17,28,000}{360 \text{ days}} \times 30 \text{ days} = ₹1,44,000$$

iv. Finished goods stock:

24,000 units @ ₹ (40+15+30) per unit = ₹20,40,000

v. Debtors for sale:

$$₹6,12,000 \times \frac{60 \text{ days}}{360 \text{ days}} = ₹1,02,000$$

vi. Creditors for raw material Purchases [Working Note (iii)]:

Annual Material Consumed (₹12,48,000 + ₹4,80,000)	₹17,28,000
Add: Closing stock of raw material	₹ 1,44,000
	₹18,72,000

$$\text{Credit allowed by suppliers} = \frac{₹18,72,000}{360 \text{ days}} \times 30 \text{ days} = ₹1,56,000$$

vii. Creditors for wages:

$$\text{Outstanding wage payment} = \frac{₹5,58,000}{360 \text{days}} \times 15 \text{ days} = ₹23,250$$

Question 14.

The following are the ratios relating to the activities of Technopak Limited:

Debtors Velocity	3 months
Stock Velocity	8 months
Creditors Velocity	2 months
Gross Profit Ratio	25 per cent

Gross profit for the current year ended December 31 amounts to ₹ 4,00,000. Closing stock of the year is ₹ 10,000 above the opening stock. Bills receivables amount to ₹ 25,000 and bills payable to ₹ 10,000.

Calculate:

a. Sales

b. Sundry Debtors

c. Sundry Creditors.

Answer :

a. Determination of Sales :

$$\text{Sales} = \frac{₹4,00,000}{25} \times 100 = ₹16,00,000$$

b. Determination of Sundry Debtors:

Debtors velocity is 3 months. In other words, debtors' collection period is 3 months, or debtors' turnover ratio is 4. Assuming all sales to be credit sales and debtors turnover ratio being calculated on the basis of year-end figures,

$$\text{Debtors Turnover Ratio} = \frac{\text{Credit Sales}}{\text{Closing Debtors + Bills Receivables}}$$

or

$$\text{Closing Debtors + Bills Receivable} = \frac{\text{Credit Sales}}{\text{Debtors Turnover Ratio}} = \frac{₹16,00,000}{4} = ₹4,00,000$$

Closing Debtors = ₹ 4,00,000 – ₹ 25,000 = ₹ 3,75,000.

Determination of Closing Stock :

Stock velocity of 8 months signifies that the inventory holding period is 8 months, stock turnover ratio is 1.5 = (12 months ÷ 8).

$$\text{Stock turnover} = \frac{\text{Cost of Goods Sold (Sales - Gross profit)}}{\text{Average Stock}}$$

$$1.5 = \frac{₹12,00,000}{\text{Average Stock}}$$

$$\text{Average stock} = \frac{₹12,00,000}{1.5} = ₹8,00,000$$

Closing Stock – Opening Stock = ₹ 10,000

$$\frac{\text{Closing Stock + Opening Stock}}{2} = ₹8,00,000$$

Or, Closing Stock + Opening Stock = ₹ 16,00,000

2 Opening Stock = ₹ 15,90,000

Opening Stock = ₹ 7,95,000

Therefore, Closing Stock = ₹ 8,05,000

c. Determination of Sundry Creditors:

Creditors velocity of 2 months signifies that the credit payment period is 2 months. In other words, creditors' turnover ratio is 6 (12 months ÷2). Assuming all purchases to be credit purchases and creditors turnover is based on year-end figures,

$$\text{Creditors Turnover Ratio} = \frac{\text{Creditors Purchases}}{\text{Credits + Bills Payable}}$$

$$6 = \frac{₹12,10,000}{\text{Creditors} + ₹10,000}$$

$$\text{Creditors} + ₹\,10,000 = \frac{₹12,10,000}{6} = ₹2,01,667$$

Creditors = ₹ 2,01,667 – ₹ 10,000 = ₹ 1,91,667

Credit Purchases are calculated as follows:

Cost of Goods Sold = Opening Stock + Purchases – Closing Stock

₹ 12,00,000 = ₹ 7,95,000 + Purchases – ₹ 8,05,000

₹ 12,00,000 + ₹ 10,000 = Purchases

₹ 12,10,000 = Purchases (credit).

Question 15.

Suggest ways in which companies can exercise control over their levels of working capital.

Answer :

Companies can exercise control over the levels of their working capital by formulating and implementing policies concerning inventory, debtors, cash and creditors. Such policies will take account of the factors that influence these components of working capital, as follows:

- **Debtors** : Credit period allowed by a company and its competitors, speed of invoicing and other aspects of administrative efficiency, the use of discounts for early settlement, debtor collection methods, the forecast volume of sales.
- **Stock** : The length of the production process, the rate of turnover of raw materials, the turnover period of finished goods, delivery lead time, the budgeted and actual volumes of output and sales.
- **Creditors** : The extent to which a company can delay payments to suppliers, the volume of purchases, and the availability of cash discounts for early payment.
- **Cash** : Interest rates and available short-term investments, the availability of credit, the ease with which a company can access funds.

Management of Payables

Question 16.

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. What should the company do?

Answer :

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:

$$\left(\frac{100}{100-d}\right)^{\frac{365}{35}} - 1 = 23.5\%$$

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 Return from investing ₹ 9,800 between day 10 and day 45:	10,000	9,800
$\frac{35}{365} \times ₹9,800 \times 25\%$	(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.

Treasury & Cash Management

Question 17.

Consider the balance sheet of Maya Limited at December 31 (in thousands). 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. 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.

	₹		₹
Cash	50	Accounts payable Bank	360
Accounts receivable	530	Bank loan	400
Inventories	545	Accruals	212
Current assets	1,125	Current liabilities	972
Net fixed assets	1,836	Long- term debt	450
		Common stock	100
		Retained earnings	1,439
Total assets	2,961	Total liabilities and equity	2,961

Purchases of raw materials are made in the month prior to the sale and amount to 60 per cent of sales in the subsequent month. 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):

	₹		₹		₹
November	500	January	600	March	650
December	600	February	1,000	April	750

On the basis of this information:

a. Prepare a cash budget for the months of January, February, and March.

b. Determine the amount of additional bank borrowings necessary to maintain a cash balance of ₹ 50,000 at all times.

c. Prepare a pro forma balance sheet for March 31.

Answer :

a.

Cash Budget

(in thousands)

	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
	₹	₹	₹	₹	₹	₹
Sales	500	600	600	1,000	650	750
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 cash receipts			590	680	890	
Purchases		360	600	390	450	
Payment for purchases			360	600	390	
Labour costs			150	200	160	
Other expenses			100	100	100	
Total cash disbursements			610	900	650	
Receipts less disbursements			(20)	(220)	240	

b.

	Jan. ₹	Feb. ₹	Mar. ₹
Additional borrowings	20	220	(240)
Cumulative borrowings	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.

c. Pro forma Balance Sheet, March 31 (in thousands)

	₹		₹
Cash	50	Accounts payable	450
Accounts receivable	620	Bank loan	400
Inventories	635	Accruals	212
Current assets	1,305	Current liabilities	1,062
Net fixed assets	1,836	Long-term debt	450
		Common stock	100
	-	Retained earnings	1,529
Total assets	3,141	Total liabilities and equity	3,141

Accounts receivable	Sales in March × 0.8 + Sales in February × 0.1
Inventories	₹ 545 + Total purchases January through March - Total sales January through March × 0.6
Accounts payable	Purchases in March
Retained earnings	₹ 1,439 + Sales – Payment for purchases – Labour costs and – Other expenses, all for January through March

Management of Receivables

Question 18.

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.

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

Answer :

Particulars	(₹)
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 × 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% : 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. Statement Showing Evaluation of Factoring Proposal

	₹
A. 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	8,83,200

	₹
B. Firm's Savings on taking Factoring Service:	
Cost of credit administration saved	2,40,000
Bad Debts (₹ 160,00,000 × 1/100) avoided	1,60,000
Total	4,00,000
C. Net Cost to the firm (A – B) (₹ 8,83,200 – ₹ 4,00,000)	4,83,200

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%)

Question 19.

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?

Also find 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%.

Answer :

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	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

$$\text{*Average Debtors} = \text{Total Cost of Credit Sales} \times \frac{\text{Collection period}}{12}$$

$$= ₹80,000 \times \frac{1.5}{12} = ₹10,000$$

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.

Question 20.

Slow Payers are regular customers of Goods Dealers Ltd., Calcutta and have approached the sellers for extension of a credit facility for enabling them to purchase goods from Goods Dealers Ltd. 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 2013, 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? Workings should form part of your answer. Assume year of 360 days.

Answer :

Statement showing the Evaluation of Debtors Policies

Particulars	Proposed Policy ₹
A. Expected Profit:	
a. Credit Sales	15,00,000
b. Total Cost	
i. Variable Cost	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

Question 21.

The Megatherm Corporation has just acquired a large account. As a result, it needs an additional ₹ 75,000 in working capital immediately. It has been determined that there are three feasible sources of funds:

a. **Trade credit**: The company buys about ₹ 50,000 of materials per month on terms of 3/30, net 90. Discounts are taken.

b. **Bank loan**: The firm's bank will lend ₹ 1,00,000 at 13 per cent. A 10 per cent compensating balance will be required, which otherwise would not be maintained by the company.

c. A factor will buy the company's receivables (₹ 1,00,000 per month), which have a collection period of 60 days. The factor will advance up to 75 per cent of the face value of the receivables at 12 per cent on an annual basis. The factor will also charge a 2 per cent fee on all receivables purchased. It has been estimated that the factor's services will save the company a credit department expense and bad-debt expenses of ₹ 1,500 per month.

On the basis of annual percentage cost, which alternative should the company select?

Answer :

a. Cost of trade credit : If discounts are not taken, upto ₹ 97,000 can be raised after the second month. The real cost of not taking advantage of the discount would be

$$\frac{3}{97}\times\frac{365}{60}=18.81\%$$

b. Cost of bank loan : Assuming the compensating balance would not otherwise be maintained, the real cost of not taking advantage of the discount would be

$$\frac{13}{90}=14.44\%$$

c. Cost of factoring : The factor fee for the year would be

$$2\% \times ₹\,12{,}00{,}000 = ₹\,24{,}000$$

The savings effected, however, would be ₹ 18,000, giving a net factoring cost of ₹ 6,000. Borrowing ₹ 75,000 on the receivables would thus cost

$$\frac{(12\%)(₹75{,}000)+₹6{,}000}{₹75{,}000}=\frac{₹9{,}000+₹6{,}000}{₹75{,}000}=20.00\%$$

Advise : Bank borrowing would be the cheapest source of funds.

Capital Budgeting

Question 22.

XYZ Ltd. is planning to introduce a new product with a project life of 8 years. The project is to be set up in Special Economic Zone (SEZ), qualifies for one time (at starting) tax free subsidy from the State Government of ₹ 25,00,000 on capital investment. Initial equipment cost will be ₹ 1.75 crores. Additional equipment costing ₹ 12,50,000 will be purchased at the end of the third year from the cash inflow of this year. At the end of 8 years, the original equipment will have no resale value, but additional equipment can be sold for ₹ 1,25,000. A working capital of ₹ 20,00,000 will be needed and it will be released at the end of eighth year. The project will be financed with sufficient amount of equity capital.
The sales volumes over eight years have been estimated as follows:

Year	1	2	3	4 - 5	6 - 8
Units	72,000	1,08,000	2,60,000	2,70,000	1,80,000

A sales price of ₹ 120 per unit is expected and variable expenses will amount to 60% of sales revenue. Fixed cash operating costs will amount ₹ 18,00,000 per year. The loss of any year will be set off from the profits of subsequent two years. The company is subject to 30 per cent tax rate and considers 12 per cent to be an appropriate after tax cost of capital for this project. The company follows straight line method of depreciation.

Required:

Calculate the net present value of the project and advise the management to take appropriate decision.

Note:

The PV factors at 12% are

Year	1	2	3	4	5	6	7	8
	.893	.797	.712	.636	.567	.507	.452	.404

Answer :

(₹'000)

Year	Sales	VC	FC	Dep.	Profit	Tax	PAT	Dep.	Cash inflow
1	86.40	51.84	18	21.875	(5.315)	-	-	21.875	16.56
2	129.60	77.76	18	21.875	11.965	1.995*	9.97	21.875	31.845
3	312.00	187.20	18	21.875	84.925	25.4775	59.4475	21.875	81.3225
4-5	324.00	194.40	18	24.125	87.475	26.2425	61.2325	24.125	85.3575
6-8	216.00	129.60	18	24.125	44.275	13.2825	30.9925	24.125	55.1175

* (30% of 11.965 – 30% of 5.315) = 3.5895 – 1.5945 = 1.995)

	₹
Cost of New Equipment	1,75,00,000
Less: Subsidy	25,00,000
Add: Working Capital	20,00,000
Outflow	1,70,00,000

Calculation of NPV

Year		Cash inflows	PV factor	NPV
		(₹)		(₹)
1		16,56,000	.893	14,78,808
2		31,84,500	.797	25,38,047
3		81,32,250 - 12,50,000 = 68,82,250	.712	49,00,162
4		85,35,750	.636	54,28,737
5		85,35,750	.567	48,39,770
6		55,11,750	.507	27,94,457
7		55,11,750	.452	24,91,311
8		55,11,750 + 20,00,000 + 1,25,000 = 76,36,750	.404	30,85,247
		Net Present Value		2,75,56,539

NPV	2,75,56,539
Less: Out flow	1,70,00,000
Saving	1,05,56,539

Advise: Since the project has a positive NPV, therefore, it should be accepted.

Question 23.

A hospital is considering to purchase a diagnostic machine costing ₹ 80,000. The projected life of the machine is 8 years and has an expected salvage value of ₹ 6,000 at the end of 8 years. The annual operating cost of the machine is ₹ 7,500. It is expected to generate revenues of ₹ 40,000 per year for eight years. Presently, the hospital is outsourcing the diagnostic work and is earning commission income of ₹ 12,000 per annum; net of taxes.

Required:

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

i. Net Present Value method

ii. Profitability Index method.

PV factors at 10% are given below:

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

Answer :

Advise to the Hospital Management

Determination of Cash inflows	
Sales Revenue	40,000
Less: Operating Cost	7,500
	32,500
Less: Depreciation (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	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)

$$\text{Profitability Index} = \frac{\text{Sum of discounted cash inflows}}{\text{Present value of cash outflows}} = \frac{74,944.36}{80,000} = 0.937$$

Advise: Since the net present value is negative and profitability index is also less than 1, therefore, the hospital should not purchase the diagnostic machine.

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

Question 24.

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

You are required to calculate:

i. Cost of the project

ii. Payback period

iii. Net present value of cash inflow

iv. Cost of capital.

Answer :

i. Cost of Project

At 15% internal rate of return (IRR), the sum of total cash inflows = cost of the project i.e initial cash outlay

Annual cost savings = ₹ 96,000

Useful life = 5 years

Considering the discount factor table @ 15%, cumulative present value of cash inflows for 5 years is 3.353

Hence, Total Cash inflows for 5 years for the Project is

96,000 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

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%

Question 25.

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-A_1 and NM-A_2, two alternative models are available in the market. The following details are collected :

		Machine	
		NM-A_1	**NM-A_2**
Cost of Machine	(₹)	20,00,000	25,00,000
Estimated working life		5 Years	5 Years
Estimated saving in direct wages per annum	(₹)	7,00,000	9,00,000
Estimated saving in scrap per annum	(₹)	60,000	1,00,000
Estimated additional cost of indirect material per annum	(₹)	30,000	90,000
Estimated additional cost of indirect labour per annum	(₹)	40,000	50,000
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.

You are required to evaluate the alternatives by calculating the:

i. Pay-back Period

ii. Accounting (Average) Rate of Return; and

iii. Profitability Index or P.V. Index (P.V. factor for ₹ 1 @ 12% 0.893; 0.797; 0.712; 0.636; 0.567 0.507)

Answer :

Evaluation of Alternatives

Working Notes:

Depreciation on Machine NM-$A_1 = \frac{20,00,000}{5}$ = 4,00,000

Depreciation on Machine NM-A_2 = $= \frac{25,00,000}{5} = 5,00,000$

Particulars	Machine NM-A_1 (₹)	Machine NM-A_2 (₹)
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 – A_1 $= \frac{Total\ Initial\ Capital\ Investment}{Annual\ exp ected\ after\ tax\ net\ cashflow}$

$= \frac{20,00,000}{5,71,500} = 3.50\ years$

Machine NM – A_2 $= \frac{25,00,000}{6,92,500} = 3.61\ years$

Decision: Machine NM-A_1 is better.

ii. Accounting (Average) Rate of Return (ARR)

$$ARR = \frac{Average\ Annual\ Net\ Savings}{Average\ Investment} \times 100$$

Machine NM – $A_1 = \frac{1,71,500}{10,00,000} \times 100 = 17.15\%$

Machine NM – $A_2 = \frac{1,92,500}{10,00,000} \times 100 = 15.4\%$

Decision: Machine NM-A1 is better

(Note: ARR may be computed alternatively by taking initial investment in the denominator.)

iii. Profitability Index or PV 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 = $\frac{\textit{Present Value of Cash Inflow}}{\textit{Investment}}$

Machine NM-$A_1 = \frac{20,60,258}{20,00,000} = 1.03$

Machine NM-$A_2 = \frac{24,96,463}{25,00,000} = 0.998 = 1.0$ *approx*

Decision: Machine NM-A1 is better.

Question 26.

WX Ltd. has a machine which has been in operation for 3 years. Its remaining estimated useful life is 8 years with no salvage value in the end. Its current market value is ₹ 2,00,000. The company is considering a proposal to purchase a new model of machine to replace the existing machine. The relevant information is as follows:

	Existing Machine	**New Machine**
Cost of machine	₹ 3,30,000	₹ 10,00,000
Estimated life	11 years	8 years
Salvage value	Nil	₹ 40,000
Annual output	30,000 units	75,000 units
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 follow the straight line method of depreciation. The corporate tax rate is 30 per cent and WX Ltd. does not make any investment, if it yields less than 12 per cent. Present value of annuity of Re. 1 at 12% rate of discount for 8 years is 4.968. Present value of ₹ 1 at 12% rate of discount, received at the end of 8th year is 0.404. Ignore capital gain tax.

Advise WX Ltd. whether the existing machine should be replaced or not.

* In the question paper this word was wrongly printed as 'unit' instead of word 'hour'. The answer provided here is on the basis of correct word i.e. 'Labour cost per hour'.

Answer :

i. Calculation of Net Initial Cash Outflows:

	₹
Cost of new machine	10,00,000
Less: Sale proceeds of existing machine	2,00,000
Net initial cash outflows	8,00,000

ii. Calculation of annual depreciation:

$$\text{On old machine} = \frac{₹\ 3,30,000}{11\ \text{years}} = ₹\ 30,000 \text{ per annum.}$$

$$\text{On new machine} = \frac{₹\ 10,00,000 - ₹\ 40,000}{8\ \text{years}} = ₹\ 1,20,000 \text{ per annum.}$$

iii. Calculation of annual cash inflows from operation:

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 × ₹ 40	1,20,000		90,000
New = 3,000 × ₹ 70		2,10,000	
Indirect cash cost	50,000	65,000	15,000
Depreciation	30,000	1,20,000	90,000
Total Cost (B)	3,20,000	6,95,000	3,75,000
Profit Before Tax (A – B)	1,30,000	4,30,000	3,00,000
Less: Tax @ 30%	39,000	1,29,000	90,000
Profit After Tax	91,000	3,01,000	2,10,000
Add: Depreciation	30,000	1,20,000	90,000
Annual Cash Inflows	1,21,000	4,21,000	3,00,000

iv. Calculation of Net Present Value

	₹
Present value of annual net cash	
Inflows: 1 – 8 years = ₹ 3,00,000 × 4.968	14,90,400
Add: Present value of salvage value of new machine at	

the end of 8th year (₹ 40,000 × 0.404)	16,160
Total present value	15,06,560
Less: Net Initial Cash Outflows	8,00,000
NPV	7,06,560

Alternative Solution:

Calculation of Net Present Value (NPV)

Particulars	**Period (Year)**	**Cash Flow (₹)**	**Present Value Factor (PVF) @ 12%**	**Present Value (₹)**
Purchase of new machine	0	- 8,00,000	1.00	- 8,00,000
Incremental Annual Cash Inflow	1 – 8	3,00,000	4.968	14,90,400
Salvage value of new machine	8	40,000	0.404	16,160
Net Present Value (NPV)				7,06,560

Advise : Hence, existing machine should be replaced because NPV is positive.

Risk Analysis in Capital Budgeting

Question 27.

X Ltd is considering its New Product 'with the following details

Sr. No.	Particulars	Figures
1	Initial capital cost	₹ 400 Cr
2	Annual unit sales	₹ 5 Cr
3	Selling price per unit	₹ 100
4	Variable cost per unit	₹ 50
5	Fixed costs per year	₹ 50 Cr
6	Discount Rate	6%

1. Calculate the NPV of the project.
2. Find the impact on the project's NPV of a 2.5 per cent adverse variance in each variable. Which variable is having maximum effect.

Answer :

1. Calculation of Net Cash Inflow per year :

	Particulars	Amount (₹)
A	Selling Price Per Unit (A)	100
B	Variable Cost Per Unit (B)	50
C	Contribution Per Unit (C = A-B)	50
D	Number of Units Sold Per Year	5 Cr.
E	Total Contribution (E = C X D)	₹ 250 Cr.
F	Fixed Cost Per Year	₹ 50 Cr.
G	Net Cash Inflow Per Year (G =E - F)	₹ 200 Cr.

Calculation of Net Present Value (NPV) of the Project:

Year	Year Cash Flow (₹ in Cr.)	Discounting @ 6%	Present Value (PV) (₹ in Cr.)
0	-400	1.000	-400
1	200	0.943	188.60
2	200	0.890	178
3	200	0.840	168
Net Present Value (188.60 + 178 +168) - 400			134.60

Here NPV represent the most likely outcomes and not the actual outcomes. The actual outcome can be lower or higher than the expected outcome.

2. Sensitivity Analysis considering 2.5 % Adverse Variance in each variable

	Changes in variable	Base	Initial Cash Flow increased to ₹ 410 crore	Selling Price per Unit Reduced to ₹ 97.5	Variable Cost Per Unit increased to ₹ 51.25	Fixed Cost Per Unit increased to ₹ 51.25	Units sold per year reduced to ₹ 4.875 crore
	Particulars	**Amount ₹**	**Amount ₹**	**Amount ₹**	**Amount ₹**	**Amount ₹**	**Amount ₹**
A	Selling Price Per Unit (A)	100	100	97.5	100	100	100
B	Variable Cost Per Unit (B)	50	50	50	51.25	50	50
C	Contribution Per Unit (C = A-B)	50	50	47.5	48.75	50	50

D	Number of Units Sold Per Year (in Crores)	5	5	5	5	5	4.875
E	Total Contribution (E = C × D)	250	250	237.5	243.75	250	243.75
F	Fixed Cost Per Year (in Crores)	50	50	50	50	51.25	50
G	Net Cash Inflow Per Year (G =E - F)	200	200	187.5	193.75	198.75	193.75
H	(G × 2.673)	534.60	534.60	501.19	517.89	531.26	517.89
I	Initial Cash Flow	400	410	400	400	400	400
J	NPV	134.60	124.60	101.19	117.89	131.26	117.89
K	Percentage Change in NPV		-7.43%	-24.82%	-12.41%	-2.48%	-12.41%

The above table shows that the by varying one variable at a time by 2.5% while keeping the others constant, the impact in percentage terms on the NPV of the project. Thus it can be seen that the change in selling price has the maximum effect on the NPV by 24.82 %.

Cost of Capital

Question 28.

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:

	₹
Debentures (₹ 100 per debenture)	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 debenture
Preference shares	₹ 110 per preference share
Equity shares	₹ 24 each.

Additional information:

1. ₹ 100 per debenture redeemable at par, 10% coupon rate, 4% floatation costs, 10 year maturity.
2. ₹ 100 per preference share redeemable at par, 5% coupon rate, 2% floatation cost and 10 year maturity.
3. Equity shares 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 50%.

Answer :

Cost of Equity $K_e = \frac{D_1}{P_0 - F} + g = \frac{₹1}{₹24 - ₹4} + 0.05 = 0.1$ or 10%
Cost of Debt $(K_e) = \frac{I(1-t) + \frac{(RV-NP)}{n}}{\frac{(RV+NP)}{2}} = \frac{10(1-0.5) + \left(\frac{100-NP}{n}\right)}{\left(\frac{RV+NP}{2}\right)}$
Cost of debt = $(K_d) = \frac{10(1-0.5) + \left(\frac{100-96}{10}\right)}{\left(\frac{100+96}{2}\right)} = \left(\frac{5+0.4}{98}\right) = 0.055$ (approx.)
Cost of preference shares $= K_p = \left(\frac{5 + \frac{2}{10}}{\frac{198}{2}}\right) = \left(\frac{5.2}{99}\right) = 0.053$ (approx.)

a. Calculation of WACC using book value weights

Source of capital	Book Value	Weights	After tax cost of capital	WACC (K_o)
		a	**b**	**(c) = (a)×(b)**
10% Debentures	5,00,000	0.25	0.055	0.0137
5% Preference shares	5,00,000	0.25	0.053	0.0132
Equity shares	10,00,000	0.50	0.10	0.0500
	20,00,000	**1.00**		**0.0769**

WACC (K_o) = 0.0769 or 7.69%

b. Calculation of WACC using market value weights

Source of capital	Market Value	Weights	After tax cost of capital	WACC (K_o)
		a	**b**	**(c) = (a)×(b)**
10% Debentures	5,25,000	0.151	0.055	0.008
5% Preference shares	5,50,000	0.158	0.053	0.008
Equity shares	24,00,000	0.691	0.10	0.069
	34,75,000	**1.000**		**0.085**

WACC (K_o) = 0.085 or 8.5%

Question 29.

Determine the cost of capital of Best Luck Limited using the book value (BV) and market value (MV) weights from the following information:

Sources	Book Value (₹)	Market Value(₹)
Equity shares	1,20,00,000	2,00,00,000
Retained earnings	30,00,000	-
Preference shares	36,00,000	33,75,000
Debentures	**9,00,000**	**10,40,000**

Additional information :

i. **Equity** : Equity shares are quoted at ₹ 130 per share and a new issue priced at ₹ 125 per share will be fully subscribed; flotation costs will be ₹ 5 per share.

ii. **Dividend** : During the previous 5 years, dividends have steadily increased from ₹ 10.60 to ₹ 14.19 per share. Dividend at the end of the current year is expected to be ₹ 15 per share.

iii. **Preference shares** : 15% Preference shares with face value of ₹ 100 would realise ₹ 105 per share.

iv. **Debentures** : The company proposes to issue 11-year 15% debentures but the yield on debentures of similar maturity and risk class is 16% ; flotation cost is 2%.

v. **Tax** : Corporate tax rate is 35%. Ignore dividend tax.

Answer :

i. Cost of Equity (K_e) $= \frac{D_1}{P_0 - F} + g = \frac{₹15}{₹125 - ₹5} + 0.06$ (refer to working note)

$K_e = 0.125 + 0.06 = 0.185$

Working Note:

Calculation of 'g'

₹ $10.6(1+g)^5$ = ₹ 14.19 Or, $(1+g)^5 = \frac{14.19}{10.6} = 1.338$

Table (FVIF) suggests that ₹1 compounds to ₹1.338 in 5 years at the compound rate of 6 percent. Therefore, g is 6 per cent.

iii. Cost of Retained Earnings (K_s) $= \frac{D_1}{P_0} + g = \frac{₹15}{₹125} + 0.06 = 0.18$

iv. Cost of Preference shares (K_p) $= \frac{PD}{P_0} = \frac{₹15}{₹105} = 0.1429$

v. Cost of Debentures (K_d) $= \frac{I(1-t) + \frac{(RV - NP)}{n}}{\frac{(RV + NP)}{2}}$

$$= \frac{₹15(1-0.35) + \left(\frac{₹100 - ₹91.75^*}{11 \text{ years}}\right)}{\frac{₹100 + ₹91.75^*}{2}}$$

$$= \frac{₹15 \times 0.65 + ₹0.75}{₹95.875} = \frac{₹10.5}{₹95.875} = 0.1095$$

*Since yield on similar type of debentures is 16 per cent, the company would be required to offer debentures at discount.

Market price of debentures (approximation method) = Coupon rate ÷ Market rate of interest

= ₹ 15 ÷ 0.16 = ₹ 93.75

Sale proceeds from debentures = ₹93.75 – ₹ 2 (i.e., floatation cost) = ₹91.75

Market value (P_0) of debentures can also be found out using the present value method: P_0 = Annual Interest × PVIFA (16%, 11 years) + Redemption value × PVIF (16%, 11 years)
P_0 = ₹15 × 5.029 + ₹100 × 0.195
P_0 = ₹75.435 + ₹19.5 = ₹ 94.935
Net Proceeds = ₹94.935 – 2% of ₹100 = ₹ 92.935
Accordingly, the cost of debt can be calculated

Cost of Capital (amount in lakh of rupees)

[BV weights and MV weights]

Source of capital	Weights		Specific Cost (K)	Total cost	
	BV	**MV**		**(BV × K)**	**(MV × K)**
Equity Shares	120	160*	0.1850	22.2	29.6
Retained Earnings	30	40*	0.1800	5.4	7.2
Preference Shares	9	10.4	0.1429	1.29	1.49
Debentures	36	33.75	0.1095	3.94	3.70
Total	**195**	**244.15**		**32.83**	**41.99**

*Market Value of equity has been apportioned in the ratio of Book Value of equity and retained earnings

Weighted Average Cost of Capital (WACC):

$$\text{Using Book Value} = \frac{₹32.83}{₹195} = 0.1684 \text{ or } 16.84\%$$

$$\text{Using Market Value} = \frac{₹41.99}{₹244.15} = 0.172 \text{ or } 17.2\%$$

Question 30.

Navya Limited wishes to raise additional capital of ₹10 lakhs for meeting its modernisation plan. It has ₹ 3,00,000 in the form of retained earnings available for investments purposes. The following are the further details:

Debt/ equity mix	40%/60%
Cost of debt (before tax)	
Upto ₹ 1,80,000	10%
Beyond ₹ 1,80,000	16%
Earnings per share	₹4
Dividend pay out	₹2
Expected growth rate in dividend	10%
Current market price per share	44
Tax rate	50%

Required:

i. To determine the pattern for raising the additional finance.

ii. To calculate the post-tax average cost of additional debt.

iii. To calculate the cost of retained earnings and cost of equity, and

iv. To determine the overall weighted average cost of capital (after tax).

Answer :

i. Pattern of Raising Additional Finance

Equity = 10,00,000 × 60/100 = ₹ 6,00,000

Debt = 10,00,000 × 40/100 = ₹ 4,00,000

Capital structure after Raising Additional Finance

Sources of fund	Amount (₹)
Shareholder's funds	
Equity capital (6,00,000 – 3,00,000)	3,00,000
Retained earnings	3,00,000
Debt at 10% p.a.	1,80,000
Debt at 16% p.a. (4,00,000 −1,80,000)	2,20,000
Total funds	**10,00,000**

ii. Post-tax Average Cost of Additional Debt

K_d = I(1 – t), where 'K_d' is cost of debt, 'I' is interest and 't' is tax rate.

On ₹ 1,80,000 = 10% (1 - 0.5) = 5% or 0.05

On ₹ 2,20,000 = 16% (1 – 0.5) = 8% or 0.08

Average Cost of Debt (Post tax) i.e.

$$K_d = \frac{(1,80,000 \times 0.05) + (2,20,000 \times 0.08)}{4,00,000} \times 100 = 6.65\%$$

iii. Cost of Retained Earnings and Cost of Equity applying Dividend Growth Model

$$K_e = \frac{D_1}{P_0} + g \quad \text{or} \quad \frac{D_0(1+g)}{P_0} + g$$

$$\text{Then, } K_e = \frac{2(1.1)}{44} + 0.10 = \frac{2.2}{44} + 0.10 = 0.15 \text{ or } 15\%$$

iv. Overall Weighted Average Cost of Capital (WACC) (After Tax)

Particulars	Amount (₹)	Weights	Cost of Capital	WACC
Equity (including retained earnings)	6,00,000	0.60	15%	9.00
Debt	4,00,000	0.40	6.65%	2.66
Total	10,00,000	1.00		11.66

Question 31.

ABC Ltd. has the following capital structure which is considered to be optimum as on 31st March, 2017.

	₹
14% Debentures	30,000
11% Preference shares	10,000
Equity Shares (10,000 shares)	1,60,000
	2,00,000

The company share has a market price of ₹ 23.60. Next year dividend per share is 50% of year 2017 EPS. The following is the trend of EPS for the preceding 10 years which is expected to continue in future.

Year	EPS (₹)	Year	EPS (₹)
2008	1.00	2013	1.61
2009	1.10	2014	1.77
2010	1.21	2015	1.95
2011	1.33	2016	2.15
2012	1.46	2017	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 (with annual dividend of ₹ 1.1 per share) were also issued. The company is in 50% tax bracket.

A. Calculate after tax:
- **i.** Cost of new debt
- **ii.** Cost of new preference shares
- **iii.** New equity share (consuming new equity from retained earnings)

B. Calculate marginal cost of capital when no new shares are issued.

C. How much can be spent for capital investment before new ordinary shares must be sold. Assuming that retained earnings for next year's investment are 50 percent of 2017.

D. What will the marginal cost of capital when the funds exceeds the amount calculated in (C), assuming new equity is issued at ₹ 20 per share?

Answer :

A.

i. Cost of new debt

$$K_d = \frac{I(1-t)}{P_0}$$

$$= \frac{16\ (1 - 0.5)}{96} = 0.0833$$

ii. Cost of new preference shares

$$K_p = \frac{PD}{P_0} = \frac{1.1}{9.2} = 0.12$$

iii. Cost of new equity shares

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

$$= \frac{1.18}{23.60} + 0.10 = 0.05 + 0.10 = 0.15$$

Calculation of D_1

D_1 = 50% of 2013 EPS = 50% of 2.36 = ₹ 1.18

B. Calculation of marginal cost of capital

Type of Capital	Proportion	Specific Cost	Product
1	**2**	**3**	**(2) × (3) = 4**
Debenture	0.15	0.0833	0.0125
Preference Share	0.05	0.12	0.0060
Equity Share	0.80	0.15	0.1200
Marginal cost of capital			0.1385

C. The company can spend the following amount without increasing marginal cost of capital and without selling the new shares:

Retained earnings = (0.50) (2.36 × 10,000) = ₹ 11,800

The ordinary equity (Retained earnings in this case) is 80% of total capital

11,800 = 80% of Total Capital

∴ Capital investment before issuing equity = $\frac{₹11,800}{0.80}$ = ₹ 14,750

D. If the company spends in excess of ₹ 14,750 it will have to issue new shares.

∴ Capital investment before issuing equity = $\frac{₹1.18}{20} + 0.10 = 0.159$

The marginal cost of capital will be:

Type of Capital	Proportion	Specific Cost	Product
1	**2**	**3**	**(2) × (3) = 4**
Debenture	0.15	0.0833	0.0125
Preference Share	0.05	0.1200	0.0060
Equity Share (new)	0.80	0.1590	0.1272
			0.1457

Question 32.

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)	₹ 1 crore
Retained Earnings	₹ 20 crores
13.5% Debentures (of ₹ 100 each)	₹ 10 crores
15% Term Loans	₹ 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 share is ₹ 40.

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

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

The Income tax rate for the company is 40%.

i. Required

Calculate the current weighted average cost of capital using:

a. book value proportions; and

b. market value proportions.

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

a. the amount will be raised by equity and debt in equal proportions;

b. the company expects to retain ₹ 1.5 crores earnings next year;

c. the additional issue of equity shares will result in the net price per share being fixed at ₹ 32;

d. the debt capital raised by way of term loans will cost 15% for the first ₹ 2.5 crores and 16% for the next ₹ 2.5 crores.

Answer :

i.

a. Statement showing computation of weighted average cost of capital by using Book value proportions

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

b. Statement showing computation of weighted average cost of capital by using market value proportions

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

[**Note:** Since retained earnings are treated as equity capital for purposes of calculation of cost of specific source of finance, the market value of the ordinary shares may be taken to represent the combined market value of equity shares and retained earnings. The separate market values of retained earnings and ordinary shares may also be worked out by allocating to each of these a percentage of total market value equal to their percentage share of the total based on book value.]

Working Notes (W.N.):

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

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

Where,

K_e = Cost of equity capital

D_1 = Expected dividend at the end of year 1

P_0 = Current market price of equity share

g = Growth rate of dividend

Now, it is given that D1 = ₹ 3.60, P0 = ₹ 40 and g = 7%

Therefore

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

Or, K_e = 16%

2. Cost of preference capital (K_p)

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

Where,

PD = Preference dividend

RV = Redeemable value of preference shares

NP = Current market price of preference shares

n =Redemption period of preference shares

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

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

3. Cost of debentures (K_d)

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

Where,

I = Interest payment

t = Tax rate applicable to the company

RV = Redeemable value of debentures

NP = Current market price of debentures

n = Redemption period of debentures

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

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

4. Cost of Term loans (K_t)

K_t = = r(1-t)

Where,

r = Rate of interest on term loans

t = Tax rate applicable to the company

Now,

r = 15% and t = 40%

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

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

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

Working Notes (W.N.):

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

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

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

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

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

(For first ₹ 2.5 crores)
r = 15% and t = 40%
Therefore, K_d = 15% (1- 40%) = 9%
(For the next 2.5 crores)
r = 16% and t = 40%
Therefore, K_d = 16% (1 - 40%)= 9.6%

Question 33.

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

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

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

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

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

i. Calculate the after tax cost (a) of new debts and new preference share capital, (b) of ordinary equity, assuming new equity comes from retained earnings.

ii. Calculate the marginal cost of capital.

iii. How much can be spent for capital investment before new ordinary share must be sold? (Assuming that retained earnings available for next year's investment is 50% of 2015 earnings.)

iv. What will be marginal cost of capital (cost of fund raised in excess of the amount calculated in part (iii) if the company can sell new ordinary shares to net ₹ 20 per share? The cost of debt and of preference capital is constant.

Answer :

i. Calculation of after tax cost of the followings:

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

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

b. Equity Shares (Retained Earnings) (K_e)

$$= \frac{\text{Expected dividend}(D_1)}{\text{Current market price }(P_0)} + \text{Growth rate (G)}$$

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

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

$$= \frac{\text{EPS in current year - EPS in previous year}}{\text{EPS in previous year}}$$

$$= \frac{₹2.773 - ₹2.476}{₹2.476} = 0.12$$

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

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

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

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

Retained earnings can be available for capital investment
= 50% of 2015 EPS × equity shares outstanding
= 50% of ₹ 2.773 × 2,00,000 shares = ₹2,77,300
Since, marginal cost of capital is to be maintained at the current level i.e. 15.28%, the retained earnings should be equal to 80% of total additional capital for investment.

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

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

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

The cost of new issue of equity shares will be:

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

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

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

Question 34.

The following is the capital structure of a Company:

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

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

You are required to calculate:

i. Cost of capital for each source of capital.

ii. Weighted average cost of capital on the basis of book value weights.

iii. Weighted average cost of capital on the basis of market value weights.

Answer :

i. Calculation of Cost of Capital for each source of capital:

a. Cost of Equity share capital:

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

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

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

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

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

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

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

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

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

Question 35.

You are analysing the beta for ABC Computers Ltd. and have divided the company into four broad business groups, with market values and betas for each group.

Business group	Market value of equity	Unleveraged beta
Main frames	₹ 100 billion	1.10
Personal Computers	₹ 100 billion	1.50
Software	₹ 50 billion	2.00
Printers	₹ 150 billion	1.00

ABC Computers Ltd. had ₹ 50 billion in debt outstanding.

Required:

i. Estimate the beta for ABC Computers Ltd. as a Company. Is this beta going to be equal to the beta estimated by regressing past returns on ABC Computers stock against a market index. Why or why not?

[Part (i) is out of syllabus and this topic is covered in Final Level paper]

ii. If the treasury bond rate is 7.5%, estimate the cost of equity for ABC Computers Ltd. Estimate the cost of equity for each division. Which cost of equity would you use to value the printer division? The average market risk premium is 8.5%.

Answer :

i. Beta of ABC Computers

= 1.10 × 2/8 + 1.50×2/8 + 2×1/8 + 1×3/8 = 1.275

Beta coefficient is a measure of volatility of securities return relative to the returns of a broad based market portfolio. Hence beta measures volatility of ABC Computers stock return against broad based market portfolio. In this case we are considering four business groups in computer segment and not a broad based market portfolio , therefore beta calculations will not be the same.

ii. Cost of equity

= rf + av mkt risk premium × β

= 7.5% + 1.275 × 8.5% = 18.34%

Main frame	KE	= 7.5% + 1.10 × 8.5% = 16.85%
Personal Computers	KE	= 7.5% + 1.5 × 8.5% = 20.25%
Software	KE	= 7.5% + 2 × 8.5% = 24.5%
Printers	KE	= 7.5% + 1 × 8.5% = 16%

Advise: To value printer division, the use of 16% KE is recommended.

Question 36.

M/s. Navya Corporation has a capital structure of 40% debt and 60% equity. The company is presently considering several alternative investment proposals costing less than ₹ 20 lakhs. The corporation always raises the required funds without disturbing its present debt equity ratio.

The cost of raising the debt and equity are as under:

Project cost	Cost of debt	Cost of equity
Upto ₹ 2 lakhs	10%	12%
Above ₹ 2 lakhs & upto to ₹ 5 lakhs	11%	13%
Above ₹ 5 lakhs & upto ₹10 lakhs	12%	14%
Above ₹10 lakhs & upto ₹ 20 lakhs	13%	14.5%

Assuming the tax rate at 50%, calculate:

i. Cost of capital of two projects X and Y whose fund requirements are ₹ 6.5 lakhs and ₹ 14 lakhs respectively.

ii. If a project is expected to give after tax return of 10%, determine under what conditions it would be acceptable?

Answer :

i. Statement of Weighted Average Cost of Capital

Project cost	Financing	Proportion of capital Structure	After tax cost (1– Tax 50%)	Weighted average cost (%)
Upto ₹ 2 Lakhs	Debt	0.4	10% (1 – 0.5) = 5%	0.4 × 5 = 2.0
	Equity	0.6	12%	0.6 × 12 = 7.2
				9.2%
Above ₹ 2 lakhs & upto to ₹ 5 Lakhs	Debt	0.4	11% (1 – 0.5) = 5.5%	0.4 × 5.5 = 2.2
	Equity	0.6	13%	0.6 × 13 = 7.8
				10.0%
Above ₹ 5 lakhs & upto ₹ 10 lakhs	Debt	0.4	12% (1 – 0.5) = 6%	0.4 × 6 = 2.4
	Equity	0.6	14%	0.6 × 14 = 8.4
				10.8%
Above ₹ 10 lakhs & upto ₹ 20 lakhs	Debt	0.4	13% (1 – 0.5) = 6.5%	0.4 × 6.5 = 2.6
	Equity	0.6	14.5%	0.6 × 14.5 = 8.7
				11.3%

Project	Fund requirement	Cost of capital
X	₹6.5 lakhs	10.8% (from the above table)
Y	₹14 lakhs	11.3% (from the above table)

ii. If a Project is expected to give after tax return of 10%, it would be acceptable provided its project cost does not exceed ₹ 5 lakhs or, after tax return should be more than or at least equal to the weighted average cost of capital.

Leverage

Question 37.

The capital structure of JCPL Ltd. is as follows:

	₹
Equity share capital of ₹ 10 each	8,00,000
8% Preferences share capital of ₹ 10 each	6,25,000
10% Debenture of ₹ 100 each	4,00,000
	18,25,000

Additional Information:

Profit after tax (tax rate 30%) ₹ 1,82,000
Operating expenses (including depreciation ₹ 90,000) being 1.50 times of EBIT
Equity share dividend paid 15%.
Market price per equity share₹ 20.

Require to calculate:

i. Operating and financial leverage.

ii. Cover for the preference and equity share of dividends.

iii. The earning yield and price earnings ratio.

iv. The net fund flow.

Answer :

[Assumption: All operating expenses (excluding depreciation) are variable]

Working Notes

	₹
Net profit after tax	1,82,000
Tax @ 30%	78,000
EBT	2,60,000
Interest on debenture	40,000
EBIT	3,00,000
Operating Expenses 1.50 times	4,50,000
Sales	7,50,000

i. Operating Leverage = Contribution/EBIT
= (7,50,000 - 3,60,000) / 3,00,000
= 3,90,000 / 3,00,000 = 1.30 times.

Financial Leverage = EBIT / EBT = 3,00,000 / 2,60,000 = 1.15 times

OR

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

$$= \frac{3,00,000}{2,60,000-(\frac{50,000}{1-0.3})} = \frac{3,00,000}{2,60,000-(7,14,29)} = \frac{3,00,000}{1,88,571} = 1.59 = 1.6$$

ii. Preference Dividend Cover = PAT / Preference share Dividend
= (1,82,000 / 50,000) = 3.64 times

Equity dividend cover = PAT - Pref. div / Equity dividend
= (1,82,000 - 50,000) / 1,20,000= 1.10 times

iii. Earning yield = EPS / Market price × 100 i.e.
= 1,32,000 / 80,000 = 1.65 / 20 = 8.25%

Price Earnings Ratio = Market price / EPS = 20 / 1.65 = 12.1 Times

iv. Net Funds Flow

Net Funds flow = Net profit after tax + depreciation – Total dividend
= 1,82,000 + 90,000 – (50,000 + 1,20,000)
= 2,72,000 – 1,70,000

Net funds flow = 1,02,000

Question 38.

The net sales of A Ltd. is ₹ 30 crores. Earnings before interest and tax of the company as a percentage of net sales is 12%. The capital employed comprises ₹ 10 crores of equity, ₹ 2 crores of 13% Cumulative Preference Share Capital and 15% Debentures of ₹ 6 crores. Income-tax rate is 40%.

i. Calculate the Return-on-equity for the company and indicate its segments due to the presence of Preference Share Capital and Borrowing (Debentures).

ii. Calculate the Operating Leverage of the Company given that combined leverage is 3.

Answer :

i. Net Sales : ₹ 30 crores

EBIT = 12% on sales = ₹ 3.6 crores

$$\text{Return on Capital Employed (pre-tax)} = \frac{\text{EBIT}}{\text{Capital Employed}} = \frac{3.6}{10+2+6} \times 100 = 20\%$$

After tax it will be = 20% (1 - 0.4)= 12 %.

Particulars	₹ in crores
EBIT	3.6
Less: Interest on Debt (15% of 6 crores)	0.9
EBT	2.7
Less : Tax @ 40%	1.08
EAT	1.62
Less : Preference dividend	0.26
Earnings available for Equity Shareholders	1.36
Return on equity = 1.36/10 × 100 = 13.6%	

Segments due to the presence of Preference Share capital and Borrowing (Debentures)

Segment of ROE due to preference capital : (12% - 13%) × ₹ 2 Crore = - 2%

Segment of ROE due to Debentures: (12% - 9%) × ₹ 6 Crores = 18 %

Total= -2 % +18 % = 16 %

Cost of debenture (after tax) = 15% (1- 0.4) = 9 %

The weighted average cost of capital is as follows

Source	Proportion	Cost (%)	WACC (%)
i. Equity	10/18	13.60	7.56
ii. Preference shares	2/18	13.00	1.44
iii. Debt	6/18	9.00	3.00
Total			**12.00**

ii. $\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{3.6}{2.7} = 1.33$

Combined Leverage = FL × OL

$3 = 1.33 \times OL$ Or, $OL = \frac{3}{1.33}$ Or, Operating Leverage = 2.26

Question 39.

A firm has sales of ₹ 75,00,000 variable cost is 56% and fixed cost is ₹ 6,00,000. It has a debt of ₹ 45,00,000 at 9% and equity of ₹ 55,00,000.

i. What is the firm's ROI?

ii. Does it have favourable financial leverage?

iii. If the firm belongs to an industry whose capital turnover is 3, does it have a high or low capital turnover?

iv. What are the operating, financial and combined leverages of the firm?

v. If the sales is increased by 10% by what percentage EBIT will increase?

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

vii. If EBIT increases by 20%, by what percentage EBT will increase?

Answer :

Income Statement

Particulars	Amount (₹)
Sales	75,00,000
Less: Variable cost (56% of 75,00,000)	42,00,000
Contribution	33,00,000
Less: Fixed costs	6,00,000
Earnings before interest and tax (EBIT)	27,00,000
Less: Interest on debt (@ 9% on ₹ 45 lakhs)	4,05,000
Earnings before tax (EBT)	22,95,000

i. $\text{ROI} = \frac{\text{EBIT}}{\text{Capital employed}} \times 100 = \frac{\text{EBIT}}{\text{Equity + Debt}} \times 100$

$= \frac{₹\ 27,00,000}{₹\ (55,00,000 + 45,00,000)} \times 100 = 27\%$

(ROI is calculated on Capital Employed)

ii. ROI = 27% and Interest on debt is 9%, hence, it has a favourable financial leverage.

iii. Capital Turnover $= \frac{\text{Net Sales}}{\text{Capital}}$

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

Which is very low as compared to industry average of 3.

iv. Calculation of Operating, Financial and Combined leverages

a. Operating Leverage $= \frac{\text{Contribution}}{\text{EBIT}}$

$= \frac{₹\ 33,00,000}{₹\ 27,00,000} = 1.22 \text{ (approx)}$

b. Financial Leverage $= \frac{\text{EBIT}}{\text{EBT}}$

$= \frac{₹\ 27,00,000}{₹\ 22,95,000} = 1.18 \text{ (approx)}$

c. Combined Leverage $= \frac{\text{Contribution}}{\text{EBT}}$

$= \frac{₹\ 33,00,000}{₹\ 22,95,000} = 1.44 \text{ (approx)}$

Or = Operating Leverage × Financial Leverage = 1.22 × 1.18 = 1.44 (approx)

v. Operating leverage is 1.22. So if sales is increased by 10%.
EBIT will be increased by 1.22 × 10 i.e. 12.20% (approx)

vi. Since the combined Leverage is 1.44, sales have to drop by 100/1.44 i.e. 69.44% to bring EBT to Zero

Accordingly, New Sales = ₹ 75,00,000 × (1 - 0.6944)
= ₹ 75,00,000 × 0.3056
= ₹ 22,92,000 (approx)

Hence at ₹ 22,92,000 sales level EBT of the firm will be equal to Zero.

vii. Financial leverage is 1.18. So, if EBIT increases by 20% then EBT will increase by 1.18 × 20 = 23.6% (approx)

Capital Structure

Question 40.

Ganapati Limited is considering three financing plans. The key information is as follows:

a. Total investment to be raised ₹ 2,00,000

b. Plans of Financing Proportion:

Plans	Equity	Debt	Preference Shares
A	100%	-	-
B	50%	50%	-
C	50%	-	50%

c. Cost of debt 8%
Cost of preference shares 8%

d. Tax rate 50%

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

f. Expected EBIT is ₹ 80,000.

You are required to determine for each plan:

i. Earnings per share (EPS)

ii. The financial break-even point.

iii. Indicate if any of the plans dominate and compute the EBIT range among the plans for indifference.

Answer :

i. Computation of Earnings per share (EPS)

Plans	A	B	C
Earnings before interest and tax (EBIT)	80,000	80,000	80,000
Less: Interest charges	--	(8,000) (8% × ₹1 lakh)	--
Earnings before tax (EBT)	80,000	72,000	80,000
Less: Tax (@ 50%)	(40,000)	(36,000)	(40,000)
Earnings after tax (EAT)	40,000	36,000	40,000
Less: Preference Dividend	--	--	(8,000) (8% × ₹1 lakh)
Earnings available for Equity shareholders (A)	40,000	36,000	32,000
No. of Equity shares (B)	10,000 (₹2 lakh ÷ ₹20)	5,000 (₹1 lakh ÷ ₹20)	5,000 (₹1 lakh ÷ ₹20)
EPS ₹ [(A) ÷ (B)]	4	7.20	6.40

ii. Calculation of Financial Break-even point

Financial break-even point is the earnings which are equal to the fixed finance charges and preference dividend.

Plan A : Under this plan there is no interest or preference dividend payment hence, the Financial Break-even point will be zero.

Plan B : Under this plan there is an interest payment of ₹8,000 and no preference dividend, hence, the Financial Break-even point will be ₹8,000 (Interest charges).

Plan C : Under this plan there is no interest payment but an after tax preference dividend of ₹8,000 is paid. Hence, the Financial Break-even point will be before tax earnings of ₹16,000 (i.e. ₹8,000 ÷ 0.5 = ₹16,000.)

iii. Computation of indifference point between the plans.

The indifference between two alternative methods of financing is calculated by applying the following formula.

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

Where,

EBIT = Earnings before interest and tax.
I_1 = Fixed charges (interest or pref. dividend) under Alternative
I_2 = Fixed charges (interest or pref. dividend) under Alternative
T = Tax rate

E_1 = No. of equity shares in Alternative 1
E_2 = No. of equity shares in Alternative 2

Now, we can calculate indifference point between different plans of financing.

i. Indifference point where EBIT of Plan A and Plan B is equal.

$$\frac{(EBIT-0)(1-0.5)}{10,000} = \frac{(EBIT - 8,000)(1 - 0.5)}{5,000}$$

$$0.5\ EBIT\ (5,000) = (0.5\ EBIT - 4,000)\ (10,000)$$

$$0.5\ EBIT = EBIT - 8,000$$

$$0.5\ EBIT = 8,000$$

$$EBIT = ₹16,000$$

ii. Indifference point where EBIT of Plan A and Plan C is equal.

$$\frac{(EBIT-0)(1-0.5)}{10,000} \quad \frac{(EBIT - 0)(1 - 0.5) - 8,000}{5,000}$$

$$\frac{0.5\ EBIT}{10,000} \quad \frac{0.5\ EBIT - 8,000}{5,000}$$

$$0.25\ EBIT = 0.5\ EBIT - 8,000$$

$$0.25\ EBIT = 8,000$$

$$EBIT = ₹\ 32,000$$

iii. Indifference point where EBIT of Plan B and Plan C is equal.

$$\frac{(EBIT-8,000)(1-0.5)}{5,000} \quad \frac{(EBIT - 0)(1 - 0.5) - 8,000}{5,000}$$

$$0.5\ EBIT - 4,000 = 0.5\ EBIT - 8,000$$

There is no indifference point between the financial plans B and C.

It can be seen that Financial Plan B dominates Plan C. Since, the financial break even point of the former is only ₹8,000 but in case of latter it is ₹16,000.

Question 41.

The management of Z Company Ltd. wants to raise its funds from market to meet out the financial demands of its long-term projects. The company has various combinations of proposals to raise its funds. You are given the following proposals of the company:

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 earnings before interest and tax ₹ 18,00,000.
From the above proposals the management wants to take advice from you for appropriate plan after computing the following:

- Earnings per share
- Financial break-even-point
- Compute the EBIT range among the plans for indifference. Also indicate if any of the plans dominate.

Answer :

i. Computation of Earnings per Share (EPS)

Plans	P	Q	R
	₹	₹	₹
Earnings before interest & tax (EBIT)	18,00,000	18,00,000	18,00,000
Less: Interest charges	-	2,00,000	-
Earnings before tax (EBT)	18,00,000	16,00,000	18,00,000
Less : Tax @ 50%	9,00,000	8,00,000	9,00,000
Earnings after tax (EAT)	9,00,000	8,00,000	9,00,000
Less : Preference share dividend	-	-	2,00,000
Earnings available for equity shareholders	9,00,000	8,00,000	7,00,000
No. of shares	2,00,000	1,00,000	1,00,000
E.P.S (₹)	**4.5**	**8**	**7**

ii. Computation of Financial Break-even Points

Proposal 'P' = 0

Proposal 'Q' = ₹ 2,00,000 (Interest charges)

Proposal R = Earnings required for payment of preference share dividend i.e. ₹ 2,00,000 ÷ 0.5 (Tax Rate) = ₹ 4,00,000

iii. Computation of Indifference Point between the Proposals

The indifference point $\frac{(EBIT - l_1)(1-T)}{E_1} = \frac{(EBIT - l_2)(1-T)}{E_2}$

Where,

EBIT = Earnings before interest and tax

l_1 = Fixed Charges (Interest) under Proposal 'P'

l_2 = Fixed charges (Interest) under Proposal 'Q'

T = Tax Rate

E1 = Number of Equity shares in Proposal P

E2 = Number of Equity shares in Proposal Q

Combination of Proposals

a. Indifference point where EBIT of proposal "P" and proposal 'Q' is equal

$$\frac{(EBIT - 0)(1- .5)}{2,00,000} = \frac{(EBIT - 2,00,000)(1- 0.5)}{1,00,000}$$

.5 EBIT (1,00,000) = (.5 EBIT -1,00,000) 2,00,000

.5 EBIT = EBIT – 2,00,000

EBIT = ₹ 4,00,000

b. Indifference point where EBIT of proposal 'P' and Proposal 'R' is equal:

$$\frac{(EBIT - 1)(1 - T)}{E_1} = \frac{(EBIT - 12)(1 - T)}{E_2} - \text{Preference share dividend}$$

$$\frac{(EBIT - 0)(1 - .5)}{2,00,000} = \frac{(EBIT - 0)(1 - .5) - 2,00,000}{1,00,000}$$

$$\frac{.5EBIT}{2,00,000} = \frac{.5EBIT - 2,00,000}{1,00,000}$$

.25 EBIT = 0.5 EBIT -2,00,000

EBIT = 2,00,000 ÷ 0.25 = ₹ 8,00,000

c. Indifference point where EBIT of proposal 'Q' and proposal 'R' are equal

$$\frac{(EBIT - 2,00,000)(1 - 0.5)}{1,00,000} = \frac{(EBIT - 0)(1 - 0.5) - 2,00,000}{1,00,000}$$

.5 EBIT -1,00,000 = .5 EBIT – 2,00,000

There is no indifference point between proposal 'Q' and proposal 'R'

Analysis: It can be seen that Financial proposal 'Q' dominates proposal 'R', since the financial break-even-point of the former is only ₹ 2,00,000 but in case of latter, it is ₹ 4,00,000.

Question 42.

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% non-convertible debentures for the balance amount. In this case, the company can issue shares at a premium of ₹ 40 each.

You are required to advise the management as to how the additional capital can be raised, keeping in mind that the management wants to maximise the earnings per share to maintain its goodwill. The company is paying income tax at 50%.

Answer :

Calculation of Earnings per share under the three options:

Particulars	Options		
	Option I: Issue Equity shares only	**Option II: Issue 16% Debentures only**	**Option III: Issue Equity Shares and 16% Debentures of equal amount**
Number of Equity Shares (nos):			
- Existing	10,00,000	10,00,000	10,00,000
- Newly issued	2,00,000 $\left(\frac{₹50,00,000}{₹(10+15)}\right)$	-	50,000 $\left(\frac{₹25,00,000}{₹10+40}\right)$
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**	**1,00,00,000**
Less: Interest on 16%	-	8,00,000	4,00,000
Debentures		(16% ×₹50,00,000)	(16%×₹25,00,000)
Profit Before Tax	1,00,00,000	92,00,000	96,00,000
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
$\left(\frac{\text{PAT}}{\text{No. of Shares}}\right)$	$\left(\frac{₹50,00,000}{12,00,000}\right)$	$\left(\frac{₹46,00,000}{10,00,000}\right)$	$\left(\frac{₹48,00,000}{10,50,000}\right)$

Advise: Option II i.e. issue of 16% Debentures is most suitable to maximize the earnings per share.

Question 43.

A Company needs ₹ 31,25,000 for the construction of new plant. The following three plans are feasible

I. The Company may issue 3,12,500 equity shares at ₹ 10 per share.

II. The Company may issue 1,56,250 ordinary equity shares at ₹ 10 per share and 15,625 debentures of Rs,. 100 denomination bearing a 8% rate of interest.

III. The Company may issue 1,56,250 equity shares at ₹ 10 per share and 15,625 preference shares at ₹ 100 epr share bearing a 8% rate of dividend.

i. if the Company's earnings before interest and taxes are ₹ 62,500, ₹ 1,25,000, ₹ 2,50,000, ₹ 3,75,000 and ₹ 6,25,000, what are the earnings per share under each of three financial plans ? Assume a Corporate Income tax rate of 40%.

ii. Which alternative would you recommend and why?

iii. Determine the EBIT-EPS indifference points by formulae between Financing Plan I and Plan II and Plan I and Plan III.

Answer :

i. Computation of EPS under three-financial plans.

Plan I: Equity Financing

EBIT	₹ 62,500	₹ 1,25,000	₹ 2,50,000	₹ 3,75,000	₹ 6,25,000
Interest	0	0	0	0	0
EBT	₹ 62,500	₹ 1,25,000	₹ 2,50,000	₹ 3,75,000	₹ 6,25,000
Less: Taxes 40%	25,000	50,000	1,00,000	1,50,000	2,50,000
PAT	₹ 37,500	₹ 75,000	₹ 1,50,000	₹ 2,25,000	₹ 3,75,000
No. of equity shares	3,12,500	3,12,500	3,12,500	3,12,500	3,12,500
EPS	₹ 0.12	0.24	0.48	0.72	1.20

Plan II: Debt – Equity Mix

EBIT	₹ 62,500	₹ 1,25,000	₹ 2,50,000	₹ 3,75,000	₹ 6,25,000
Less : Interest	1,25,000	1,25,000	1,25,000	1,25,000	1,25,000
EBT	(62,500)	0	1,25,000	2,50,000	5,00,000
Less: Taxes 40%	25,000*	0	50,000	1,00,000	2,00,000
PAT	(37,500)	0	75,000	1,50,000	3,00,000
No. of equity shares	1,56,250	1,56,250	1,56,250	1,56,250	1,56,250
EPS	(₹ 0.24)	0	0.48	0.96	1.92

* The Company will be able to set off losses against other profits. If the Company has no profits from operations, losses will be carried forward.

Plan III : Preference Shares – Equity Mix

EBIT	₹ 62,500	₹ 1,25,000	₹ 2,50,000	₹ 3,75,000	₹ 6,25,000
Less : Interest	0	0	0	0	0
EBT	62,500	1,25,000	2,50,000	3,75,000	6,25,000
Less: Taxes 40%	25,000	50,000	1,00,000	1,50,000	2,50,000
PAT	37,500	75,000	1,50,000	2,25,000	3,75,000
Less: Pref. dividend	1,25,000	1,25,000	1,25,000	1,25,000	1,25,000
PAT for ordinary shareholders	(87,500)	(50,000)	25,000	1,00,000	2,50,000
No. of Equity shares	1,56,250	1,56,250	1,56,250	1,56,250	1,56,250
EPS	(0.56)	(0.32)	0.16	0.64	1.60

ii. The choice of the financing plan will depend on the state of economic conditions. If the company's sales are increasing, the EPS will be maximum under Plan II: Debt – Equity

Mix. Under favourable economic conditions, debt financing gives more benefit due to tax shield availability than equity or preference financing.

iii. EBIT – EPS Indifference Point : Plan I and Plan II

$$\frac{(EBIT^*) \times (1 - T_C)}{N_1} = \frac{(EBIT^* - Interest) \times (1 - T_C)}{N_2}$$

$$\frac{EBIT^* (1 - 0.40)}{3,12,500} = \frac{(EBIT^* - 1,25,000) \times (1 - 0.40)}{1,56,250}$$

$$EBIT^* = \frac{3,12,500}{3,12,500 - 1,56,250} \times 1,25,000$$

$$= ₹\ 2,50,000$$

EBIT – EPS Indifference Point: Plan I and Plan III

$$\frac{EBIT^* (1 - T_c)}{N_1} = \frac{EBIT^* (1 - T_c) - Pref.Div.}{N_2}$$

$$EBIT^* = \frac{N_1}{N_1 - N_2} \times \frac{Pref.\ Div.}{1 - T_C}$$

$$= \frac{3,12,500}{3,12,500 - 1,56,250} \times \frac{1,25,000}{1 - 0.4}$$

$$= ₹\ 4,16,666.67$$

Question 44.

'A' Ltd. and 'B' Ltd. are identical in every respect except capital structure. 'A' Ltd. does not employ debts in its capital structure whereas 'B' Ltd. employs 12% Debentures amounting to ₹ 10 lakhs. Assuming that :

i. All assumptions of M-M model are met;

ii. Income-tax rate is 30%;

iii. EBIT is ₹ 2,50,000 and

iv. The Equity capitalization rate of 'A' Ltd. is 20%.

Calculate the value of both the companies and also find out the Weighted Average Cost of Capital for both the companies.

Answer :

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

Market Value of 'A Ltd' (Unlevered)

$$V_u = \frac{EBIT(1-t)}{K_e}$$

$$= \frac{2,50,000(1 - 0.30)}{20\%}$$

$$= \frac{1,75,000}{20\%} = 8,75,000$$

Market Value of 'B Ltd.' (Levered)

$V_E = V_u + DT$

$= 8,75,000 + (10,00,000 \times 0.30)$

$= 8,75,000 + 3,00,000 = ₹\ 11,75,000$

ii. Computation of Weighted Average Cost of Capital (WACC)

WACC of 'A Ltd.' = 20% ($K_e = K_o$)

WACC of 'B Ltd.'

	B Ltd.
EBIT	2,50,000
Interest to Debt holders	(1,20,000)
EBT	1,30,000
Taxes @ 30%	(39,000)
Income available to Equity Shareholders	91,000
Total Value of Firm	11,75,000
Less: Market Value of Debt	(10,00,000)
Market Value of Equity	1,75,000
K_e = 91,000 / 1,75,000	0.52

For Computation of WACC B. Ltd

Component of Costs	**Amount**	**Weight**	**Cost of Capital**	**WACC**
Equity	1,75,000	0.149	0.52	0.0775
Debt	10,00,000	0.851	0.084*	0.0715
	11,75,000			**0.1490**

K_d = 12% (1- 0.3) = 12% x 0.7 = 8.4%

WACC = 14.90%

Question 45.

The following figures of Theta Limited are presented as under:

	₹	₹
Earnings before Interest and Tax		23,00,000
Less: Debenture Interest @ 8%	80,000	
Long Term Loan Interest @ 11%	2,20,000	3,00,000
		20,00,000
Less: Income Tax		10,00,000
Earnings after tax		10,00,000

No. of Equity Shares of ₹ 10 each	5,00,000
EPS	₹ 2
Market Price of Share	₹ 20
P/E Ratio	10

The company has undistributed reserves and surplus of ₹ 20 lakhs. It is in need of ₹ 30 lakhs to pay off debentures and modernise its plants. It seeks your advice on the following alternative modes of raising finance.

Alternative 1 - Raising entire amount as term loan from banks @ 12%.

Alternative 2 - Raising part of the funds by issue of 1,00,000 shares of ₹ 20 each and the rest by term loan at 12 percent.

The company expects to improve its rate of return by 2 percent as a result of modernisation, but P/E ratio is likely to go down to 8 if the entire amount is raised as term loan.

i. Advise the company on the financial plan to be selected.

ii. If it is assumed that there will be no change in the P/E ratio if either of the two alternatives is adopted, would your advice still hold good?

Answer :

Working Notes:

i. Capital Employed

		₹
Equity Capital	(5,00,000 shares of ₹ 10 each)	50,00,000
Debentures	(₹ 80,000×100/8)	10,00,000
Term Loan	(₹ 2,20,000×100/11)	20,00,000
Reserves and Surplus		20,00,000
Total Capital Employed		**1,00,00,000**

ii. Rate of Return

Earnings before Interest and Tax = ₹ 23,00,000

$$\text{Rate of Return on Capital Employed} = \frac{23,00,000}{1,00,00,000} \times 100 = 23\%$$

iii. Expected Rate of Return after Modernisation = 23% + 2% = 25%

Alternative 1: Raise Entire Amount as Term Loan

Original Capital Employed	1,00,00,000
Less: Debentures	10,00,000
	90,00,000
Add: Additional Term Loan	30,00,000
Revised Capital Employed	1,20,00,000

		₹
EBIT on Revised Capital Employed (@ 25% on ₹ 120 lakhs)		30,00,000
Less: Interest		
Existing Term Loan (@11%)	2,20,000	
New Term Loan (@12%)	3,60,000	5,80,000
		24,20,000
Less: Income Tax (@ 50%)		12,10,000
Earnings after Tax (EAT)		12,10,000

$$\text{Earnings per Share (EPS)} = \frac{\text{EAT}}{\text{No. of Equity Shares}} = \frac{₹\ 12,10,000}{5,00,000\ \text{Shares}} = ₹\ 2.42$$

$$\text{P/E Ratio} = \frac{\text{Market Price per Share}}{\text{EPS}} = 8$$

$$8 = \frac{\text{Market Price}}{₹\ 2.42}$$

Market Price = ₹ 19.36

Alternative 2: Raising Part by Issue of Equity Shares and Rest by Term Loan

		₹
Earnings before Interest and Tax (@ 25% on Revised Capital Employed i.e., ₹ 120 lakhs)		30,00,000
Less: Interest		
Existing Term Loan @ 11%	2,20,000	
New Term Loan @ 12%	1,20,000	3,40,000
		26,60,000
Less: Income Tax @ 50%		13,30,000
Earnings after Tax		13,30,000

$$EPS = \frac{₹\ 13,30,000}{5,00,000\ (existing)\ +\ 1,00,000\ (new)} = ₹\ 2.217$$

P/E Ratio = 10

Market Price = ₹ 22.17

Advise:

i. From the above computations it is observed that the market price of Equity Shares is maximised under Alternative 2. Hence this alternative should be selected.

ii. If, under the two alternatives, the P/E ratio remains constant at 10, the market price under Alternative 1 would be ₹ 24.20. Then Alternative 1 would be better than Alternative 2.

Question 46.

Company P and Q are identical in all respects including risk factors except for debt/equity, company P having issued 10% debentures of ₹ 18 lakhs while company Q is unlevered. 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% from an all-equity company.

Required:

Calculate the value of companies' P and Q using

i. Net Income Approach and

ii. Net Operating Income Approach.

Answer :

i. Valuation under Net Income Approach

Particulars	P Amount (₹)	Q Amount (₹)
Earnings before Interest & Tax (EBIT) (20% of ₹ 30,00,000)	6,00,000	6,00,000
Less: Interest (10% of ₹ 18,00,000)	1,80,000	
Earnings before Tax (EBT)	4,20,000	6,00,000
Less: Tax @ 50%	2,10,000	3,00,000
Earnings after Tax (EAT) (available to equity holders)	2,10,000	3,00,000
Value of equity (capitalized @ 15%)	14,00,000 (2,10,000 × 100/15)	20,00,000 (3,00,000 × 100/15)
Add: Total Value of debt	18,00,000	Nil
Total Value of Company	**32,00,000**	**20,00,000**

ii. Valuation of Companies under Net Operating Income Approach

Particulars	P Amount (₹)	Q Amount (₹)
Capitalisation of earnings at 15% $\left(\frac{₹6,00,000(1-0.5)}{0.15}\right)$	20,00,000	20,00,000
Less: Value of debt {18,00,000 (1 – 0.5)}	9,00,000	Nil
Value of equity	11,00,000	20,00,000
Add: Total Value of debt	18,00,000	Nil
Total Value of Company	**29,00,000**	**20,00,000**

Dividend Policy

Question 47.

The following information is supplied to you:

	₹
Total Earnings	2,00,000
No. of equity shares (of ₹ 100 each)	20,000
Dividend paid	1,50,000
Price/ Earning ratio	12.5

Applying Walter's Model

i. Ascertain whether the company is following an optimal dividend policy.

ii. Find out what should be the P/E ratio at which the dividend policy will have no effect on the value of the share.

iii. Will your decision change, if the P/E ratio is 8 instead of 12.5?

Answer :

i. The EPS of the firm is ₹ 10 (i.e., ₹ 2,00,000/ 20,000). The P/E Ratio is given at 12.5 and the cost of capital, ke, may be taken at the inverse of P/E ratio.

Therefore, ke is 8 (i.e., 1/12.5). The firm is distributing total dividends of ₹ 1,50,000 among 20,000 shares, giving a dividend per share of ₹ 7.50. the value of the share as per Walter's model may be found as follows:

$$P = \frac{D}{K_e} + \frac{(r/K_e)(E-D)}{K_e} = \frac{7.50}{.08} + \frac{(.10/.08)(10-7.5)}{.08} = ₹132.81$$

The firm has a dividend payout of 75% (i.e., ₹1,50,000) out of total earnings of ₹ 2,00,000. since, the rate of return of the firm, r, is 10% and it is more than the ke of 8%, therefore, by distributing 75% of earnings, the firm is not following an optimal dividend policy. The optimal dividend policy for the firm would be to pay zero dividend and in such a situation, the market price would be

$$P = \frac{D}{K_e} + \frac{(r/K_e)(E-D)}{K_e} = \frac{0}{.08} + \frac{(.10/.08)(10-0)}{.08} = ₹156.25$$

So, theoretically the market price of the share can be increased by adopting a zero payout.

ii. The P/E ratio at which the dividend policy will have no effect on the value of the share is such at which the k_e would be equal to the rate of return, r, of the firm. The K_e would be 10% (=r) at the P/E ratio of 10. Therefore, at the P/E ratio of 10, the dividend policy would have no effect on the value of the share.

iii. If the P/E is 8 instead of 12.5, then the K_e which is the inverse of P/E ratio, would be 12.5 and in such a situation $k_e > r$ and the market price, as per Walter's model would be

$$P = \frac{D}{K_e} + \frac{(r/K_e)(E-D)}{K_e} = \frac{7.50}{.125} + \frac{(.1/.25)(10-7.5)}{.125} = ₹76$$

Question 48.

The dividend payout ratio of H ltd. is 40%. If the company follows traditional approach to dividend policy with a multiplier of 9, what will be the P/E ratio.

Answer :

The P/E ratio i.e. price earnings ratio can be computed with the help of the following formula:

$$P/E \text{ ratio} = \frac{MPS}{EPS}$$

Since the D/P ratio is 40%,
D = 40% of E i.e. 0.4E

Hence,
Market price per share (P) = m(D + E/3)

Where,
P = Market price per share
D = Dividend per share
E = Earnings per share
m = a multiplier
P = 9 (0.4E + E/3)

$$P = 9\left(\frac{1.2E + E}{3}\right) = 3(2.2E)$$

P = 6.6E

$$\frac{P}{E} = 6.6 \text{ i.e. } P/E \text{ ratio is 6.6 times .}$$

Question 49.

Given the last year's dividend is ₹ 9.80, speed of adjustment = 45%, target payout ratio 60% and EPS for current year ₹ 20. Calculate current year's dividend.

Answer :

$D_1 = 9.80 + [(20 \times 60\%) - 9.80] \times 0.45$
$D_1 = ₹ 10.79$

Criticism :

- This model does not offer a market price for the shares.
- The adjustment factor is an arbitrary number and not based on any scientific criterion or methods.

Question 50.

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.

Answer :

Market Price (P) per share as per Walter's Model is:

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e}$$

Where,

P = Price of Share

r = Return on investment or rate of earning

K_e = Rate of Capitalisation or Cost of Equity

Calculation of Market Price (P) under the following dividend payout ratio and earning rates:

	Rate of Earning (r)	(i) DP ratio 50%	(ii) DP ratio 75%	(iii) DP ratio 100%
a.	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.	10%	$\frac{5+\left(\frac{0.10}{0.10}\right)(10-5)}{0.10} = \frac{10}{0.10} = ₹100$	$\frac{7.5+\left(\frac{0.10}{0.10}\right)(10-7.5)}{0.10} = \frac{10}{0.10} = ₹100$	$\frac{10+\left(\frac{0.10}{0.10}\right)(10-10)}{0.10} = \frac{10}{0.10} = ₹100$
c.	5%	$\frac{5+\left(\frac{0.05}{0.10}\right)(10-5)}{0.10} = \frac{7.5}{0.10} = ₹75$	$\frac{7.5+\left(\frac{0.05}{0.10}\right)(10-7.5)}{0.10} = \frac{8.75}{0.10} = ₹87.5$	$\frac{10+\left(\frac{0.05}{0.10}\right)(10-10)}{0.10} = \frac{10}{0.10} = ₹100$