

CA Inter Financial Management

Version 4

**Jan 26
& Onwards**

Ready To Go

CA
Amit Sharma

Question Bank

first attempt success tutorials



Hep my buddies !!

How are you all ?? All good ? I hope everything is going very - very - very good

I am presenting to you all **COLOURFUL QUESTION BANK** for CA Intermediate Financial Management.

It took a lot of efforts . dedication . patience and obviously some hardwork to combine all PP , RTP , MTP and SM Questions and then group them on the basis of concepts asked. This book is a **one - stop solution** for all your FM related doubts and I assure that this single book will make you **READY - TO - GO** and score the marks that you desire to achieve.

FAST
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Don't worry . be assured and we will give you all the **Tips and Tricks** to solve and also the list of all important and tough Questions which you must practice.

So thank you so much ❤️ for choosing me for this interesting subject and now **GET READY AND FASTEN YOUR SEAT BELTS** as you are going to witness a super exciting journey.

Thanking you all :-
CA AMIT SHARMA
aka yours - amitbhai

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Let's fall in love..

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1

CHAPTER

RATIO ANALYSIS

Q.1

All Ratios

PY May 23



Following information and ratios are given in respect of AQUA Ltd. for the year ended 31st March, 2023:

Current ratio	4.0
Acid test ratio	2.5
Inventory turnover ratio (based on sales)	6
Average collection period (days)	70
Earnings per share	₹ 3.5
Current liabilities	₹ 3,10,000
Total assets turnover ratio (based on sales)	0.96
Cash ratio	0.43
Proprietary ratio	0.48
Total equity dividend	₹ 1,75,000
Equity dividend coverage ratio	1.60

Assume 360 days in a year.

You are required to complete Balance Sheet as on 31st March, 2023.

Balance Sheet as on 31st March, 2023.

Liabilities	₹	Assets	₹
Equity share capital (₹10 per share)	XXX	Fixed assets	XXX
Reserves & surplus	XXX	Inventory	XXX
Long-term debt	XXX	Debtors	XXX
Current liabilities	3,10,000	Loans & advances	XXX
		Cash & bank	XXX
Total	XXX	Total	XXX

Ans.

- (i) Current Ratio = 4
- $$\frac{\text{Current Assets}}{\text{Current Liabilities}} = 4$$
- $$\frac{\text{Current Assets}}{3,10,000} = 4$$
- Current Assets = ₹ 12,40,000
- (ii) Acid Test Ratio = 2.5
- $$\frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}} = 2.5$$
- $$\frac{12,40,000 - \text{Inventory}}{3,10,000} = 2.5$$
- 12,40,000 - Inventory = ₹ 7,75,000
- Inventory = ₹ 4,65,000
- (iii) Inventory Turnover Ratio (on Sales) = 6

$$\frac{\text{Sales}}{\text{Inventory}} = 6$$

$$\frac{\text{Sales}}{4,65,000} = 6$$

$$\text{Sales} = ₹ 27,90,000$$

(iv) Debtors Collection Period = 70 days

$$(\text{Debtors} / \text{sales}) \times 360 = 70$$

$$(\text{Debtors} / 27,90,000) \times 360 = 70$$

$$\text{Debtors} = ₹ 5,42,500$$

(v) Total Assets Turnover Ratio (on Sales) = 0.96

$$\frac{\text{Sales}}{\text{Total Assets}} = 0.96$$

$$\frac{27,90,000}{\text{Total Assets}} = 0.96$$

$$\text{Total Assets} = ₹ 29,06,250$$

(vi) Fixed Assets (FA) = Total Assets - Current Assets

$$= 29,06,250 - 12,40,000$$

$$\text{Fixed Assets} = ₹ 16,66,250$$

(vii) Cash Ratio = $\frac{\text{Cash}}{\text{Current Liabilities}} = 0.43$

$$\frac{\text{Cash}}{3,10,000} = 0.43$$

$$\text{Cash} = ₹ 1,33,300$$

(viii) Proprietary Ratio = $\frac{\text{Proprietary Fund}}{\text{Total Assets}} = 0.48$

$$\frac{\text{Proprietary Fund}}{29,06,250} = 0.48$$

$$\text{Proprietary Fund} = ₹ 13,95,000$$

(ix) Equity Dividend Coverage Ratio = 1.6 or

$$\frac{\text{EPS}}{\text{DPS}} = \frac{3.5}{\text{DPS}}$$

$$\text{DPS} = ₹ 2.1875$$

$$\text{DPS} = \frac{\text{Total Dividend}}{\text{Number of Equity Shares}}$$

$$2.1875 = \frac{1,75,000}{\text{Number of Equity Shares}}$$

$$\text{Number of Equity Shares} = 80,000$$

$$\text{Equity Share Capital} = 80,000 \times 10 = ₹ 8,00,000$$

$$\text{Reserves \& Surplus} = 13,95,000 - 8,00,000 = ₹ 5,95,000$$

(x) Loans and Advances = Current Assets - (Inventory + Receivables + Cash & Bank)

$$= ₹ 12,40,000 - (₹ 4,65,000 + 5,42,500 + 1,33,300) = ₹ 99,200$$

Balance Sheet as on 31st March 2023

Liabilities	₹	Assets	₹
Equity Share Capital (₹ 10 per share)	8,00,000	Fixed Assets	16,66,250



Reserves & Surplus	5,95,000	Inventory	4,65,000
Long-term debt *(B/F)	12,01,250	Receivables	5,42,500
Current Liabilities	3,10,000	Loans & Advances	99,200
		Cash & Bank	1,33,300
Total	29,06,250	Total	29,06,250

Q.2

All Ratios

PY May 22



Following information and ratios are given for W Limited for the year ended 31st March, 2022:

Equity Share Capital of ₹ 10 each	₹ 10 lakhs
Reserves & Surplus to Shareholders' Fund	0.50
Sales / Shareholders' Fund	1.50
Current Ratio	2.50
Debtors Turnover Ratio	6.00
Stock Velocity	2 Months
Gross Profit Ratio	20%
Net Working Capital Turnover Ratio	2.50

You are required to calculate:

- Shareholders' Fund
- Stock
- Debtors
- Current liabilities
- Cash Balance.

Ans.

(i) **Calculation of Shareholders' Fund:**

$$\frac{\text{Reserve \& Surplus}}{\text{Shareholders' Funds}} = 0.5$$

$$\frac{\text{Reserve \& Surplus}}{\text{Equity Share Capital + Reserve \& Surplus}} = 0.5$$

$$\frac{\text{Reserve \& Surplus}}{10,00,000 + \text{Reserve \& Surplus}} = 0.5$$

$$\text{Reserve \& Surplus} = 5,00,000 + 0.5 \text{ Reserve \& Surplus}$$

$$0.5 \text{ Reserve \& Surplus} = 5,00,000$$

$$\text{Reserve \& Surplus} = 10,00,000$$

$$\text{Shareholders' funds} = 10,00,000 + 10,00,000$$

$$\text{Shareholders' funds} = ₹ 20,00,000$$

(ii) **Calculation of Value of Stock:**

$$\frac{\text{Sales}}{\text{Shareholders' Funds}} = 1.5$$

$$\text{Sales} = 1.5 \times 20,00,000$$

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

$$\text{Gross Profit} = 30,00,000 \times 20\% = 6,00,000$$

$$\begin{aligned} \text{Cost of Goods Sold} &= 30,00,000 - 6,00,000 \\ &= ₹ 24,00,000 \end{aligned}$$

$$\text{Stock velocity} = 2 \text{ months}$$

$$\frac{\text{Average Stock}}{\text{Cost of Goods Sold}} \times 12 = 2$$

$$\frac{\text{Average Stock}}{24,00,000} \times 12 = 2$$

$$\text{Average Stock} = 24,00,000 \times \frac{2}{12}$$

Average stock = ₹ 4,00,000

(iii) **Calculation of Debtors:**

Debtors Turnover Ratio = 6

$$\frac{\text{Sales}}{\text{Average Debtor}} = 6$$

$$\frac{30,00,000}{\text{Average Debtor}} = 6$$

Average Debtors = ₹ 5,00,000

(iv) **Calculation of Current Liabilities:**

Net Working Capital Turnover ratio = 2.5

$$\frac{\text{Sales}}{\text{Current Assets} - \text{Current Liabilities}} = 2.5$$

$$\frac{30,00,000}{\text{Current Assets} - \text{Current Liabilities}} = 2.5$$

Current Assets - Current Liabilities = 12,00,000 (1)

Current Ratio = 2.5

$$\frac{\text{Current Assets}}{\text{Current Liabilities}} = 2.5$$

Current Assets = 2.5 Current Liabilities (2)

From (1) & (2),

2.5 Current Liabilities - Current Liabilities = 12,00,000

1.5 Current Liabilities = 12,00,000

Current Liabilities = ₹ 8,00,000

(v) **Calculation of Cash Balance:**

Current Assets = 2.5 Current Liabilities

Current Assets = 2.5 (8,00,000)	= 20,00,000
(-) Debtors	(5,00,000)
(-) Stock	(4,00,000)
Cash Balance	₹ 11,00,000

Q.3

Prepare B/s

PY Dec 21



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

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



Liabilities	₹	Assets	₹
Equity Share Capital	20,00,000	Fixed assets	
Reserves & surplus		Inventories	
Long-term debts		Accounts receivable	
Accounts payable		Cash	
Total	50,00,000	Total	

Required:

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

Ans.**Working Notes:**

(1) Total liability = Total Assets = ₹ 50,00,000

Debt to Total Asset Ratio = 0.40

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

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

So, **Debt = 20,00,000**

(2) Total Liabilities = ₹ 50,00,000

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

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

So, Reserves & Surplus = ₹ 10,00,000

(3) $\frac{\text{Long term Debt}}{\text{Equity Shareholders' Fund}} = 30\%^*$

$$\frac{\text{Long term Debt}}{(20,00,000 + 10,00,000)} = 30\%^*$$

Long Term Debt = ₹ 9,00,000

(4) So, Accounts Payable = ₹ 20,00,000 - ₹ 9,00,000

Accounts Payable = ₹ 11,00,000

(5) Gross Profit to sales = 20%

Cost of Goods Sold = 80% of Sales = ₹ 64,00,000

Sales = $\frac{100}{80} \times 64,00,000 = 80,00,000$

(6) Inventory Turnover = $\frac{360}{55}$

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

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

Closing inventory = 9,77,778

(7) Accounts Receivable period = 36 days

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

$$\text{Accounts Receivable} = \frac{36}{360} \times \text{credit sales}$$

$$= \frac{36}{360} \times 80,00,000 \text{ (assumed all sales are on credit)}$$

$$\text{Accounts Receivable} = ₹ 8,00,000$$

(8) Quick Ratio = 0.9

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

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

$$\text{Cash + 8,00,000} = ₹ 9,90,000$$

$$\text{Cash} = ₹ 1,90,000$$

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

Balance Sheet of ABC Industries as on 31st March 2021

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

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

Q.4

Prepare B/s

PY July 21



Masco Limited has furnished the following ratios and information relating to the year ended 31st March 2021:

Sales	₹ 75,00,000
Return on net worth	25%
Rate of income tax	50%
Share capital to reserves	6:4
Current ratio	2.5
Net profit to sales (After Income Tax)	6.50%
Inventory turnover (based on cost of goods sold)	12
Cost of goods sold	₹ 22,50,000
Interest on debentures	₹ 75,000
Receivables (includes debtors ₹ 1,25,000)	₹ 2,00,000
Payables	₹ 2,50,000
Bank Overdraft	₹ 1,50,000

You are required to:

- Calculate the operating expenses for the year ended 31st March, 2021.
- Prepare a balance sheet as on 31st March in the following format:



Liabilities	₹	Assets	₹
Share Capital		Fixed Assets	
Reserves and Surplus		Current Assets	
15% Debentures		Stock	
Payables		Receivables	
Bank Term Loan		Cash	

Ans. (a) **Calculation of Operating Expenses for the year ended 31st March, 2021**

Particulars		(₹)
Net Profit [@ 6.5% of Sales] Add: Income		4,87,500
Tax (@ 50%)		4,87,500
Profit Before Tax (PBT)		9,75,000
Add: Debenture Interest		75,000
Profit before interest and tax (PBIT)		10,50,000
Sales		75,00,000
Less: Cost of goods sold	22,50,000	
PBIT	10,50,000	33,00,000
Operating Expenses		42,00,000

(b) **Balance Sheet as on 31st March, 2021**

Liabilities	₹	Assets	₹
Share Capital	11,70,000	Fixed Assets	18,50,000
Reserve and Surplus	7,80,000	Current Assets	
15% Debentures	5,00,000	Stock	1,87,500
Payables	2,50,000	Receivables	2,00,000
Bank Overdraft(or Bank Term Loan)	1,50,000	Cash	6,12,500
	28,50,000		28,50,000

Working Notes:

(i) **Calculation of Share Capital and Reserves**

The return on net worth is 25%. Therefore, the profit after tax of ₹ 4,87,500 should be equivalent to 25% of the net worth.

$$\text{Net worth} \times \frac{25}{100} = ₹ 4,87,500$$

$$\text{Net worth} = \frac{4,87,500 \times 100}{25} = ₹ 19,50,000$$

The ratio of share capital to reserves is 6:4

$$\text{Share Capital} = 19,50,000 \times \frac{6}{10} = ₹ 11,70,000$$

$$\text{Reserves} = 19,50,000 \times \frac{4}{10} = ₹ 7,80,000$$

(ii) **Calculation of Debentures**

Interest on Debentures @ 15% (as given in the balance sheet format) = ₹ 75,000

$$\text{Debentures} = \frac{75,000 \times 100}{15} = ₹ 5,00,000$$

(iii) **Calculation of Current Assets**

$$\text{Current Ratio} = 2.5$$

Payables = ₹ 2,50,000
 Bank overdraft = ₹ 1,50,000
 Total Current Liabilities = ₹ 2,50,000 + ₹ 1,50,000 = ₹ 4,00,000
 Current Assets = 2.5 × Current Liabilities = 2.5 × 4,00,000 = ₹ 10,00,000

(iv) Calculation of Fixed Assets

Particulars	₹
Share capital	11,70,000
Reserves	7,80,000
Debentures	5,00,000
Payables	2,50,000
Bank Overdraft	1,50,000
Total Liabilities	28,50,000
Less: Current Assets	10,00,000
Fixed Assets	18,50,000

(v) Calculation of Composition of Current Assets

Inventory Turnover = 12
 $\frac{\text{Cost of goods sold}}{\text{Closing stock}} = 12$
 Closing stock = $\frac{22,50,000}{12}$ = Closing stock = ₹ 1,87,500

Particulars	₹
Stock	1,87,500
Receivables	2,00,000
Cash (balancing figure)	6,12,500
Total Current Assets	10,00,000

Q.5

Prepare B/s

PY Jan 21



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

- (i) Equity Share Capital : ₹ 2,00,000
- (ii) Total debt to owner's equity : 0.75
- (iii) Total Assets turnover : 2 times
- (iv) Inventory turnover : 8 times
- (v) Fixed Assets to owner's equity : 0.60
- (vi) Current debt to total debt : 0.40

Balance Sheet of XYZ Co. as on March 31, 2020

Liabilities	Amount (₹)	Assets	Amount (₹)
Equity Shares Capital	2,00,000	Fixed Assets	?
Long term Debt	?	Current Assets:	
Current Debt	?	Inventory	?
		Cash	?

Ans.

Balance Sheet of XYZ Co. as on March 31, 2020

Liabilities	Amount (₹)	Assets	Amount (₹)
Equity Share Capital	2,00,000	Fixed Assets	1,20,000



Long-term Debt	90,000	Current Assets:	
Current Debt	60,000	Inventory	87,500
		Cash (balancing figure)	1,42,500
	3,50,000		3,50,000

Working Notes

- Total Debt = $0.75 \times \text{Equity Share Capital} = 0.75 \times ₹ 2,00,000 = ₹ 1,50,000$
Further, Current Debt to Total Debt = 0.40.
So, Current Debt = $0.40 \times ₹ 1,50,000 = ₹ 60,000$
Long term Debt = $₹ 1,50,000 - ₹ 60,000 = ₹ 90,000$
- Fixed Assets = $0.60 \times \text{Equity Share Capital} = 0.60 \times ₹ 2,00,000 = ₹ 1,20,000$
- Total Assets to Turnover = 2 times; Inventory Turnover = 8 times
Hence, Inventory / Total Assets = $2/8 = 1/4$
Further, Total Assets = $₹ 2,00,000 + ₹ 1,50,000 = ₹ 3,50,000$
Therefore, Inventory = $₹ 3,50,000/4 = ₹ 87,500$
Cash in Hand = Total Assets - Fixed Assets - Inventory
= $₹ 3,50,000 - ₹ 1,20,000 - ₹ 87,500 = ₹ 1,42,500$

Q.6

Return on Asset

PY Nov 20



Following information relates to RM Co. Ltd.

	(₹)
Total Assets employed	10,00,000
Direct Cost	5,50,000
Other Operating Cost	90,000

Goods are sold to the customers at 150% of direct costs.

50% of the assets being financed by borrowed capital at an interest cost of 8% per annum. Tax rate is 30%.

You are required to calculate :

- Net profit margin
- Return on Assets
- Asset turnover
- Return on owners' equity

Ans.

Computation of net profit:

Particulars	(₹)
Sales (150% of ₹ 5,50,000)	8,25,000
Direct Costs	5,50,000
Gross profit	2,75,000
Other Operating Costs	90,000
Operating profit (EBIT)	1,85,000
Interest charges (8% of ₹ 5,00,000)	40,000
Profit before taxes (EBT)	1,45,000
Taxes (@ 30%)	43,500
Net profit after taxes (EAT)	1,01,500

- Net profit margin (After tax) = $\frac{\text{Profit after taxes}}{\text{Sales}} = \frac{1,01,500}{8,25,000} = 0.12303$ or 12.303%
- Net profit margin (Before tax) = $\frac{\text{Profit before taxes}}{\text{Sales}} = \frac{1,45,000}{8,25,000} = 0.17576$ or 17.576%

- (ii) Return on assets = $\frac{\text{EBIT} (1 - T)}{\text{Total Assets}} = \frac{1,85,000 (1 - 0.3)}{10,00,000} = 0.1295$ or **12.95%**
- (iii) Asset turnover = $\frac{\text{Sales}}{\text{Assets}} = \frac{8,25,000}{10,00,000} = 0.825$ times
- (iv) Return on owner's equity = $\frac{\text{Profit after taxes}}{\text{Owners equity}} = \frac{1,01,500}{50\% \times 10,00,000} = 0.203$ or **20.3%**

Q.7

COGS

PY Nov 18



The following is the information of XML Ltd. relate to the year ended 31-03-2018 : Gross Profit 20% of Sales

Net Profit	10% of Sales
Inventory Holding period	3 months
Receivable collection period	3 months
Non-Current Assets to Sales	1 : 4
Non-Current Assets to Current Assets	1 : 2
Current Ratio	2 : 1
Non-Current Liabilities to Current Liabilities	1 : 1
Share Capital to Reserve and Surplus	4 : 1
Non-current Assets as on 31st March, 2017	₹ 50,00,000

Assume that:

- (i) No change in Non-Current Assets during the year 2017-18
 (ii) No depreciation charged on Non-Current Assets during the year 2017-18.
 (iii) Ignoring Tax

You are required to Calculate cost of goods sold, Net profit, Inventory, Receivables and Cash for the year ended on 31st March, 2018

Ans.

Workings

$$\frac{\text{Non Current Assets}}{\text{Current Assets}} = \frac{1}{2}$$

Or $\frac{50,00,000}{\text{Current Assets}} = \frac{1}{2}$

So, Current Assets = ₹ 1,00,00,000

Now further,

$$\frac{\text{Non Current Assets}}{\text{Sales}} = \frac{1}{4}$$

Or $\frac{50,00,000}{\text{Sales}} = \frac{1}{4}$

So, Sales = ₹ 2,00,00,000

Calculation of Cost of Goods sold, Net profit, Inventory, Receivables and Cash:

- (i) Cost of Goods Sold (COGS):
 Cost of Goods Sold = Sales - Gross Profit
 = ₹ 2,00,00,000 - 20% of ₹ 2,00,00,000
 = ₹ 1,60,00,000



(ii) Net Profit = 10% of Sales = 10% of ₹ 2,00,00,000
= ₹ 20,00,000

(iii) Inventory:

$$\text{Inventory Holding Period} = \frac{12 \text{ Months}}{\text{Inventory Turnover Ratio}}$$

$$\text{Inventory Turnover Ratio} = 12 / 3 = 4$$

$$4 = \frac{\text{COGS}}{\text{Average Inventory}}$$

$$4 = \frac{1,60,00,000}{\text{Average Inventory}}$$

$$\text{Average or Closing Inventory} = ₹ 40,00,000$$

(iv) Receivables :

$$\text{Receivable Collection Period} = \frac{12 \text{ Months}}{\text{Receivables Turnover Ratio}}$$

$$\text{Or Receivables Turnover Ratio} = 12 / 3 = 4 = \frac{\text{Credit Sales}}{\text{Average Accounts Receivable}}$$

$$\text{Or } 4 = \frac{2,00,00,000}{\text{Average Accounts Receivable}}$$

$$\text{So, Average Accounts Receivable/Receivables} = ₹ 50,00,000/-$$

(v) Cash:

$$\text{Cash}^* = \text{Current Assets}^* - \text{Inventory} - \text{Receivables}$$

$$\text{Cash} = ₹ 1,00,00,000 - ₹ 40,00,000 - ₹ 50,00,000$$

$$= ₹ 10,00,000$$

(it is assumed that no other current assets are included in the Current Asset)

Q.8

Calculate Ratios

RTP Nov 19



From the following table of financial ratios of Prabhu Chemicals Limited, comment on various ratios given at the end:

Ratios	2021	2022	Average of Chemical Industry
Liquidity Ratios			
Current ratio	2.1	2.3	2.4
Quick ratio	1.4	1.8	1.4
Receivable turnover ratio	8	9	8
Inventory turnover	8	9	5
Receivables collection period	46 days	41 days	46 days
Operating profitability			
Operating income -ROI	24%	21%	18%
	18%	18%	12%

Operating profit margin			
Financing decisions	45%	44%	60%
Debt ratio			
Return	26%	28%	18%
Return on equity			

COMMENT on the following aspect of Prabhu Chemicals Limited

- (i) Liquidity
- (ii) Operating profits
- (iii) Financing
- (iv) Return to the shareholders

Ans.

Ratios	Comment
Liquidity	Current ratio has improved from last year and matching the industry average. Quick ratio also improved than last year and above the industry average. The reduced inventory levels (evidenced by higher inventory turnover ratio) have led to better quick ratio in FY 2022 compared to FY 2021. Further the decrease in current liabilities is greater than the collective decrease in inventory and debtors as the current ratio have increase from FY2021 to FY 2022.
Operating Profits	Operating Income-ROI reduced from last year, but Operating Profit Margin has been maintained. This may happen due to decrease in operating cost. However, both the ratios are still higher than the industry average.
Financing	The company has reduced its debt capital by 1% and saved earnings for equity shareholders. It also signifies that dependency on debt compared to other industry players (60%) is low.
Return to the shareholders	Prabhu's ROE is 26 per cent in 2021 and 28 per cent in 2022 compared to an industry average of 18 per cent. The ROE is stable and improved over the last year.

Q.9

Find missing figures of B/S

RTP May 23



From the following information, find out missing figures and REWRITE the balance sheet of Mukesh Enterprise.

Current Ratio = 2:1

Acid Test ratio = 3:2

Reserves and surplus = 20% of equity share capital

Long term debt = 45% of net worth Stock turnover velocity = 1.5 months Receivables turnover velocity = 2 months

You may assume closing Receivables as average Receivables. Gross profit ratio = 20%

Sales is ₹ 21,00,000 (25% sales are on cash basis and balance on credit basis) Closing stock is ₹ 40,000 more than opening stock.

Accumulated depreciation is 1/6 of original cost of fixed assets.

Balance sheet of the company is as follows:

Liabilities	(₹)	Assets	(₹)
Equity Share Capital	?	Fixed Assets (Cost)	?
Reserves & Surplus	?	Less: Accumulated. Depreciation	?



Long Term Loans	6,75,000	Fixed Assets (WDV)	?
Bank Overdraft	60,000	Stock	?
Creditors	?	Debtors	?
		Cash	?
Total	?	Total	?

Ans.

Liabilities	(₹)	Assets	(₹)
Equity Share Capital	12,50,000	Fixed Assets (cost)	20,58,000
Reserves & Surplus	2,50,000	Less: Acc. Depreciation	(3,43,000)
Long Term Loans	6,75,000	Fixed Assets (WDV)	17,15,000
Bank Overdraft	60,000	Stock	2,30,000
Payables	4,00,000	Receivables	2,62,500
		Cash	4,27,500
Total	26,35,000	Total	26,35,000

Working Notes:

- (i) Sales ₹ 21,00,000
 Less: Gross Profit (20%) ₹ 4,20,000
 Cost of Goods Sold (COGS) ₹ 16,80,000

$$(ii) \text{ Receivables Turnover Velocity} = \frac{\text{Average Receivables}}{\text{Credit Sales}} \times 12$$

$$2 = \frac{\text{Average Receivables}}{21,00,000 \times 75\%} \times 12$$

$$\text{Average Receivables} = \frac{21,00,000 \times 75\% \times 2}{12}$$

$$\text{Average Receivables} = ₹ 2,62,500$$

$$\text{Closing Receivables} = ₹ 2,62,500$$

$$(iii) \text{ Stock Turnover Velocity} = \frac{\text{Average Stock}}{\text{COGS}} \times 12$$

$$\text{Or } 1.5 = \frac{\text{Average Stock}}{16,80,000} \times 12$$

$$\text{Or Average Stock} = \frac{16,80,000 \times 1.5}{12}$$

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

$$\frac{\text{Opening Stock} + \text{Closing Stock}}{2} = ₹ 2,10,000$$

$$\text{Opening Stock} + \text{Closing Stock} = ₹ 4,20,000 \dots\dots\dots(1)$$

$$\text{Also, Closing Stock} - \text{Opening Stock} = ₹ 40,000 \dots\dots\dots(2)$$

Solving (1) and (2), we get **closing stock = ₹ 2,30,000**

$$(iv) \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{\text{Stock} + \text{Receivables} + \text{Cash}}{\text{Bank Overdraft} + \text{Creditors}}$$

$$\text{Or } 2 = \frac{2,30,000 + 2,62,500 + \text{Cash}}{60,000 + \text{Creditors}}$$

$$\text{Or } ₹ 1,20,000 + 2 \text{ Payables} = ₹ 4,92,500 + \text{Cash}$$

$$\text{Or } 2 \text{ Payables} - \text{Cash} = ₹ 3,72,500$$

$$\text{Or } \text{Cash} = 2 \text{ Payables} - ₹ 3,72,500 \dots\dots\dots(3)$$

$$\text{Acid Test Ratio} = \frac{\text{Current Assets} - \text{Stock}}{\text{Current Liabilities}} = \frac{\text{Debtor} + \text{Cash}}{\text{Current Liabilities}}$$

$$\text{Or } \frac{3}{2} = \frac{2,62,500 + \text{Cash}}{60,000 + \text{Creditors}}$$

$$\text{Or } ₹ 1,80,000 + 3 \text{ Payables} = ₹ 5,25,000 + 2 \text{ Cash}$$

$$\text{Or } 3 \text{ Payables} - 2 \text{ Cash} = ₹ 3,45,000 \dots\dots\dots(4)$$

Substitute (3) in (4)

$$\text{Or } 3 \text{ Payables} - 2(2 \text{ Payables} - ₹ 3,72,500) = ₹ 3,45,000$$

$$\text{Or } 3 \text{ Payables} - 4 \text{ Payables} + ₹ 7,45,000 = ₹ 3,45,000 \text{ (Payables)} = ₹ 3,45,000 - ₹ 7,45,000$$

$$\text{Payables} = ₹ 4,00,000$$

$$\text{So, Cash} = 2 \times ₹ 4,00,000 - ₹ 3,72,5000$$

$$\text{Cash} = ₹ 4,27,500$$

(v) Long term Debt = 45% of Net Worth Or ₹ 6,75,000 = 45% of Net Worth Net Worth = ₹ 15,00,000

(vi) Equity Share Capital (ESC) + Reserves = ₹ 15,00,000

$$\text{Or } \text{ESC} + 0.2\text{ESC} = ₹ 15,00,000$$

$$\text{Or } 1.2 \text{ ESC} = ₹ 15,00,000$$

$$\text{Equity Share Capital (ESC)} = ₹ 12,50,000$$

(vii) Reserves = 0.2 × ₹ 12,50,000

$$\text{Reserves} = ₹ 2,50,000$$

(viii) Total of Liabilities = Total of Assets

$$\text{Or } ₹ 12,50,000 + ₹ 2,50,000 + ₹ 6,75,000 + ₹ 60,000 + ₹ 4,00,000 + \text{Fixes}$$

$$\text{Assets (FA) (WDV)} + ₹ 2,30,000 + ₹ 2,62,000 + ₹ 4,27,500$$

$$\text{Or } ₹ 26,35,000 = ₹ 9,20,000 + \text{FA (WDV)}$$

$$\text{FA (WDV)} = ₹ 17,15,000$$

$$\text{Now } \text{FA (Cost)} - \text{Depreciation} = \text{FA (WDV)} \text{ Or } \text{FA (Cost)} - \text{FA (Cost)}/6 = ₹ 17,15,000$$

$$\text{Or } 5 \text{ FA (Cost)}/6 = ₹ 17,15,000$$

$$\text{Or } \text{FA (Cost)} = ₹ 17,15,000 \times 6/5$$

$$\text{So, FA (Cost)} = ₹ 20,58,000$$

$$\text{Depreciation} = ₹ 20,58,000/6 = ₹ 3,43,000$$

Q. 10

Prepare B/S

RTP Nov 22



The following information of ASD Ltd. relate to the year ended 31st March, 2022:

Net profit

8% of sales

Raw materials consumed

20% of Cost of Goods Sold



Direct wages	10% of Cost of Goods Sold
Stock of raw materials	3 months' usage
Stock of finished goods	6% of Cost of Goods Sold
Gross Profit	15% of Sales
Debt collection period (All sales are on credit)	2 Months
Current ratio	2 : 1
Fixed assets to Current assets	13 : 11
Fixed assets to sales	1 : 3
Long-term loans to Current liabilities	2 : 1
Capital to Reserves and Surplus	1 : 4

You are required to PREPARE-

- (a) Profit & Loss Statement of ASD Limited for the year ended 31st March, 2022 in the following format.

Particulars	(₹)	Particulars	(₹)
To Direct Materials consumed	?	By Sales	?
To Direct Wages	?		
To Works (Overhead)	?		
To Gross Profit c/d	?		
	?		?
To Selling and Distribution Expenses	?	By Gross Profit b/d	?
To Net Profit	?		
	?		?

- (b) Balance Sheet as on 31st March, 2022 in the following format.

Liabilities	(₹)	Assets	(₹)
Share Capital	?	Fixed Assets	1,30,00,000
Reserves and Surplus	?	Current Assets:	
Long term loans	?	Stock of Raw Material	?
Current liabilities	?	Stock of Finished Goods	?
		Debtors	?
		Cash	?
	?		?

Ans.

Working Notes:

- (i) Calculation of Sales

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

$$\frac{1,30,00,000}{\text{Sales}} = \frac{1}{3} \Rightarrow \text{Sales} = ₹ 3,90,00,000$$

- (ii) Calculation of Current Assets

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

$$\frac{1,30,00,000}{\text{Current Assets}} = \frac{13}{11} \Rightarrow \text{Current Assets} = ₹ 1,10,00,000$$

(iii) Calculation of Raw Material Consumption and Direct Wages

	₹
Sales	3,90,00,000
Less: Gross Profit (15 % of Sales)	<u>58,50,000</u>
Cost of Goods sold	<u>3,31,50,000</u>
Raw Material Consumption (20% of Cost of Goods Sold)	₹ 66,30,000
Direct Wages (10% of Cost of Goods Sold)₹	33,15,000

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

$$= 66,30,000 \times \frac{3}{12} = ₹ 16,57,500$$

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

$$= 3,31,50,000 \times \frac{6}{100} = ₹ 19,89,000$$

(vi) Calculation of Current Liabilities

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

$$\frac{1,10,00,000}{\text{Current Liabilities}} = 2 \Rightarrow \text{Current Liabilities} = ₹ 55,00,000$$

(vii) Calculation of Debtors

$$\text{Average collection period} = \frac{\text{Debtors}}{\text{Credit Sales}} \times 12 \text{ months}$$

$$\frac{\text{Debtors}}{3,90,00,000} \times 12 = 2 \Rightarrow \text{Debtors} = ₹ 65,00,000$$

(viii) Calculation of Long-term Loan

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

$$\frac{\text{Long term Loan}}{55,00,000} = \frac{2}{1} \Rightarrow \text{Long term loan} = ₹ 1,10,00,000$$

(ix) Calculation of Cash Balance

	₹
Current assets	1,10,00,000
Less: Debtors	65,00,000
Raw materials stock	16,57,500
Finished goods stock	<u>19,89,000</u>
Cash balance	<u>8,53,500</u>

(x) Calculation of Net worth

Fixed Assets	1,30,00,000
Current Assets	<u>1,10,00,000</u>
Total Assets	2,40,00,000
Less: Long term Loan	1,10,00,000



Current Liabilities	<u>55,00,000</u>	<u>1,65,00,000</u>
Net worth		75,00,000

Net worth = Share capital + Reserves = ₹ 75,00,000

$$\frac{\text{Capital}}{\text{Reserves and Surplus}} = \frac{1}{4} \Rightarrow \text{Share Capital} = ₹ 75,00,000 \times \frac{1}{5} = ₹ 15,00,000$$

Reserves and Surplus = ₹ 75,00,000 × 5 = ₹ 60,00,000

**Profit and Loss Statement of ASD Ltd.
for the year ended 31st March, 2022**

Particulars	(₹)	Particulars	(₹)
To Direct Materials consumed	66,30,000	By Sales	3,90,00,000
To Direct Wages	33,15,000		
To Works (Overhead) (Bal. fig.)	2,32,05,000		
To Gross Profit c/d (15% of Sales)	58,50,000		
	<u>3,90,00,000</u>		<u>3,90,00,000</u>
To Selling and Distribution Expenses (Bal. fig.)	27,30,000	By Gross Profit b/d	58,50,000
To Net Profit (8% of Sales)	31,20,000		
	<u>58,50,000</u>		<u>58,50,000</u>

**Balance Sheet of ASD Ltd.
as at 31st March, 2022**

Liabilities	(₹)	Assets	(₹)
Share Capital	15,00,000	Fixed Assets	1,30,00,000
Reserves and Surplus	60,00,000	Current Assets:	
Long term loans	1,10,00,000	Stock of Raw Material	16,57,500
Current liabilities	55,00,000	Stock of Finished Goods	19,89,000
		Debtors	65,00,000
		Cash	8,53,500
	<u>2,40,00,000</u>		<u>2,40,00,000</u>

Q.11

Debtor / Creditor Ratio

RTP May 22



FM Ltd. is in a competitive market where every company offers credit. To maintain the competition, FM Ltd. sold all its goods on credit and simultaneously received the goods on credit. The company provides the following information relating to current financial year:

Debtors Velocity	3 months
Creditors Velocity	2 months
Stock Turnover Ratio (on Cost of Goods Sold)	1.5
Fixed Assets turnover Ratio (on Cost of Goods Sold)	4

Gross Profit Ratio	25%
Bills Receivables	₹ 75,000
Bills Payables	₹ 30,000
Gross Profit	₹ 12,00,000

FM Ltd. has the tendency of maintaining extra stock of ₹ 30,000 at the end of the period than that at the beginning.

DETERMINE:

- (i) Sales and cost of goods sold
- (ii) Sundry Debtors
- (iii) Closing Stock
- (iv) Sundry Creditors
- (v) Fixed Assets

Ans.

(i) Determination of Sales and Cost of goods sold:

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

$$\text{Or, } \frac{25}{100} = \frac{12,00,000}{\text{Sales}}$$

$$\text{Or, Sales} = \frac{12,00,00,000}{25} = ₹ 48,00,000$$

$$\begin{aligned} \text{Cost of Goods Sold} &= \text{Sales} - \text{Gross Profit} \\ &= ₹ 48,00,000 - ₹ 12,00,000 = ₹ 36,00,000 \end{aligned}$$

(ii) Determination of Sundry Debtors:

Debtors' velocity is 3 months or Debtors' collection period is 3 months,

$$\text{So, Debtors' turnover ratio} = \frac{12 \text{ months}}{3 \text{ months}} = 4$$

$$\begin{aligned} \text{Debtors' turnover ratio} &= \frac{\text{Credit Sales}}{\text{Average Accounts Receivable}} \\ &= \frac{48,00,000}{\text{Bills Receivable} + \text{Sundry Debtors}} = 4 \end{aligned}$$

$$\text{Or, Sundry Debtors} + \text{Bills receivable} = ₹ 12,00,000$$

$$\text{Sundry Debtors} = ₹ 12,00,000 - ₹ 75,000 = ₹ 11,25,000$$

(iii) Determination of Closing Stock

$$\text{Stock Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Stock}} = \frac{36,00,000}{\text{Average Stock}} = 1.5$$

$$\text{So, Average Stock} = ₹ 24,00,000$$

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

$$\text{Or } \frac{\text{Opening Stock} + (\text{Opening Stock} + ₹ 30,000)}{2} = ₹ 24,00,000$$



$$\begin{aligned} \text{Or } 2 \text{ Opening Stock} + ₹ 30,000 &= ₹ 48,00,000 \\ \text{Or } 2 \text{ Opening Stock} &= ₹ 47,70,000 \\ \text{Or, Opening Stock} &= ₹ 23,85,000 \\ \text{So, Closing Stock} &= ₹ 23,85,000 + ₹ 30,000 = ₹ 24,15,000 \end{aligned}$$

(iv) Determination of Sundry Creditors:

Creditors' velocity of 2 months or credit payment period is 2 months.

$$\text{So, Creditors' turnover ratio} = \frac{12 \text{ months}}{2 \text{ months}} = 6$$

$$\begin{aligned} \text{Creditors turnover ratio} &= \frac{\text{Credit Purchases} *}{\text{Average Accounts Payables}} \\ &= \frac{36,30,000}{\text{Sundry Creditors} + \text{Bills Payables}} = 6 \end{aligned}$$

$$\begin{aligned} \text{So, Sundry Creditors} + \text{Bills Payable} &= ₹ 6,05,000 \\ \text{Or, Sundry Creditors} + ₹ 30,000 &= ₹ 6,05,000 \\ \text{Or, Sundry Creditors} &= ₹ 5,75,000 \end{aligned}$$

(v) Determination of Fixed Assets

$$\text{Fixed Assets Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Fixed Assets}} = 4$$

$$\text{Or, } \frac{36,00,000}{\text{Fixed Assets}} = 4$$

$$\text{Or, Fixed Asset} = ₹ 9,00,000$$

Workings:

*Calculation of Credit purchases

Cost of goods sold = Opening stock + Purchases - Closing stock

$$₹ 36,00,000 = ₹ 23,85,000 + \text{Purchases} - ₹ 24,15,000$$

$$\text{Purchases (credit)} = ₹ 36,30,000$$

Calculation of credit purchase also can be done as below:

$$\text{Or Credit Purchases} = \text{Cost of goods sold} + \text{Difference in Opening Stock}$$

$$\text{Or Credit Purchases} = 36,00,000 + 30,000 = ₹ 36,30,000$$

Q.12

Return Ratios

RTP July 21



Given below are the estimations for the next year by Niti Ltd.:

Particulars	(₹ in crores)
Fixed Assets	5.20
Current Liabilities	4.68
Current Assets	7.80
Sales	23.00
EBIT	2.30

The company will issue equity funds of ₹ 5 crores in the next year. It is also considering the debt alternatives of ₹ 3.32 crores for financing the assets. The company wants to adopt one of the policies given below:

(₹ in crores)

Financing Policy	Short term debt @ 12%	Long term debt @ 16%	Total
Conservative	1.08	2.24	3.32
Moderate	2.00	1.32	3.32
Aggressive	3.00	0.32	3.32

Assuming corporate tax rate at 30%, CALCULATE the following for each of the financing policy:

- Return on total assets
- Return on owner's equity
- Net Working capital
- Current Ratio

Also advise which Financing policy should be adopted if the company wants high returns.

Ans.

- Return on total assets**

$$\begin{aligned} \text{Return on total assets} &= \frac{\text{EBIT} (1 - T)}{\text{Total assets (FA + CA)}} \\ &= \frac{2.30 \text{ crores} (1 - 0.3)}{5.20 \text{ crores} + 7.80 \text{ crores}} \\ &= \frac{1.61 \text{ crores}}{13 \text{ crores}} = 0.1238 \text{ or } 12.38\% \end{aligned}$$

- Return on owner's equity**

(Amount in ₹)

	Financing policy (₹)		
	Conservative	Moderate	Aggressive
Expected EBIT	2,30,00,000	2,30,00,000	2,30,00,000
Less: Interest			
Short term Debt @ 12%	12,96,000	24,00,000	36,00,000
Long term Debt @ 16%	35,84,000	21,12,000	5,12,000
Earnings before tax (EBT)	1,81,20,000	1,84,88,000	1,88,88,000
Less: Tax @ 30%	54,36,000	55,46,400	56,66,400
Earnings after Tax (EAT)	1,26,84,000	1,29,41,600	1,32,21,600
Owner's Equity	5,00,00,000	5,00,00,000	5,00,00,000
Return on owner's equity	= $\frac{1,26,84,000}{5,00,00,000}$	= $\frac{1,29,41,600}{5,00,00,000}$	= $\frac{1,32,21,600}{5,00,00,000}$
Net Profit after taxes (EAT)			
Owners' equity	= 0.2537 or 25.37%	= 0.2588 or 25.88%	= 0.2644 or 26.44%

- Net Working capital**

(₹ in crores)

	Financing policy		
	Conservative	Moderate	Aggressive



Current Liabilities (Excluding Short Term Debt)	4.68	4.68	4.68
Short term Debt	1.08	2.00	3.00
Total Current Liabilities	5.76	6.68	7.68
Current Assets	7.80	7.80	7.80
Net Working capital = Current Assets - Current Liabilities	7.80 - 5.76 = 2.04	7.80 - 6.68 = 1.12	7.80 - 7.68 = 0.12

(iv) Current ratio

(₹ in crores)

	Financing policy		
	Conservative	Moderate	Aggressive
Current Ratio = $\frac{\text{Current Assets}}{\text{Current Liabilities}}$	= $\frac{7.80}{5.76} = 1.35$	= $\frac{7.80}{6.68} = 1.17$	= $\frac{7.80}{7.68} = 1.02$

Advise: It is advisable to adopt aggressive financial policy, if the company wants high return as the return on owner's equity is maximum in this policy i.e. 26.44%.

Q.13

ROCE / EPS / P/E

RTP May 20



MT Limited has the following Balance Sheet as on March 31, 2019 and March 31, 2020:

Balance Sheet

	₹ in lakhs	
	March 31, 2019	March 31, 2020
Sources of Funds:		
Shareholders' Funds	2,500	2,500
Loan Funds	3,500	3,000
	6,000	5,500
Applications of Funds: Fixed Assets	3,500	3,000
Cash and bank	450	400
Receivables	1,400	1,100
Inventories	2,500	2,000
Other Current Assets	1,500	1,000
Less: Current Liabilities	(1,850)	(2,000)
	6,000	5,500

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

	₹ in lakhs	
	March 31, 2019	March 31, 2020
Sales	22,500	23,800
Less: Cost of Goods sold	(20,860)	(21,100)

Gross Profit	1,640	2,700
Less: Selling, General and Administrative expenses	(1,100)	(1,750)
Earnings before Interest and Tax (EBIT)	540	950
Less: Interest Expense	(350)	(300)
Earnings before Tax (EBT)	190	650
Less: Tax	(57)	(195)
Profits after Tax (PAT)	133	455

Required:

CALCULATE for the year 2019-20-

- Inventory turnover ratio
 - Financial Leverage
 - Return on Capital Employed (ROCE)
 - Return on Equity (ROE)
 - Average Collection period.
- [Take 1 year = 365 days]

Ans. Ratios for the year 2019-2020

(a) Inventory turnover ratio

$$= \frac{\text{COGS}}{\text{Average Inventory}} = \frac{21,100}{\frac{(2,500 + 2,000)}{2}} = 9.4$$

(b) Financial leverage

$$= \frac{\text{EBIT}}{\text{EBT}} = \frac{950}{650} = 1.46$$



(c) ROCE

$$= \frac{\text{EBIT} (1 - t)}{\text{Average Capital Employed}} = \frac{950 (1 - 0.3)}{\frac{(6,000 + 5,500)}{2}} = \frac{665}{5,750} \times 100 = 11.56 \%$$

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

(d) ROE

$$= \frac{\text{Profits after tax}}{\text{Average shareholders' funds}} = \frac{455}{2,500} \times 100 = 18.2\%$$

(e) Average Collection Period

$$\text{Average Sales per day} = \frac{23,800}{365} = ₹ 65.20 \text{ lakhs}$$

$$\begin{aligned} \text{Average collection period} &= \frac{\text{Average Receivables}}{\text{Average sales per day}} \\ &= \frac{\frac{(1,400 + 1,100)}{2}}{65.2} = \frac{1,250}{65.2} = 19.17 \text{ days} \end{aligned}$$



Q.14

All Ratios

RTP Nov 19



The following is the Profit and loss account and Balance sheet of KLM LLP.

Trading and Profit & Loss Account

Particulars	Amount (₹)	Particulars	Amount (₹)
To Opening stock	12,46,000	By Sales	1,96,56,000
To Purchases	1,56,20,000	By Closing stock	14,28,000
To Gross profit c/d	42,18,000		
	2,10,84,000		2,10,84,000
		By Gross profit b/d	42,18,000
To Administrative expenses	18,40,000	By Interest on investment	24,600
To Selling & distribution expenses	7,56,000	By Dividend received	22,000
To Interest on loan	2,60,000		
To Net profit	14,08,600		
	42,64,600		42,64,600

Balance Sheet as on.....

Capital & Liabilities	Amount (₹)	Assets	Amount (₹)
Capital	20,00,000	Plant & machinery	24,00,000
Retained earnings	42,00,000	Building	42,00,000
General reserve	12,00,000	Furniture	12,00,000
Term loan from bank	26,00,000	Sundry receivables	13,50,000
Sundry Payables	7,20,000	Inventory	14,28,000
Other liabilities	2,80,000	Cash & Bank balance	4,22,000
	1,10,00,000		1,10,00,000

You are required to COMPUTE:

- Gross profit ratio
- Net profit ratio
- Operating cost ratio
- Operating profit ratio
- Inventory turnover ratio
- Current ratio
- Quick ratio
- Interest coverage ratio
- Return on capital employed
- Debt to assets ratio.

Ans.

$$(i) \text{ Gross profit ratio} = \frac{\text{Gross profit}}{\text{Sales}} \times 100 = \frac{42,18,000}{1,96,56,000} \times 100 = 21.46\%$$

$$(ii) \text{ Net profit ratio} = \frac{\text{Net profit}}{\text{Sales}} \times 100 = \frac{14,08,600}{1,96,56,000} \times 100 = 7.17\%$$

$$(iii) \text{ Operating ratio} = \frac{\text{Operating cost}}{\text{Sales}} \times 100$$

$$\begin{aligned} \text{Operating cost} &= \text{Cost of goods sold} + \text{Operating expenses} \\ \text{Cost of goods sold} &= \text{Sales} - \text{Gross profit} \end{aligned}$$

$$\begin{aligned}
 &= 1,96,56,000 - 42,18,000 = 1,54,38,000 \\
 \text{Operating expenses} &= \text{Administrative expenses} + \text{Selling \& distribution expenses} \\
 &= 18,40,000 + 7,56,000 = 25,96,000 \\
 \text{Therefore, Operating ratio} &= \frac{1,54,38,000 + 25,96,000}{1,96,56,000} \times 100 \\
 &= \frac{1,80,34,000}{1,96,56,000} \times 100 = 91.75\% \\
 \\
 \text{(iv) Operating profit ratio} &= 100 - \text{Operating cost ratio} \\
 &= 100 - 91.75\% = 8.25\% \\
 \\
 \text{(v) Inventory turnover ratio} &= \frac{\text{Cost of goods sold}}{\text{Average stock}} \\
 &= \frac{1,54,38,000}{\frac{(14,28,000 + 12,46,000)}{2}} \\
 &= \frac{1,54,38,000}{13,37,000} = 11.55 \text{ times}
 \end{aligned}$$

$$\text{(vi) Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$\begin{aligned}
 \text{Current assets} &= \text{Sundry receivables} + \text{Inventory} + \text{Cash \& Bank balance} \\
 &= 13,50,000 + 14,28,000 + 4,22,000 = 32,00,000
 \end{aligned}$$

$$\begin{aligned}
 \text{Current liabilities} &= \text{Sundry Payables} + \text{Other liabilities} \\
 &= 7,20,000 + 2,80,000 = 10,00,000
 \end{aligned}$$

$$\text{Current ratio} = \frac{32,00,000}{10,00,000} = 3.2 \text{ times}$$

$$\begin{aligned}
 \text{(vii) Quick Ratio} &= \frac{\text{Current assets} - \text{Inventories}}{\text{Current liabilities}} \\
 &= \frac{32,00,000 - 14,28,000}{10,00,000} = 1.77 \text{ times}
 \end{aligned}$$

$$\begin{aligned}
 \text{(viii) Interest coverage ratio} &= \frac{\text{EBIDT}}{\text{Interest}} = \frac{\text{Net profit} + \text{Interest}}{\text{Interest}} \\
 &= \frac{14,08,600 + 2,60,000}{2,60,000} = 6.42 \text{ times}
 \end{aligned}$$

$$\begin{aligned}
 \text{(ix) Return on capital employed (ROCE)} &= \frac{\text{EBIT}}{\text{Capital employed}} \times 100 \\
 \text{Capital employed} &= \text{Capital} + \text{Retained earnings} + \text{General reserve} + \text{Term loan} \\
 &= 20,00,000 + 42,00,000 + 12,00,000 + 26,00,000 \\
 &= 1,00,00,000
 \end{aligned}$$



$$\text{Therefore, ROCE} = \frac{16,68,600}{1,00,00,000} \times 100 = 16.69\%$$

$$\begin{aligned} \text{(x) Debt to assets ratio} &= \frac{\text{Debts}}{\text{Total assets}} \times 100 \\ &= \frac{26,00,000}{1,10,00,000} \times 100 = 23.64\% \end{aligned}$$

Q.15

Change in current ratio

RTP Nov 18



Assuming the current ratio of a Company is 2, STATE in each of the following cases whether the ratio will improve or decline or will have no change:

- (i) Payment of current liability
- (ii) Purchase of fixed assets by cash
- (iii) Cash collected from Customers
- (iv) Bills receivable dishonoured
- (v) Issue of new shares

Ans.

$$\text{Current Ratio} = \frac{\text{Current Assets (CA)}}{\text{Current Liabilities (CL)}} = 2 \text{ i.e. } 2 : 1$$

S. No.	Situation	Improve/ Decline/ No Change	Reason
(i)	Payment of Current liability	Current Ratio will improve	Let us assume CA is ₹ 2 lakhs & CL is ₹ 1 lakh. If payment of Current Liability = ₹10,000 then, CA = 1,90,000 CL = 90,000. Current Ratio = $\frac{1,90,000}{90,000} = 2.11 : 1$. When Current Ratio is 2:1 Payment of Current liability will reduce the same amount in the numerator and denominator. Hence, the ratio will improve.
(ii)	Purchase of Fixed Assets by cash	Current Ratio will decline	Since the cash being a current asset converted into fixed asset, current assets reduced, thus current ratio will fall.
(iii)	Cash collected from Customers	Current Ratio will not change	Cash will increase and Debtors will reduce. Hence No Change in Current Asset.
(iv)	Bills Receivable dishonoured	Current Ratio will not change	Bills Receivable will come down and debtors will increase. Hence no change in Current Assets.
(v)	Issue of New Shares	Current Ratio will improve	As Cash will increase, Current Assets will increase and current ratio will increase.

Q.16

Inventory T/O

MTP Nov 23 (2)



ABC Ltd. has total sales of 12,00,000 all of which are credit sales. It has a gross profit ratio of 20% on sales and a current ratio of 2. The company's current liabilities are ₹ 3,00,000. Further, it has inventories of ₹ 1,00,000,

marketable securities of ₹ 70,000 and cash of ₹ 50,000. From the above information:

- (i) CALCULATE the average inventory if the expected inventory turnover ratio is three times?
- (ii) Also CALCULATE the average collection period if the opening balance of debtors is expected to be ₹ 1,20,000.

Assume 360 days a year.

Ans.

(i) Calculation of Average Inventory

Since gross profit is 20% of sales, the cost of goods sold should be 80% of the sales.

$$\text{Cost of goods sold} = 12,00,000 \times \frac{80}{100} = 9,60,000$$

$$\begin{aligned} \text{Inventory Turnover} &= \frac{\text{Cost of goods sold}}{\text{Average Inventory}} \\ &= \frac{9,60,000}{\text{Average Inventory}} \end{aligned}$$

$$\text{Average Inventory} = \frac{9,60,000}{3} = 3,20,000$$

(ii) Calculation of Average Collection Period

$$\text{Average Collection Period} = \frac{\text{Average Receivable}}{\text{Credit Sales}} \times 360$$

$$\text{Where, Average Receivables} = \frac{\text{Opening Receivables} - \text{Closing Receivables}}{2}$$

Calculation of Closing balance of Receivables

	₹	₹
Current Assets (2 x 3,00,000)		6,00,000
Less: Inventories	1,00,000	
Less: Marketable Securities	70,000	
Less: Cash	50,000	2,20,000
Receivables (Closing Balance)		3,80,000

$$\text{Now, Average Receivables} = \frac{1,20,000 + 3,80,000}{2} = 2,50,000$$

$$\text{So, Average Collection Period} = \frac{2,50,000}{12,00,000} \times 360 = 75 \text{ days}$$

Q.17

Prepare B/S

MTP May 23 (2)



Using the following information, PREPARE the balance sheet:

Long-term debt to net worth	0.25
Total asset turnover	3
Average collection period	9 days
Inventory turnover	13
Gross profit margin	20%
Acid-test ratio	1.5



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

Liabilities	₹	Assets	₹
Notes and payables	2,50,000	Cash	?
Long-term debt	?	Accounts receivable	?
Common stock	8,00,000	Inventory	?
Retained earnings	16,00,000	Plant and equipment	?
Total liabilities and equity	?	Total assets	?

Ans.

Working Notes:

- (i) Long term Debt
 Long Term Debt/ Net worth = 0.25
 Long Term Debt/ (8,00,000+16,00,000) = 0.25
 Long term debt = 6,00,000
- (ii) Total assets
 Total liabilities and Equity = Notes and payables + Long-term debt + Common stock + Retained earnings
 = 2,50,000+6,00,000+8,00,000+16,00,000
 Total assets = Total liabilities and Equity = 32,50,000
- (iii) Sales and Cost of Goods sold
 Total asset turnover = 3 = Sales/ Total Assets = Sales/32,50,000
 Sales = 97,50,000
 Cost of goods sold = (100% - Gross Profit margin) x Sales
 = (100% - 20%) x 97,50,000 = 78,00,000.
- (iv) Current Assets
 Inventory turnover = 13 = COGS/ Inventory = 78,00,000/Inventory
 Inventory = ₹ 6,00,000
 Average collection period = 9 = Receivables/Sales x 360 = Receivables/ 97,50,000 x 360
 Accounts receivables = 2,43,750
 Acid-test ratio = 1.5 = (Cash+ Accounts Receivables) /Notes and Payables
 = (Cash +2,43,750)/2,50,000 = 1.5
 Cash = 1,31,250
- (v) Plant and equipment
 = Total Assets - Current Assets
 = 32,50,000 - (1,31,250+2,43,750+6,00,000) = 22,75,000

Balance Sheet

Liabilities	₹	Assets	₹
Notes and payables	2,50,000	Cash	1,31,250
Long-term debt	6,00,000	Accounts receivable	2,43,750
Common stock	8,00,000	Inventory	6,00,000
Retained earnings	16,00,000	Plant and equipment	22,75,000
Total liabilities and equity	32,50,000	Total assets	32,50,000

Q.18

Prepare B/S & PL

MTP Nov 22 (2)



From the following information and ratios, PREPARE the Balance sheet as at 31st March 2022 and Income statement for the year ended on that date for M/s Ganguly & Co -

Average Stock	₹10 lakh
Current Ratio	3:1
Acid Test Ratio	1:1
PBIT to PBT	2.2:1
Average Collection period (Assume 360 days in a year)	30 days
Stock Turnover Ratio (Use sales as turnover)	5 times
Fixed assets turnover ratio	0.8 times
Working Capital	₹10 lakh
Net profit Ratio	10%
Gross profit Ratio	40%
Operating expenses (excluding interest)	₹ 9 lakh
Long term loan interest	12%
Tax	Nil

Ans.

1. **Current Ratio = 3:1**

Current Assets (CA)/Current Liability (CL) = 3:1

CA = 3CL

WC = 10,00,000

CA - CL = 10,00,000

3CL - CL = 10,00,000

2CL = 10,00,000

CL = 10,00,000

CL = ₹5,00,000

CA = 3 × 5,00,000

CA = ₹15,00,000



2. **Acid Test Ratio = CA - Stock / CL = 1:1**

= 15,00,000 - Stock / 5,00,000 = 1

15,00,000 - stock = 5,00,000

Stock = ₹10,00,000

3. **Stock Turnover ratio (on sales) = 5**

Sales/ Avg stock = 5

Sales/10,00,000 = 5

Sales = ₹50,00,000

4. **Gross Profit = 50,00,000 × 40% = ₹20,00,000**

Net profit (PBT) = 50,00,000 × 10% = ₹5,00,000

5. **PBIT/PBT = 2.2**

PBIT = 2.2 × 5,00,000

PBIT = ₹11,00,000



Interest = 11,00,000 - 5,00,000 = ₹6,00,000

Long term loan = $\frac{6,00,000}{0.12} = ₹50,00,000$

6. Average collection period = 30 days
Receivables = $30/360 \times 50,00,000 = 4,16,667$

7. Fixed Assets Turnover Ratio = 0.8
 $50,00,000 / \text{Fixed Assets} = 0.8$
Fixed Assets = ₹62,50,000

Income Statement

	Amount (₹)
Sales	50,00,000
Less: Cost of Goods Sold	30,00,000
Gross Profit	20,00,000
Less: Operating Expenses	9,00,000
Less: Interest.	6,00,000
Net Profit	5,00,000

Balance sheet

Liabilities	Amount (₹)	Assets	Amount (₹)
Equity share capital	22,50,000	Fixed asset	62,50,000
Long term debt	50,00,000	Current assets:	
Current liability	5,00,000	Stock	10,00,000
		Receivables	4,16,667
		Other	83,333
	77,50,000		15,00,000
			77,50,000

Q.19

Prepare B/S

MTP May 22 (2)



From the following information, you are required to PREPARE a summarised Balance Sheet for Rudra Ltd. for the year ended 31st March, 2022

Debt Equity Ratio	1:1
Current Ratio	3:1
Acid Test Ratio	8:3
Fixed Asset Turnover (on the basis of sales)	4
Stock Turnover (on the basis of sales)	6
Cash in hand	5,00,000
Stock to Debtor	1:1
Sales to Net Worth	4
Capital to Reserve	1:2
Gross Profit	20% of Cost
COGS to Creditor	10:1
Interest for entire year is yet to be paid on Long Term loan @ 10% .	

Ans.

Balance Sheet of Rudra Ltd.

Liabilities	Amount (₹)	Assets	Amount (₹)
Capital	10,00,000	Fixed Assets	30,00,000
Reserves	20,00,000	Current Assets:	
Long Term Loan @ 10%	30,00,000	Stock in Trade	20,00,000
Current Liabilities:		Debtors	20,00,000
Creditors	10,00,000	Cash	5,00,000
Other Short-term Current Liability (Other STCL)	2,00,000		
Outstanding Interest	3,00,000		
	75,00,000		75,00,000

Working Notes:

Let sales be ₹ x

Balance Sheet of Rudra Ltd.

Liabilities	Amount (₹)	Assets	Amount (₹)
Capital		Fixed Assets	x/4
Reserves		Current Assets:	
Net Worth	x/4	Stock in Trade	x/6
Long Term Loan @ 10%	x/4	Debtors	x/6
		Cash	5,00,000
Current liabilities:			
Creditors	x/12		
Other Short-term Current Liability			
Outstanding Interest			
Total Current Liabilities	x/9+5,00,000/3		
Total		Total	

- Fixed Asset Turnover = 4 = $\frac{x}{\text{Fixed Assets}}$
 $\text{Fixed Assets} = \frac{x}{4}$
- Stock Turnover = 6 = $\frac{x}{\text{Stock}}$
 $\text{Stock} = \frac{x}{6}$
- Sales to net worth = 4 = $\frac{x}{\text{Net worth}}$
 $\text{net worth} = \frac{x}{4}$
- Debt: Equity = 1 : 1



$$\frac{\text{Long Term Loan}}{\text{Net worth}} = \frac{1}{1}$$

$$\text{Long term loan} = \text{Net worth} = \frac{x}{4}$$

5. $\frac{\text{Gross Profit to Cost}}{\text{Sales - GP}} = 20\%$

$$\frac{GP}{\text{Sales} - GP} = 20\%$$

$$\frac{GP}{x - GP} = 20\%$$

$$GP = 0.2x - 0.2GP$$

$$1.2GP = 0.2x$$

$$GP = \frac{0.2x}{1.2}$$

$$GP = \frac{x}{6}$$

$$\text{Cost of Goods Sold} = x - \frac{x}{6} = \frac{5}{6}x$$

6. $\frac{\text{COGS to creditors}}{\text{Creditors}} = 10:1$

$$\frac{\text{COGS}}{\text{Creditors}} = \frac{10}{1}$$

$$\frac{\frac{5x}{6}}{\text{Creditors}} = \frac{10}{1}$$

$$\text{Creditors} = \frac{5x}{60} = \frac{x}{12}$$

7. $\frac{\text{Stock}}{\text{Debtor}} = 1$

$$\text{Debtor} = \text{Stock} = \frac{x}{6}$$

8. $\frac{\text{Current Ratio}}{\text{Debtor}} = 3:1$

$$\frac{\text{Stock} + \text{Debtors} + \text{Cash}}{\text{Debtor}} = \frac{3}{1}$$

$$\frac{\frac{x}{6} + \frac{x}{6} + 5,00,000}{\text{Current Liabilities}} = 3$$

$$\frac{\frac{x}{3} + 5,00,000}{3} = \text{CL}$$

$$\text{CL} = \frac{x}{9} + \frac{5,00,000}{3}$$

9. $\text{CA} = 3\text{CL}$

$$\text{CA} = 3\left(\frac{x}{9} + \frac{5,00,000}{3}\right)$$

$$\text{CA} = \frac{x}{3} + 5,00,000$$

10. $\text{Net worth} + \text{Long Term Loan} + \text{Current Liability} = \text{Fixed Asset} + \text{Current Assets}$

$$\frac{x}{4} + \frac{x}{4} + \frac{x}{9} + \frac{5,00,000}{3} = \frac{x}{4} + \frac{x}{3} + 5,00,000$$

$$\frac{x}{4} + \frac{x}{9} - \frac{x}{3} = 5,00,000 - \frac{5,00,000}{3}$$

$$\frac{9x + 4x - 12x}{36} = \frac{15,00,000 - 5,00,000}{3}$$

$$\frac{x}{36} = \frac{10,00,000}{3}$$

$$= 1,20,00,000$$

11. Now, from above calculations, we get,

-> Fixed Asset = $\frac{x}{4} = \frac{1,20,00,000}{4} = 30,00,000$

-> Stock = $\frac{x}{6} = \frac{1,20,00,000}{6} = 20,00,000$

-> Debtor = $\frac{x}{6} = \frac{1,20,00,000}{6} = 20,00,000$

-> Net Worth = $x / 4 = 30,00,000$

Now, Capital to Reserve is 1 : 2

Capital = ₹ 10,00,000

and, Reserve = ₹ 20,00,000

-> Long Term Loan = $\frac{x}{4} = 30,00,000$

-> Outstanding Interest = $30,00,000 \times 10\% = 3,00,000$

-> Creditors = $\frac{x}{12} = \frac{1,20,00,000}{12} = 10,00,000$

-> Current Liabilities = Creditors + Other STCL + Outstanding Interest

$\frac{x}{9} = \frac{5,00,000}{3} = 10,00,000 + \text{Other STCL} + 3,00,000$

$\frac{1,20,00,000}{9} = \frac{5,00,000}{3} = 13,00,000 + \text{Other STCL}$

15,00,000 = Other STCL + 13,00,000

Other STCL = 2,00,000

Q.20

Decision on basis of ratio

MTP Dec 21 (2)



Jensen and spencer pharmaceutical is in the business of manufacturing pharmaceutical drugs including the newly invented Covid vaccine. Due to increase in demand of Covid vaccines, the production had increased at all time high level and the company urgently needs a loan to meet the cash and investment requirements. It had already submitted a detailed loan proposal and project report to Expo-Impo bank, along with the financial statements of previous three years as follows:

Statement of Profit and Loss

(In ₹ '000)

	2018-19	2019-20	2020-21
Sales			
Cash	400	960	1,600
Credit	3,600	8,640	14,400
Total sales	4,000	9,600	16,000
Cost of goods sold	2,480	5,664	9,600



Gross profit	1,520	3,936	6,400
Operating expenses:			
General, administration, and selling expenses	160	900	2,000
Depreciation	200	800	1,320
Interest expenses (on borrowings)	120	316	680
Profit before tax (PBT)	1,040	1,920	2,400
Tax @ 30%	312	576	720
Profit after tax (PAT)	728	1,344	1,680

BALANCE SHEET

(In ₹ '000)

	2018-19	2019-20	2020-21
Assets			
Non-Current Assets			
Fixed assets (net of depreciation)	3,800	5,000	9,400
Current Assets			
Cash and cash equivalents	80	200	212
Accounts receivable	600	3,000	4,200
Inventories	640	3,000	4,500
Total	5,120	11,200	18,312
Equity & Liabilities			
Equity share capital (shares of ₹10 each)	2,400	3,200	4,000
Other Equity	728	2,072	3,752
Non-Current borrowings	1,472	2,472	5,000
Current liabilities	520	3,456	5,560
Total	5,120	11,200	18,312

INDUSTRY AVERAGE OF KEY RATIOS

Ratio	Sector Average
Current ratio	2.30:1
Acid test ratio (quick ratio)	1.20:1
Receivable turnover ratio	7 times
Inventory turnover ratio	4.85 times
Long-term debt to total debt	24%
Debt-to-equity ratio	35%
Net profit ratio	18%
Return on total assets	10%
Interest coverage ratio (times interest earned)	10

As a loan officer of Expo-Impo Bank, you are REQUIRED to apprise the loan proposal on the basis of comparison with industry average of key ratios considering closing balance for accounts receivable of ₹ 6,00,000 and inventories of ₹ 6,40,000 respectively as on 31st March, 2018.

Ans.

(In ₹ '000)

Ratio	Formula	2018-19	2019-20	2020-21	Industry Average
Current Ratio	$\frac{\text{Current assets}}{\text{Current liabilities}}$	$\frac{1,320}{520}$ = 2.54	$\frac{6,200}{3,456}$ = 1.80	$\frac{8,912}{5,560}$ = 1.60	2.30:1

Acid test ratio (quick ratio)	$\frac{\text{Quick Assets}}{\text{Current Liabilities}}$	$\frac{680}{520} = 1.31$	$\frac{3,200}{3,456} = 0.93$	$\frac{4,412}{5,560} = 0.79$	1.20:1
Receivable turnover ratio	$\frac{\text{Credit Sales}}{\text{Average Accounts Receivable}}$	$\frac{3,600}{(600+600)/2} = 6$	$\frac{8,640}{(600+3,000)/2} = 4.80$	$\frac{14,400}{(3,000+4,200)/2} = 4$	7 times
Inventory turnover ratio	$\frac{\text{COGS}}{\text{Average Inventory}}$	$\frac{2,480}{(640+640)/2} = 3.88$	$\frac{5,664}{(640+3,000)/2} = 3.11$	$\frac{9,600}{(3,000+4,500)/2} = 2.56$	4.85 times
Long-term debt to total debt	$\frac{\text{Long term Debt} \times 100}{\text{Total Debt}}$	$\frac{1,472 \times 100}{1,992} = 73.90\%$	$\frac{2,472 \times 100}{5,928} = 41.70\%$	$\frac{5,000 \times 100}{10,560} = 47.35\%$	24%
Debt-to-equity ratio	$\frac{\text{Long term Debt} \times 100}{\text{Shareholders' Equity}}$	$\frac{1,472 \times 100}{3,128} = 47.06\%$	$\frac{2,472 \times 100}{5,272} = 46.89\%$	$\frac{5,000 \times 100}{7,752} = 64.50\%$	35%
Net profit ratio	$\frac{\text{Net Profit} \times 100}{\text{Sales}}$	$\frac{728 \times 100}{4,000} = 18.2\%$	$\frac{1,344 \times 100}{9,600} = 14\%$	$\frac{1,680 \times 100}{16,000} = 10.5\%$	18%
Return on total assets	$\frac{\text{Net Profit after taxes} \times 100}{\text{Total assets}}$	$\frac{728 \times 100}{5,120} = 14.22\%$	$\frac{1,344 \times 100}{11,200} = 12\%$	$\frac{1,680 \times 100}{18,312} = 9.17\%$	10%
Interest coverage ratio (times interest earned)	$\frac{\text{EBIT}}{\text{Interest}}$	$\frac{1,160}{120} = 9.67$	$\frac{2,236}{316} = 7.08$	$\frac{3,080}{680} = 4.53$	10

Conclusion:

In the last two years, the current ratio and quick ratio are less than the ideal ratio (2:1 and 1:1 respectively) indicating that the company is not having enough resources to meet its current obligations. Receivables are growing slower. Inventory turnover is slowing down as well, indicating a relative build-up in inventories or increased investment in stock. High Long-term debt to total debt ratio and Debt to equity ratio compared to that of industry average indicates high dependency on long term debt by the company. The net profit ratio is declining substantially and is much lower than the industry norm. Additionally, though the Return on Total Asset (ROTA) is near to industry average, it is declining as well. The interest coverage ratio measures how many times a company can cover its current interest payment with its available earnings. A high interest coverage ratio means that an enterprise can easily meet its interest obligations, however, it is declining in the case of Jensen & Spencer and is also below the industry average indicating excessive use of debt or inefficient operations.

On overall comparison of the industry average of key ratios than that of Jensen & Spencer, the company is in deterioration position. The company's profitability has declined steadily over the period. However, before jumping to the conclusion relying only on the key ratios, it is pertinent to keep in mind the industry, the company



dealing in with i.e. manufacturing of pharmaceutical drugs. The pharmaceutical industry is one of the major contributors to the economy and is expected to grow further. After the covid situation, people are more cautious towards their health and are going to spend relatively more on health medicines. Thus, while analysing the loan proposal, both the factors, financial and non-financial, needs to be kept in mind.

Q.21

Average Inventory

MTP Dec 21 (1)



ABC Ltd. has total sales of 10,00,000 all of which are credit sales. It has a gross profit ratio of 25% and a current ratio of 2. The company's current liabilities are ₹ 2,00,000. Further, it has inventories of ₹ 80,000, marketable securities of ₹ 50,000 and cash of ₹ 30,000. From the above information:

- CALCULATE the average inventory, if the expected inventory turnover ratio is three times?
- Also CALCULATE the average collection period if the opening balance of debtors is expected to be ₹ 1,50,000. Assume 360 days a year.

Ans.

(i) Calculation of Average Inventory

Since gross profit is 25% of sales, the cost of goods sold should be 75% of the sales.

Cost of goods sold = 10,00,000 × 75/100 = 7,50,000

$$\text{Inventory Turnover} = \frac{\text{Cost of goods sold}}{\text{Average Inventory}}$$

$$3 = \frac{7,50,000}{\text{Average Inventory}}$$

$$\text{Average Inventory} = \frac{7,50,000}{3} = 2,50,000$$

(ii) Calculation of Average Collection Period

$$\text{Average Collection Period} = \frac{\text{Average Debtors}}{\text{Credit Sales}} \times 360$$

$$\text{Where, Average Debtors} = \frac{\text{Opening Debtors} + \text{Closing Debtors}}{2}$$

Calculation of Closing balance of debtors

	₹	₹
Current Assets (2 × 2,00,000)		4,00,000
Less: Inventories	80,000	
Marketable Securities	50,000	
Cash	30,000	1,60,000
Debtors Closing Balance		2,40,000

$$\text{Now, Average Debtors} = \frac{1,50,000 + 2,40,000}{2} = 1,95,000$$

$$\text{So, Average Collection Period} = \frac{1,95,000}{10,00,000} \times 360 = 70.2 \text{ or } 70 \text{ days}$$

Q.22

Prepare B/S

MTP May 21 (1)



SN Ltd. has furnished the following ratios and information relating to the year ended 31 st March 2021:

Share Capital	Rs. 6,25,000
Working Capital	Rs. 2,00,000
Gross Margin	25%
Inventory Turnover	5 times
Average Collection Period	1.5 months
Current Ratio	1.5:1
Quick Ratio	0.7:1
Reserves & Surplus to Bank & Cash	3 times

Further, the assets of the company consist of fixed assets and current assets, while its current liabilities comprise bank credit and others in the ratio of 3:1. Assume 360 days in a year.

You are required to PREPARE the Balance Sheet as on 31st March 2021.

(Note- Balance sheet may be prepared in traditional T Format.)

Ans.

Workings:

$$1. \quad \text{Current Ratio} = \frac{\text{Current Assets(CA)}}{\text{Current Liabilities(CL)}} = \frac{15}{1}$$

$$CA = 1.5 CL$$

$$\text{Also, } CA - CL = \text{Rs. } 2,00,000$$

$$1.5 CL - CL = \text{Rs. } 2,00,000$$

$$CL = \frac{\text{Rs. } 2,00,000}{0.5} = \text{Rs. } 4,00,000$$

$$CA = 1.5 \times \text{Rs. } 4,00,000 = \text{Rs. } 6,00,000$$

$$2. \quad \text{Bank Credit (BC) to Other Current Liabilities (OCL) ratio} = 3:1$$

$$\frac{\text{Bank Credit (BC)}}{\text{Other Current Liabilities (OCL)}} = \frac{3}{1}$$

$$BC = 3 OCL \text{ Also, } BC + OCL = CL$$

$$3 OCL + OCL = \text{Rs. } 4,00,000$$

$$OCL = \frac{\text{Rs. } 4,00,000}{4} = \text{Rs. } 1,00,000$$

$$\text{Bank Credit} = 3 \times \text{Rs. } 1,00,000 = \text{Rs. } 3,00,000$$

$$3. \quad \text{Quick Ratio} = \frac{\text{Current Assets} - \text{Inventories}}{\text{Current Liabilities}}$$



$$0.7 = \frac{\text{Rs. } 6,00,000 - \text{Inventories}}{\text{Rs. } 4,00,000}$$

$$\text{Inventories} = \text{Rs. } 6,00,000 - \text{Rs. } 2,80,000 = \text{Rs. } 3,20,000$$

4. Inventory Turnover = 5 times

$$\text{Inventory Turnover} = \frac{\text{Cost of goods sold (COGS)}}{\text{Average Inventory}}$$

$$\text{Average Inventory} = \frac{\text{Cost of goods sold (COGS)}}{\text{Inventory Turnover}}$$

$$\text{COGS} = \text{Rs. } 3,20,000 \times 5 = \text{Rs. } 16,00,000$$

5. Gross Margin = $\frac{\text{Sales} - \text{COGS}}{25\% \text{ Sales}} \times 100 =$

$$\text{Sales} = \frac{16,00,000}{0.75} = \text{Rs. } 21,33,333.33$$

6. Average Collection Period (ACP) = 1.5 months = 45 days

$$\text{Debtors Turnover} = \frac{360}{\text{ACP}} = \frac{360}{45} = 8 \text{ times}$$

$$\text{Also, Debtors Turnover} = \frac{\text{Sales}}{\text{Average Debtors}}$$

$$\text{Hence, Debtors} = \frac{\text{Rs. } 21,33,333.33}{8} = \text{Rs. } 2,66,667$$

Q. 23

Prepare B/S

MTP Nov 18 (2)



From the following information, PREPARE a summarised Balance Sheet as at 31st March, 20X6:

Working Capital	Rs.2,40,000
Bank overdraft	Rs.40,000
Fixed Assets to Proprietary ratio	0.75
Reserves and Surplus	Rs.1,60,000
Current ratio	2.5
Liquid ratio	1.5

Ans.

Working notes:

(i) Current assets and Current liabilities computation:

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

$$\text{Or, } \frac{\text{Current assets}}{2.5} = \frac{\text{Current liabilities}}{1} = k \text{ (say)}$$

Or, Current Assets = 2.5 k and Current Liabilities = k

Or, Working capital = (Current Assets - Current Liabilities) Or, Rs.2,40,000 = k (2.5 - 1) = 1.5 k

Or, k = Rs.1,60,000

Current Liabilities = Rs. 1,60,000

Current Assets = Rs.1,60,000 + 2.5 = Rs.4,00,000

(ii) Computation of stock

$$\text{Liquid ratio} = \frac{\text{Liquid assets}}{\text{Current liabilities}}$$

$$\text{Or, } 1.5 = \frac{\text{Current Assets} - \text{Stock}}{\text{Rs.1,60,000}}$$

$$\text{Or, } 1.5 \times \text{Rs.1,60,000} = \text{Rs.4,00,000} - \text{Stock}$$

$$\text{Or, Stock} = \text{Rs.1,60,000}$$

(iii) Computation of Proprietary fund; Fixed assets; Capital and Sundry payables (creditors)

$$\text{Proprietary ratio} = \frac{\text{Fixed assets}}{\text{Proprietary fund}} = 0.75$$

$$\text{Fixed assets} = 0.75 \text{ Proprietary fund}$$

$$\text{And Net working capital} = 0.25 \text{ Proprietary fund}$$

$$\text{Or, Rs.2,40,000}/0.25 = \text{Proprietary fund}$$

$$\text{Or, Proprietary fund} = \text{Rs.9,60,000}$$

$$\text{And Fixed assets} = 0.75 \text{ proprietary fund}$$

$$= 0.75 \times \text{Rs.9,60,000}$$

$$= \text{Rs.7,20,000}$$

$$\text{Equity Capital} = \text{Proprietary fund} - \text{Reserves \& Surplus}$$

$$= \text{Rs.9,60,000} - \text{Rs.1,60,000}$$

$$= \text{Rs.8,00,000}$$

$$\text{Sundry payables (creditors)} = (\text{Current liabilities} - \text{Bank overdraft})$$

$$= (\text{Rs.1,60,000} - \text{Rs.40,000}) = \text{Rs.1,20,000}$$

Balance Sheet

Liabilities	(Rs.)	Assets	(Rs.)
Equity Capital	8,00,000	Fixed assets	7,20,000
Reserves & Surplus	1,60,000	Stock	1,60,000
Bank overdraft	40,000	Current assets	2,40,000
Sundry payables	1,20,000		
	11,20,000		11,20,000

Q.24

Debtor / Creditor

MTP Nov 18 (1)



Following information relate to a concern:

Debtors Velocity	3 months
Credits Velocity	2 months
Stock Turnover Ratio	1.5
Gross Profit Ratio	25%



Bills Receivables	Rs. 25,000
Bills Payables	Rs. 10,000
Gross Profit	Rs. 4,00,000
Fixed Assets to turnover Ratio	4

Closing stock of the period is Rs. 10,000 above the opening stock. CALCULATE

- (i) Sales and cost of goods sold
- (ii) Sundry Debtors
- (iii) Sundry Creditors
- (iv) Closing Stock
- (v) Fixed Assets

Ans. (i) Determination of Sales and Cost of goods sold:

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

$$\text{Or, } \frac{25}{100} = \frac{\text{Rs. 4, 00, 000}}{\text{Sales}}$$

$$\text{Or, Sales} = \frac{\text{Rs. 4, 00, 000}}{25} = \text{Rs. 16,00,000}$$

$$\begin{aligned} \text{Cost of Goods Sold} &= \text{Sales} - \text{Gross Profit} \\ &= \text{Rs. 16,00,000} - \text{Rs. 4,00,000} = \text{Rs. 12,00,000} \end{aligned}$$

(ii) Determination of Sundry Debtors:

Debtors velocity is 3 months or Debtors' collection period is 3 months.

$$\text{So, Debtors' turnover ratio} = \frac{12 \text{ months}}{3 \text{ months}} = 4$$

$$\begin{aligned} \text{Debtors' turnover ratio} &= \frac{\text{Credit Sales}}{\text{Average Accounts Receivable}} \\ &= \frac{\text{Rs. 16,00,000}}{\text{Bills Receivable} + \text{Sundry Debtors}} = 4 \end{aligned}$$

$$\text{Or, Sundry Debtors} + \text{Bills receivable} = \text{Rs. 4,00,000}$$

$$\text{Sundry Debtors} = \text{Rs. 4,00,000} - \text{Rs. 25,000} = \text{Rs. 3,75,000}$$

(iii) Determination of Sundry Creditors:

Creditors velocity of 2 months or credit payment period is 2 months.

$$\text{So, Creditors' turnover ratio} = \frac{12 \text{ months}}{2 \text{ months}} = 6$$

$$\begin{aligned} \text{Creditors turnover ratio} &= \frac{\text{Credit Purchases} *}{\text{Average Accounts Payables}} \\ &= \frac{\text{Rs. 12,10,000}}{\text{Sundry Creditors} + \text{Bills Payables}} = 6 \end{aligned}$$

$$\text{So, Sundry Creditors} + \text{Bills Payable} = \text{Rs. 2,01,667}$$

$$\text{Or, Sundry Creditors} + \text{Rs. 10,000} = \text{Rs. 2,01,667}$$

$$\text{Or, Sundry Creditors} = \text{Rs. 2,01,667} - \text{Rs. 10,000} = \text{Rs. 1,91,667}$$

(iv) Closing Stock

$$\text{Stock Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Stock}} = \frac{\text{Rs.12,00,000}}{\text{Average Stock}} = 1.5$$

So, Average Stock = Rs. 8,00,000

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

$$\text{Or } \frac{\text{Opening Stock} + (\text{Opening Stock} + \text{Rs.10,000})}{2} = \text{Rs. 8,00,000}$$

Or, Opening Stock = Rs. 7,95,000

So, Closing Stock = Rs. 7,95,000 + Rs. 10,000 = Rs. 8,05,000

(v) Calculation of Fixed Assets

$$\text{Fixed Assets Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Fixed Assets}} = 4$$

$$\text{Or, } \frac{\text{Rs.12,00,000}}{\text{Fixed Assets}} = 4$$

Or, Fixed Asset = Rs. 3,00,000

Workings:

***Calculation of Credit purchases:**

Cost of goods sold = Opening stock + Purchases - Closing stock

Rs. 12,00,000 = Rs. 7,95,000 + Purchases - Rs. 8,05,000

Rs. 12,00,000 + Rs. 10,000 = Purchases Rs. 12,10,000 = Purchases (credit).

Assumption:

- (i) All sales are credit sales
- (ii) All purchases are credit purchase
- (iii) Stock Turnover Ratio and Fixed Asset Turnover Ratio may be calculated either on Sales or on Cost of Goods Sold.

Q. 25

All Ratios

ICAI MAT



In a meeting held at Solan towards the end of 2021-22, the Directors of HPCL Ltd. have taken a decision to diversify. At present HPCL Ltd. sells all finished goods from its own warehouse. The company issued debentures on 01.04.2022 and purchased fixed assets on the same day. The purchase prices have remained stable during the concerned period. Following information is provided to you:

INCOME STATEMENT

Particulars	2021-22 (₹)		2022-23 (₹)	
Cash Sales	30,000		32,000	
Credit Sales	2,70,000		3,42,000	3,74,000
Less: Cost of goods sold		2,36,000		2,98,000
Gross profit		64,000		76,000
Less: Operating Expenses:				
Warehousing	13,000		14,000	
Transport	6,000		10,000	



Administrative	19,000		19,000	
Selling	11,000	49,000	14,000	57,000
Net Profit		15,000		19,000

BALANCE SHEET

Assets & Liabilities	2021-22 (₹)		2022-23 (₹)	
Fixed Assets (Net Block)	-	30,000	-	40,000
Receivables	50,000		82,000	
Cash at Bank	10,000		7,000	
Stock	60,000		94,000	
Total Current Assets (CA)	1,20,000		1,83,000	
Payables	50,000		76,000	
Total Current Liabilities (CL)	50,000		76,000	
Working Capital (CA - CL)		70,000		1,07,000
Net Assets		1,00,000		1,47,000
Represented by:				
Share Capital		75,000		75,000
Reserve and Surplus		25,000		42,000
Debentures		-		30,000
		1,00,000		1,47,000

You are required to CALCULATE the following ratios for the years 2021-22 and 2022-23:

- Gross Profit Ratio
- Operating Expenses to Sales Ratio
- Operating Profit Ratio
- Capital Turnover Ratio
- Stock Turnover Ratio
- Net Profit to Net Worth Ratio
- Receivables Collection Period



Ratio relating to capital employed should be based on the capital at the end of the year. Give the reasons for change in the ratios for 2 years. Assume opening stock of ₹ 40,000 for the year 2021-22. Ignore Taxation.

Ans.

Computation of Ratios		
Ratio	2021-22 (₹)	2022-23 (₹)
1. Gross profit ratio (Gross profit/sales)	$\frac{64,000 \times 100}{3,00,000} = 21.3\%$	$\frac{76,000 \times 100}{3,74,000} = 20.3\%$
2. Operating expense to sales ratio (Operating exp/ Total sales)	$\frac{49,000 \times 100}{3,00,000} = 16.3\%$	$\frac{57,000 \times 100}{3,74,000} = 15.2\%$
3. Operating profit ratio (Operating profit/ Total sales)	$\frac{15,000 \times 100}{3,00,000} = 5\%$	$\frac{19,000 \times 100}{3,74,000} = 5.08\%$
4. Capital turnover ratio (Sales/capital employed)	$\frac{3,00,000}{1,00,000} = 3$	$\frac{3,74,000}{1,47,000} = 2.54$

5. Stock turnover ratio (COGS/ Average stock) (Refer to W.N. 1)	$\frac{2,36,000}{50,000} = 4.72$	$\frac{2,98,000}{77,000} = 3.87$
6. Net Profit to Net worth ratio (Net profit / Net worth)	$\frac{15,000 \times 100}{1,00,000} = 15\%$	$\frac{19,000 \times 100}{1,17,000} = 16.24\%$
7. Receivables collection period (Average receivables/Average daily credit sales) (Refer to W.N. 2)	$\frac{50,000}{739.73} = 67.6$ days	$\frac{82,000}{936.99} = 87.5$ days
Working notes (W.N.):		
1. Average Stock = (opening stock + closing stock)/2	$(40,000 + 60,000)/2$ = 50,000	$(60,000 + 94,000)/2$ = 77,000
2. Average daily sales = Credit sales / 365	$\frac{2,70,000}{365} = 739.73$	$\frac{3,42,000}{365} = 936.99$

Analysis: The decline in the Gross profit ratio could be either due to a reduction in the selling price or increase in the direct expenses (since the purchase price has remained the same). In this case, cost of goods sold have increased more than proportion of increment in sales & hence impacting gross profit ratio.

Similarly, there is a decline in the ratio of operating expenses to sales. Further analysis reveals that in comparison to increase in sales, there has a lesser proportionate increase in operating expenses. As a result, even the operating profit ratio has remained the same approximately in spite of a decline in the Gross profit ratio.

The company has not been able to deploy its capital efficiently. This is indicated by a decline in the Capital turnover ratio from 3 to 2.54 times.

The decline in stock turnover ratio implies that the company has increased its investment in stock. Net Profit to Net worth ratio has increased indicating that the company's Net worth or Shareholders' capital is efficient in generating profits.

The increase in the Receivables collection period indicates that the company has become liberal in extending credit on sales. There is a corresponding increase in the receivables also due to such credit policy.

Q.26

All Ratios

ICAI MAT



Following is the abridged Balance Sheet of Alpha Ltd.:

Liabilities	₹	Assets	₹	₹
Share Capital	1,00,000	Land and Buildings		80,000
Profit and Loss Account	17,000	Plant and Machineries	50,000	
Current Liabilities	40,000	Less: Depreciation	15,000	35,000
				1,15,000
		Stock	21,000	
		Receivables	20,000	
		Bank	1,000	42,000



Total	1,57,000	Total	1,57,000
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With the help of the additional information furnished below, you are required to

PREPARE Trading and Profit & Loss Account and Balance Sheet as at 31st March, 2023:

- (i) The company went in for re-organisation of capital structure, with share capital remaining the same as follows:
- | | |
|---------------------------|-----|
| Share capital | 50% |
| Other Shareholders' funds | 15% |
| 5% Debentures | 10% |
| Current Liabilities | 25% |
- Debentures were issued on 1st April, interest being paid annually on 31st March.
- (ii) Land and Buildings remained unchanged. Additional plant and machinery has been bought and a further ₹ 5,000 depreciation was written off.
(The total fixed assets then constituted 60% of total fixed and current assets.)
- (iii) Working capital ratio was 8 : 5.
- (iv) Quick assets ratio was 1 : 1.
- (v) The receivables (four-fifth of the quick assets) to sales ratio revealed a credit period of 2 months. There were no cash sales.
- (vi) Return on net worth was 10%.
- (vii) Gross profit was at the rate of 15% of selling price. (viii) Stock turnover was eight times for the year.
Ignore Taxation.

Ans.

Particulars	%	(₹)
Share capital (given to be same)	50%	1,00,000
Other shareholders funds	15%	30,000
5% Debentures	10%	20,000
Current Liabilities	25%	50,000
Total (1,00,000 / 50%)	100%	2,00,000

Calculation of Assets

$$\begin{aligned}
 \text{Total liabilities} &= \text{Total Assets} \\
 ₹ 2,00,000 &= \text{Total Assets} \\
 \text{Fixed Assets} &= 60\% \text{ of total fixed assets and current assets} \\
 &= ₹ 2,00,000 \times 60/100 = ₹ 1,20,000 \\
 \text{Current Assets} &= \text{Total Assets} - \text{Fixed Assets} \\
 &= ₹ 2,00,000 - ₹ 1,20,000 = ₹ 80,000
 \end{aligned}$$

Calculation of additions to Plant & Machinery

	₹
Total fixed assets	1,20,000
Less: Land & Buildings	80,000
Plant and Machinery (after providing depreciation)	40,000
Less: Existing Plant & Machinery (after extra	30,000

depreciation of ₹ 5,000) i.e. 50,000 - 20,000	
Addition to the Plant & Machinery	10,000

Calculation of stock

$$\begin{aligned} \text{Quick ratio:} &= \frac{\text{Current assets} - \text{stock}}{\text{Current liabilities}} = 1 \\ &= \frac{80,000 - \text{stock}}{50,000} = 1 \\ \text{₹ 50,000} &= \text{₹ 80,000} - \text{Stock} \\ \text{Stock} &= \text{₹ 80,000} - \text{₹ 50,000} \\ &= \text{₹ 30,000} \end{aligned}$$

$$\begin{aligned} \text{Receivables} &= 4/5\text{th of quick assets} \\ &= (\text{₹ 80,000} - \text{₹ 30,000}) \times 4/5 \\ &= \text{₹ 40,000} \end{aligned}$$

$$\begin{aligned} \text{Receivables turnover} &= \frac{\text{Receivables}}{\text{Credit Sales}} \times 12 \text{ Months} = 2 \text{ months} \\ &= \frac{40,000 \times 12}{\text{Credit Sales}} = 2 \text{ months} \end{aligned}$$

$$\begin{aligned} 2 \times \text{credit sales} &= 4,80,000 \\ \text{Credit sales} &= 4,80,000/2 \\ &= \text{₹ 2,40,000} = \text{Total Sales (As there were no cash sales)} \end{aligned}$$

$$\text{Gross profit} = 15\% \text{ of sales} = \text{₹ 2,40,000} \times 15/100 = \text{₹ 36,000}$$

Return on net worth (net profit)

$$\begin{aligned} \text{Net worth} &= \text{₹ 1,00,000} + \text{₹ 30,000} \\ &= \text{₹ 1,30,000} \\ \text{Net profit} &= \text{₹ 1,30,000} \times 10/100 = \text{₹ 13,000} \\ \text{Debenture interest} &= \text{₹ 20,000} \times 5/100 = \text{₹ 1,000} \end{aligned}$$

Projected profit and loss account for the year ended 31st March, 2023

Particulars	₹	Particulars	₹
To cost of goods sold	2,04,000	By sales	2,40,000
To gross profit	36,000		
	2,40,000		2,40,000
To debenture interest	1,000	By gross profit	36,000
To administration and other expenses (bal. fig.)	22,000		
To net profit	13,000		
	36,000		36,000

Projected Balance Sheet as at 31st March, 2023

Liabilities	₹	Assets	₹
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Share capital	1,00,000	Fixed assets:		
Profit and loss A/c (17,000+13,000)	30,000	Land & buildings		80,000
5% Debentures	20,000	Plant & machinery	60,000	
Current liabilities	50,000	Less: Depreciation	20,000	40,000
		Current assets		
		Stock	30,000	
		Receivables	40,000	
		Bank	10,000	
				80,000
	2,00,000			2,00,000

Q.27

Balance Sheet

ICAI MAT



From the following ratios and information given below, PREPARE Trading Account, Profit and Loss Account and Balance Sheet of Aebece Company:

Fixed Assets	₹ 40,00,000
Closing Stock	₹ 4,00,000
Stock turnover ratio	10
Gross profit ratio	25 percent
Net profit ratio	20 percent
Net profit to capital	1/5
Capital to total liabilities	1/2
Fixed assets to capital	5/4
Fixed assets/Total current assets	5/7

Ans.

Workings:

$$(i) \frac{\text{Fixed Assets}}{\text{Total Current Assets}} = \frac{5}{7}$$

$$\text{Or, Total Current Assets} = \frac{40,00,000 \times 7}{5} = ₹ 56,00,000$$

$$(ii) \frac{\text{Fixed Assets}}{\text{Capital}} = \frac{5}{4}$$

$$\text{Or, Capital} = \frac{40,00,000 \times 4}{5} = ₹ 32,00,000$$

$$(iii) \frac{\text{Capital}}{\text{Total Liabilities}^*} = \frac{1}{2}$$

$$\text{Or, Total liabilities} = ₹ 32,00,000 \times 2 = ₹ 64,00,000$$

*It is assumed that total liabilities do not include capital.

$$(iv) \frac{\text{Net Profit}}{\text{Capital}} = \frac{1}{5}$$

$$\text{Or, Net Profit} = ₹ 32,00,000 \times \frac{1}{5} = ₹ 6,40,000$$

$$(v) \frac{\text{Net Profit}}{\text{Sales}} = \frac{1}{5}$$

$$\text{Or, Sales} = ₹ 6,40,000 \times 5 = ₹ 32,00,000$$

(vi) Gross Profit = 25% of ₹ 32,00,000 = ₹ 8,00,000

$$\begin{aligned} \text{(vii) Stock Turnover} &= \frac{\text{Cost of Goods Sold (i.e. Sales - Gross profit)}}{\text{Average Stock}} = 10 \\ &= \frac{32,00,000 - ₹ 8,00,000}{\text{Average Stock}} = 10 \end{aligned}$$

Or, Average Stock = ₹ 2,40,000

$$\text{Or, } \frac{\text{Opening Stock} + ₹ 4,00,000}{2} = ₹ 2,40,000$$

Or, Opening Stock = ₹ 80,000

Trading Account

Particulars	(₹)	Particulars	(₹)
To Opening Stock	80,000	By Sales	32,00,000
To Manufacturing exp./ Purchase	27,20,000		
(Balancing figure)			
To Gross Profit b/d	8,00,000	By Closing Stock	4,00,000
	36,00,000		36,00,000

Profit and Loss Account

Particulars	(₹)	Particulars	(₹)
To Operating Expenses	1,60,000	By Gross Profit c/d	8,00,000
(Balancing figure)			
To Net Profit	6,40,000		
	8,00,000		8,00,000

Balance Sheet

Capital and Liabilities	(₹)	Assets	(₹)
Capital	32,00,000	Fixed Assets	40,00,000
Liabilities	64,00,000	Current Assets:	
		Closing Stock	4,00,000
		Other Current Assets	52,00,000
		(Bal. figure)	
	96,00,000		96,00,000

Q.28

All Ratios

ICAI MAT



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

Navya Ltd.



Balance Sheet as at 31.3.2023

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

Statement of Profitability

For the year ending 31.3.2023

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

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

Ans.

Ratios	Navya Ltd.	Industry Norms
1. Current Ratio = $\frac{\text{Current Ass}}{\text{Current Liabilities}}$	$\frac{₹52,80,000}{₹19,80,000} = 2.67$	2.50
2. Receivable Turnover Ratio = $\frac{\text{Sales}}{\text{Debtors}}$	$\frac{₹1,10,00,000}{₹11,00,000} = 10.0$	8.00
3. Inventory turnover ratio = $\frac{\text{Sales}}{\text{Stock}}$	$\frac{₹1,10,00,000}{₹33,00,000} = 3.33$	9.00
4. Total Asset Turn over ratio = $\frac{\text{Sales}}{\text{Total Assets}}$	$\frac{₹1,10,00,000}{₹77,00,000} = 1.43$	2.00

	Total Assets	₹77,00,000	
5	Net Profit Ratio = $\frac{\text{Net Profit}}{\text{Sales}}$	$\frac{₹2,31,000}{₹1,10,00,000} = 2.10\%$	3.50%
6.	Return on Total Asset = $\frac{\text{EBIT}}{\text{Total Assets}}$	$\frac{₹5,54,000}{₹77,00,000} = 7.19\%$	7%
7.	Return on Net worth = $\frac{\text{Net Profit}}{\text{Net Worth}}$	$\frac{₹2,31,000}{₹48,00,000} = 4.81\%$	10.5%
8.	$\frac{\text{Total Debt}}{\text{Total Assets}}$	$\frac{₹29,00,000}{₹77,00,000} = 37.66\%$	60%

Comments:

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

Q. 29

Balance Sheet

ICAI MAT



Ganpati Limited has furnished the following ratios and information relating to the year ended 31st March, 2023:

Sales	₹ 60,00,000
Return on net worth	25%
Rate of income tax	50%
Share capital to reserves	7:3
Current ratio	2
Net profit to sales	6.25%
Inventory turnover (based on cost of goods sold)	12
Cost of goods sold	₹ 18,00,000
Interest on debentures	₹ 60,000
Receivables	₹ 2,00,000
Payables	₹ 2,00,000

You are required to:

- (a) CALCULATE the operating expenses for the year ended 31st March, 2023.
- (b) PREPARE a Balance Sheet as on 31st March, 2023 in the following format:

Balance Sheet as on 31st March, 2023

Liabilities	₹	Assets	₹
Share Capital		Fixed Assets	
Reserve and Surplus		Current Assets	
15% Debentures		Stock	
Payables		Receivables	
		Cash	



Ans. (a) Calculation of Operating Expenses for the year ended 31st March, 2023

		(₹)
Net Profit [@ 6.25% of Sales]		3,75,000
Add: Income Tax (@ 50%)		3,75,000
Profit Before Tax (PBT)		7,50,000
Add: Debenture Interest		60,000
Profit before interest and tax (PBIT)		8,10,000
Sales		60,00,000
Less: Cost of goods sold	18,00,000	
PBIT	8,10,000	26,10,000
Operating Expenses		33,90,000

(b) Balance Sheet as on 31st March, 2023

Liabilities	₹	Assets	₹
Share Capital	10,50,000	Fixed Assets	17,00,000
Reserve and Surplus	4,50,000	Current Assets:	
15% Debentures	4,00,000	Stock	1,50,000
Payables	2,00,000	Receivables	2,00,000
		Cash	50,000
	21,00,000		21,00,000

Working Notes:

(i) Share Capital and Reserves and Surplus

The return on net worth is 25%. Therefore, the profit after tax of ₹ 3,75,000 should be equivalent to 25% of the net worth.

$$\text{Net worth} \times \frac{25}{100} = ₹ 3,75,000$$

$$\text{Net worth} = \frac{3,75,000}{25} \times 100 = ₹ 15,00,000$$

The ratio of share capital to reserves is 7:3

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

$$\text{Reserves and Surplus} = 15,00,000 \times \frac{3}{10} = ₹ 4,50,000$$

(ii) Debentures

Interest on Debentures @ 15% = ₹ 60,000

$$\text{Debentures} = \frac{60,000 \times 100}{15} = ₹ 4,00,000$$

(iii) Current Assets

Current Ratio = 2
 Payables = ₹ 2,00,000
 Current Assets = 2 Current Liabilities = 2 × 2,00,000 = ₹ 4,00,000

(iv) Fixed Assets

	₹
Share capital	10,50,000
Reserves and Surplus	4,50,000
Debentures	4,00,000
Payables	2,00,000
	21,00,000
Less: Current Assets	4,00,000
Fixed Assets	17,00,000

(v) Composition of Current Assets

Inventory Turnover = 12 $\frac{\text{Cost of goods sold}}{\text{Closing stock}} = 12$
 Closing stock = $\frac{18,00,000}{12} = ₹ 1,50,000$

Composition	₹
Stock	1,50,000
Receivables	2,00,000
Cash (balancing figure)	50,000
Total Current Assets	4,00,000

Q. 30

All Ratios

ICAI MAT



Manan Pvt. Ltd. gives you the following information relating to the year ending 31st March, 2023:

- | | |
|--|-------------|
| (1) Current Ratio | 2.5 : 1 |
| (2) Debt-Equity Ratio | 1 : 1.5 |
| (3) Return on Total Assets (After Tax) | 15% |
| (4) Total Assets Turnover Ratio | 2 |
| (5) Gross Profit Ratio | 20% |
| (6) Stock Turnover Ratio | 7 |
| (7) Net Working Capital | ₹ 13,50,000 |
| (8) Fixed Assets | ₹ 30,00,000 |
| (9) 1,80,000 Equity Shares of | ₹ 10 each |
| (10) 60,000, 9% Preference Shares of | ₹ 10 each |
| (11) Opening Stock | ₹ 11,40,000 |

You are required to CALCULATE:

- Quick Ratio
- Fixed Assets Turnover Ratio



- (c) Proprietary Ratio
(d) Earnings per Share

Ans.

Workings Notes:**(i) Computation of Current Assets & Current Liabilities & Total Assets**

$$\begin{aligned} \text{Net Working Capital} &= \text{Current Assets} - \text{Current Liabilities} \\ &= 2.5 - 1 = 1.5 \\ \text{Thus, Current Assets} &= \frac{\text{Net Working Capital} \times 2.5}{1.5} = \frac{13,50,000 \times 2.5}{1.5} \\ &= ₹ 22,50,000 \\ \text{Current Liabilities (CL)} &= ₹ 22,50,000 - ₹ 13,50,000 = ₹ 9,00,000 \\ \text{Total Assets} &= \text{Current Assets} + \text{Fixed Assets} \\ &= ₹ 22,50,000 + ₹ 30,00,000 = ₹ 52,50,000 \end{aligned}$$

(ii) Computation of Sales & Cost of Goods Sold

$$\begin{aligned} \text{Sales} &= \text{Total Assets Turnover} \times \text{Total Assets} \\ &= 2 \times (\text{Fixed Assets} + \text{Current Assets}) \\ &= 2 \times (₹ 30,00,000 + ₹ 22,50,000) \\ &= ₹ 1,05,00,000 \\ \text{Cost of Goods Sold} &= (100\% - 20\%) \text{ of Sales} = 80\% \text{ of Sales} \\ &= 80\% \times ₹ 1,05,00,000 = ₹ 84,00,000 \end{aligned}$$

(iii) Computation of Stock & Quick Assets

$$\begin{aligned} \text{Average Stock} &= \frac{\text{Cost of Good Sold}}{\text{Stock Turnover Ratio}} = \frac{84,00,000}{7} \\ &= ₹ 12,00,000 \\ \text{Closing Stock} &= (\text{Average Stock} \times 2) - \text{Opening Stock} \\ &= (₹ 12,00,000 \times 2) - ₹ 11,40,000 \\ &= ₹ 12,60,000 \\ \text{Quick Assets} &= \text{Current Assets} - \text{Closing Stock} \\ &= ₹ 22,50,000 - ₹ 12,60,000 = ₹ 9,90,000 \end{aligned}$$

(iv) Computation of Proprietary Fund

$$\begin{aligned} \text{Debt-Equity Ratio} &= \frac{\text{Debt}}{\text{Equity}} = \frac{1}{1.5} \\ \text{Or, Equity} &= 1.5 \text{ Debt} \\ \text{Total Assets} &= \text{Equity} + \text{Preference capital} + \text{Debt} + \text{CL} \\ ₹ 52,50,000 &= 1.5 \text{ Debt} + ₹ 6,00,000 + \text{Debt} + ₹ 9,00,000 \\ \text{Thus, Debt} &= \frac{37,50,000}{2.5} = ₹ 15,00,000 \\ \text{Equity} &= ₹ 15,00,000 \times 1.5 \\ &= ₹ 22,50,000 \\ \text{So, Proprietary Fund} &= \text{Equity} + \text{Preference Capital} \\ &= ₹ 22,50,000 + ₹ 6,00,000 \\ &= ₹ 28,50,000 \end{aligned}$$

(v) **Computation of Profit after tax (PAT)**

$$\begin{aligned} &= \text{Total Assets} \times \text{Return on Total Assets} \\ &= ₹ 52,50,000 \times 15\% \\ &= ₹ 7,87,500 \end{aligned}$$

(a) **Quick Ratio**

$$\text{Quick Ratio} = \frac{\text{Quick Assets}}{\text{Current Liabilities}} = \frac{9,90,000}{9,00,000} = 1.1$$

(b) **Fixed Assets Turnover Ratio**

$$\text{Fixed Assets Turnover Ratio} = \frac{\text{Sales}}{\text{Fixed Assets}} = \frac{1,05,00,000}{30,00,000} = 3.5$$

(c) **Proprietary Ratio**

$$\text{Proprietary Ratio} = \frac{\text{Proprietary fund}}{\text{Total Assets}} = \frac{28,50,000}{52,50,000} = 0.54$$

(d) **Earnings per Equity Share (EPS)**

$$\begin{aligned} \text{Earnings per Equity Share} &= \frac{\text{PAT} - \text{Preference Share Dividend}}{\text{Number of Equity Shares}} \\ &= \frac{₹ 7,87,500 - ₹ 54,000 \text{ (9\% of ₹ 6,00,000)}}{1,80,000} \\ &= ₹ 4.075 \text{ per share} \end{aligned}$$

Q.31

Theme Ltd provides you the following information:

12.5 % Debt	₹ 45,00,000
Debt to Equity ratio	1.5 : 1
Return on Shareholder's fund	54%
Operating Ratio	85%
Ratio of operating expenses to Cost of Goods sold	2 : 6
Tax rate	25%
Fixed Assets	₹ 39,00,000
Current Ratio	1.8 : 1

You are required to calculate:

- (i) Interest Coverage Ratio
- (ii) Gross Profit Ratio
- (iii) Current Assets

Ans.

Working Notes:

$$\begin{aligned} \text{Debt} &= ₹ 45,00,000 \\ \text{Interest} &= ₹ 45,00,000 \times 12.5\% = 5,62,500 \\ \text{Debt to Equity} &= 1.5:1 = \frac{\text{Total Debt}}{\text{Shareholders' Equity}} \\ \text{Equity} &= ₹ 30,00,000 \\ \text{Return of Shareholder's funds} = 54\% &= \frac{\text{Net Profit after taxes}}{\text{Equity shareholders' fund}} \times 100 \end{aligned}$$



$$\begin{aligned}
 \text{Profit after tax (PAT)} &= 54\% \times \text{Equity} = ₹16,20,000 \\
 \text{Profit before tax (PBT)}(1-25\%) &= \text{Profit after tax} \\
 &= ₹16,20,000/75\% = ₹21,60,000 \\
 \text{Earning before interest and tax (EBIT)} &= \text{PBT} + \text{Interest} \\
 &= ₹21,60,000 + ₹ 5,62,500 \\
 &= ₹27,22,500 \\
 \text{(i) Interest Coverage Ratio} &= \text{EBIT}/\text{Interest} \\
 &= ₹27,22,500/₹5,62,500 \\
 &= 4.84 \text{ Times} \\
 \text{(ii) Operating Profit Ratio} &= 1 - \text{Operating Ratio} \\
 &= 1 - 0.85 = 0.15 \text{ or } 15\% \\
 0.15 &= \frac{\text{Operating Profit}}{\text{Sales}} \times 100 \\
 \text{Sales} &= \text{EBIT or Operating Profit} / 0.15 \\
 &= ₹ 27,22,500 / 0.15 \\
 &= ₹ 1,81,50,000 \\
 \text{Operating ratio} &= \frac{\text{Operating expenses}}{\text{Cost of goods sold (COGS)}} = 2 : 6 = 1 : 3 \\
 \text{Operating expenses} &= 1/3\text{COGS} \\
 \text{Operating cost} &= \text{Sales} - \text{Operating profit} \\
 &= ₹ 1,81,50,000 - ₹ 27,22,500 \\
 &= ₹ 1,54,27,500 \\
 ₹ 1,54,27,500 &= \text{COGS} + \text{Operating expenses} \\
 ₹ 1,54,27,500 &= \text{COGS} + 1/3\text{COGS} \\
 \text{COGS} &= ₹ 1,15,70,625 \\
 \text{Gross profit} &= \text{Sales} - \text{COGS} \\
 &= 1,81,50,000 - 1,15,70,625 \\
 &= ₹ 65,79,375 \\
 \text{Gross Profit ratio} &= \frac{\text{Gross Profit}}{\text{Sales}} \times 100 \\
 &= 65,79,375/1,81,50,000 \\
 &= \mathbf{0.3625 \text{ or } 36.25\%}
 \end{aligned}$$

Gross profit and sales can be calculated in alternative way also. However, there will be no change in GP ratio i.e 36.25%

$$\begin{aligned}
 \text{(iii) Current Ratio} &= \frac{\text{Current Assets}}{\text{Current Liabilities}} \\
 &= 1.8 \\
 \text{Current Assets} &= 1.8 \text{ Current Liabilities} \\
 \text{Total of Balance sheet liability} &= \text{Equity} + \text{Debt} + \text{Current Liabilities} \\
 &= 30,00,000 + 45,00,000 + \text{CL} \dots \dots \dots (2) \\
 \text{Total Balance sheet asset} &= \text{Fixed Assets} + \text{Current Assets} \\
 &= 39 \text{ lakhs} + \text{CA} = 39 + 1.8\text{CL} \quad (3) \\
 \text{Equating 2 and 3,} & \\
 75,00,000 + \text{CL} &= 39,00,000 + 1.8\text{CL} \\
 0.8\text{CL} &= 36,00,000
 \end{aligned}$$

CL = ₹ 45,00,000
Current Assets = 1.8 CL = 1.8 × 45 lakhs = ₹ 81,00,000

Q.32

MTP Sept 24 (2)



EPL Ltd. has furnished the following information relating to the year ended 31st March 2023 and 31st March, 2024:

	31 st March, 2023	31 st March, 2024
Share Capital	50,00,000	50,00,000
Reserve and Surplus	20,00,000	25,00,000
Long term loan	30,00,000	30,00,000

- Net profit ratio: 8%
- Gross profit ratio: 20%
- Long-term loan has been used to finance 40% of the fixed assets.
- Stock turnover with respect to cost of goods sold is 4.
- Debtors represent 90 days sales.
- The company holds cash equivalent to 1½ months cost of goods sold.
- Ignore taxation and assume 360 days in a year.

You are required to PREPARE Balance Sheet as on 31st March 2024 in following format:

Liabilities	(₹)	Assets	(₹)
Share Capital	-	Fixed Assets	-
Reserve and Surplus	-	Sundry Debtors	-
Long-term loan	-	Closing Stock	-
Sundry Creditors	-	Cash in hand	-

Ans.

Change in Reserve & Surplus = ₹ 25,00,000 - ₹ 20,00,000 = ₹ 5,00,000

So, Net profit = ₹ 5,00,000

(i) Net Profit Ratio = 8%

$$\therefore \text{Sales} = \frac{5,00,000}{8\%} = ₹ 62,50,000$$

(ii) Cost of Goods sold

= Sales - Gross profit Margin

= ₹ 62,50,000 - 20% of ₹ 62,50,000

= ₹ 50,00,000

(iii) Fixed Assets = $\frac{30,00,000}{40\%} = ₹ 75,00,000$

(iv) Stock = $\frac{\text{Cost of Goods Sold}}{\text{STR}} = \frac{50,00,000}{4} = ₹ 12,50,000$

(v) Debtors = $\frac{62,50,000}{360} \times 90 = ₹ 15,62,500$

(vi) Cash Equivalent = $\frac{50,00,000}{12} \times 1.5 = ₹ 6,25,000$

Balance Sheet as on 31st March 2024

Liabilities	(₹)	Assets	(₹)
Share Capital	50,00,000	Fixed Assets	75,00,000
Reserve and Surplus	25,00,000	Sundry Debtors	15,62,500
Long-term loan	30,00,000	Closing Stock	12,50,000



Sundry Creditors (Balancing Figure)	4,37,500	Cash in hand	6,25,000
	1,09,37,500		1,09,37,500

Q.33

MTP Jan 25 (2)



The financial statement and operating results of Alpha Limited revealed the following position as on 31st March, 2023:

— Equity share capital (Rs. 10 fully paid share)	Rs. 20,00,000
— Working capital	Rs. 6,00,000
— Bank overdraft	Rs. 1,00,000
— Current ratio	2.5 : 1
— Liquidity ratio	1.5 : 1
— Proprietary ratio (Net fixed assets/Proprietary fund)	.75 : 1
— Cost of sales	Rs. 14,40,000
— Debtors velocity	2 months
— Stock turnover based on cost of sales	4 times
— Gross profit ratio	20% of sales
— Net profit ratio	15% of sales

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

Expenses include depreciation of Rs. 90,000.

The following information was collected from the records for the year ended 31st March, 2024:

- Total sales for the year were 20% higher as compared to previous year.
- Balances as on 31st March, 2024 were : Stock Rs. 5,20,000, Creditors Rs. 4,15,000, Debtors Rs. 4,95,000 and Cash balance Rs. 3,10,000.
- Percentage of Gross profit on turnover has gone up from 20% to 25% and ratio of net profit to sales from 15% to 16%.
- A portion of Fixed assets was very old (book values Rs. 1,80,000) disposed for Rs. 90,000. (No depreciations to be provided on this item).
- Long-term investments were purchased for Rs. 2,96,600.
- Bank overdraft fully discharged.
- Percentage of depreciation to Fixed assets to be provided at the rate in the previous year.

PREPARE Balance Sheet as on 31st March, 2023 and 31st March, 2024.

Ans.

Balance Sheets of Alpha Limited

Liabilities	₹		Assets	₹	
	31 March 2023	31 March 2024		31 March 2023	31 March 2024
Equity share capital (₹ 10 each fully paid)	20,00,000	20,00,000	Fixed Assets (₹18,90,000- ₹90,000)	18,00,000	15,39,000
Reserve and Surplus (balancing)	1,30,000	1,30,000	Long term investment	-	2,96,600
Profit & Loss A/c (15% of sales)	2,70,000	6,15,600	Current Assets (₹ 10,00,000)		
Current Liabilities			Stock	4,00,000	5,20,000
Bank Overdraft	1,00,000	-	Sundry Debtors	3,00,000	4,95,000

Creditors	3,00,000	4,15,000	Cash at Bank (Balancing)	3,00,000	3,10,000
Total	28,00,000	31,60,600	Total	28,00,000	31,60,600

Calculation for 31st March, 2023

(i) Calculation of Current Liabilities

Suppose that Current Liabilities = x, then current assets will be 2.5 x

Working capital = Current Assets - Current Liabilities

6,00,000 = 2.5x - x

x = 6,00,000 / 1.5 = ₹ 4,00,000 (C.L.)

Other Current Liabilities = Current Liabilities - Bank Overdraft

(Creditors) = 4,00,000 - 1,00,000 = ₹ 3,00,000

Current Assets = 2.5 x 4,00,000 = ₹ 10,00,000

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

1.5 = $\frac{\text{Liquid Assets}}{4,00,000}$

Liquid assets = ₹6,00,000

Liquid assets = Current Assets - Stock

6,00,000 = 10,00,000 - Stock

So, Stock = ₹ 4,00,000

(iii) Calculation of fixed assets: Fixed assets to proprietary fund is 0.75, working capital is therefore 0.25 of proprietary fund. So,

Fixed Assets = 6,00,000 / 0.25 x 0.75 = ₹ 18,00,000

(iv) Sales = (14,40,000 / 80) x 100 = ₹ 18,00,000

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

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

Calculation for the year 31st March, 2024

(vii) Sales = 18,00,000 + (18,00,000 x 0.2) = 21,60,000

(viii) Calculation of fixed assets

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

(ix) Net profit for the year 2011, 16% x 21,60,000 = ₹ 3,45,600

Total Profit = 2,70,000 + 3,45,600 = ₹ 6,15,600

Q.34

MTP May 24 (2)



EOC Ltd is a listed company and has presented the below abridged financial statements below.

Statement of Profit and Loss	₹	₹
Sales		1,25,00,000
Cost of goods sold		(76,40,000)
Gross Profit		48,60,000



Less: Operating Expenses		
Administrative Expenses	13,20,000	
Selling and Distribution Expenses	15,90,000	(29,10,000)
Operating Profit		19,50,000
Add: Non Operating Income		3,28,000
Less: Non Operating Expenses		(1,27,000)
Profit before Interest and taxes		21,51,000
Less: Interest		(4,39,000)
Profit before tax		17,12,000
Less: Taxes		(4,28,000)
Profit after Tax		12,84,000

Balance Sheet

Sources of Funds	₹	₹
Owned Funds		
Equity Share Capital	30,00,000	
Reserves and Surplus	18,00,000	48,00,000
Borrowed Funds		
Secured Loan	10,00,000	
Unsecured Loan	4,30,000	14,30,000
Total Funds Raised		62,30,000
Application of Funds		
Non-Current Assets		
Building	7,50,000	
Machinery	2,30,000	
Furniture	7,60,000	
Intangible Assets	50,000	17,90,000
Current Assets		
Inventory	38,60,000	
Receivables	39,97,000	
ST investments	3,00,000	
Cash and Bank	2,30,000	83,87,000
Less: Current Liabilities		
Creditors	25,67,000	
ST loans	13,80,000	(39,47,000)
Total Funds Employed		62,30,000

The company has set certain standards for the upcoming year financial status.

All the ratios are based on closing figures in financial statements.

Equity SC to Reserves=	1	
Net Profit Ratio=	15%	
Gross Profit Ratio=	50%	
Long Term Debt to Equity=	0.5	
Debtor Turnover=	100	Days
Creditor Turnover (based on COGS)=	100	Days
Inventory=	70%	of Opening inventory

Cash Balance is assumed to remain same for next year You are required to -

- (1) CALCULATE inventory turnover ratio in days for current year
- (2) CALCULATE receivables turnover ratio in days for current year
- (3) CALCULATE the projected receivables, inventory, payables and long term debt

Ans. Inventory Turnover = $\frac{\text{Inventory}}{\text{COGS}} \times 365 = \frac{38,60,000 \times 365}{76,40,000} \times 365 = 184.41 \text{ days}$
= 185 days (apx)

Receivables Turnover = $\frac{\text{Receivables}}{\text{Sales}} \times 365 = \frac{39,97,000 \times 365}{1,25,00,000} = 116.71$
= 117 days (apx)

Equity to Reserves = 1

Reserves = $1 \times 30,00,000 = 30,00,000$

Projected profit = $30,00,000 - 18,00,000 = 12,00,000$

Net Profit Margin = 15%

$12,00,000 / \text{Sales} = 0.15$

Sales = 80,00,000

Gross Profit = $80,00,000 \times 50\% = 40,00,000$

COGS = $80,00,000 - 40,00,000 = 40,00,000$

Projected Debtors Turnover = 100 days = $\frac{\text{Closing Receivables}}{\text{Sales}} \times 365$

$100 = \frac{\text{Closing Receivables}}{80,00,000} \times 365$

Closing Receivables = $\frac{80,00,000 \times 100}{365} = 21,91,781$

Projected Closing Inventory = 70% of opening inventory = 70% of 38,60,000 = 27,02,000

Projected Creditor Turnover = 100 days = $\frac{\text{Closing Creditors}}{\text{COGS}} \times 365$

Closing Creditors = $\frac{\text{COGS}}{365} \times 100$

Closing Creditor = $\frac{40,00,000}{365} \times 100 = 10,95,890$

Equity Share Capital + Reserves = $30,00,000 + 30,00,000 = 60,00,000$

Long Term Debt to Equity = 0.5

$\frac{\text{LTD}}{60,00,000} = 0.5$

Long Term Debt = $0.5 \times 60,00,000$

Long Term Debt = 30,00,000

Q. 35

MTP SEP 2025(2)



Fortune Ltd. has furnished the following information relating to the year ended 31st March, 2024 and 31st March, 2025:

	31st March, 2024 (₹)	31st March, 2025 (₹)
Share Capital	60,00,000	60,00,000
Reserve and Surplus	30,00,000	40,00,000
Long term loan	40,00,000	40,00,000

- Net profit ratio: 8%
- Gross profit ratio: 20%
- Long-term loan has been used to finance 40% of the fixed assets.



- Stock turnover with respect to cost of goods sold is 4.
- Debtors represent 90 days of credit sales.
- The company holds cash equivalent to $1\frac{1}{2}$ months cost of goods sold.
- Ignore taxation and assume 360 days in a year.
- All sales are credit sales.

You are required to PREPARE Balance Sheet as on 31st March, 2025 in the following format:

Liabilities	(₹)	Assets	(₹)
Share Capital	-	Fixed Assets	-
Reserve and Surplus	-	Sundry Debtors	-
Long-term loan	-	Closing Stock	-
Sundry Creditors	-	Cash in hand	-

Ans.

(i) Change in Reserve & Surplus = ₹ 40,00,000 - ₹ 30,00,000 = ₹ 10,00,000

So, Net profit = ₹ 10,00,000

Net Profit Ratio = 8%

$$\therefore \text{Sales} = \frac{[10,00,000]}{(8\%)} = ₹ 1,25,00,000$$

(ii) Cost of Goods sold

= Sales - Gross profit Margin

= ₹ 1,25,00,000 - 20% of ₹ 1,25,00,000

= ₹ 1,00,00,000

(iii) Fixed Assets = $\frac{₹ 40,00,000}{40\%} = ₹ 1,00,00,000$

(iv) Stock = $\frac{\text{Cost of Goods Sold}}{\text{Stock Turnover ratio}} = \frac{₹ 10,00,000}{4} = ₹ 25,00,000$

(v) Debtors = $\frac{1,25,00,000}{360} \times 90 = ₹ 31,25,000$

(vi) Cash Equivalent = $\frac{₹ 1,00,00,000}{12} \times 1.5 = ₹ 12,50,000$

Balance Sheet as on 31st March 2025

Liabilities	(₹)	Assets	(₹)
Share Capital	60,00,000	Fixed Assets	1,00,00,000
Reserve and Surplus	40,00,000	Sundry Debtors	31,25,000
Long-term loan	40,00,000	Closing Stock	25,00,000
Sundry Creditors	28,75,000	Cash in hand	12,50,000
(Balancing Figure)			
	1,68,75,000		1,68,75,000

Q.36

The Balance Sheets of A Ltd. and B Ltd. as on 31st March 2023 are as follows:

Particulars	A Ltd	B Ltd
Liabilities:		
Share Capital	40,00,000	40,00,000
Reserve and surplus	32,30,000	25,00,000
Secured Loans	25,25,000	32,50,000
Current Liabilities and provisions:		
Sundry Creditors	15,00,000	14,00,000
Outstanding Expenses	2,00,000	3,00,000
Provision for Tax	3,00,000	3,00,000

	Proposed Dividend	6,00,000	-
	Unclaimed Dividend	15,000	-
Assets:		1,23,70,000	1,17,50,000
	Fixed Assets (Net)	80,00,000	50,00,000
	Investments	15,00,000	-
	Inventory at Cost	23,00,000	45,00,000
	Sundry Debtors	-	17,00,000
	Cash & Bank	5,70,000	5,50,000
		1,23,70,000	1,17,50,000

Additional information available:

- (i) 75% of the Inventory in A Ltd. readily saleable at cost plus 20%,
- (ii) 50% of Sundry Debtors of B Ltd. are due from C Ltd. which is not in a position to repay the amount B Ltd. agreed to accept 15% debentures of C Ltd.
- (iii) B Ltd. had also proposed 15% dividend but that was not shown in the accounts.
- (iv) At the year end, B Ltd. sold investments amounting to ₹1,20,000 and repaid Sundry Creditors.

On the basis of the given Balance Sheet and the additional information, you are required to evaluate liquidity of the companies. All working should form part of the answer.

Ans.

Particulars	A	B
Current Assets and Liquid Assets:		
Stock (23,00,000 × 75%) + 20%	20,70,000	-
Debtor (17,00,000 × 50%)	-	8,50,000
Cash & Bank	5,70,000	5,50,000
Liquid Assets	26,40,000	14,00,000
Add: Stock (23,00,000 × 25%)	5,75,000	45,00,000
Total Current Assets	32,15,000	59,00,000
Current Liabilities:		
Proposed Dividend	6,00,000	6,00,000
Creditor	15,00,000	15,20,000
Out Expenses	2,00,000	3,00,000
Provision for tax	3,00,000	3,00,000
Unclaimed Dividend	15,000	-
	26,15,000	27,20,000

Evaluation of Liquidity		
RATIO	A	B
1. Current Ratio = $\frac{CA}{CL}$	$\frac{32,15,000}{26,15,000} = 1.23$	$\frac{59,00,000}{27,20,000} = 2.17$
2. Liquid Ratio = $\frac{LA}{CL}$	$\frac{26,40,000}{26,15,000} = 1.009$	$\frac{14,00,000}{27,20,000} = .51$

2 CHAPTER

LEVERAGE

Q.1

EPS calculation

PY May 23



Following information is given for X Ltd.:

Total contribution (₹)	4,25,000
Operating leverage	3.125
15% Preference shares (₹ 100 each)	1,000
Number of equity shares	2,500
Tax rate	50%

Calculate EPS of X Ltd., if 40% decrease in sales will result EPS to zero.

Ans.

(i) Operating Leverage (OL) = $\frac{\text{Contribution}}{\text{EBIT}}$ Or, 3.125 = $\frac{4,25,000}{\text{EBIT}}$

Or EBIT = ₹ 1,36,000

(ii) Degree of Combined Leverage (CL) = $\frac{\% \text{ Change in EPS}}{\% \text{ Change in Sales}} = \frac{100}{40} = 2.5$

(iii) Combined Leverage = OL × FL = 3.125 × FL
So, Financial Leverage = 2.5 / 3.125 = 0.8

(iv) Financial Leverage = $\frac{\text{EBIT}}{\text{EBT}}$ = $\frac{1,36,000}{\text{EBT}}$ = 0.8

So, EBT = $\frac{1,36,000}{0.8}$ = ₹ 1,70,000



Calculation of EPS of X Ltd

Particulars	(₹)
EBT	1,70,000
Less: Tax (50%)	85,000
EAT	85,000
Preference Dividend	15,000
Net Earnings for Equity Shareholders	70,000
Number of equity shares	2,500
EPS	28

Q.2

PL Statement

PY Nov 22



The following information is available for SS Ltd.

Profit volume (PV) ratio	30%
Operating leverage	2.00
Financial leverage	1.50
Loan	₹ 1,25,000
Post-tax interest rate	5.6%
Tax rate	30%
Market Price per share (MPS)	₹ 140
Price Earnings Ratio (PER)	10

You are required to:

- (1) Prepare the Profit-Loss statement of SS Ltd. and
- (2) Find out the number of equity shares.

Ans. (1) Preparation of Profit - Loss Statement

Working Notes:

1. Post tax interest 5.60%
- Tax rate 30%
- Pre tax interest rate = $(5.6/70) \times 100$ 8%
- Loan amount ₹ 1,25,000
- Interest amount = $1,25,000 \times 8\%$ ₹ 10,000

$$\text{Financial Leverage (FL)} = \left(\frac{\text{EBIT}}{\text{EBT}} \right) = \left[\frac{\text{EBIT}}{(\text{EBIT} - \text{Interest})} \right] = \left[\frac{\text{EBIT}}{(\text{EBIT} - 10,000)} \right]$$

$$1.5 = \left[\frac{\text{EBIT}}{(\text{EBIT} - 10,000)} \right]$$

$$1.5 \text{ EBIT} - 15,000 = \text{EBIT}$$

$$1.5 \text{ EBIT} - \text{EBIT} = 15,000$$

$$0.5 \text{ EBIT} = 15,000$$

$$\text{EBIT} = ₹ 30,000$$

$$\text{EBT} = \text{EBIT} - \text{Interest} = 30,000 - 10,000 = ₹ 20,000$$

$$2. \text{ Operating Leverage (OL)} = \frac{\text{Contribution}}{\text{EBIT}}$$

$$2 = \frac{\text{Contribution}}{30,000}$$

$$\text{Contribution} = ₹ 60,000$$

$$3., \text{ Fixed cost} = \text{Contribution} - \text{Profit} \\ = 60,000 - 30,000 = ₹ 30,000$$

$$4., \text{ Sales} = \frac{\text{Contribution}}{\text{PV Ratio}} \\ = \frac{60,000}{30\%} = ₹ 2,00,000$$

5. If PV ratio is 30%, then the variable cost is 70% on sales.

$$\text{Variable cost} = 2,00,000 \times 70\% = ₹ 1,40,000$$

Profit - Loss Statement

Particulars	₹
Sales	2,00,000
Less: Variable cost	1,40,000

Contribution	60000
Less: Fixed cost	30,000
EBIT	30,000
Less: Interest	10,000
EBT	20,000
Less: Tax @ 30% EAT	6,000
	14,000

(2) Calculation of no. of Equity shares

Market Price per Share (MPS) = ₹140

Price Earnings Ratio (PER) = 10

WKT,

$$\text{EPS} = \frac{\text{MPS}}{\text{PER}} = \frac{140}{10} = ₹ 14$$

Total earnings (EAT) = ₹ 14,000

No. of Equity Shares = 14,000 / 14 = 1000

Q.3

ROCE / EPS / OL / FL / CL

PY May 22



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

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

Required:

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

Ans.

Income Statement

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

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

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

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

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

(iii) Calculation of Operating, Financial and Combined leverages:

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

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

$$\text{Combined Leverage} = \frac{\text{Contribution}}{\text{EBT}} = \frac{30,10,000}{14,60,000} = 2.062 \text{ (approx.)}$$

$$\text{Or, } = \text{Operating Leverage} \times \text{Financial Leverage} = 1.497 \times 1.377 = 2.06 \text{ (approx.)}$$

(iv) Operating leverage is 1.497. So, if sales are increased by 10%.

EBIT will be increased by $1.497 \times 10\%$ i.e. 14.97% (approx.)

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

$$\begin{aligned} \text{Accordingly, New Sales} &= ₹ 86,00,000 \times (1 - 0.4850) \\ &= ₹ 86,00,000 \times 0.515 \\ &= ₹ 44,29,000 \text{ (approx.)} \end{aligned}$$

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

Q.4

% change in EPS / PL / FL / CL

PY Dec 21



Information of A Ltd. is given below:

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

Required:

(i) From the given data complete following statement:

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

Less: Income tax	XXXX
EAT	XXXX

- (ii) Calculate Financial Leverage and Combined Leverage.
 (iii) Calculate the percentage change in earning per share, if sales increased by 5%.

Ans.

(i) **Working Notes**

Earning after tax (EAT) is 5% of sales

Income tax is 50%

So, EBT is 10% of Sales

Since Interest Expenses is ₹ 30,000

EBIT = 10% of Sales + ₹30,000 (Equation i)

Now Degree of operating leverage = 4

$$\text{So, } \frac{\text{Contribution}}{\text{EBIT}} = 4$$

Or, Contribution = 4 EBIT

Or, Sales - Variable Cost = 4 EBIT

Or, Sales - ₹ 6,00,000 = 4 EBIT (Equation ii)

Replacing the value of EBIT of equation (i) in Equation (ii)

We get, Sales - ₹ 6,00,000 = 4 (10% of Sales + ₹ 30,000)

Or, Sales - ₹ 6,00,000 = 40% of Sales + ₹ 1,20,000

Or, 60% of Sales = ₹ 7,20,000

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

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

$$\text{EBIT} = \frac{6,00,000}{4} = ₹ 1,50,000$$

Fixed Cost = Contribution - EBIT = ₹ 6,00,000 - ₹ 1,50,000 = ₹ 4,50,000

EBT = EBIT - Interest = ₹ 1,50,000 - ₹ 30,000 = ₹ 1,20,000

EAT = 50% of ₹ 1,20,000 = ₹ 60,000

Income Statement

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

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

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

Or,

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

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

(iii) Percentage Change in Earnings per share

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

% Change in EPS = 25%

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

Q.5

EPS / OL / CL

PY Jan 21



The information related to XYZ Company Ltd. for the year ended 31st March, 2020 are as follows:

Equity Share Capital of ₹ 100 each	₹ 50 Lakhs
12% Bonds of ₹ 1000 each	₹ 30 Lakhs
Sales	₹ 84 Lakhs
Fixed Cost (Excluding Interest)	₹ 7.5 Lakhs
Financial Leverage	1.39
Profit-Volume Ratio	25%
Market Price per Equity Share	₹ 200
Income Tax Rate Applicable	30%

You are required to compute the following:

- (i) Operating Leverage
- (ii) Combined Leverage
- (iii) Earning per share
- (iv) Earning Yield

Ans.

Workings:

1. Profit Volume Ratio = $\frac{Contribution}{Sales} \times 100$

So, 25 = $\frac{Contribution}{84,00,000} \times 100$

Contribution = $\frac{84,00,000 \times 25}{100} = ₹ 21,00,000$

2. Financial leverage = $\frac{EBIT}{EBT}$

$$\text{Or, } 1.39 = \frac{13,50,000 \text{ (as calculated above) EBT}}{\text{EBT}} \text{ ₹}$$

$$\text{EBT} = ₹ 9,71,223$$

3. Income Statement

Particulars	(₹)
Sales	84,00,000
Less: Variable Cost (Sales - Contribution)	(63,00,000)
Contribution	21,00,000
Less: Fixed Cost	(7,50,000)
EBIT	13,50,000
Less: Interest (EBIT - EBT)	(3,78,777)
EBT	9,71,223
Less: Tax @ 30%	(2,91,367)
Profit after Tax (PAT)	6,79,856

(i) **Operating Leverage** = $\frac{\text{Contribution}}{\text{Earnings before interest and tax (EBIT)}}$

$$= \frac{21,00,000}{13,50,000} = 1.556 \text{ (approx.)}$$

(ii) **Combined Leverage** = Operating Leverage × Financial Leverage

$$= 1.556 \times 1.39 = 2.163 \text{ (approx.)}$$

Or, $\frac{\text{Contribution}}{\text{EBT}} = \frac{21,00,000}{9,71,223} = 2.162 \text{ (approx.)}$

(iii) **Earnings per Share (EPS)**

$$\text{EPS} = \frac{\text{PAT}}{6,79,856} = ₹ 13.597$$

No. of shares = 50,000

(iv) **Earning Yield**

$$= \frac{\text{EPS}}{\text{Market Price}} \times 100 = \frac{13.597}{200} \times 100 = 6.80\% \text{ (approx.)}$$

Note: The question has been solved considering Financial Leverage given in the question as the base for calculating total interest expense including the interest of 12% Bonds of ₹ 30 Lakhs. The question can also be solved in other alternative ways.

Q.6

% change in EBIT

PY Nov 20



The following data is available for Stone Ltd. : (₹)

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

Using the concept of leverage, find out

- (i) The percentage change in taxable income if EBIT increases by 10%.
- (ii) The percentage change in EBIT if sales increases by 10%.
- (iii) The percentage change in taxable income if sales increases by 10%.

Also verify the results in each of the above case.

Ans.

(i) Degree of Financial Leverage = $\frac{\text{EBIT}}{\text{EBT}} = \frac{1,00,000}{75,000} = 1.333 \text{ times}$

So, If EBIT increases by 10% then Taxable Income (EBT) will be increased by $1.333 \times 10 = 13.33\%$ (approx.)

Verification

Particulars	Amount (₹)
New EBIT after 10% increase (₹ 1,00,000 + 10%)	1,10,000
Less: Interest	25,000
Earnings before Tax after change (EBT)	85,000

Increase in Earnings before Tax = ₹ 85,000 - ₹ 75,000 = ₹ 10,000

So, percentage change in Taxable Income (EBT) = $\frac{1,00,000}{75,000} \times 100 = 13.333\%$, hence verified

(ii) Degree of Operating Leverage = $\frac{\text{Contribution}}{\text{EBIT}} = \frac{3,00,000}{1,00,000} = 3 \text{ times}$

So, if sale is increased by 10% then EBIT will be increased by $3 \times 10 = 30\%$

Verification

Particulars	Amount (₹)
New Sales after 10% increase (₹ 5,00,000 + 10%)	5,50,000
Less: Variable cost (40% of ₹ 5,50,000)	2,20,000
Contribution	3,30,000
Less: Fixed costs	2,00,000
Earnings before interest and tax after change (EBIT)	1,30,000

Increase in Earnings before interest and tax (EBIT) = ₹ 1,30,000 - ₹ 1,00,000 = ₹ 30,000

So, percentage change in EBIT = $\frac{30,000}{1,00,000} \times 100 = 30\%$, hence verified.

(iii) Degree of Combined Leverage = $\frac{\text{Contribution}}{\text{EBIT}} = \frac{3,00,000}{75,000} = 4 \text{ times}$

So, if sale is increased by 10% then Taxable Income (EBT) will be increased by $4 \times 10 = 40\%$

Verification

Particulars	Amount (₹)
New Sales after 10% increase (₹ 5,00,000 + 10%)	5,50,000
Less: Variable cost (40% of ₹ 5,50,000)	2,20,000
Contribution	3,30,000
Less: Fixed costs	2,00,000
Earnings before interest and tax (EBIT)	1,30,000
Less: Interest	25,000

Earnings before tax after change (EBT)	1,05,000
--	----------

Increase in Earnings before tax (EBT) = ₹ 1,05,000 - ₹ 75,000 = ₹ 30,000

So, percentage change in Taxable Income (EBT) = $\frac{30,000}{75,000} \times 100 = 40\%$, hence verified

Q.7

EBIT / OL / FL / CL

PY Nov 19



The Balance Sheet of Gitashree Ltd. is given below:

Liabilities		(₹)
<i>Shareholders' fund</i>		
<i>Equity share capital of ₹ 10 each</i>	₹ 1,80,000	
<i>Retained earnings</i>	₹ 60,000	2,40,000
<i>Non-current liabilities 10% debt</i>		2,40,000
<i>Current liabilities</i>		1,20,000
		6,00,000
Assets		
<i>Fixed Assets</i>		4,50,000
<i>Current Assets</i>		1,50,000
		6,00,000

The company's total asset turnover ratio is 4. Its fixed operating cost is ₹ 2,00,000 and its variable operating cost ratio is 60%. The income tax rate is 30%.

Calculate:

- (i) (a) Degree of Operating leverage.
 (b) Degree of Financial leverage.
 (c) Degree of Combined leverage.
- (ii) Find out EBIT if EPS is (a) ₹ 1 (b) ₹ 2 and (c) ₹ 0.

Ans.

Working Notes:

Total Assets = ₹ 6,00,000

Total Asset Turnover Ratio i.e. = $\frac{\text{Total Sales}}{\text{Total Assets}} = 4$

Hence, Total Sales = ₹ 6,00,000 × 4 = ₹ 24,00,000

Computation of Profits after Tax (PAT)

Particulars	(₹)
Sales	24,00,000
Less: Variable operating cost @ 60%	14,40,000
Contribution	9,60,000
Less: Fixed operating cost (other than Interest)	2,00,000
EBIT (Earning before interest and tax)	7,60,000
Less: Interest on debt (10% ₹ 2,40,000)	24,000

EBT (Earning before tax)	7,36,000
Less: Tax 30%	2,20,800
EAT (Earning after tax)	5,15,200

(i) (a) **Degree of Operating Leverage**

$$\text{Degree of Operating leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{9,60,000}{7,60,000} = 1.263 \text{ (approx.)}$$

(b) **Degree of Financial Leverage**

$$\text{Degree of Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{9,60,000}{7,60,000} = 1.033 \text{ (approx.)}$$

(c) **Degree of Combined Leverage**

$$\begin{aligned} \text{Degree of Combined Leverage} &= \frac{\text{Contribution}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{EBT}} \times \frac{\text{Contribution}}{\text{EBT}} \\ &= \frac{9,60,000}{7,60,000} = 1.304 \text{ (approx.)} \end{aligned}$$

Or

$$\begin{aligned} \text{Degree of Combined Leverage} &= \text{Degree of Operating Leverage} \times \text{Degree of Financial Leverage} \\ &= 1.263 \times 1.033 = 1.304 \text{ (approx.)} \end{aligned}$$

(ii) (a) **If EPS is Re. 1**

$$\text{EPS} = \frac{(\text{EBIT} - \text{Interest})(1 - \text{tax})}{\text{Noof equity shares}}$$

$$\text{Or, } 1 = \frac{(\text{EBIT} - 24,000)(1 - 0.30)}{18,000}$$

$$\text{Or, EBIT} = ₹ 49,714 \text{ (approx.)}$$

(b) **If EPS is ₹ 2**

$$2 = \frac{(\text{EBIT} - 24,000)(1 - 0.30)}{18,000}$$

$$\text{Or, EBIT} = ₹ 75,429 \text{ (approx.)}$$

(c) **If EPS is ₹ 0**

$$0 = \frac{(\text{EBIT} - 24,000)(1 - 0.30)}{18,000}$$

$$\text{Or, EBIT} = ₹ 24,000$$

Alternatively, if EPS is 0 (zero), EBIT will be equal to interest on debt i.e. ₹ 24,000.

Q.8

% change in EPS / OL / FL

PY May 19



The capital structure of the Shiva Ltd. consists of equity share capital of ₹ 20,00,000 (Share of ₹ 100 per value) and ₹ 20,00,000 of 10% Debentures, sales increased by 20% from 2,00,000 units to 2,40,000 units, the selling price is ₹ 10 per unit; variable costs amount to ₹ 6 per unit and fixed expenses amount to ₹ 4,00,000. The income tax rate is assumed to be 50%.

(a) You are required to calculate the following:

- (i) The percentage increase in earnings per share;
- (ii) Financial leverage at 2,00,000 units and 2,40,000 units.

- (iii) Operating leverage at 2,00,000 units and 2,40,000 units.
- (b) Comment on the behaviour of operating and Financial leverages in relation to increase in production from 2,00,000 units to 2,40,000 units.

Ans. (a)

Sales in units	2,00,000 (₹)	2,40,000 (₹)
Sales Value @ ₹ 10 Per Unit	20,00,000	24,00,000
Variable Cost @ ₹ 6 per unit	(12,00,000)	(14,40,000)
Contribution	8,00,000	9,60,000
Fixed expenses	(4,00,000)	(4,00,000)
EBIT	4,00,000	5,60,000
Debenture Interest	(2,00,000)	(2,00,000)
EBT	2,00,000	3,60,000
Tax @ 50%	(1,00,000)	(1,80,000)
Profit after tax (PAT)	1,00,000	1,80,000
No of Share	20,000	20,000
Earnings per share (EPS)	5	9
(i) The percentage Increase in EPS		$\frac{4}{5} \times 100 = 80\%$
(ii) Financial Leverage = $\frac{\text{EBIT}}{\text{EBT}}$	$\frac{4,00,000}{2,00,000} = 2$	$\frac{₹ 5,60,000}{₹ 3,60,000} = 1.56$
(iii) Operating leverage = $\frac{\text{Contribution}}{\text{EBIT}}$	$\frac{8,00,000}{4,00,000} = 2$	$\frac{9,60,000}{5,60,000} = 1.71$

- (b) When production is increased from 2,00,000 units to 2,40,000 units both financial leverage and operating leverages reduced from 2 to 1.56 and 1.71 respectively. Reduction in financial leverage and operating leverages signifies reduction in business risk and financial risk.

Q.9

PL Statement

RTP May 23



The selected financial data for A, B and C companies for the current year ended 31st March are as follows:

Particulars	A	B	C
Variable Expenses as a % of sales	60	50	40
Interest	₹ 1,00,000	₹ 4,00,000	₹ 6,00,000
Degree of Operating Leverage	4:1	3:1	2.5:1
Degree of Financial Leverage	3:1	5:1	2.5:1
Income Tax Rate	30%	30%	30%

- (a) PREPARE income statement for A, B and C companies
- (b) COMMENT on the financial position and structure of these companies

Ans.

Income Statement of companies A, B and C

Particulars	A	B	C
Sales	₹15,00,000	₹30,00,000	₹41,66,667
Less: Variable Expenses	₹9,00,000	₹15,00,000	₹16,66,667
Contribution	₹6,00,000	₹15,00,000	₹25,00,000
Less: Fixed Cost	₹4,50,000	₹10,00,000	₹15,00,000
EBIT	₹1,50,000	₹5,00,000	₹10,00,000
Less: Interest	₹1,00,000	₹4,00,000	₹6,00,000
PBT	₹50,000	₹1,00,000	₹4,00,000
Less: Tax @ 30%	₹15,000	₹30,000	₹1,20,000
PAT	₹35,000	₹70,000	₹2,80,000

Working Notes:

(i) Degree of Financial Leverage = $\frac{\text{EBIT}}{\text{EBIT} - \text{Interest}}$

$\text{DFL} \times (\text{EBIT} - \text{Int}) = \text{EBIT}$

$\text{DFL} \times \text{EBIT} - \text{Int} \times \text{DFL} = \text{EBIT}$

$\text{DFL} \times \text{EBIT} - \text{EBIT} = \text{Int} \times \text{DFL}$

$\text{EBIT} (\text{DFL} - 1) = \text{Int} \times \text{DFL}$

$\text{EBIT} = \frac{\text{int} \times \text{DFL}}{\text{DFL} - 1}$

For A,

$\text{EBIT}_A = \frac{1,00,000 \times 3}{3 - 1}$

$\text{EBIT}_A = ₹150,000$

For B

$\text{EBIT}_B = \frac{4,00,000 \times 5}{5 - 1}$

$\text{EBIT}_B = ₹5,00,000$

For C

$\text{EBIT}_C = \frac{6,00,000 \times 2.5}{2.5 - 1} ₹$

$\text{EBIT}_C = ₹10,00,000$

(ii) $\text{DOL} = \frac{\text{Contribution}}{\text{EBIT}}$

$\text{Contribution} = \text{DOL} \times \text{EBIT}$

$\text{Contribution}_A = 4 \times ₹1,50,000$

$\text{Contribution}_A = ₹6,00,000$

$\text{Contribution}_B = 3 \times ₹5,00,000$

$\text{Contribution}_B = ₹15,00,000$

$\text{Contribution}_C = 2.5 \times ₹10,00,000$

$\text{Contribution}_C = ₹25,00,000$

(iii) Fixed Cost = Contribution - EBIT

$\text{Fixed Cost}_A = ₹6,00,000 - ₹1,50,000 = ₹4,50,000$



$$\text{Fixed Cost}_B = ₹15,00,000 - ₹5,00,000 = ₹10,00,000$$

$$\text{Fixed Cost}_C = ₹25,00,000 - ₹10,00,000 = ₹15,00,000$$

(iv) Contribution = Sales - VC
 VC = Sales - Contribution
 Sales × VC Ratio = Sales - Contribution
 Contribution = Sales - Sales × VC Ratio
 Contribution = Sales(1 - VCR)

$$\text{Sales} = \frac{\text{Contribution}}{1 - \text{VCR}}$$

$$\text{Sales}_A = ₹6,00,000 / (1 - 0.6) = ₹15,00,000$$

$$\text{Sales}_B = ₹15,00,000 / (1 - 0.5) = ₹30,00,000$$

$$\text{Sales}_C = ₹25,00,000 / (1 - 0.4) = ₹41,66,667$$

Of all the companies, A has the highest degree of Operating Leverage, B has highest degree of Financial Leverage and C is equally leveraged on both Operating and Financial fronts. If we consider combined leverage companies will have the leverages of 12, 15 and 6.25 (by multiplying both operating and financial leverages). This means A is undertaking a higher degree of operating risk while B is undertaking a higher degree of financial risk.

Q. 10

EPS / FL

RTP Nov 22



Debu Ltd. currently has an equity share capital of ₹ 1,30,00,000 consisting of 13,00,000 Equity shares. The company is going through a major expansion plan requiring to raise funds to the tune of ₹ 78,00,000. To finance the expansion the management has following plans:

Plan-I : Issue 7,80,000 Equity shares of ₹ 10 each.

Plan-II : Issue 5,20,000 Equity shares of ₹ 10 each and the balance through long-term borrowing at 12% interest p.a.

Plan-III : Issue 3,90,000 Equity shares of ₹ 10 each and 39,000, 9% Debentures of ₹ 100 each.

Plan-IV : Issue 3,90,000 Equity shares of ₹ 10 each and the balance through 6% preference shares.

EBIT of the company is expected to be ₹ 52,00,000 p.a.

Considering corporate tax rate @ 40%, you are required to-

- CALCULATE EPS in each of the above plans.
- ASCERTAIN financial leverage in each plan and comment.

Ans.

Sources of Capital	Plan I	Plan II	Plan III	Plan IV
Present Equity Shares	13,00,000	13,00,000	13,00,000	13,00,000
New Issue	7,80,000	5,20,000	3,90,000	3,90,000
Equity share capital (₹)	2,08,00,000	1,82,00,000	1,69,00,000	1,69,00,000
No. of Equity shares	20,80,000	18,20,000	16,90,000	16,90,000
12% Long term loan (₹)	-	26,00,000	-	-
9% Debentures (₹)	-	-	39,00,000	-
6% Preference Shares (₹)	-	-	-	39,00,000

Computation of EPS and Financial Leverage

Sources of Capital	Plan I	Plan II	Plan III	Plan IV
EBIT (₹)	52,00,000	52,00,000	52,00,000	52,00,000
Less: Interest on 12% Loan (₹)	-	3,12,000	-	-

Less: Interest on 9% debentures (₹)	-	-	3,51,000	-
EBT (₹)	52,00,000	48,88,000	48,49,000	52,00,000
Less: Tax@ 40%	20,80,000	19,55,200	19,39,600	20,80,000
EAT (₹)	31,20,000	29,32,800	29,09,400	31,20,000
Less: Preference Dividends (₹)	-	-	-	2,34,000
(a) Net Earnings available for equity shares (₹)	31,20,000	29,32,800	29,09,400	28,86,000
(b) No. of equity shares	20,80,000	18,20,000	16,90,000	16,90,000
(c) EPS (a / b) (₹)	1.50	1.61	1.72	1.71
Financial leverage $\left(\frac{EBIT}{EBT}\right)$	1.00	1.06	1.07	1.08*

* Financial Leverage in the case of Preference dividend =
$$\frac{EBIT}{(EBIT - \text{Interest}) - \left(\frac{Dp}{(1-t)}\right)}$$

$$\left(\frac{52,00,000}{(52,00,000 - 0) - \left(\frac{2,34,000}{(1 - 40)}\right)}\right) = \left(\frac{52,00,000}{48,10,000}\right) = 1.08$$

Q.11

PL Statement

RTP May 22



Company P and Q are having same earnings before tax. However, the margin of safety of Company P is 0.20 and, for Company Q, is 1.25 times than that of Company P. The interest expense of Company P is ₹ 1,50,000 and, for Company Q, is 1/3rd less than that of Company P. Further, the financial leverage of Company P is 4 and, for Company Q, is 75% of Company P.

Other information is given as below:

Particulars	Company P	Company Q
Profit volume ratio	25%	33.33%
Tax rate	45%	45%

You are required to PREPARE Income Statement for both the companies.

Ans.

Income Statement

Particulars	Company P (₹)	Company Q (₹)
Sales	40,00,000	18,00,000
Less: Variable Cost	30,00,000	12,00,000
Contribution	10,00,000	6,00,000
Less: Fixed Cost	8,00,000	4,50,000
EBIT	2,00,000	1,50,000
Less: Interest	1,50,000	1,00,000
EBT	50,000	50,000
Tax (45%)	22,500	22,500
EAT	27,500	27,500

Workings:

(i) Margin of Safety

For Company P = 0.20
 For Company Q = $0.20 \times 1.25 = 0.25$

(ii) Interest Expenses

For Company P = ₹ 1,50,000
 For Company Q = ₹ 1,50,000 (1-1/3) = ₹ 1,00,000

(iii) Financial Leverage

For Company P = 4
 For Company Q = $4 \times 75\% = 3$

(iv) EBIT

For Company A
 Financial Leverage = $\text{EBIT}/(\text{EBIT} - \text{Interest})$
 4 = $\text{EBIT}/(\text{EBIT} - ₹ 1,50,000)$
 $4\text{EBIT} - ₹ 6,00,000 = \text{EBIT}$
 3EBIT = ₹ 6,00,000
 EBIT = ₹ 2,00,000

For Company B

Financial Leverage = $\text{EBIT}/(\text{EBIT} - \text{Interest})$
 3 = $\text{EBIT}/(\text{EBIT} - ₹ 1,00,000)$
 $3\text{EBIT} - ₹ 3,00,000 = \text{EBIT}$
 2EBIT = ₹ 3,00,000
 EBIT = ₹ 1,50,000

(v) For Company A

Operating Leverage = $1/\text{Margin of Safety}$
 Operating Leverage = $1/0.20 = 5$
 5 = $\text{Contribution}/\text{EBIT}$
 Contribution = $\text{Contribution}/₹ 2,00,000$

For Company B = ₹ 10,00,000

Operating Leverage

Operating Leverage = $1/\text{Margin of Safety}$
 4 = $1/0.25 = 4$
 4 = $\text{Contribution}/\text{EBIT}$
 Contribution = $\text{Contribution}/₹ 1,50,000$
 Sales = ₹ 6,00,000

(vi) For Company A

Profit Volume Ratio = 25%
 Profit Volume Ratio = $\text{Contribution}/\text{Sales} \times 100$
 25% = $₹ 10,00,000/\text{Sales}$
 Sales = $₹ 10,00,000/25\%$
 Sales = ₹ 40,00,000

For Company B

Profit Volume Ratio = 33.33%
 Therefore, Sales = $₹ 6,00,000/33.33\%$
 Sales = ₹ 18,00,000



Q.12

Raise money by Equity or Debt

RTP Dec 21



The following particulars relating to Navya Ltd. for the year ended 31st March 2021 is given:

Output	1,00,000 units at normal
Selling price per unit	₹ 40
Variable cost per unit	₹ 20
Fixed cost	₹ 10,00,000

The capital structure of the company as on 31st March, 2021 is as follows:

Particulars	₹
Equity share capital (1,00,000 shares of ₹ 10 each)	10,00,000
Reserves and surplus	5,00,000
7% debentures	10,00,000
Current liabilities	5,00,000
Total	30,00,000

Navya Ltd. has decided to undertake an expansion project to use the market potential, that will involve ₹ 10 lakhs. The company expects an increase in output by 50%. Fixed cost will be increased by ₹ 5,00,000 and variable cost per unit will be decreased by 10%. The additional output can be sold at the existing selling price without any adverse impact on the market.

The following alternative schemes for financing the proposed expansion programme are planned:

- Entirely by equity shares of ₹ 10 each at par.
- ₹ 5 lakh by issue of equity shares of ₹ 10 each and the balance by issue of 6% debentures of ₹ 100 each at par.
- Entirely by 6% debentures of ₹ 100 each at par.

FIND out which of the above-mentioned alternatives would you recommend for Navya Ltd. with reference to the risk and return involved, assuming a corporate tax of 40%.

Ans. Statement showing Profitability of Alternative Schemes for Financing

(₹ in '00,000)

Particulars	Existing	Alternative Schemes		
		(i)	(ii)	(iii)
Equity Share capital (existing)	10	10	10	10
New issues	-	10	5	-
	10	20	15	10
7% debentures	10	10	10	10
6% debentures	-	-	5	10
	20	30	30	30
Debt interest (7%)	0.7	0.7	0.7	0.7
Debt interest (6%)	-	-	0.3	0.6
	0.7	0.7	1.0	1.3
Output (units in lakh)	1	1.5	1.5	1.5
Contribution per. unit (₹) (Selling price - Variable Cost)	20	22	22	22
Contribution (₹ lakh)	20	33	33	33
Less: Fixed cost	10	15	15	15

EBIT	10	18	18	18
Less: Interest (as calculated above)	0.7	0.7	1.0	1.3
EBT	9.3	17.3	17	16.7
Less: Tax (40%)	3.72	6.92	6.8	6.68
EAT	5.58	10.38	10.20	10.02
Operating Leverage (Contribution / EBIT)	2.00	1.83	1.83	1.83
Financial Leverage (EBIT/EBT)	1.08	1.04	1.06	1.08
Combined Leverage (Contribution/EBT)	2.15	1.91	1.94	1.98
EPS (EAT/No. of shares) (₹)	5.58	5.19	6.80	10.02
Risk	-	Lowest	Lower than option (3)	Highest
Return	-	Lowest	Lower than option (3)	Highest

From the above figures, we can see that the Operating Leverage is same in all alternatives though Financial Leverage differs. Alternative (iii) uses the maximum amount of debt and result into the highest degree of financial leverage, followed by alternative (ii). Accordingly, risk of the company will be maximum in these options. Corresponding to this scheme, however, maximum EPS (i.e., ₹ 10.02 per share) will be also in option (iii).

So, if Navya Ltd. is ready to take a high degree of risk, then alternative (iii) is strongly recommended. In case of opting for less risk, alternative (ii) is the next best option with a reduced EPS of ₹ 6.80 per share. In case of alternative (i), EPS is even lower than the existing option, hence not recommended.

Q.13

EPS / OL / CL

RTP May 20



The following information is related to YZ Company Ltd. for the year ended 31st March, 2020:

Equity share capital (of ₹ 10 each)	₹ 50 lakhs
12% Bonds of ₹ 1,000 each	₹ 37 lakhs
Sales	₹ 84 lakhs
Fixed cost (excluding interest)	₹ 6.96 lakhs
Financial leverage	1.49
Profit-volume Ratio	27.55% Income
Tax Applicable	40%

You are required to CALCULATE:

- Operating Leverage;
- Combined leverage; and
- Earnings per share.

Show calculations up-to two decimal points.

Ans.

Computation of Profits after Tax (PAT)

Particulars	Amount (₹)
Sales	84,00,000
Contribution (Sales × P/V ratio)	23,14,200
Less: Fixed cost (excluding Interest)	(6,96,000)
EBIT (Earnings before interest and tax)	16,18,200
Less: Interest on debentures (12% ₹ 37 lakhs)	(4,44,000)
Less: Other fixed Interest (balancing figure)	(88,160)
EBT (Earnings before tax)	10,86,040*

Less: Tax @ 40%	4,34,416
PAT (Profit after tax)	6,51,624

(i) **Operating Leverage:**

$$= \frac{\text{Contribution}}{\text{EBIT}} = \frac{23,14,200}{16,18,200} = 1.43$$

(ii) **Combined Leverage:**

$$= \text{Operating Leverage} \times \text{Financial Leverage}$$

$$= 1.43 \times 1.49 = 2.13$$

Or,

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

$$\text{Combined Leverage} = \frac{\text{Contribution}}{\text{EBT}} = \frac{23,14,200}{10,86,040} = 2.13$$

$$\text{*Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{16,18,200}{10,86,040} = 1.49$$

$$\text{So, EBT} = \frac{16,18,200}{1.49} = ₹10,86,040$$

Accordingly, other fixed interest

$$= ₹ 16,18,200 - ₹ 10,86,040 - ₹ 4,44,000 = ₹ 88,160$$

(iii) **Earnings per share (EPS):**

$$= \frac{\text{PAT}}{\text{No. of shares outstanding}} = \frac{6,51,624}{5,00,000 \text{ equity shares}} = ₹ 1.30$$

Q.14

OL & Beta theory

RTP Nov 19

The following summarises the percentage changes in operating income, percentage changes in revenues, and betas for four listed firms.

Firm	Change in revenue	Change in operating income	Beta
A Ltd.	35%	22%	1.00
B Ltd.	24%	35%	1.65
C Ltd.	29%	26%	1.15
D Ltd.	32%	30%	1.20

Required:

- CALCULATE the degree of operating leverage for each of these firms. Comment also.
- Use the operating leverage to EXPLAIN why these firms have different beta.

Ans.

- Degree of operating leverage = $\frac{\% \text{Change in Operating income}}{\% \text{Change in Revenues}}$

A Ltd.	=	0.22 / 0.35	=	0.63
B Ltd.	=	0.35 / 0.24	=	1.46
C Ltd.	=	0.26 / 0.29	=	0.90
D Ltd.	=	0.30 / 0.32	=	0.94

It is level specific.

- (ii) High operating leverage leads to high beta. So when operating leverage is lowest i.e. 0.63, Beta is minimum (1) and when operating leverage is maximum i.e. 1.46, beta is highest i.e. 1.65

Q. 15

ROI / EPS / OL / FL / CL

RTP Nov 18



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. You are required to INTERPRET:

- The firm's ROI?
- Does it have favourable financial leverage?
- If the firm belongs to an industry whose capital turnover is 3, does it have a high or low capital turnover?
- The operating, financial and combined leverages of the firm?
- If the sales is increased by 10% by what percentage EBIT will increase?
- At what level of sales the EBT of the firm will be equal to zero?
- If EBIT increases by 20%, by what percentage EBT will increase?

Ans.

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

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

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

(ROI is calculated on Capital Employed)

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

$$(iii) \text{ Capital Turnover} = \frac{\text{NetSales}}{\text{Capital}}$$

$$\text{Or} = \frac{\text{NetSales}}{\text{Capital}} = \frac{75,00,000}{1,00,00,000} = 0.75$$

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

- (iv) Calculation of Operating, Financial and Combined leverages

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

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

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

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)

Q.16

EBIT / Sales / Fixed Cost

MTP Nov 23 (1)



Following are the selected financial information of A Ltd. and B Ltd. for the current Financial Year:

	A Ltd.	B Ltd.
Variable Cost Ratio	60%	50%
Interest	₹ 30,000	₹ 1,20,000
Operating Leverage	6	3
Financial Leverage	4	3
Tax Rate	30%	30%

You are required to FIND out:

- (i) EBIT
- (ii) Sales
- (iii) Fixed Cost
- (iv) Identify the company which is better placed with reasons based on leverages.



Ans.

Company A

(i) Financial Leverage = $\frac{\text{EBIT}}{\text{EBT i.e EBIT} - \text{Interest}}$

So, 4 = $\frac{\text{EBIT}}{\text{EBIT} - ₹ 30,000}$

Or, 4 (EBIT - 30,000) = EBIT

Or, 3 EBIT = 1,20,000

Or, EBIT = 40,000

(ii) Operating Leverage = $\frac{\text{Contribution}}{\text{EBIT}}$ Or, 6 = $\frac{\text{Contribution}}{40,000}$

Or Contribution = ₹ 2,40,000

Sales = $\frac{\text{Contribution}}{\text{P / V Ratio (1 - variable cost ratio)}} = \frac{2,40,000}{40\%} = ₹ 6,00,000$

(iii) Fixed Cost = Contribution - EBIT
= ₹ 2,40,000 - 40,000

Or Fixed cost = ₹ 2,00,000

Company B

$$(i) \text{ Financial Leverage} = \frac{\text{EBIT}}{\text{EBT i.e EBIT} - \text{Interest}}$$

$$\text{So, } 3 = \frac{\text{EBIT}}{\text{EBIT} - 1,20,000}$$

$$\text{Or, } 3 (\text{EBIT} - ₹1,20,000) = \text{EBIT}$$

$$\text{Or, } 3 \text{ EBIT} - ₹ 3,60,000 = \text{EBIT}$$

$$\text{Or, } 2 \text{ EBIT} = ₹ 3,60,000$$

$$\text{Or, EBIT} = ₹ 1,80,000$$

$$(ii) \text{ Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}}$$

$$\text{Or, } 3 = \frac{\text{Contribution}}{1,80,000}$$

$$\text{Or, Contribution} = ₹ 5,40,000$$

$$\text{Sales} = \frac{\text{Contribution}}{P / \text{VRatio} (1 - \text{variable cost ratio})} = \frac{5,40,000}{50\%} = ₹ 10,80,000$$

$$(iii) \text{ Fixed Cost} = \text{Contribution} - \text{EBIT}$$

$$= ₹ 5,40,000 - ₹ 1,80,000$$

$$\text{Or, Fixed cost} = ₹ 3,60,000$$

Income Statements of Company A and Company B

	Company A (₹)	Company B (₹)
Sales	6,00,000	10,80,000
Less: Variable cost	3,60,000	5,40,000
Contribution	2,40,000	5,40,000
Less: Fixed Cost	2,00,000	3,60,000
Earnings before interest and tax (EBIT)	40,000	1,80,000
Less: Interest	30,000	1,20,000
Earnings before tax (EBT)	10,000	60,000
Less: Tax @ 30%	3,000	18,000
Earnings after tax (EAT)	7,000	42,000

Comment based on Leverage

Comment based on leverage - Company B is better than company A of the following reasons:

- Capacity of Company B to meet interest liability is better than that of companies A (from EBIT/ Interest ratio)

$$\left[A = \frac{40,000}{30,000} = 1.33, B = \frac{1,80,000}{1,20,000} = 1.50 \right]$$

Company B has the least financial risk as the total risk (business and financial) of company B is lower (combined leverage of Company A - 24 and Company B- 9)

Q.17

OL / Break Even

MTP Nov 22 (1)



Following information is provided relating to SVB Ltd.:

Sales price ₹ 21 per unit

Variable cost ₹ 13.50 per unit
Break-even point 30,000 units
You are required to CALCULATE operating leverage at sales volume 37,500 units and 45,000 units.

Ans. Computation of Operating Leverage (OL)

Selling Price = ₹ 21 per unit

Variable Cost = ₹ 13.50 per unit

Fixed Cost = BEP × (Selling price - Variable cost) = 30,000 × (21 - 13.50) = 30,000 × 7.5 = 2,25,000

Particulars	For 37,500 units (₹)	For 45,000 units (₹)
Sales (@ ₹ 21 /unit)	7,87,500	9,45,000
Less: Variable Cost (@ 13.50 /unit)	5,06,250	6,07,500
Contribution	2,81,250	3,37,500
Less: Fixed Cost	2,25,000	2,25,000
Earnings before Interest and tax (EBIT)	56,250	1,12,500
Operating Leverage $\left(\frac{\text{Contribution}}{\text{EBIT}}\right)$	$\left(\frac{2,81,250}{56,250}\right)$	$\left(\frac{2,81,250}{1,12,500}\right)$
Operating Leverage	5 times	3 times

Q.18

PL Statement

MTP May 22 (2)



From the given details, PREPARE Income Statement for Alpha Ltd. and Beta Ltd.

Particulars	Alpha Ltd.	Beta Ltd.
Operating Leverage	1.875	1.800
Financial Leverage	1.600	1.250
PV Ratio	60%	50%
Profit after tax	₹ 3,00,000	₹ 2,40,000
Tax rate	40%	40%

Ans.

Particulars	Alpha Ltd. (₹)	Beta Ltd. (₹)
Sales	25,00,000	18,00,000
Less: Variable Cost	10,00,000	9,00,000
Contribution	15,00,000	9,00,000
Less: Fixed Cost	7,00,000	4,00,000
EBIT	8,00,000	5,00,000
Less: Interest	3,00,000	1,00,000
PBT	5,00,000	4,00,000
Less: Tax (40%)	2,00,000	1,60,000
PAT	3,00,000	2,40,000

Working Note:

Particulars	Alpha Ltd.	Beta Ltd.
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PAT	₹ 3,00,000	₹ 2,40,000
Tax Rate (t)	40%	40%
PBT = PAT/(1-t)	$\frac{3,00,000}{1-0.4} = 5,00,000$	$\frac{2,40,000}{1-0.4} = 4,00,000$
Finance Leverage	1.60	1.25
EBIT = PBT × FL	$5,00,000 \times 1.6$ $= 8,00,000$	$4,00,000 \times 1.25$ $= 5,00,000$
Operating Leverage	1.875	1.800
Contribution = EBIT × OL	$8,00,000 \times 1.875$ $= 15,00,000$	$5,00,000 \times 1.8$ $= 9,00,000$
PV ratio	60%	50%
Sales = $\frac{\text{Contribution}}{\text{PV ratio}}$	$\frac{15,00,000}{.60} = 25,00,000$	$\frac{9,00,000}{.50} = 18,00,000$

Q.19

FL / PV / EPS

MTP Dec 21 (1)



(a) The following details of PQR Limited for the year ended 31st March, 2021 are given below:

Operating leverage	1.4
Combined leverage	2.8
Fixed Cost (Excluding interest)	₹ 2.10 lakhs
Sales	₹ 40.00 lakhs
10% Debentures of ₹ 100 each	₹ 25.00 lakhs
Equity Share Capital of ₹ 10 each	₹ 20.00 lakhs
Income tax rate	30 per cent

REQUIRED:

- Calculate Financial leverage
- Calculate P/V ratio and Earning per Share (EPS)
- If the company belongs to an industry, whose assets turnover is 1.6, does it have a high or low assets turnover?
- At what level of sales, the Earning before Tax (EBT) of the company will be equal to zero? In the question, assume that 10% Debentures and Share Capital consists of total liabilities.

(b) Write a short note on electronic fund transfer.

Ans.

- (a) (i) **Financial leverage**
 Combined Leverage = Operating Leverage × Financial Leverage
 So, financial leverage = Combined Leverage / Operating Leverage
 = 2.8 / 1.4 = 2
- (ii) **P/V Ratio and EPS**
 Operating Leverage = $\frac{\text{Contribution}}{\text{Contribution} - \text{Fixed Cost}}$

$$1.4 = \frac{\text{Contribution}}{\text{Contribution} - 2,10,000}$$

$$1.4 \text{ Contribution} - 2,94,000 = \text{Contribution}$$

$$0.4 \text{ Contribution} = 2,94,000$$

$$\text{Contribution} = 7,35,000$$

Now, P/V Ratio = $\frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{7,35,000}{40,00,000} \times 100 = 18.375\%$

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

Earning before tax (EBT) = Contribution - Fixed Cost - Interest
 = 7,35,000 - 2,10,000 - 2,50,000
 = 2,75,000

Profit after tax = EBT - Tax @ 30%
 = 2,75,000 - 82,500
 = 1,92,500

$$\text{EPS} = \frac{1,92,500}{2,00,000} = 0.9625$$

(iii) **Asset Turnover**

Total Assets = Equity Share Capital + Debentures = ₹ 20 lakhs + ₹ 25 lakhs = ₹ 45 lakhs

$$\text{Asset Turnover} = \frac{\text{Sales}}{\text{Total Assets}} = \frac{40,00,000}{45,00,000} = 0.89$$

0.89 < 1.6, means lower than industry turnover.

(iv) EBT zero means 100% reduction in EBT. Since combined leverage is 2.8, sales have to be dropped by 100/2.8 = 35.71%. Hence new sales will be 40,00,000 x (100% - 35.71%) = 25,71,600

- (b) **Electronic Fund Transfer:** With the developments which took place in the information technology, the present banking system has switched over to the computerization of banks branches to offer efficient banking services and cash management services to their customers. The network will be linked to the different branches, banks. This helped the customers in the following ways:
- (i) Instant updating of accounts.
 - (ii) Quick transfer of funds.
 - (iii) Instant information about foreign exchange rates.

Q.20

OL / FL

MTP May 21 (2)



Following data of MT Ltd. under Situations 1, 2 and 3 and Financial Plan A and B is given: Installed Capacity (units) 3,600

Actual Production and Sales (units)		2,400
Selling price per unit (Rs.)		30
Variable cost per unit (Rs.)		20
Fixed Costs (Rs.):	Situation 1	3,000
	Situation 2	6,000
	Situation 3	9,000

Capital Structure :

Particulars	Financial Plan
-------------	----------------

	A	B
Equity	Rs. 15,000	Rs. 22,500
Debt	Rs. 15,000	Rs. 7,500
Cost of Debt	12%	12%

Required:

- CALCULATE the operating leverage and financial leverage.
- FIND out the combinations of operating and financial leverage which give the highest value and the least value.

Ans.

(i) Operating Leverage

	Situation 1 (Rs.)	Situation 2 (Rs.)	Situation 3 (Rs.)
Sales (S)			
2,400 units @ Rs. 30 per unit	72,000	72,000	72,000
Less: Variable Cost (VC) @ Rs. 20 per unit	48,000	48,000	48,000
Contribution (C)	24,000	24,000	24,000
Less: Fixed Cost (FC)	3,000	6,000	9,000
EBIT	21,000	18,000	15,000
Operating Leverage = $\frac{C}{EBIT}$	$\frac{Rs. 24,000}{Rs. 21,000} = 1.14$	$\frac{Rs. 24,000}{Rs. 18,000} = 1.33$	$\frac{Rs. 24,000}{Rs. 15,000} = 1.60$

Financial Leverage

	Financial Plan	
	A (Rs.)	B (Rs.)
Situation 1		
EBIT	21,000	21,000
Less: Interest on debt (Rs. 15,000 × 12%):(Rs. 7,500 × 12%)	1,800	900
EBT	19,200	20,100
Financial Leverage = $\frac{EBIT}{EBT}$	$\frac{Rs. 21,000}{Rs. 19,200} = 1.09$	$\frac{Rs. 21,000}{Rs. 20,100} = 1.04$
Situation 2		
EBIT	18,000	18,000
Less: Interest on debt	1,800	900
EBT	16,200	17,100
Financial Leverage = $\frac{EBIT}{EBT}$	$\frac{Rs. 18,000}{Rs. 16,200} = 1.11$	$\frac{Rs. 18,000}{Rs. 17,100} = 1.05$
Situation 3		
EBIT	15,000	15,000
Less: Interest on debt	1,800	900
EBT	13,200	14,100
Financial Leverage = $\frac{EBIT}{EBT}$	$\frac{Rs. 15,000}{Rs. 13,200} = 1.14$	$\frac{Rs. 15,000}{Rs. 14,100} = 1.06$

(ii) **Combined Leverages**

CL = OL x FL

	Financial Plan	
	A (Rs.)	B (Rs.)
(a) Situation 1	1.14 x 1.09 = 1.24	1.14 x 1.04 = 1.19
(b) Situation 2	1.33 x 1.11 = 1.48	1.33 x 1.05 = 1.40
(c) Situation 3	1.60 x 1.14 = 1.82	1.60 x 1.06 = 1.70

The above calculations suggest that the highest value is in Situation 3 financed by Financial Plan A and the lowest value is in the Situation 1 financed by Financial Plan B.

Q.21

OL / CL

MTP May 21 (1)



Following information are related to four firms of the same industry:

Firm	Change in Revenue	Change in Operating Income	Change in Earning per Share
P	25%	23%	30%
Q	27%	30%	26%
R	24%	36%	20%
S	20%	30%	20%

For all the firms, FIND OUT:

- (i) Degree of operating leverage, and
- (ii) Degree of combined leverage.

Ans.

Calculation of Degree of Operating leverage and Degree of Combined leverage

Firm	Degree of Operating Leverage (DOL)	Degree of Combined Leverage (DCL)
	= $\frac{\% \text{ change in Operating Income}}{\% \text{ change in Revenue}}$	= $\frac{\% \text{ change in EPS}}{\% \text{ change in Revenue}}$
P	$\frac{23\%}{25\%} = 0.92$	$\frac{30\%}{25\%} = 1.2$
Q	$\frac{30\%}{27\%} = 1.11$	$\frac{26\%}{27\%} = 0.96$
R	$\frac{36\%}{24\%} = 1.50$	$\frac{20\%}{24\%} = 0.83$
S	$\frac{30\%}{20\%} = 1.50$	$\frac{20\%}{20\%} = 1.00$

Q.22

PL Statement

MTP Nov 18 (2)



From the following, PREPARE Income Statement of Company A and B.

Company	A	B
Financial leverage	3:1	4:1

Interest	Rs.20,000	Rs.30,000
Operating leverage	4:1	5:1
Variable Cost as a Percentage to Sales	66 $\frac{2}{3}$ %	75%
Income tax Rate	45%	45%

Ans. Working Notes:

Company A

$$\text{Financial leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{3}{1} = \text{Or, EBIT} = 3 \times \text{EBT} \quad (1)$$

$$\begin{aligned} \text{Again EBIT - Interest} &= \text{EBT} \\ \text{Or, EBIT- 20,000} &= \text{EBT} \end{aligned} \quad (2)$$

$$\begin{aligned} \text{Taking (1) and (2) we get} \\ 3 \text{ EBT- 20,000} &= \text{EBT} \\ \text{Or, 2 EBT} &= 20,000 \text{ or EBT} = \text{Rs.10,000} \\ \text{Hence EBIT} &= 3\text{EBT} = \text{Rs.30,000} \end{aligned}$$

$$\text{Again, we have operating leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{4}{1}$$

$$\begin{aligned} \text{EBIT} &= \text{Rs. 30,000, hence we get} \\ \text{Contribution} &= 4 \times \text{EBIT} = \text{Rs.1,20,000} \end{aligned}$$

$$\text{Now variable cost} = 66 \frac{2}{3} \% \text{ on sales}$$

$$\text{Contribution} = 100 - 66 \frac{2}{3} \% \text{ i.e. } 33 \frac{1}{3} \% \text{ on sales}$$

$$\text{Hence, sales} = \frac{1,20,000}{33 \frac{1}{3} \%} = \text{Rs. 3,60,000}$$

Same way EBIT, EBT, contribution and sales for company B can be worked out.

Company B

$$\text{Financial leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{4}{1} \text{ or EBIT} = 4 \text{ EBT} \quad (3)$$

$$\text{Again EBIT - Interest} = \text{EBT or EBIT} - 30,000 = \text{EBT} \quad (4)$$

$$\begin{aligned} \text{Taking (3) and (4) we get, } 4\text{EBT} - 30,000 &= \text{EBT} \\ \text{Or, } 3\text{EBT} &= 30,000 \text{ Or, EBT} = 10,000 \end{aligned}$$

$$\text{Hence, EBIT} = 4 \times \text{EBT} = 40,000$$

$$\text{Again, we have operating leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{5}{1}$$

$$\text{EBIT} = 40,000; \text{ Hence we get contribution} = 5 \times \text{EBIT} = 2,00,000$$

$$\text{Now variable cost} = 75\% \text{ on sales}$$

$$\text{Contribution} = 100 - 75\% \text{ i.e. } 25\% \text{ on sales}$$

$$\text{Hence Sales} = \frac{2,00,000}{25\%} = \text{Rs. 8,00,000}$$

Income Statement

	A (Rs.)	B (Rs.)
Sales	3,60,000	8,00,000
Less: Variable Cost	2,40,000	6,00,000
Contribution	1,20,000	2,00,000

Less: Fixed Cost (bal. Fig)	90,000	1,60,000
EBIT	30,000	40,000
Less: Interest	20,000	30,000
EBT	10,000	10,000
Less: Tax 45%	4,500	4,500
EAT	5,500	5,500

Q.23

EBIT / OL

ICAI MAT



CALCULATE the operating leverage for each of the four firms A, B, C and D from the following price and cost data:

	Firms			
	A (₹)	B (₹)	C (₹)	D (₹)
Sale price per unit	20	32	50	70
Variable cost per unit	6	16	20	50
Fixed operating cost	60,000	40,000	1,00,000	Nil

What calculations can you draw with respect to levels of fixed cost and the degree of operating leverage result? EXPLAIN. Assume number of units sold is 5,000.

Ans.

	Firms			
	A (₹)	B (₹)	C (₹)	D (₹)
Sales (units)	5,000	5,000	5,000	5,000
Sales revenue (Units × sale price per unit)	1,00,000	1,60,000	2,50,000	3,50,000
Less: Variable cost (Units × variable cost per unit)	(30,000)	(80,000)	(1,00,000)	(2,50,000)
Less: Fixed operating costs	(60,000)	(40,000)	(1,00,000)	Nil
EBIT	10,000	40,000	50,000	1,00,000

$$DOL = \frac{\text{Current sales (S)} - \text{Variable costs (VC)}}{\text{Current EBIT}}$$

$$DOL_{(A)} = \frac{1,00,000 - 30,000}{10,000} = 7$$

$$DOL_{(B)} = \frac{1,60,000 - 80,000}{40,000} = 2$$

$$DOL_{(C)} = \frac{2,50,000 - 1,00,000}{50,000} = 3$$

$$DOL_{(D)} = \frac{3,50,000 - 2,50,000}{1,00,000} = 1$$

The operating leverage exists only when there are fixed costs. In the case of firm D, there is no magnified effect on the EBIT due to change in sales. A 20 per cent increase in sales has resulted in a 20 per cent increase in EBIT. In the case of other firms, operating leverage exists. It is maximum in firm A, followed by firm C and minimum in firm B. The interception of DOL of 7 is that 1 per cent change in sales results in 7 per cent change in EBIT level in the direction of the change of sales level of firm A.

Q. 24

% change in EPS

ICAI MAT



From the following information extracted from the books of accounts of Imax Ltd., CALCULATE percentage change in earnings per share, if sales increase by 10% and Fixed Operating cost is ₹ 1,57,500.

Particulars	(₹)
EBIT (Earnings before Interest and Tax)	31,50,000
Earnings before Tax (EBT)	14,00,000

Ans.

Operating Leverage (OL)

$$= \frac{\text{Contribution}}{\text{EBIT}} = \frac{\text{EBIT} + \text{Fixed Cost}}{\text{EBIT}}$$

$$= \frac{31,50,000 + 1,57,500}{31,50,000} = 1.05$$

Financial Leverage (FL)

$$= \frac{\text{EBIT}}{\text{EBT}} = \frac{31,50,000}{14,00,000} = 2.25$$

Combined Leverage (CL)

$$= 1.05 \times 2.25 = 2.3625$$



Percentage Change in Earnings per share

$$\text{DCL} = \frac{\% \text{change in EPS}}{\% \text{change in Sales}} = 2.3625 = \frac{\% \text{change in EPS}}{10}$$

$$\% \text{ change in EPS} = 23.625\%$$

Hence, if sales increases by 10%, EPS will be increased by 23.625%.

Q. 25

EPS

ICAI MAT



The Sale revenue of TM excellence Ltd. @ ₹ 20 Per unit of output is ₹ 20 lakhs and Contribution is ₹ 10 lakhs. At the present level of output, the DOL of the company is 2.5. The company does not have any Preference Shares. The number of Equity Shares are 1 lakh. Applicable corporate Income Tax rate is 50% and the rate of interest on Debt Capital is 16% p.a. CALCULATE the EPS (at sales revenue of ₹ 20 lakhs) and amount of Debt Capital of the company if a 25% decline in Sales will wipe out EPS.

Ans.

(i) **Calculation of Fixed Cost**

$$\text{DOL} = \frac{\text{Contribution}}{\text{Contribution} - \text{Fixed Cost}} \text{ or } 2.5 = \frac{10,00,000}{\text{EBIT}} \text{ or EBIT} = ₹ 4,00,000$$

$$\text{EBIT} = \text{Contribution} - \text{Fixed Cost}$$

$$\begin{aligned} ₹ 4,00,000 &= ₹ 10,00,000 - \text{Fixed Cost} \\ \text{Fixed Cost} &= ₹ 10,00,000 - ₹ 4,00,000 = ₹ 6,00,000 \end{aligned}$$

(ii) **Calculation of Degree of Combined Leverage (DCL)**

Question says that 25% change in sales will wipe out EPS. Here, wipe out means it will reduce EPS by 100%.

$$DCL = \frac{\text{Percentage Change in EPS}}{\text{Percentage Change in Sales}} = \frac{100\%}{25\%} = 4$$

(iii) **Calculation of Degree of Financial Leverage (DFL)**

$$\begin{aligned} DCL &= DOL \times DFL \\ 4 &= 2.5 \times DFL \\ \text{So, DFL} &= 1.6 \end{aligned}$$

(iv) **Calculation of Interest and amount of Debt**

$$DFL = \frac{EBIT}{EBIT - \text{Int}} \text{ Or, } 1.6 = \frac{4,00,000}{4,00,000 - \text{Int}} \text{ Or, Int} = ₹ 1,50,000$$

$$\begin{aligned} \text{Debt} \times \text{Interest rate} &= \text{Amount of Interest} \\ \text{Debt} \times 16\% &= ₹ 1,50,000 \\ \text{Debt} &= ₹ 9,37,500 \end{aligned}$$

(v) **Calculation of Earnings per share (EPS)**

$$EPS = \frac{(EBIT - \text{Int})(1 - t)}{N} = \frac{(4,00,000 - 1,50,000)0.5}{1,00,000} = ₹ 1.25$$



Q.26

MTP SEP 2025(2)



ABC Engineering Ltd., a mid-sized capital-intensive manufacturing company, is evaluating the risk-return profile of its operations. The company currently operates at 75% of its production capacity. The following information relates to its current operations:

Income Statement at 75% Capacity

Particulars	Amount (₹)
Sales Revenue	7,50,00,000
Variable Cost	4,50,00,000
Fixed Operating Costs	1,20,00,000
EBIT (Earnings Before Interest & Tax)	?
Interest on Debt (12% Debentures)	?
EBT (Earnings Before Tax)	?
Tax Rate	30%

Additional Information:

- The company has equity share capital of ₹2,00,00,000 (shares of ₹ 10 each, fully paid-up).
- The current Debt-Equity ratio is 0.75:1, and the company is considering increasing its production to 90% capacity.

3. At 90% capacity:
 - Sales and variable cost per unit will increase proportionately.
 - Fixed operating costs will increase by ₹ 10,00,000 due to additional maintenance, supervisory staff, and overheads.
 - To finance the additional working capital and fixed overheads, the company is considering issuing additional ₹ 50,00,000 in 13% debentures.
4. The management wants to analyze the impact of increased capacity on Operating Leverage, Financial Leverage, and Combined Leverage and the change in EPS (Earnings Per Share) under the new financial plan. You are required to:
 - (i) At 75% Capacity (Current Scenario)
 - (a) CALCULATE EPS by filling the missing figures.
 - (b) CALCULATE Degree of Operating Leverage (DOL), Degree of Financial Leverage (DFL) and Degree of Combined Leverage (DCL).
 - (ii) At 90% Capacity with Revised Financial Plan
 - (a) CALCULATE new DOL, DFL, and DCL.
 - (b) Revised EPS.
 - (iii) ADVISE as to whether the company proceed with the capacity expansion and debt issue.

Ans.

(i) **Current Scenario at 75% Capacity**

- (a) Calculation of EBIT, EBT, Profit after tax and Earning Per Share

Particulars	Amount (₹)
Sales Revenue	7,50,00,000
Less: Variable Cost	4,50,00,000
Contribution	3,00,00,000
Less: Fixed Cost	1,20,00,000
EBIT	1,80,00,000
Less: Interest (1,50,00,000 × 12%)	18,00,000
EBT	1,62,00,000
Less: Tax@30%	48,60,000
Profit after tax	1,13,40,000
No. of Equity Shares	20,00,000
Earnings Per Share	5.67

- (b) Calculation of Various Leverages

Degree of Operating Leverage (DOL):

$$DOL = \frac{\text{Contribution}}{\text{EBIT}} = \frac{3,00,00,000}{1,80,00,000} = 1.67$$

Degree of Financial Leverage (DFL):

$$DFL = \frac{\text{EBIT}}{\text{EBT}} = \frac{1,80,00,000}{1,62,00,000} = 1.11$$

Degree of Combined Leverage (DCL):

$$DCL = DOL \times DFL = 1.67 \times 1.11 = 1.85$$

(ii) **New Scenario at 90% Capacity**

- (a) Revised calculation of EBIT, EBT, Profit after tax and Earning Per Share:

Particulars	Amount (₹)
Sales Revenue [7,50,00,000 × (90/75)]	9,00,00,000
Less: Variable Cost [4,50,00,000 × (90/75)]	5,40,00,000
Contribution	3,60,00,000
Less: Fixed Cost (1,20,00,000 + 10,00,000)	1,30,00,000
EBIT	2,30,00,000
Less: Interest (1,50,00,000 × 12%) + (50,00,000 × 13%)	24,50,000
EBT	2,05,50,000
Less: Tax@30%	61,65,000
Profit after tax	1,43,85,000
No. of Equity Shares	20,00,000
Earning Per Share (1,43,85,000 / 20,00,000)	7.19

(b) Revised Calculation of Various Leverages

$$DOL = 3,60,00,000 / 2,30,00,000 = 1.57$$

$$DFL = 2,30,00,000 / 2,05,50,000 = 1.12$$

$$DCL = 1.57 \times 1.12 = 1.76$$

- (c)** At higher capacity utilization, the company is able to generate higher EBIT and EPS. However, it takes on slightly more financial risk by issuing 13% debentures. The company should go ahead with the capacity expansion and new financing plan, as the overall risk has been slightly reduced as indicated in the combined leverage while shareholder return by way of EPS has significantly increased.

Q.27

RTP SEP 2025



X Limited and Y Limited are two mid-sized companies operating in the same competitive industry. Both companies have recently undergone a financial performance review to assess their operational efficiency, cost structure, and overall financial risk. You, as a financial analyst, have been provided with selective financial indicators and are required to draw insights and comparisons based on leverage analysis and income statement reconstruction.

The management of X Limited has disclosed that the company is currently operating with a Margin of Safety (M/S) ratio of 0.1667. In contrast, Y Limited has a Margin of Safety that is twice as high as that of X Limited. Both companies maintain a Financial Leverage of 3. Their variable cost ratios are 60% for X Limited and 50% for Y Limited.

In terms of financing costs, X Limited incurs an annual interest expense of ₹30,000. Y Limited, however, incurs an interest cost that is 300% higher than X Limited. Both companies are subject to a corporate tax rate of 30%, which affects their net profitability after interest and taxes.

You are required to PREPARE Income statement for both the companies and IDENTIFY the company which is better placed with reasons based on leverages.

Ans.

Company X

$$\begin{aligned}
 \text{(i) Financial Leverage} &= \frac{\text{EBIT}}{\text{EBT i.e EBIT - Interest}} \\
 \text{So, 3} &= \frac{\text{EBIT}}{\text{EBIT} - ₹ 30,000} \\
 \text{Or, 3 (EBIT - 30,000)} &= \text{EBIT} \\
 \text{Or, 2 EBIT} &= 90,000
 \end{aligned}$$



$$\begin{aligned}
 \text{Or, EBIT} &= 45,000 \\
 \text{(ii) Margin of safety} &= 0.1667 \\
 \text{Operating Leverage} &= 1/\text{Margin of safety} \\
 &= 1/0.1667 = 6 \\
 &= \frac{\text{Contribution}}{\text{EBIT}} \\
 \text{Or, 6} &= \frac{\text{Contribution}}{\text{₹ 45,000}} \\
 \text{Or, Contribution} &= \text{₹ 2,70,000} \\
 \text{Sales} &= \frac{\text{Contribution}}{\text{P/V Ratio (1 - variable cost ratio)}} \\
 &= \frac{\text{₹ 2,70,000}}{40\%} \\
 &= \text{₹ 6,75,000} \\
 \text{(iii) Fixed Cost} &= \text{Contribution} - \text{EBIT} \\
 &= \text{₹ 2,70,000} - 45,000 \\
 \text{Or, Fixed cost} &= \text{₹ 2,25,000}
 \end{aligned}$$

Company Y

$$\begin{aligned}
 \text{(i) Financial Leverage} &= \frac{\text{EBIT}}{\text{EBT i.e EBIT - Interest}} \\
 \text{So, 3} &= \frac{\text{EBIT}}{\text{EBIT} - \text{₹ 1,20,000}} \\
 \text{Or, 3 (EBIT - ₹ 1,20,000)} &= \text{EBIT} \\
 \text{Or, 3 EBIT - ₹ 3,60,000} &= \text{EBIT} \\
 \text{Or, EBIT} &= \text{₹ 1,80,000} \\
 \text{(ii) Margin of safety} &= 0.1667 \times 2 = 0.3333 \\
 \text{Operating Leverage} &= 1/\text{Margin of safety} \\
 &= 1/0.3333 = 3 \\
 &= \frac{\text{Contribution}}{\text{EBIT}} \\
 \text{Or, 3} &= \frac{\text{Contribution}}{\text{₹ 1,80,000}} \\
 \text{Or, Contribution} &= \text{₹ 5,40,000} \\
 \text{Sales} &= \frac{\text{Contribution}}{\text{P/V Ratio (1 - variable cost ratio)}} \\
 &= \text{₹ 5,40,000} = \text{₹ 10,80,000} \\
 \text{(iii) Fixed Cost} &= \text{Contribution} - \text{EBIT} \\
 &= \text{₹ 5,40,000} - \text{₹ 1,80,000} \\
 \text{Or, Fixed cost} &= \text{₹ 3,60,000} \\
 \text{(iv) Interest} &= \text{₹ 30,000} + \text{₹ 30,000} \times 300\% = \text{₹ 1,20,000}
 \end{aligned}$$

Income Statements of X Ltd and Y Ltd

	X Ltd (₹)	Y Ltd (₹)
Sales	6,75,000	10,80,000
Less: Variable cost	4,05,000	5,40,000
Contribution	2,70,000	5,40,000

Less: Fixed Cost	2,25,000	3,60,000
Earnings before interest and tax (EBIT)	45,000	1,80,000
Less: Interest	30,000	1,20,000
Earnings before tax (EBT)	15,000	60,000
Less: Tax @ 30%	4,500	18,000
Earnings after tax (EAT)	10,500	42,000

Comment based on Leverage

Comment based on leverage - Company Y is better than company X of the following reasons:

- (i) Capacity of Company Y to meet interest liability is same that of companies X (from EBIT/Interest ratio)

$$[X = \frac{₹ 45,000}{₹ 30,000} = 1.5, Y = \frac{₹ 1,80,000}{₹ 1,20,000} = 1.5]$$
- (ii) However, Company Y has lesser financial risk as the total risk (business and financial) of company Y is lower (combined leverage of Company X is 18 and Company Y is 9).

NOTES



3 CHAPTER

CAPITAL STRUCTURE

Q.1

Additional capital & MPS max

PY May 23



The following information pertains to CIZA Ltd.:

	₹
<i>Capital Structure:</i>	
Equity share capital (₹ 10 each)	8,00,000
Retained earnings	20,00,000
9% Preference share capital (₹ 100 each)	12,00,000
12% Long-term loan	10,00,000
Interest coverage ratio	8
Income tax rate	30%
Price - earnings ratio	25

The company is proposed to take up an expansion plan, which requires an additional investment of ₹ 34,50,000. Due to this proposed expansion, earnings before interest and taxes of the company will increase by ₹ 6,15,000 per annum. The additional fund can be raised in following manner:

- By issue of equity shares at present market price, or
- By borrowing 16% Long-term loans from bank.

You are informed that Debt-equity ratio (Debt/ Shareholders' fund) in the range of 50% to 80% will bring down the price-earnings ratio to 22 whereas; Debt-equity ratio over 80% will bring down the price-earnings ratio to 18.

Required:

Advise which option is most suitable to raise additional capital so that the Market Price per Share (MPS) is maximized.

Ans.

Working notes:

(i) Interest Coverage ratio = 8

$$\frac{\text{EBIT}}{\text{Interest}} = 8$$

$$\frac{\text{EBIT}}{1,20,000} = 8$$

So, EBIT = ₹ 9,60,000

(ii) Proposed Earnings Before Interest & Tax = 9,60,000 + 6,15,000 = ₹ 15,75,000

Option 1: Equity option

Debt = ₹ 10,00,000

Shareholders Fund = 8,00,000+20,00,000+12,00,000+34,50,000 = ₹ 74,50,000

$$\text{Debt Equity ratio(Debt/Shareholders fund)} = \frac{10,00,000}{74,50,000} = 13.42\%$$

P/E ratio in this case will be 25 times

Option 2: Debt option

Debt = 10,00,000+34,50,000 = ₹ 44,50,000

Shareholders Fund = 8,00,000+20,00,000+12,00,000 = ₹ 40,00,000

Debt Equity ratio(Debt/Shareholders fund) = $\frac{44,50,000}{40,00,000} = 111.25\%$

Debt equity ratio has crossed the limit of 80% hence PE ratio in this case will remain at 18 times.

Number of Equity Shares to be issued = ₹ 34,50,000/ ₹ 150 = 23,000

(iii) Calculation of Earnings per Share and Market Price per share

Particulars	₹
Current Earnings Before Interest & Tax	9,60,000
Less: Interest	1,20,000
Earnings Before Tax	8,40,000
Less: Taxes	2,52,000
Earnings After Tax	5,88,000
Less: Preference Dividend (@9%)	1,08,000
Net earnings for Equity shareholders	4,80,000
Number of equity shares	80,000
Earnings Per Share	6
Price-earnings ratio	25
Market Price per share	150

Calculation of EPS and MPS under two financial options

Particulars	Financial Options	
	Option I Equity Shares Issued (₹)	Option II 16% Long Term Debt Raised (₹)
Earnings before interest and Tax (EBIT)	15,75,000	15,75,000
Less: Interest on old debentures @ 12%	1,20,000	1,20,000
Less: Interest on additional loan (new) @ 16% on ₹ 34,50,000	NIL	5,52,000
Earnings before tax	14,55,000	9,03,000
Less: Taxes @ 30%	4,36,500	2,70,900
(EAT/Profit after tax)	10,18,500	6,32,100
Less: Preference Dividend (@9%)	1,08,000	1,08,000
Net Earnings available to Equity shareholders	9,10,500	5,24,100
Number of Equity Shares	1,03,000	80,000
Earnings per Share (EPS)	8.84	6.55
Price/ Earnings ratio	25	18
Market price per share (MPS)	221	117.9

Advise: Equity option has higher Market Price per Share therefore company should raise additional fund through equity option.



Q.2

Additional Capital & EPS max

PY May 22



The particulars relating to Raj Ltd. for the year ended 31st March, 2022 are given as follows:

Output (units at normal capacity)	1,00,000
Selling price per unit	₹ 40
Variable cost per unit	₹ 20
Fixed cost	₹ 10,00,000

The capital structure of the company as on 31st March, 2022 is as follows:

Particulars	Amount in ₹
Equity share capital (1,00,000 shares of ₹ 10 each)	10,00,000
Reserves and surplus	5,00,000
Current liabilities	5,00,000
Total	20,00,000

Raj Ltd. has decided to undertake an expansion project to use the market potential that will involve ₹ 20 lakhs. The company expects an increase in output by 50%. Fixed cost will be increased by ₹ 5,00,000 and variable cost per unit will be decreased by 15%. The additional output can be sold at the existing selling price without any adverse impact on the market.

The following alternative schemes for financing the proposed expansion program are planned:

Alternative	(Amount in ₹)	
	Debt	Equity Shares
1	5,00,000	Balance
2	10,00,000	Balance
3	14,00,000	Balance

Current market price per share is ₹ 200.

Slab wise interest rate for fund borrowed is as follows:

Fund limit	Applicable interest rate
Up-to ₹ 5,00,000	10%
Over ₹ 5,00,000 and up-to ₹ 10,00,000	15%
Over ₹ 10,00,000	20%

Find out which of the above-mentioned alternatives would you recommend for Raj Ltd. with reference to the EPS, assuming a corporate tax rate is 40%?

Ans.

- Alternative 1 = Raising Debt of ₹ 5 lakh + Equity of ₹ 15 lakh
 Alternative 2 = Raising Debt of ₹ 10 lakh + Equity of ₹ 10 lakh
 Alternative 3 = Raising Debt of ₹ 14 lakh + Equity of ₹ 6 lakh

Calculation of Earnings per share (EPS)

Particulars	FINANCIAL ALTERNATIVES		
	Alternative 1	Alternative 2	Alternative 3
	(₹)	(₹)	(₹)

Expected EBIT [W. N. (a)]	19,50,000	19,50,000	19,50,000
Less: Interest [W. N. (b)]	(50,000)	(1,25,000)	(2,05,000)
Earnings before taxes (EBT)	19,00,000	18,25,000	17,45,000
Less: Taxes @ 40%	7,60,000	7,30,000	6,98,000
Earnings after taxes (EAT)	11,40,000	10,95,000	10,47,000
Number of shares [W. N. (d)]	1,07,500	1,05,000	1,03,000
Earnings per share (EPS)	10.60	10.43	10.17

Conclusion: Alternative 1 (i.e. Raising Debt of ₹ 5 lakh and Equity of ₹ 15 lakh) is recommended which maximises the earnings per share.

Working Notes (W.N.):

(a) Calculation of Earnings before Interest and Tax (EBIT)

Particulars		
Output (1,00,000 + 50%)	(A)	1,50,000
Selling price per unit		₹ 40
Less: Variable cost per unit (₹ 20 - 15%)		₹ 17
Contribution per unit	(B)	₹ 23
Total contribution	(A × B)	₹ 34,50,000
Less: Fixed Cost (₹ 10,00,000 + ₹ 5,00,000)		₹ 15,00,000
EBIT		₹ 19,50,000

(b) Calculation of interest on Debt

Alternative		(₹)	Total (₹)
1	(₹ 5,00,000 × 10%)		50,000
2	(₹ 5,00,000 × 10%)	50,000	1,25,000
	(₹ 5,00,000 × 15%)	75,000	
3	(₹ 5,00,000 × 10%)	50,000	2,05,000
	(₹ 5,00,000 × 15%)	75,000	
	(₹ 4,00,000 × 20%)	80,000	

(c) Number of equity shares to be issued

$$\text{Alternative 1} = \frac{(20,00,000 - 5,00,000)}{200 \text{ (Market price of share)}} = \frac{15,00,000}{200} = 7,500 \text{ shares}$$

$$\text{Alternative 2} = \frac{(20,00,000 - 10,00,000)}{200 \text{ (Market price of share)}} = \frac{10,00,000}{200} = 5,000 \text{ shares}$$

$$\text{Alternative 3} = \frac{(20,00,000 - 14,00,000)}{200 \text{ (Market price of share)}} = \frac{6,00,000}{200} = 3,000 \text{ shares}$$

(d) Calculation of total equity shares after expansion program



	Alternative 1	Alternative 2	Alternative 3
Existing no. of shares	1,00,000	1,00,000	1,00,000
Add: issued under expansion program	7,500	5,000	3,000
Total no. of equity shares	1,07,500	1,05,000	1,03,000

Q.3

Calculate new EPS

PY Dec 21



Earnings before interest and tax of a company are ₹ 4,50,000. Currently the company has 80,000 Equity shares of ₹ 10 each, retained earnings of ₹ 12,00,000. It pays annual interest of ₹ 1,20,000 on 12% Debentures. The company proposes to take up an expansion scheme for which it needs additional fund of ₹ 6,00,000. It is anticipated that after expansion, the company will be able to achieve the same return on investment as at present.

It can raise fund either through debts at rate of 12% p.a. or by issuing Equity shares at par. Tax rate is 40%.

Required:

Compute the earning per share if:

- The additional funds were raised through debts.
- The additional funds were raised by issue of Equity shares.

Advise whether the company should go for expansion plan and which sources of finance should be preferred.

Ans

Working Notes:

- (1)
- Capital employed before expansion plan:**

	(₹)
Equity shares (₹ 10 × 80,000 shares)	8,00,000
Debentures {(₹ 1,20,000/12) ÷ 100}	10,00,000
Retained earnings	12,00,000
Total capital employed	30,00,000

- (2)
- Earnings before interest and tax (EBIT) = 4,50,000**

- (3)
- Return on Capital Employed (ROCE):**

$$\text{ROCE} = \frac{\text{EBIT}}{\text{Capital employed}} \times 100 = \frac{4,50,000}{30,00,000} \times 100 = 15\%$$

- (4)
- Earnings before interest and tax (EBIT) after expansion scheme:**

After expansion, capital employed = ₹ 30,00,000 + ₹ 6,00,000 = ₹ 36,00,000

Desired EBIT = 15% × ₹ 36,00,000 = ₹ 5,40,000

- (i) & (ii)
- Computation of Earnings Per Share (EPS) under the following options:**

	Present situation	Expansion scheme	
		Additional funds raised as	
	(₹)	Debt (i) (₹)	Equity (ii) (₹)
Earnings before Interest and Tax (EBIT)	4,50,000	5,40,000	5,40,000
Less: Interest - Old Debt	1,20,000	1,20,000	1,20,000

- New Debt	--	72,000 (₹ 6,00,000 × 12%)	--
Earnings before Tax (EBT)	3,30,000	3,48,000	4,20,000
Less: Tax (40% of EBT)	1,32,000	1,39,200	1,68,000
PAT/EAT	1,98,000	2,08,800	2,52,000
No. of shares outstanding	80,000	80,000	1,40,000
Earnings per Share (EPS)	2.475 $\left(\frac{1,98,000}{80,000}\right)$	2.610 $\left(\frac{2,08,800}{80,000}\right)$	1.800 $\left(\frac{2,52,000}{1,40,000}\right)$

Advise to the Company: When the expansion scheme is financed by additional debt, the EPS is higher. Hence, the company should finance the expansion scheme by raising debt.

Q.4

EPS / Fin. BEP / Indifference

PY Nov 20



J Ltd. is considering three financing plans. The-key information is as follows:

- (a) Total investment to be raised ₹ 4,00,000.
(b) Plans showing the Financing Proportion:

Plans	Equity	Debt	Preference Shares
X	100%	-	-
Y	50%	50%	-
Z	50%	-	50%

- (c) Cost of Debt 10% Cost of preference shares 10%
(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 ₹ 1,00,000

You are required to compute the following for each plan :

- (i) Earnings per share (EPS)
(ii) Financial break even point
(iii) Indifference Point between the plans and indicate if any of the plans dominate.(10 Marks)

Ans

(i) Computation of Earnings per Share (EPS)

Plans	X (₹)	Y (₹)	Z (₹)
Earnings before interest & tax (EBIT)	1,00,000	1,00,000	1,00,000
Less: Interest charges (10% of ₹ 2,00,000)	--	(20,000)	--
Earnings before tax (EBT)	1,00,000	80,000	1,00,000
Less: Tax @ 50%	(50,000)	(40,000)	(50,000)
Earnings after tax (EAT)	50,000	40,000	50,000
Less: Preference share dividend (10% of ₹2,00,000)	--	--	(20,000)
Earnings available for equity shareholders (A)	50,000	40,000	30,000
No. of equity shares (B) Plan X = ₹ 4,00,000/ ₹ 20	20,000	10,000	10,000
Plan Y = ₹ 2,00,000 / ₹ 20			



Plan Z = ₹ 2,00,000 / ₹ 20			
E.P.S (A) (B)	2.5	4	3

(ii) Computation of Financial Break-even Points

Financial Break-even point = Interest + Preference dividend / (1 - tax rate)

Proposal 'X' = 0

Proposal 'Y' = ₹ 20,000 (Interest charges)

Proposal 'Z' = Earnings required for payment of preference share dividend

= ₹ 20,000 ÷ (1 - 0.5 Tax Rate) = ₹ 40,000

(iii) Computation of Indifference Point between the plans

Combination of Proposals

(a) Indifference point where EBIT of proposal 'X' and proposal 'Y' is equal

$$\frac{(\text{EBIT})(1-0.5)}{20,000\text{shares}} = \frac{(\text{EBIT} - ₹20,000)(1-0.5)}{10,000\text{shares}}$$

$$0.5 \text{ EBIT} = \text{EBIT} - ₹ 20,000$$

$$\text{EBIT} = ₹ 40,000$$

(b) Indifference point where EBIT of proposal 'X' and proposal 'Z' is equal:

$$\frac{(\text{EBIT})(1-0.5)}{20,000\text{shares}} = \frac{\text{EBIT}(1-0.5) - ₹ 20,000}{10,000\text{shares}}$$

$$0.5 \text{ EBIT} = \text{EBIT} - ₹ 40,000$$

$$0.5 \text{ EBIT} = ₹ 40,000$$

$$\text{EBIT} = \frac{40,000}{0.5} = ₹ 80,000$$

(c) Indifference point where EBIT of proposal 'Y' and proposal 'Z' are equal

$$\frac{(\text{EBIT} - ₹ 20,000)(1-0.5)}{10,000\text{shares}} = \frac{\text{EBIT}(1-0.5) - ₹ 20,000}{10,000 \text{ shares}}$$

$$0.5 \text{ EBIT} - ₹ 10,000 = 0.5 \text{ EBIT} - ₹ 20,000$$

There is no indifference point between proposal 'Y' and proposal 'Z'

Analysis: It can be seen that financial proposal 'Y' dominates proposal 'Z', since the financial break-even-point of the former is only ₹ 20,000 but in case of latter, it is ₹ 40,000. EPS of plan 'Y' is also higher.

Q.5

Form of Financing to choose

PY Nov 18



Y Limited requires ₹ 50,00,000 for a new project. This project is expected to yield earnings before interest and taxes of ₹ 10,00,000. While deciding about the financial plan, the company considers the objective of maximizing earnings per share. It has two alternatives to finance the project - by raising debt ₹ 5,00,000 or ₹ 20,00,000 and the balance, in each case, by issuing Equity Shares. The company's share is currently selling at ₹ 300, but is expected to decline to ₹ 250 in case the funds are borrowed in excess of ₹ 20,00,000. The funds can be borrowed at the rate of 12 percent upto ₹ 5,00,000 and at 10 percent over ₹ 5,00,000. The tax rate applicable to the company is 25 percent. Which form of financing should the company choose?

Ans.

Plan I = Raising Debt of Rs 5 lakh + Equity of Rs 45 lakh.

Plan II = Raising Debt of ₹ 20 lakh + Equity of ₹ 30 lakh.

Calculation of Earnings per share (EPS)

Particulars	Financial Plans	
	Plan I	Plan II
	₹	₹
Expected EBIT	10,00,000	10,00,000
Less: Interest (Working Note 1)	(60,000)	(2,10,000)
Earnings before taxes	9,40,000	7,90,000
Less: Taxes @ 25%	(2,35,000)	(1,97,500)
Earnings after taxes (EAT)	7,05,000	5,92,500
Number of shares (Working Note 2)	15,000	10,000
Earnings per share (EPS)	47	59.25

Financing Plan II (i.e. Raising debt of ₹ 20 lakh and issue of equity share capital of ₹ 30 lakh) is the option which maximises the earnings per share.

Working Notes:

1. Calculation of interest on Debt.

Plan I	(₹ 5,00,000 × 12%)		₹ 60,000
Plan II	(₹ 5,00,000 × 12%)	₹ 60,000	₹ 2,10,000
	(₹ 15,00,000 × 10%)	₹ 1,50,000	

2. Number of equity shares to be issued

$$\text{Plan I: } \frac{\text{Rs. } 45,00,000}{\text{Rs. } 300 \text{ (Market Price of share)}} = 15,000 \text{ shares}$$

$$\text{Plan II: } \frac{\text{Rs. } 30,00,000}{\text{Rs. } 300 \text{ (Market Price of share)}} = 10,000 \text{ shares}$$

(*Alternatively, interest on Debt for Plan II can be 20,00,000 × 10% i.e. ₹ 2,00,000. accordingly, the EPS for the Plan II will be ₹60)

Q.6

Calculate new MPS

RTP Nov 23



Prakash Limited provides you the following information:

	(₹)
Profit (EBIT)	3,00,000
Less: Interest on Debenture @ 10%	(50,000)
EBT	2,50,000
Less Income Tax @ 50%	(1,25,000)
	1,25,000
No. of Equity Shares (₹ 10 each)	25,000
Earnings per share (EPS)	5
Price /EPS (PE) Ratio	10

The company has reserves and surplus of ₹ 7,50,000 and required ₹ 5,00,000 further for modernisation. Return on Capital Employed (ROCE) is constant. Debt (Debt/ Debt + Equity) Ratio higher than 40% will bring the P/E Ratio down to 8 and increase the interest rate on additional debts to 12%. You are required to ASCERTAIN the



probable price of the share.

- (i) If the additional capital is raised as debt; and
- (ii) If the amount is raised by issuing equity shares at ruling market price

Ans.

Ascertainment of probable price of shares of Prakash limited

Particulars	Plan-I	Plan-II
	If ₹ 5,00,000 is raised as debt (₹)	If ₹ 5,00,000 is raised by issuing equity shares (₹)
Earnings Before Interest and Tax (EBIT) {20% of new capital i.e., 20% of (₹15,00,000 + ₹ 5,00,000)} (Refer working note1)	4,00,000	4,00,000
Less: Interest on old debentures (10% of ₹5,00,000)	(50,000)	(50,000)
Less: Interest on new debt (12% of ₹5,00,000) Earnings Before Tax (EBT)	(60,000)	--
Less: Tax @ 50%	2,90,000 (1,45,000)	3,50,000 (1,75,000)
Earnings for equity shareholders (EAT)	1,45,000	1,75,000
No. of Equity Shares (refer working note 2)	25,000	35,000
Earnings per Share (EPS)	₹ 5.80	₹ 5.00
Price/ Earnings (P/E) Ratio (refer working note 3)	8	10
Probable Price Per Share (PE Ratio × EPS)	₹ 46.40	₹ 50

Working Notes:

1. Calculation of existing Return of Capital Employed (ROCE):

	(₹)
Equity Share capital (25,000 shares × ₹10)	2,50,000
10% Debentures $\left(50,000 \times \frac{100}{10}\right)$	5,00,000
Reserves and Surplus	7,50,000
Total Capital Employed	15,00,000
Earnings before interest and tax (EBIT) (given)	3,00,000
$ROCE = \frac{3,00,000}{15,00,000} \times 100$	20%

2. Number of Equity Shares to be issued in Plan-II:

$$= \frac{5,00,000}{50} = 10,000 \text{ Shares}$$

Thus, after the issue total number of shares = 25,000+ 10,000 = 35,000 shares

3. Debt/Equity Ratio if ₹ 5,00,000 is raised as debt:

$$= \frac{10,00,000}{20,00,000} \times 100 = 50\%$$

As the debt equity ratio is more than 40% the P/E ratio will be brought down to 8 in Plan-I

Q.7

Indifference point

RTP May 23



Current Capital Structure of XYZ Ltd is as follows:

Equity Share Capital of 7 lakh shares of face value ₹ 20 each

Reserves of ₹ 10,00,000

9% bonds of ₹ 3,00,00,000

11% preference capital: 3,00,000 shares of face value ₹ 50 each

Additional Funds required for XYZ Ltd are ₹ 5,00,00,000. XYZ Ltd is evaluating the following alternatives:

I. Proposed alternative I: Raise the funds via 25% equity capital and 75% debt at 10%.
PE ratio in such scenario would be 12.

II. Proposed alternative II: Raise the funds via 50% equity capital and rest from 12% Preference capital .PE ratio in such scenario would be 11.

Any new equity capital would be issued at a face value of ₹ 20 each. Any new preferential capital would be issued at a face value of ₹ 20 each. Tax rate is 34%

DETERMINE the indifference point under both the alternatives.

Ans.

Current Capital Structure		
Equity Share Capital	₹ 20 × 7 lakhs	₹ 1,40,00,000
Reserves		₹ 10,00,000
9% Bonds		₹ 3,00,00,000
11% Preference Share Capital	₹ 50 × 3 lakhs	₹ 1,50,00,000
Total Capital Employed		₹ 6,00,00,000

Proposed Capital Structure

Capital	Working	Proposal I	Proposal II
Capital to be raised		₹ 5,00,00,000	₹ 5,00,00,000
Equity	50000000 × 25%	₹ 1,25,00,000	-
Debt @ 10%	50000000 × 50%	-	₹ 2,50,00,000
Preference Shares @ 12%	50000000 × 75%	₹ 3,75,00,000	-
	50000000 × 50%	-	₹ 2,50,00,000
Combined Capital		Amount (proposal 1)	Amount (proposal 2)
Equity		₹ 2,65,00,000	₹ 3,90,00,000
Reserves		₹ 10,00,000	₹ 10,00,000
9% Bond		₹ 3,00,00,000	₹ 3,00,00,000
10% Debt		₹ 3,75,00,000	-
11% Preference Shares		₹ 1,50,00,000	₹ 1,50,00,000
12% Preference Shares		-	₹ 2,50,00,000
		₹ 11,00,00,000	₹ 11,00,00,000

Interest for Proposal I = ₹ 3,00,00,000 × 9% + ₹ 3,75,00,000 × 10%



$$= ₹ 27,00,000 + ₹ 37,50,000$$

$$= ₹ 64,50,000$$

Preference Dividend for Proposal I	= ₹ 1,50,00,000 × 11% = ₹ 16,50,000
Interest for Proposal II	= ₹ 3,00,00,000 × 9% = ₹ 27,00,000
Preference Dividend for Proposal II	= ₹ 1,50,00,000 × 11% + ₹ 2,50,00,000 × 12%
	= ₹ 16,50,000 + ₹ 30,00,000 = ₹ 46,50,000

Let the indifference point be ₹ X

For Proposal I,

$$EPS = \frac{(X - ₹ 64,50,000) \times 0.66 - ₹ 16,50,000}{13,25,000} \dots\dots\dots(1)$$

For Proposal II,

$$EPS = \frac{(X - ₹ 27,00,000) \times 0.66 - ₹ 46,50,000}{13,25,000} \dots\dots\dots(2)$$

Equating (1) and (2),

$$EPS = \frac{(X - ₹ 64,50,000) \times 0.66 - ₹ 16,50,000}{13,25,000} = \frac{(X - ₹ 27,00,000) \times 0.66 - ₹ 46,50,000}{19,50,000}$$

$$= \frac{0.66X - ₹ 42,57,000 - ₹ 16,50,000}{1,325} = \frac{0.66X - ₹ 17,82,000 - ₹ 46,50,000}{1,950}$$

$$\frac{0.66X - ₹ 59,07,000}{53} = \frac{0.66X - ₹ 64,32,000}{78}$$

$$₹ 51.48X - ₹ 46,07,46,000 = ₹ 37.98X - ₹ 34,08,96,000$$

$$₹ 16.5X = ₹ 11,98,50,000$$

$$\text{Indifference Point} = X = ₹ 72,63,636.36$$

Q.8

Calculate new MPS

RTP Nov 22



ABC Limited provides you the following information:

	(₹)
Profit (EBIT)	2,80,000
Less: Intt. on Debt @10%	<u>40,000</u>
EBT	2,40,000
Less: Income Tax @ 50%	<u>1,20,000</u>
	<u>1,20,000</u>
No. of Equity Shares (₹ 10 each)	30,000
Earnings per share (EPS)	4
Price / EPS (P/E) Ratio	10
Ruling Market price per share	40

The company has undistributed reserves of ₹ 7,00,000 and needs ₹ 4,00,000 further for expansion. This investment is expected to earn the same rate as funds already invested. You are informed that a debt equity (debt/ debt +equity) ratio higher than 32% will push the P/E ratio down to 8 and raise the interest rate on

additional borrowings (debentures) to 12%. You are required to ASCERTAIN the probable price of the share.

- (i) If the additional funds are raised as debt; and
- (ii) If the amount is raised by issuing equity shares at ruling market price of ₹ 40 per share.

Ans.

Ascertainment of probable price of shares

Particulars	Plan (i) (If ₹ 4,00,000 is raised as debt) (₹)	Plan (ii) (If ₹ 4,00,000 is raised by issuing equity shares) (₹)
Earnings Before Interest (EBIT)	3,60,000	3,60,000
20% on (14,00,000 + 4,00,000)		
Less: Interest on old debentures @ 10% on 4,00,000	40,000	40,000
	3,20,000	3,20,000
Less: Interest on New debt @ 12% on ₹ 4,00,000	48,000	-
Earnings Before Tax (After interest)	2,72,000	3,20,000
Less: Tax @ 50%	1,36,000	1,60,000
Earnings for equity shareholders (EAIT)	1,36,000	1,60,000
Number of Equity Shares (in numbers)	30,000	40,000
Earnings per Share (EPS)	4.53	4.00
Price/ Earnings Ratio	8	10
Probable Price Per Share	36.24 (8 × 4.53)	40 (10 × 4)

Working Notes:

	(₹)
1. Calculation of Present Rate of Earnings	
Equity Share capital (30,000 × ₹ 10)	3,00,000
10% Debentures $\left(40,000 \times \frac{100}{10}\right)$	4,00,000
Reserves (given)	7,00,000
	14,00,000
Earnings before interest and tax (EBIT) given	2,80,000
Rate of Present Earnings = $\left(\frac{2,80,000}{14,00,000} \times 100\right)$	20%
	10,000
2. Number of Equity Shares to be issued in Plan $\left(\frac{4,00,000}{40}\right)$	
Thus, after the issue total number of shares	30,000 + 10,000 = 40,000
3. Debt/Equity Ratio if ₹ 4,00,000 is raised as debt:	$\left(\frac{8,00,000}{18,00,000} \times 100\right)$

As the debt equity ratio is more than 32% the P/E ratio shall be 8 in plan (i) = 44.44%



Q.9

Indifference point & Dividend

RTP Nov 20



Xylo Ltd. is considering two alternative financing plans as follows:

Particulars	Plan - A (₹)	Plan - B (₹)
Equity shares of ₹ 10 each	8,00,000	8,00,000
Preference Shares of ₹ 100 each	-	4,00,000
12% Debentures	4,00,000	-
	12,00,000	12,00,000

The indifference point between the plans is ₹ 4,80,000. Corporate tax rate is 30%. CALCULATE the rate of dividend on preference shares.

Ans.

Computation of Rate of Preference Dividend

$$\frac{(EBIT - \text{Interest})(1 - t)}{\text{No. of Equity Shares (N1)}} = \frac{EBIT(1 - t) - \text{Preference Dividend}}{\text{No. of Equity Shares (N2)}}$$

$$\frac{(\text{₹}4,80,000 - \text{₹}48,000) \times (1 - 0.30)}{80,00,000 \text{ shares}} = \frac{4,80,000(1 - 0.30) - \text{Preference Dividend}}{80,00,000 \text{ shares}}$$

$$\frac{3,02,400}{80,00,000 \text{ shares}} = \frac{3,36,000 - \text{Preference Dividend}}{80,00,000 \text{ shares}}$$

$$\text{₹}3,02,400 = \text{₹}3,36,000 - \text{Preference Dividend}$$

$$\text{Preference Dividend} = \text{₹}3,36,000 - \text{₹}3,02,400 = \text{₹}33,600$$

$$\text{Rate of Dividend} = \frac{\text{Preference Dividend}}{\text{Preference share capital}} \times 100$$

$$= \frac{33,600}{4,00,000} \times 100 = 8.4\%$$

Q.10

Indifference Point

RTP May 20



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

(i) Equity share capital of ₹60,00,000 and 12% debentures of ₹40,00,000.

Or

(ii) Equity share capital of ₹40,00,000, 14% preference share capital of ₹20,00,000 and 12% debentures of ₹40,00,000.

Assume the corporate tax rate is 35% and par value of equity share is ₹100 in each case.

Ans.

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

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

$$\text{EPS}_{\text{Alternative (i)}} = \frac{(EBIT - \text{Interest})(1 - \text{tax rate})}{\text{No. of equity shares}}$$

$$= \frac{(EBIT - 0.12 \times 40,00,000)(1 - 0.35)}{60,000 \text{ shares}}$$

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

$$\text{EPS Alternative (ii)} = \frac{(\text{EBIT} - 0.12 \times 40,00,000)(1 - 0.35) - (0.14 \times 20,00,000)}{40,000 \text{ shares}}$$

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

$$\frac{(\text{EBIT} - 0.12 \times 40,00,000)(1 - 0.35)}{60,000 \text{ shares}} = \frac{(\text{EBIT} - 0.12 \times 40,00,000)(1 - 0.35) - (0.14 \times 20,00,000)}{40,000 \text{ shares}}$$

$$\text{Or } \frac{0.65 \text{ EBIT} - 3,12,000}{3} = \frac{0.65 \text{ EBIT} - 5,92,000}{2}$$

$$\begin{aligned} \text{Or } 1.30 \text{ EBIT} - ₹6,24,000 &= 1.95 \text{ EBIT} - ₹17,76,000 \\ \text{Or } (1.95 - 1.30) \text{ EBIT} &= ₹17,76,000 - ₹6,24,000 = ₹11,52,000 \\ \text{Or } \text{EBIT} &= \frac{11,52,000}{0.65} \\ \text{Or } \text{EBIT} &= ₹17,72,308 \end{aligned}$$

Q.11

Compute EPS & Choose best EPS MTP Nov 23(1)



Bhaskar Manufactures Ltd. have Equity Share Capital of ₹ 5,00,000 (face value ₹100) to meet the expenditure of an expansion programme, the company wishes to raise ₹ 3,00,000 and is having following four alternative sources to raise the funds:

Plan A: To have full money from equity shares.

Plan B: To have ₹ 1 lakhs from equity and ₹ 2 lakhs from borrowing from the financial institution @ 10% p.a.

Plan C: Full money from borrowing @ 10% p.a.

Plan D: ₹1 lakh in equity and ₹ 2 lakhs from preference shares at 8% p.a.

The company is expected to have an earning of ₹ 1,50,000. The corporate tax is 50%. Suggest a suitable plan of the above four plans to raise the required funds.

Ans.

Statement showing the EPS under the four plans

	Plan A	Plan B	Plan C	Plan D
Equity share capital	₹ 8,00,000	₹ 6,00,000	₹ 5,00,000	₹ 6,00,000
8% Pref. Share capital	-	-	-	₹ 2,00,000
Borrowing @ 10%	-	₹ 2,00,000	₹ 3,00,000	-
	₹ 8,00,000	₹ 8,00,000	₹ 8,00,000	₹ 8,00,000
E.B.I.T	₹ 1,50,000	₹ 1,50,000	₹ 1,50,000	₹ 1,50,000
Less: Interest @ 10%		₹ 20,000	₹ 30,000	
E.B.T	₹ 1,50,000	₹ 1,30,000	₹ 1,20,000	₹ 1,50,000
Less: Tax	₹ 75,000	₹ 65,000	₹ 60,000	₹ 75,000
Less: Pref Divided				₹ 16,000
Earnings available to equity share holders	₹ 75,000	₹ 65,000	₹ 60,000	₹ 59,000
No.of equity shares (₹100)	8,000	6,000	5,000	6,000
Earning per share	₹ 9.38	₹ 10.83	₹ 12.00	₹ 9.83

Plan C given the highest EPS and therefore to be accepted.



Q.12

Indifference point (pref divd)

MTP May 23(1)



Aeron We Ltd. is considering two alternative financing plans as follows:

Particulars	Plan - A (₹)	Plan - B (₹)
Equity shares of ₹ 100 each	90,00,000	90,00,000
Preference Shares of ₹ 100 each	-	20,00,000
9% Debentures	20,00,000	-
	1,10,00,000	1,10,00,000

The indifference point between the plans is ₹7,60,000. Corporate tax rate is 25%. CALCULATE the rate of dividend on preference shares.

Ans.

Computation of Rate of Preference Dividend

$$\frac{(\text{EBIT} - \text{Interest})(1 - t)}{\text{No. of Equity Shares (N1)}} = \frac{(\text{EBIT}(1 - t) - \text{Preference Dividend})}{\text{No. of Equity Shares (N2)}}$$

$$\frac{(7,60,000 - 1,80,000) \times (1 - 0.25)}{90,000 \text{ shares}} = \frac{7,60,000(1 - 0.25) - \text{Preference Dividend}}{90,000 \text{ shares}}$$

$$\frac{4,35,000}{90,000 \text{ shares}} = \frac{5,70,000 - \text{Preference Dividend}}{90,000 \text{ shares}}$$

$$\begin{aligned} \text{₹ 4,35,000} &= \text{₹ 5,70,000} - \text{Preference Dividend} \\ \text{Preference Dividend} &= \text{₹ 5,70,000} - \text{₹ 4,35,000} = \text{₹ 1,35,000} \end{aligned}$$

$$\begin{aligned} \text{Rate of Dividend} &= \frac{\text{Preference Dividend}}{\text{Preference share capital}} \times 100 \\ &= \frac{1,35,000}{20,00,000} \times 100 = 6.75\% \end{aligned}$$

Q.13

Calculate New EPS

MTP May 23(1)



RML Limited needs ₹6,50,00,000 for the Expansion purposes. The following three plans are feasible:

- (I) The Company may issue 6,50,000 equity shares at ₹100 per share.
- (II) The Company may issue 4,00,000 equity shares at ₹100 per share and 2,50,000 debentures of ₹100 denomination bearing a 9% rate of interest.
- (III) The Company may issue 4,00,000 equity shares at ₹100 per share and 2,50,000 cumulative preference shares at ₹100 per share bearing a 9% rate of dividend.
 - (i) If the Company's earnings before interest and taxes are ₹15,62,500, ₹22,50,000, ₹62,50,000, ₹93,75,000 and ₹1,56,25,000, CALCULATE the earnings per share under each of three financial plans? Assume a Corporate Income tax rate of 25%.
 - (ii) WHICH alternative would you recommend and why?

Ans.

Computation of EPS under three-financial plans.

Plan I: Equity Financing

	(₹)	(₹)	(₹)	(₹)	(₹)
EBIT	15,62,500	22,50,000	62,50,000	93,75,000	1,56,25,000
Interest	0	0	0	0	0
EBT	15,62,500	22,50,000	62,50,000	93,75,000	1,56,25,000
Less: Tax @ 25%	3,90,625	5,62,500	15,62,500	23,43,750	39,06,250

PAT	11,71,875	16,87,500	46,87,500	70,31,250	1,17,18,750
No. of equity shares	6,50,000	6,50,000	6,50,000	6,50,000	6,50,000
EPS	1.80	2.60	7.21	10.82	18.03

Plan II: Debt - Equity Mix

	(₹)	(₹)	(₹)	(₹)	(₹)
EBIT	15,62,500	22,50,000	62,50,000	93,75,000	1,56,25,000
Less: Interest	22,50,000	22,50,000	22,50,000	22,50,000	22,50,000
EBT	(6,87,500)	0	40,00,000	71,25,000	1,33,75,000
Less: Tax @ 25%	1,71,875*	0	10,00,000	17,81,250	33,43,750
PAT	(5,15,625)	0	30,00,000	53,43,750	1,00,31,250
No. of equity shares	4,00,000	4,00,000	4,00,000	4,00,000	4,00,000
EPS (₹)	(1.29)	0.00	7.50	13.36	25.08

* The Company can set off losses against the overall business profit or may carry forward it to next financial years.

Plan III: Preference Shares - Equity Mix

	(₹)	(₹)	(₹)	(₹)	(₹)
EBIT	15,62,500	22,50,000	62,50,000	93,75,000	1,56,25,000
Less: Interest	0	0	0	0	0
EBT	15,62,500	22,50,000	62,50,000	93,75,000	1,56,25,000
Less: Tax @ 25%	3,90,625	5,62,500	15,62,500	23,43,750	39,06,250
PAT	11,71,875	16,87,500	46,87,500	70,31,250	1,17,18,750
Less: Pref. dividend *	22,50,000	22,50,000	22,50,000	22,50,000	22,50,000
PAT after Pref. dividend.	(10,78,125)	(5,62,500)	24,37,500	47,81,250	94,68,750
No. of Equity shares	4,00,000	4,00,000	4,00,000	4,00,000	4,00,000
EPS	(2.70)	(1.41)	6.09	11.95	23.67

* In case of cumulative preference shares, the company has to pay cumulative dividend to preference shareholders.

(ii) In case of lower EBIT Plan I i.e Equity Financing is better however in case of higher EBIT Plan II i.e Debt=Equity Mix is best.

Q.14

Interest / EPS

MTP Nov 22(2)



Axar Ltd. has a Sales of ₹ 68,00,000 with a Variable cost Ratio of 60%.

The company has fixed cost of ₹16,32,000. The capital of the company comprises of 12% long term debt, ₹1,00,000 Preference Shares of ₹ 10 each carrying dividend rate of 10% and 1,50,000 equity shares.

The tax rate applicable for the company is 30%.

At current sales level, DETERMINE the Interest, EPS and amount of debt for the firm if a 25% decline in Sales will wipe out all the EPS.

Ans.

Break Even Sales = ₹ 6800000 × 0.75 = ₹ 51,00,000

Income Statement

(Amount in ₹)

	Original	Calculation of Interest at BEP (backward calculation)	Now at present level
Sales	68,00,000	51,00,000	68,00,000



Less: Variable Cost	40,80,000	30,60,000	40,80,000
Contribution	27,20,000	20,40,000	27,20,000
Less: Fixed Cost	16,32,000	16,32,000	16,32,000
EBIT	10,88,000	4,08,000	10,88,000
Less: Interest (EBIT-PBT)	?	3,93,714	3,93,714
PBT	?	14,286(10,000/70%)	6,94,286
Less: Tax @ 30%(or PBT-PAT)	?	4,286	2,08,286
PAT	?	10,000(Nil+10,000)	4,86,000
Less: Preference Dividend	10,000	10,000	10,000
Earnings for Equity share holders	?	Nil (at BEP)	4,76,000
Number of Equity Shares	1,50,000	1,50,000	1,50,000
EPS	?	-	3.1733

So Interest=₹3,93,714, EPS=₹3.1733, Amount of debt=3,93,714/12%=₹ 32,80,950

Q.15

Indifference Point

MTP Nov 19



RPS Company presently has Rs. 36,00,000 in debt outstanding bearing an interest rate of 10 percent. It wishes to finance a Rs. 40,00,000 expansion programme and is considering three alternatives: additional debt at 12 per cent interest, preferred stock with an 11 per cent dividend, and the sale of common stock at Rs. 16 per share. The company presently has 8,00,000 shares of common stock outstanding and is in a 40 per cent tax bracket.

- If earnings before interest and taxes are presently Rs. 15,00,000, CALCULATE earnings per share for the three alternatives, assuming no immediate increase in profitability?
- CALCULATE indifference point between debt and common stock.

Ans.

(i)

first attempt success tutorials

(Rs. in thousands)

	Debt	Preferred Stock	Common Stock
	Rs.	Rs.	Rs.
EBIT	1,500	1,500	1,500
Interest on existing debt	360	360	360
Interest on new debt	480		
Profit before taxes	660	1,140	1,140
Taxes	264	456	456
Profit after taxes	396	684	684
Preferred stock dividend		440	
Earnings available to common shareholders	396	244	684
Number of shares	800	800	1,050
Earnings per share	.495	.305	.651

- Mathematically, the indifference point between debt and common stock is (Rs in thousands):

$$\frac{\text{EBIT} * - \text{Rs. } 840}{800} = \frac{\text{EBIT} * - \text{Rs. } 360}{1,050}$$

$$\text{EBIT} * (1,050) - \text{Rs. } 840(1,050) = \text{EBIT} * (800) - \text{Rs. } 360(800)$$

$$250\text{EBIT} * = \text{Rs. } 5,94,000$$

$$\text{EBIT} * = \text{Rs. } 2,376$$

Q.16

Indifference Point

RTP SEP 2025



ABC Ltd. is planning to raise ₹50,00,000 for a major expansion project. The firm is evaluating three financing options:

- (i) **Equity Financing Only**
Issuing new shares at ₹10 each (Issue price: ₹10, but flotation cost per share: ₹0.50).
Existing equity shares: 10,00,000. Market price per share: ₹20.
- (ii) **Debt Financing Only**
Borrow ₹50,00,000 at 12% interest. Flotation cost on debt: 2% of the face value.
The lender imposes a debt covenant limiting the interest coverage ratio (EBIT/Interest) to a minimum of 2.5.
- (iii) **Mix of Equity and Debt Financing**
Raise ₹25,00,000 through equity (floatation cost: ₹0.50/share at ₹ 10 issue price).
Raise ₹25,00,000 through debt at 12% interest (floatation cost: 2%).

Additional Information

- (i) Project EBIT: ₹15,00,000 annually.
- (ii) Corporate tax rate: 30%.
- (iii) Existing shares: 10,00,000.
- (iv) Risk-free rate: 6%, Market return: 14%, Equity beta: 1.2.

From the above information:

1. CALCULATE the net proceeds from each financing method (after floatation costs) and determine the number of new shares issued in Option (i) and Option (iii).
 2. For debt options, CHECK if the interest coverage ratio complies with the covenant (minimum 2.5).
 3. COMPUTE EPS under each option.
 4. COMPUTE the WACC under each option, considering the impact of floatation costs on capital raised.
- ADVISE which financing option is best from both an EPS and WACC perspective.

Ans.

- (i) **Calculation of Net Proceeds after Floatation Cost and Number of New Shares in Option (i) and (iii)**

Equity Option

$$\begin{aligned} \text{Net proceeds per share} &= ₹ 10 - ₹ 0.50 = ₹ 9.50 \\ \text{Number of shares issued} &= ₹ 50,00,000 / ₹ 9.50 = 5,26,316 \text{ shares} \end{aligned}$$

Debt Option

$$\begin{aligned} \text{Flotation cost} &= 2\% \text{ of } ₹ 50,00,000 = ₹ 1,00,000 \\ \text{Net proceeds} &= ₹ 50,00,000 - ₹ 1,00,000 = ₹ 49,00,000 \end{aligned}$$

But project requires ₹ 50,00,000.

$$\begin{aligned} \text{So gross borrowing} &= ₹ 50,00,000 / (1 - 0.02) = ₹ 51,02,041 \\ \text{Interest} &= 12\% \times ₹ 51,02,041 = ₹ 6,12,245 \end{aligned}$$

Mix Option (₹25 lakh Equity, ₹25 lakh Debt)

Equity

$$\begin{aligned} \text{Net proceeds/share} &= ₹ 9.50 \\ \text{Shares issued} &= ₹ 25,00,000 / ₹ 9.50 = 2,63,158 \text{ shares} \end{aligned}$$

Debt

$$\begin{aligned} \text{Net debt proceeds} &= ₹ 25,00,000. \\ \text{Gross borrowing} &= ₹ 25,00,000 / (1 - 0.02) = ₹ 25,51,020 \\ \text{Interest} &= 12\% \times ₹ 25,51,020 = ₹ 3,06,122 \end{aligned}$$

**(ii) Calculation of Interest Coverage Ratio (ICR)**

$$\text{ICR} = \text{EBIT} / \text{Interest}$$

Debt Option:

$$\begin{aligned} \text{EBIT} &= ₹ 15,00,000 \\ \text{Interest} &= ₹ 6,12,245 \\ \text{ICR} &= ₹ 15,00,000 / ₹ 6,12,245 \approx 2.45 \text{ (Fails covenant)} \end{aligned}$$

Mix of Equity and Debt Option

$$\begin{aligned} \text{Interest} &= ₹ 3,06,122 \\ \text{ICR} &= ₹ 15,00,000 / ₹ 3,06,122 \approx 4.90 \text{ (Passes covenant)} \end{aligned}$$

(iii) Calculation of Earnings Per Share (EPS)

$$\text{EPS} = \frac{(\text{EBIT} - \text{Interest}) (1 - \text{Tax})}{\text{Total Shares}}$$

Equity Option

$$\begin{aligned} \text{Interest} &= ₹ 0 \\ \text{Net Income} &= ₹ 15,00,000 \times (1 - 0.30) = ₹ 10,50,000 \\ \text{Total Shares} &= 10,00,000 + 5,26,316 = 15,26,316 \\ \text{EPS} &= ₹ 10,50,000 / 15,26,316 = ₹ 0.688 \end{aligned}$$

Debt Option (Fails covenant)

$$\begin{aligned} \text{Interest} &= ₹ 6,12,245 \\ \text{Net Income} &= (₹ 15,00,000 - ₹ 6,12,245) \times (1 - 0.30) \\ &= ₹ 6,21,428.5 \end{aligned}$$

$$\begin{aligned} \text{Total Shares} &= 10,00,000 \\ \text{EPS} &= ₹ 6,21,428.5 / 10,00,000 \\ &= ₹ 0.621 \text{ (But violates ICR)} \end{aligned}$$

Mix Option

$$\begin{aligned} \text{Interest} &= ₹ 3,06,122 \\ \text{Net Income} &= (₹ 15,00,000 - ₹ 3,06,122) \times 0.70 = ₹ 8,35,714.6 \\ \text{Total Shares} &= 10,00,000 + 2,63,158 = 12,63,158 \\ \text{EPS} &= ₹ 8,35,714.6 / 12,63,158 \approx ₹ 0.662 \end{aligned}$$

(iv) Calculation of WACC

Cost of Equity (Using CAPM)

$$\text{Cost of Equity} = R_f + \beta(R_m - R_f)$$

$$= 6\% + 1.2 \times (14\% - 6\%) = 6\% + 9.6\% = 15.6\%$$

$$\text{Now, WACC} = (E/V \times K_e) + (D/V \times K_d \times (1 - t))$$

Equity Option

$$\begin{aligned} E &= ₹ 50,00,000 \\ D &= ₹ 0 \\ \text{WACC} &= 15.6\% \end{aligned}$$

Debt Option

$$\begin{aligned} E &= ₹ 0 \\ D &= ₹ 51,02,041 \\ K_d &= 12\% \\ \text{After-tax cost of debt} &= 12\% \times (1 - 0.30) = 8.4\% \\ \text{WACC} &= 8.4\% \text{ (Lowest WACC but fails covenant)} \end{aligned}$$

Mix Option

$$\begin{aligned}
 E &= ₹ 25,00,000, D = ₹ 25,51,020 \\
 \text{Total Value} &= ₹ 50,51,020 \\
 K_e &= 15.6\%, K_d \text{ (after tax)} = 8.4\% \\
 \text{WACC} &= (\text{Weight of } K_e \times \text{Cost of Equity}) + (\text{Weight of } K_d \times \text{Cost of Debt}) \\
 &= (0.495 \times 0.156) + (0.505 \times 0.084) \\
 &= 0.0772 + 0.0424 = 0.1196 \text{ or } 11.96\%
 \end{aligned}$$

Conclusion & Recommendation

Option	EPS	WACC	Covenant Compliant
Equity	₹ 0.688	15.6%	Not Applicable
Debt	₹ 0.621	8.4%	No (ICR < 2.5)
Mix	₹ 0.662	11.96%	Yes

Hence, the recommended option is Mixed Financing as it complies with the debt covenant, has higher EPS than Debt Option, and lower WACC than Equity Option.

Q.17

Indifference Point



PCB Corporation has plans for expansion which calls for 50% increase in assets. The alternatives before the Corporation are issued of equity shares or debt at 14%. Its balance sheet and profit and loss accounts are as given below:

Balance Sheet as at 31st March, 2023

Liabilities	₹	Assets	₹
Ordinary Shares (10,00,000 Shares @ ₹10 each)	1,00,00,000	Total Assets	2,00,00,000
12% Debentures	25,00,000		
General Reserve	75,00,000		
Total	2,00,00,000	Total	2,00,00,000

Profit and Loss Account for the year ending 31st March, 2023

Particulars	₹
Sales	7,50,00,000
Less: total cost excluding interest	6,75,00,000
EBIT	75,00,000
Less: Interest @ 12% of ₹25,00,000	3,00,000
EBT	72,00,000
Less: Tax @ 50%	36,00,000
EAT	36,00,000
÷ No. of Equity shares:	10,00,000
EPS	₹3.60
Price Earning Ratio	5 Times
Market Price Per Share	₹18.00

If the PCB Corporation finances the expansion with debt, the incremental financing charges will be at 14% and P/E ratio is expected to be at 4 times. If the expansion is through equity, the P/E ratio will remain at 5 times. The company expects that its new issues will be subscribed to at a premium of 25%.

With the above information determine the following:

- If EBIT is 10% of sales, calculate EPS and MPS at sales levels of ₹4 crores, ₹8 crores and ₹10 crores.
- After expansion determine at what level of EBIT, EPS would remain the same, whether new funds are raised by equity or debt.



Ans.

(i)

Statement of EPS and MPS

Particulars	Sales 4 Crores		Sales 8 Crores		Sales 10 Crores	
	Equity	Debt	Equity	Debt	Equity	Debt
EBIT @ 10% of Sales	40,00,000	40,00,000	80,00,000	80,00,000	1,00,00,000	1,00,00,000
Less: Interest:						
Existing	3,00,000	3,00,000	3,00,000	3,00,000	3,00,000	3,00,000
New @ 14% of ₹1 cr.	-	14,00,000	-	14,00,000	-	14,00,000
EBT	37,00,000	23,00,000	77,00,000	63,00,000	97,00,000	83,00,000
Less: Tax @ 50%	18,50,000	11,50,000	38,50,000	31,50,000	48,50,000	41,50,000
PAT	18,50,000	11,50,000	38,50,000	31,50,000	48,50,000	41,50,000
÷ No. of Equity shares						
Existing	10,00,000	10,00,000	10,00,000	10,00,000	10,00,000	10,00,000
New	8,00,000	-	8,00,000	-	8,00,000	-
EPS	₹1.03	₹1.15	₹2.14	₹3.15	₹2.69	₹4.15
× P/E Ratio	5 Times	4 Times	5 Times	4 Times	5 Times	4 Times
MPS	₹5.15	₹4.60	₹10.70	₹12.60	₹13.45	₹16.60

(ii) Indifference point between two alternatives of financing:

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

$$\frac{(EBIT - 3,00,000)(1-0.50)}{18,00,000} = \frac{(EBIT - 17,00,000)(1-0.50)}{10,00,000}$$

$$EBIT = ₹34,50,000$$

4

CHAPTER

CAPITAL STRUCTURE THEORY

Q.1

MM Hypothesis

PY July 21



The details about two companies R Ltd. and S Ltd. having same operating risk are given below:

Particulars	R Ltd.	S Ltd.
Profit before interest and tax	₹ 10 lakhs	₹ 10 lakhs
Equity share capital ₹ 10 each	₹ 17 lakhs	₹ 50 lakhs
Long term borrowings @ 10%	₹ 33 lakhs	-
Cost of Equity (Ke)	18%	15%

You are required to:

- (1) Calculate the value of equity of both the companies on the basis of M.M. Approach without tax.
- (2) Calculate the Total Value of both the companies on the basis of M.M. Approach without tax.

Ans.

- (1) **Computation of value of equity on the basis of MM approach without tax**

Particulars	R Ltd. (₹ in lakhs)	S Ltd. (₹ in lakhs)
Profit before interest and taxes	10	10
Less: Interest on debt (10% × ₹ 33,00,000)	3.3	-
Earnings available to Equity shareholders	6.7	10
Ke	18%	15%
Value of Equity (Earnings available to Equity shareholders/Ke)	37.222	66.667

- (2) **Computation of total value on the basis of MM approach without tax**

Particulars	R Ltd. (₹ in lakhs)	S Ltd. (₹ in lakhs)
Value of Equity (S) (as calculated above)	37.222	66.667
Debt (D)	33	-
Value of Firm (V) = S + D	70.222	66.667

Q.2

Implied equity rate of

PY Jan 21



A Limited and B Limited are identical except for capital structures. A Ltd. has 60 per cent debt and 40 per cent equity, whereas B Ltd. has 20 per cent debt and 80 per cent equity. (All percentages are in market-value terms.) The borrowing rate for both companies is 8 per cent in a no-tax world, and capital markets are assumed to be perfect.

- (a)
 - (i) If X, owns 3 per cent of the equity shares of A Ltd., determine his return if the Company has net operating income of ₹ 4,50,000 and the overall capitalization rate of the company, (K₀) is 18 percent.
 - (ii) Calculate the implied required rate of return on equity of A Ltd.
- (b) B Ltd. has the same net operating income as A Ltd.
 - (i) Calculate the implied required equity return of B Ltd.
 - (ii) Analyse why does it differ from that of A Ltd.



Ans. (a) Value of A Ltd. = $\frac{NOI}{K_o} = \frac{4,50,000}{18\%} = 25,00,000$

(i) Return on Shares of X on A Ltd.

Particulars	Amount (₹)
Value of the company	25,00,000
Market value of debt (60% × ₹ 25,00,000)	15,00,000
Market value of shares (40% × ₹ 25,00,000)	10,00,000
Particulars	Amount (₹)
Net operating income	4,50,000
Interest on debt (8% × ₹ 15,00,000)	1,20,000
Earnings available to shareholders	3,30,000
Return on 3% shares (3% × ₹ 3,30,000)	9,900

(ii) Implied required rate of return on equity of A Ltd. = $\frac{3,30,000}{10,00,000} = 33\%$

(b) (i) Calculation of Implied rate of return of B Ltd.

Particulars	Amount (₹)
Total value of company	25,00,000
Market value of debt (20% × ₹ 25,00,000)	5,00,000
Market value of equity (80% × ₹ 25,00,000)	20,00,000
Particulars	Amount (₹)
Net operating income	4,50,000
Interest on debt (8% × ₹ 5,00,000)	40,000
Earnings available to shareholders	4,10,000

Implied required rate of return on equity = $\frac{4,10,000}{20,00,000} = 20.5\%$

(ii) Implied required rate of return on equity of B Ltd. is lower than that of A Ltd. because B Ltd. uses less debt in its capital structure. As the equity capitalisation is a linear function of the debt-to-equity ratio when we use the net operating income approach, the decline in required equity return offsets exactly the disadvantage of not employing so much in the way of "cheaper" debt funds.

Q.3

MM Hypothesis

PY May 18



Stopgo Ltd, an all equity financed company, is considering the repurchase of ₹ 200 lakhs equity and to replace it with 15% debentures of the same amount. Current market Value of the company is ₹ 1140 lakhs and it's cost of capital is 20%. It's Earnings before Interest and Taxes (EBIT) are expected to remain constant in future. It's entire earnings are distributed as dividend. Applicable tax rate is 30 per cent.

You are required to calculate the impact on the following on account of the change in the capital structure as per Modigliani and Miller (MM) Hypothesis:

- The market value of the company
- It's cost of capital, and
- It's cost of equity

Ans.

Working Note

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

$$\frac{\text{Net income (NI) for equity holders}}{0.20} = ₹ 1,140 \text{ lakhs}$$

Therefore, Net Income to equity-holders = ₹ 228 lakhs

EBIT = ₹ 228 lakhs / 0.7 = ₹ 325.70 lakhs

	All Equity (₹ In lakhs)	Debt of Equity (₹ In lakhs)
EBIT	325.70	325.70
Interest on ₹200 lakhs @ 15%	--	30.00
EBT	325.70	295.70
Tax @ 30 %	97.70	88.70
Income available to equity holders	228	207

(i) **Market value of levered firm** = Value of unlevered firm + Tax Advantage
 = ₹ 1,140 lakhs + (₹200 lakhs × 0.3)
 = ₹ 1,200 lakhs

The impact is that the market value of the company has increased by ₹ 60 lakhs (₹ 1,200 lakhs - ₹ 1,140 lakhs)

Calculation of Cost of Equity

$$\begin{aligned} \text{Ke} &= (\text{Net Income to equity holders} / \text{Equity Value}) \times 100 \\ &= (207 \text{ lakhs} / 1200 \text{ lakhs} - 200 \text{ lakhs}) \times 100 \\ &= (207 / 1000) \times 100 \\ &= 20.7 \% \end{aligned}$$

(ii) **Cost of Capital**

Components	Amount (₹ In lakhs)	Cost of Capital %	Weight	WACC %
Equity	1000	20.7	83.33	17.25
Debt	200	(15% × 0.7) = 10.5	16.67	1.75
	1200			19.00

The impact is that the WACC has fallen by 1% (20% - 19%) due to the benefit of tax relief on debt interest payment.

(iii) **Cost of Equity is 20.7% [As calculated in point (i)]**

The impact is that cost of equity has risen by 0.7% i.e. 20.7% - 20% due to the presence of financial risk. Further, Cost of Capital and Cost of equity can also be calculated with the help of formulas as below, though there will be no change in final answers.

Cost of Capital (K_o) = K_{eu}(1-tL) Where,

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

t = Tax rate



$$L = \frac{\text{Debt}}{\text{Debt} + \text{Equity}}$$

$$K_o = 0.2 \times \left(1 - \frac{200\text{lakh}}{1,200\text{lakh}} \times 0.3 \right)$$

So, Cost of capital = 0.19 or 19%

$$\text{Cost of Equity (Ke)} = K_{eu} + (K_{eu} - K_d) \frac{\text{Debt} (1 - t)}{\text{Equity}}$$

Where,

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

K_d = Cost of debt

t = Tax rate

$$K_e = 0.20 + \left(0.20 - 0.15 \times \frac{200 \text{ lakh} \times 0.7}{1,000 \text{ lakh}} \right)$$

$$K_e = 0.20 + 0.007 = 0.207 \text{ or } 20.7\%$$

So, Cost of Equity = 20.70%

Q.4

MM Hypothesis

RTP May 22



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

Particulars	Bee Ltd.	Cee Ltd.
12% Debt	₹ 27,00,000	-
Equity Capitalization Rate	-	18
Expected Net Operating Income	₹ 9,00,000	₹ 9,00,000

You are required to:

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

Ans.

- (a) Assuming no tax as per MM Approach.

Calculation of Value of Firms 'Bee Ltd.' and 'Cee Ltd' according to MM Hypothesis

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

$$\text{Total Value of Unlevered Firm (Vu)} = [\text{NOI}/k_e] = 9,00,000/0.18 = ₹ 50,00,000$$

$$K_e \text{ of Unlevered Firm (given)} = 0.18$$

$$K_o \text{ of Unlevered Firm (Same as above} = k_e \text{ as there is no debt)} = 0.18$$

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

$$\begin{aligned} \text{Total Value of Levered Firm (VL)} &= V_u + (\text{Debt} \times \text{Nil}) \\ &= ₹ 50,00,000 + (27,00,000 \times \text{nil}) \\ &= ₹ 50,00,000 \end{aligned}$$

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

Particulars	Bee Ltd.
Net Operating Income (NOI)	9,00,000

Less: Interest on Debt (I)	3,24,000
Earnings of Equity Shareholders (NI)	5,76,000
Overall Capitalization Rate (k_0)	0.18
Total Value of Firm ($V = \text{NOI}/k_0$)	50,00,000
Less: Market Value of Debt	27,00,000
Market Value of Equity (S)	23,00,000
Equity Capitalization Rate [$k_e = \text{NI}/S$]	0.2504
Weighted Average Cost of Capital (k_0)*	0.18
$k_0 = (k_e \times S/V) + (k_d \times D/V)$	

*Computation of WACC Bee Ltd

Component of Capital	Amount	Weight	Cost of Capital	WACC
Equity	23,00,000	0.46	0.2504	0.1152
Debt	27,00,000	0.54	0.12*	0.0648
Total	50,00,000			0.18

* $k_d = 12\%$ (since there is no tax) WACC = 18%

(b) Assuming 40% taxes as per MM Approach

Calculation of Value of Firms 'Bee Ltd.' and 'Cee Ltd' according to MM Hypothesis

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

$$\begin{aligned} \text{Total Value of unlevered Firm (V}_u) &= [\text{NOI} (1 - t)/k_e] = 9,00,000 (1 - 0.40) / 0.18 \\ &= ₹ 30,00,000 \end{aligned}$$

k_e of unlevered Firm (given) = 0.18

k_0 of unlevered Firm (Same as above = k_e as there is no debt) = 0.18

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

$$\begin{aligned} \text{Total Value of Levered Firm (V}_L) &= V_u + (\text{Debt} \times \text{Tax}) \\ &= ₹ 30,00,000 + (27,00,000 \times 0.4) \\ &= ₹ 40,80,000 \end{aligned}$$

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

= 18% (i.e. $k_e = k_0$)

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

Particulars	Bee Ltd. (₹)
Net Operating Income (NOI)	9,00,000
Less: Interest on Debt (I)	3,24,000
Earnings Before Tax (EBT)	5,76,000
Less: Tax @ 40%	2,30,400
Earnings for equity shareholders (NI)	3,45,600
Total Value of Firm (V) as calculated above	40,80,000
Less: Market Value of Debt	27,00,000
Market Value of Equity (S)	13,80,000
Equity Capitalization Rate [$k_e = \text{NI}/S$]	0.2504
Weighted Average Cost of Capital (k_0)*	13.23
$k_0 = (k_e \times S/V) + (k_d \times D/V)$	



*Computation of WACC Bee Ltd.

Component of Capital	Amount	Weight	Cost of Capital	WACC
Equity	13,80,000	0.338	0.2504	0.0846
Debt	27,00,000	0.662	0.072*	0.0477
Total	40,80,000			0.1323

*Kd= 12% (1- 0.4) = 12% × 0.6 = 7.2% WACC = 13.23%

Q.5

MM Hypothesis & Traditional

RTP Jul 21



Zordon Ltd. has net operating income of ₹ 5,00,000 and total capitalization of ₹ 50,00,000 during the current year. The company is contemplating to introduce debt financing in capital structure and has various options for the same. The following information is available at different levels of debt value:

Debt value (₹)	Interest rate (%)	Equity capitalization rate (%)
0	-	10.00
5,00,000	6.0	10.50
10,00,000	6.0	11.00
15,00,000	6.2	11.30
20,00,000	7.0	12.40
25,00,000	7.5	13.50
30,00,000	8.0	16.00

Assuming no tax and that the firm always maintains books at book values, you are REQUIRED to calculate:

- Amount of debt to be employed by firm as per traditional approach.
- Equity capitalization rate, if MM approach is followed.

Ans.

(a) Amount of debt to be employed by firm as per traditional approach

Calculation of Equity, W_d and W_e

Total Capital (₹)	Debt (₹)	W_d	Equity value (₹)	W_e
(a)	(b)	(b)/(a)	(c) = (a) - (b)	(c)/(a)
50,00,000	0	-	50,00,000	1.0
50,00,000	5,00,000	0.1	45,00,000	0.9
50,00,000	10,00,000	0.2	40,00,000	0.8
50,00,000	15,00,000	0.3	35,00,000	0.7
50,00,000	20,00,000	0.4	30,00,000	0.6
50,00,000	25,00,000	0.5	25,00,000	0.5
50,00,000	30,00,000	0.6	20,00,000	0.4

Statement of Weighted Average Cost of Capital (WACC)

K_e	W_e	K_d	W_d	$K_e W_e$	$K_d W_d$	K_o
(1)	(2)	(3)	(4)	(5) = (1) × (2)	(6) = (3) × (4)	(7) = (5) + (6)
0.100	1.0	-	-	0.100	-	0.100
0.105	0.9	0.060	0.1	0.095	0.006	0.101

0.110	0.8	0.060	0.2	0.088	0.012	0.100
0.113	0.7	0.062	0.3	0.079	0.019	0.098
0.124	0.6	0.070	0.4	0.074	0.028	0.102
0.135	0.5	0.075	0.5	0.068	0.038	0.106
0.160	0.4	0.080	0.6	0.064	0.048	0.112

So, amount of Debt to be employed = ₹ 15,00,000 as WACC is minimum at this level of debt i.e. 9.8%.

- (b) As per MM approach, cost of the capital (K_0) remains constant and cost of equity increases linearly with debt.

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

$$₹ 50,00,000 = \frac{5,00,000}{K_0}$$

$$K_0 = \frac{5,00,000}{50,00,000} = 10\%$$

Statement of Equity Capitalization rate (k_e) under MM approach

Debt (₹)	Equity (₹)	Debt/Equity	K_0	K_d	$K_0 - K_d$	K_e = $K_0 + (K_0 - K_d) \frac{\text{Debt}}{\text{Equity}}$
(1)	(2)	(3) = (1)/(2)	(4)	(5)	(6) = (4) - (5)	(7) = (4) + (6) × (3)
0	50,00,000	0	0.10	-	0.100	0.100
5,00,000	45,00,000	0.11	0.10	0.060	0.040	0.104
10,00,000	40,00,000	0.25	0.10	0.060	0.040	0.110
15,00,000	35,00,000	0.43	0.10	0.062	0.038	0.116
20,00,000	30,00,000	0.67	0.10	0.070	0.030	0.120
25,00,000	25,00,000	1.00	0.10	0.075	0.025	0.125
30,00,000	20,00,000	1.50	0.10	0.080	0.020	0.130

Q.6

MM Hypothesis

RTP Nov 18



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

- Market value of J Ltd.
- Cost of Equity (K_e)
- Weighted average cost of capital (using market weights) and comment on it.

Ans. Value of a company (V) = Value of equity (S) + Value of debt (D)

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

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



Market Value of Equity	= ₹ 25,00,000
Ke = 21%	
$\frac{\text{Net income (NI) for equity holders}}{K_e}$	= Market Value of Equity
$\frac{\text{Net income (NI) for equity holders}}{0.21}$	= ₹ 25,00,000
Net income for equity holders	= ₹ 5,25,000
EBIT = 5,25,000/0.7	= ₹ 7,50,000

INTERMEDIATE (NEW) EXAMINATION: NOVEMBER, 2018

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

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

(i) Value of Restructured firm

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

(ii) Cost of Equity (Ke)

Total Value = ₹ 26,50,000

Less: Value of Debt = ₹ 5,00,000

Value of Equity = ₹ 21,50,000

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

(iii) WACC (on market value weight)

Cost of Debt (after tax) = 15% (1 - 0.3) = 0.15 (0.70) = 0.105 = 10.5%

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

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

Q.7

Net Income & Net operating

RTP May 18



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.

Ans.

(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% $\left(\frac{(1 - 0.5)}{5}\right)$	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

Q.8

Arbitrage Process

MTP May23(2)



Following data is available in respect of two companies having same business risk: Capital employed = ₹ 12,00,000, EBIT = ₹ 2,40,000 and $K_e = 15\%$

Sources	Dumbo Ltd (₹)	Jumbo Ltd (₹)
Debt (@12%)	4,00,000	Nil
Equity	8,00,000	12,00,000

An investor is holding 20% shares in the levered company. CALCULATE the increase in annual earnings of investor if arbitrage process is undertaken.

Also EXPLAIN the arbitrage process if $K_e = 20\%$ for Dumbo Ltd instead of 15%.



Ans.

(I). Valuation of firms

Particulars	Dumbo Ltd (₹)	Jumbo Ltd (₹)
EBIT	2,40,000	2,40,000
Less: Interest on debt (12% × ₹ 4,00,000)	48,000	Nil
Earnings available to Equity shareholders	1,92,000	2,40,000
Ke	15%	15%
Value of Equity (S)	12,80,000	16,00,000
Debt (D)	4,00,000	Nil
Value of Firm (V) = S + D	16,80,000	16,00,000

Value of Levered company is more than that of unlevered company. Therefore, investor will sell his shares in levered company and buy shares in unlevered company. To maintain the level of risk he will borrow proportionate amount and invest that amount also in shares of unlevered company

(II) Investment & Borrowings

	₹
Sell shares in Levered company (12,80,000 × 20%)	2,56,000
Borrow money (4,00,000 × 20%)	<u>80,000</u>
Buy shares in Unlevered company	<u>3,36,000</u>

(III) Change in Return

	₹
Income from shares in Unlevered company (2,40,000 × 3,36,000/16,00,000)	50,400
Less: Interest on loan (80,000 × 12%)	<u>9,600</u>
Net Income from unlevered firm	40,800
Less: Income from Levered firm (1,92,000 × 20%)	<u>38,400</u>
Incremental Income due to arbitrage	2,400
Arbitrage process if Ke = 20%	

(I). Valuation of firms

Particulars	Dumbo Ltd (₹)	Jumbo Ltd (₹)
EBIT	2,40,000	2,40,000
Less: Interest on debt (12% × ₹ 4,00,000)	48,000	Nil
Earnings available to Equity shareholders	1,92,000	2,40,000
Ke	20%	15%
Value of Equity (S) (Earnings available to Equity shareholders/Ke)	9,60,000	16,00,000
Debt (D)	4,00,000	Nil
Value of Firm (V) = S + D	13,80,000	16,00,000

Value of unlevered company is more than that of levered company. Therefore, investor will sell his shares in unlevered company and buy proportionate shares and debt in levered company i.e. 20% share.

(II). Investment & Borrowings

	₹
Sell shares in unlevered company (16,00,000 × 20%)	3,20,000
Buy shares in levered company (9,60,000 × 20%)	<u>1,92,000</u>
Buy Debt of levered company	1,28,000

(III). Change in Return

	₹
Income from shares in levered company (1,92,000 × 20%)	38,400
Add: Interest on debt of levered (1,28,000 × 12%)	<u>15,360</u>
Net Income from levered firm	53,760
Less: Income from unlevered firm (2,40,000 × 20%)	<u>48,000</u>
Incremental Income due to arbitrage	5,760

Q.9

MM Hypothesis

MTP May 20



A&R Ltd. is an all equity financed company with a market value of Rs.25,000 lakh and cost of equity (K_e) 18%. The company wants to buyback equity shares worth Rs.5,000 lakh by issuing and raising 10% debentures redeemable at 10% premium after 5 years. Rate of tax may be taken as 35%. Applying Modigliani-Miller (MM) (with taxes), you are required to CALCULATE after restructuring:

- (i) Market value of A&R Ltd.
- (ii) Cost of Equity (K_e)
- (iii) Weighted average cost of capital (using market weights).

Ans.

Value of a company (V) = Value of equity (S) + Value of debt (D)
A&R Ltd. is all equity financed company, its value would equal to value of equity.

$$\text{Market value of equity} = \frac{\text{Net Income (NI)}}{K_e}$$

In the question, market value of equity is Rs.25,000 lakh and cost of equity (K_e) is 18%. The Net Income (NI) is calculated as follows:

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

$$\frac{\text{Net income (NI) for equity - holders}}{0.18} = 25,000 \text{ lakh}$$

$$\text{Net income for equity holders} = 4,500 \text{ lakh}$$

Net Income (NI) is after tax income, the before tax income would be

$$\text{EBT} = \frac{4,500 \text{ lakh}}{(1-0.35)} = 6,923.07 \text{ lakh.}$$

Since, A&R Ltd. is an all equity financed and there is no interest expense, so here EBT is equal to EBIT. After issuing 10% debentures, the A&R Ltd would become a levered company.

- (i) The value of A&R Ltd. after issuing debentures would be calculated as follows:

Value of a levered company (V_g)



$$\begin{aligned}
 &= \text{Value of an unlevered company (Vu)} + \text{Tax benefit (TB)} \\
 &= \text{Rs.25,000 lakh} + (\text{Rs.5,000 lakh} \times 35\%) \\
 &= \text{Rs.25,000} + \text{Rs.1,750} = \text{Rs.26,750}
 \end{aligned}$$

(ii) Cost of Equity (Ke)

$$\begin{aligned}
 \text{Total Value} &= \text{Rs.26,750 lakh} \\
 \text{Less: Value of Debt} &= \text{Rs. 5,000 lakh} \\
 \text{Value of Equity} &= \text{Rs. 21,750}
 \end{aligned}$$

$$K_e = \frac{4,175 \text{ lakh}}{21,750 \text{ lakh}} = 0.1919 = 19.19\%$$

(iii) WACC (on market value weight)

Components of Costs	Amount (lakh)	Cost of Capital (%)	Weight	WACC (%)
Equity	21,750	19.19	0.81	15.54
Debt	5,000	8.10	0.19	1.54
	26,750			17.08

Workings Note:

1.

(Rs. in lakh)

	All Equity	Debt and Equity
EBIT (as calculated above)	6,923.07	6,923.07
Interest to debt-holders	-	500.00
EBT	6,923.07	6,423.07
Taxes (35%)	2,423.07	2,248.07
Income available to equity shareholders	4,500.00	4,175.00
Income to debt holders plus income available to shareholders	4,500.00	4,675.00

$$\begin{aligned}
 2. \quad \text{Cost of Debenture (Kd)} &= \frac{\text{Rs.500}(1 - 0.35) + \frac{(5,500 - 5,000)}{5}}{(5,500 + 5,000)} \\
 &= \frac{\text{Rs.325} + 100}{5,250} = 0.081 \text{ or } 8.1\%
 \end{aligned}$$

Q.10

MM Hypothesis

MTP Nov 19



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 Rs.100 lakhs. Assuming that :

- (i) All assumptions of M-M model are met;
- (ii) Income-tax rate is 30%;
- (iii) EBIT is Rs. 25,00,000 and
- (iv) The Equity capitalization rate of 'A' Ltd. is 20%.

CALCULATE the value of & also find out the Weighted Average Cost of Capital for both the companies.

Ans.

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

Market Value of 'A Ltd.' (Unlevered)

$$V_u = \frac{EBIT(1-t)}{K_e} = \frac{Rs.25,00,000(1-0.30)}{20\%} = \frac{Rs.17,50,000}{20\%} = Rs.87,50,000$$

Market Value of 'B Ltd.' (Levered)

$$\begin{aligned} V_g &= V_u + TB \\ &= Rs.87,50,000 + (Rs.1,00,00,000 \times 0.30) \\ &= Rs.87,50,000 + Rs.30,00,000 = Rs.1,17,50,000 \end{aligned}$$

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

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

WACC of 'B Ltd.'

	B Ltd. (Rs.)
EBIT	25,00,000
Interest to Debt holders	(12,00,000)
EBT	13,00,000
Taxes @ 30%	(3,90,000)
Income available to Equity Shareholders	9,10,000
Total Value of Firm	1,17,50,000
Less: Market Value of Debt	(1,00,00,000)
Market Value of Equity	17,50,000
Return on equity (K_e) = 9,10,000 / 17,50,000	0.52

Computation of WACC B. Ltd

Component of Capital	Amount	Weight	Cost of Capital	WACC
Equity	17,50,000	0.149	0.52	0.0775
Debt	1,00,00,000	0.851	0.084*	0.0715
Total	1,17,50,000			0.1490

* $K_d = 12\% (1 - 0.3) = 12\% \times 0.7 = 8.4\%$

WACC = 14.90%

Q.11

Traditional Theory

MTP May 19(2)



The proportion and required return of debt and equity was recorded for a company with its increased financial leverage as below:

Debt (%)	Required return (Kd) (%)	Equity (%)	Required Return (Ke) (%)	Weighted Average Cost of Capital (WACC) (Ko)(%)
7	5	100	15	15
20	6	80	16	?
40	7	60	18	?
60	10	40	23	?
80	15	20	35	?

You are required to complete the table and IDENTIFY which capital structure is most beneficial for this company. (Based on traditional theory, i.e., capital structure is relevant).



Ans. Computation of Weighted Average Cost of Capital (WACC) for each level of Debt-equity mix.

Debt (%)	Required return (Kd)(%)	Equity (%)	Required return (Ke) (%)	Kd × Proportion of debt + Ke Proportion and equity	Weighted Average Cost of Capital (WACC)(Ko)(%)
0	5	100	15	0%(5%)+100%(15%)	15
20	6	80	16	20%(6%)+80%(16%)	14
40	7	60	18	40%(7%)+60%(18%)	13.6
60	10	40	23	60%(10%)+40%(23%)	15.2
80	15	20	35	80%(15%)+20%(35%)	19

The optimum mix is 40% debt and 60% equity, as this will lead to lowest WACC value i.e., 13.6%.

Q.12

FM May 24



Following data is available in respect of Levered and Unlevered companies having same business risk:
Capital employed = ₹ 2,00,000, EBIT = ₹ 25,000 and $K_e = 12.5\%$

Sources	Levered Company (₹)	Unlevered Company (₹)
Debt (@8%)	75,000	Nil
Equity	1,25,000	2,00,000

An investor is holding 12% shares in levered company. Calculate the increase in annual earnings of investor if he switches over his holding from Levered to Unlevered company.

Ans.

1. Valuation of firms

Particulars	Levered Firm (₹)	Unlevered Firm (₹)
EBIT	25,000	25,000
Less: Interest on debt (8% × ₹ 75,000)	6,000	Nil
Earnings available to Equity shareholders	19,000	25,000
K_e	12.5%	12.5%
Value of Equity (S) (Earnings available to Equity shareholders / K_e)	1,52,000	2,00,000
Debt (D)	75,000	Nil
Value of Firm (V) = S + D	2,27,000	2,00,000

Value of Levered company is more than that of unlevered company. Therefore, investor will sell his shares in levered company and buy shares in unlevered company. To maintain the level of risk he will borrow proportionate amount and invest that amount also in shares of unlevered company.

2. Investment & Borrowings

Sell shares in Levered company (₹ 1,52,000 × 12%)	18,240
Borrow money (₹ 75,000 × 12%)	9,000
Buy shares in Unlevered company	<u>27,240</u>

3. Change in Return

Income from shares in Unlevered company (₹ 27,240 × 12.5%)	3,405
Less: Interest on loan (₹ 9,000 × 8%)	<u>720</u>
Net Income from unlevered firm	2,685
Less: Income from Levered firm (₹ 18,240 × 12.5%)	<u>2,280</u>
Incremental Income due to arbitrage	<u>405</u>

Solution can also be done in the following way:

Valuation of firms

Particulars	Levered Firm (₹)	Unlevered Firm (₹)
EBIT	25,000	25,000
Less: Interest on debt (8% × ₹ 75,000)	6,000	Nil
Earnings available to Equity shareholders	19,000	25,000
Ke	12.5%	12.5%
Value of Equity (S) (Earnings available to Equity shareholders/ Ke)	1,52,000	2,00,000
Debt (D)	75,000	Nil
Value of Firm (V) = S + D	2,27,000	2,00,000

Value of Levered company is more than that of unlevered company. Therefore, investor will sell his shares in levered company and buy shares in unlevered company.

Arbitrage Process:

If investor have 12% shares of levered company, value of investment in equity shares is 12% of ₹ 1,52,000 i.e. ₹ 18,240 and return will be 12% of ₹19,000 = ₹ 2,280.

Alternate Strategy will be:

Sell 12% shares of levered firm for ₹ 18,240 and borrow 12% of levered firm's debt i.e. ₹ 9,000 (12% of ₹ 75,000) and invest the money i.e. 12% in unlevered firm's stock:

Total resources /Money investor have = ₹ 18,240 + ₹ 9,000 = ₹ 27,240 and investor invest 12% of ₹ 2,00,000 = ₹ 24,000

Surplus cash available with investor is = ₹ 27,240 - ₹ 24,000 = ₹ 3,240

Investor return = 12% EBIT of unlevered firm - Interest to be paid on borrowed funds

i.e. = 12% of ₹ 25,000 - 8% of ₹ 9,000 = ₹ 3,000 - ₹ 720 = ₹ 2,280

Now, return remains the same i.e. ₹ 2,280 which investor is getting from levered company before investing in unlevered company but still have ₹ 3,240 excess money available with investor. Hence, investor is better off by doing arbitrage.

Q.13

MTP Jan 25(2)  success tutorials

Theta Limited is expecting an annual earning of Rs. 3 Lakhs before paying any interest and taxes. The company has Rs. 10 lakhs of 10% debentures in its capital structure. The capitalisation rate is 12.5%. You are required to calculate the value of Theta Limited as per the NI approach. Also, COMPUTE the overall cost of capital.

Ans.

EBIT = ₹ 3,00,000

Less: Interest = ₹ 10,00,000 × 10% = ₹ 1,00,000

Earnings available to equity shareholders = ₹ 2,00,000

Equity capitalization rate = 12.5%

Market value of equity = $\frac{2,00,000}{12.5\%} = ₹ 16,00,000$

Market value of debt = ₹ 10,00,000

Market value of the firm = ₹ 26,00,000

Overall cost of capital = $\frac{3,00,000 \times 100}{26,00,000} = 11.54\%$

Q.14

RST Ltd. is expecting an EBIT of ₹4,00,000 for F.Y. 2015-16. Presently the company is financed by equity share capital ₹20,00,000 with equity capitalization rate of 16%. The company is contemplating to redeem part of the capital by introducing debt financing. The company has two options to raise debt to the extent of 30% or 50% of the total fund. It is expected that for debt financing upto 30%, the rate of interest will be 10% and equity

capitalization rate will increase to 17%. If the company opts for 50% debt, then the interest rate will be 12% and equity capitalization rate will be 20%.

You are required to compute value of the company; its overall cost of capital under different options and also state which is the best option.

Ans.

Statement of Value of Firm and Cost of Capital

Particulars	All equity	30% Debt	50% Debt
Earnings before interest and tax	4,00,000	4,00,000	4,00,000
Less: Interest @ 10% of ₹6,00,000 or @ 12% of ₹10,00,000	-	60,000	-
Earning available for Equity	4,00,000	3,40,000	2,80,000
÷ Ke	16%	17%	20%
Value of Equity (E) [PBT ÷ Ke]	25,00,000	20,00,000	14,00,000
Value of Debt (D)	-	6,00,000	10,00,000
Value of Firm (V)	25,00,000	26,00,000	24,00,000
Ko (EBIT ÷ V)	16%	15.38%	16.67%

Decision: Company should opt for 30% debt finance having higher Value of firm and lower K_o .

Q.15

There are two company N Ltd. and M Ltd., having same earnings before interest and taxes i.e. EBIT of ₹20,000. M Ltd. is a levered company having a debt of ₹1,00,000 @ 7% rate of interest. The cost of equity of N Ltd. is 10% and of M Ltd. is 11.50%.

Compute how arbitrage process will be carried on?

Ans.

$$\begin{aligned} \text{Value of Equity (S)} &= \frac{\text{NOI} - \text{Interest}}{\text{Cost of Equity}} \\ S_N &= \frac{20,000}{10\%} = ₹2,00,000 \\ S_M &= \frac{20,000 - 7,000}{11.50\%} = ₹1,13,043 \\ V_N &= ₹2,00,000 \\ V_M &= S_M + D \\ &= ₹1,13,043 + ₹1,00,000 = ₹2,13,043 \end{aligned}$$

Arbitrage Process:

If you have 10% shares of M Ltd., your value of investment in equity shares is 10% of ₹1,13,043 i.e. ₹11,304.30 and return will be 10% of (₹20,000 - ₹7,000) = ₹1,300.

Strategy (Same return with lower investment):

Sell your 10% share of levered firm for ₹11,304.30 and borrow 10% of levered firms debt i.e. 10% of ₹1,00,000 and invest the money i.e. 10% in unlevered firms stock:

Total resources /Money we have	=	₹11,304.30 + ₹10,000	=	₹21,304.30
Invest in 10% shares of Unlevered firm	=	10% of ₹2,00,000	=	₹20,000
Surplus cash available with you	=	₹21,304.3 - ₹20,000	=	₹1,304.30
Your return	=	10% EBIT of unlevered firm - Interest		
	=	10% of ₹20,000 - 7% of ₹10,000		
	=	₹2,000 - ₹700	=	₹1,300

Conclusion:

Your return is same i.e. ₹1,300 which you are getting from N Ltd. before investing in M Ltd. but still you have ₹1,304.3 excess money available with you. Hence, you are better off by doing arbitrage.

Q.16

XYZ Ltd. is expecting an EBIT of ₹3,00,000. The company presently raised its entire fund requirement of ₹20 lakhs by Issue of equity with equity capitalisation rate of 16%.

The firm is now contemplating to redeem a part of capital by introducing debt financing. The firm has two options to raise debt to the extent of 30% or 50% of total funds.

It is expected that for debt financing up to 30% the rate of interest will be 10% and equity capitalisation rate is expected to increase to 17%. However, if firm opts for 50% debt then interest rate will be 12% and equity capitalisation rate will be 20%.

You are required to compute value of firm and its overall cost of capital under different options if the traditional approach is held valid.

Ans.

Statement of K_o and Value of Firm

Particulars	All equity	30% Debt	50% Debt
Earnings before interest and tax	3,00,000	3,00,000	3,00,000
Less: Interest	-	60,000	1,20,000
PBT	3,00,000	2,40,000	1,80,000
÷ K_e	16%	17%	20%
Value of Equity (E)	18,75,000	14,11,765	9,00,000
Value of Debt (D)	-	6,00,000	1,00,000
Value of Firm (V)	18,75,000	20,11,765	19,00,000
K_o (PBIT ÷ V)	16%	14.91%	15.79%

Decision: Company should opt for 30% debt finance

Q.17

XYZ Ltd. has EBIT of ₹4,00,000. The firm currently has outstanding debts of ₹15,00,000 at an average cost of 10%. Its cost of equity capital K_e is estimated 16%.

- Determine the current value of the firm using the Traditional valuation approach.
- Determine the firm's overall capitalization rate K_o .
- The firm is considering to issue capital of ₹5,00,000 in order to redeem ₹5,00,000 debt. The cost of debt is expected to be unaffected. However, the firm's cost of equity capital is to be reduced to 14% as a result of decrease in leverage. Would you recommend the proposed action?

Ans.

- Value of the firm as per Traditional approach:**

EBIT	₹4,00,000
Less: Interest @10% on ₹15,00,000	₹1,50,000
Net Income for equity holders	₹2,50,000
K_e (equity capitalization rate)	0.16
Market value of equity	₹15,62,500
Market value of debt	₹15,00,000
Total market value	₹30,62,500
- Overall capitalization rate** = $EBIT \div V = 4,00,000 \div 30,62,500 = 13.06\%$
- Effect of proposed redemption of debt:**

EBIT	₹4,00,000
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Less: Interest @10% on ₹10,00,000	₹1,00,000
Net Income for equity holders	₹3,00,000
K_e (equity capitalization rate)	0.14
Market value of equity	₹21,42,857
Market value of debt	₹10,00,000
Total market value	₹31,42,857

The proposal should be accepted as it would increase the value of the firm from ₹30,62,500 to ₹31,42,857.

Q.18

ABC Ltd. with EBIT of ₹3,00,000 is evaluating a number of possible capitals below. Which of the capital structure will you recommend, and why?

Capital Structure	Debt	K_d	K_e
I	₹3,00,000	10%	12.00%
II	₹4,00,000	10%	12.50%
III	₹5,00,000	11%	13.50%
IV	₹6,00,000	12%	15.00%
V	₹7,00,000	14%	18.00%

Ans.

Statement of K_o and Value of Firm

Particulars	Plan I	Plan II	Plan III	Plan IV	Plan V
EBIT	3,00,000	3,00,000	3,00,000	3,00,000	3,00,000
Less: Interest	30,000	40,000	55,000	72,000	98,000
Net profit	2,70,000	2,60,000	2,45,000	2,28,000	2,02,000
$\div K_e$	0.12	0.125	0.135	0.15	0.18
Market value of Equity (E)	22,50,000	20,80,000	18,14,815	15,20,000	11,22,222
Market value of Debt (D)	3,00,000	4,00,000	5,00,000	6,00,000	7,00,000
Market value of firm (V)	25,50,000	24,80,000	23,14,815	21,20,000	18,22,222
K_o (EBIT \div V)	11.76%	12.10%	12.95%	14.15%	16.46%

The capital structure (Plan I) having ₹3,00,000 of debt has the lowest cost of capital consequently the highest market value, should be accepted.

Q.19

One third of the total market value of Sanghmani Limited consists of loan stock, which has a cost of 10 per cent. Another company, Samsui Limited, is identical in every respect to Sanghmani Limited, except that its capital structure is all equity, and its cost of equity is 16 per cent. According to Modigliani and Miller, if we ignored taxation and tax relief on debt capital.

Compute the cost of equity of Sanghmani Limited?

Ans.	K_o Sanghmani Limited	=	K_o Samsui Limited	= 16%
	K_o Sanghmani Limited	=	$K_e W_e + K_d W_d$	
	16%	=	$K_e \times 2/3 + 10\% \times 1/3$	
	K_e Sanghmani Limited	=	19%	



5

CHAPTER

COST OF CAPITAL

Q.1

Effective Cost of Capital

MTP May 19(2)



Annova Ltd is considering raising funds of about Rs.250 lakhs by any of two alternative methods, viz., 14% institutional term loan and 13% non-convertible debentures. The term loan option would attract no major incidental cost and can be ignored. The debentures would have to be issued at a discount of 2.5% and would involve cost of issue of 2% on face value.

ADVISE the company as to the better option based on the effective cost of capital in each case. Assume a tax rate of 50%.

Ans.

Calculation of Effective Cost of Capital:

Particulars	Option 1 14% institutional Term loan (Rs. in Lakhs)	Option 2 13% Non-convertible Debentures (Rs. in lakhs)
(A) Effective capital to be raised Face value	250.00	250.00
Less: Discount	Nil	(6.25)
	250.00	243.75
Less: Cost of issue	Nil	5.00
Effective amount of capital	250.00	238.75
(B) Annual interest charges on face value of Rs. 250 lakhs	35.0	32.50
Less: Tax benefit on interest @ 50%	17.5	16.25
	17.5	16.25
(C) Effective cost of capital after tax	$\frac{B}{A} \times 100$ = 7.0%	$\frac{16.25}{238.75} \times 100$ = 6.81% (approx)

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

Q.2

Cost of Debt (Kd)

RTP Nov 22



Bounce Ltd. evaluates all its capital projects using discounting rate of 15%. Its capital structure consists of equity share capital, retained earnings, bank term loan and debentures redeemable at par. Rate of interest on bank term loan is 1.5 times that of debenture. Remaining tenure of debenture and bank loan is 3 years and 5 years respectively. Book value of equity share capital, retained earnings and bank loan is ₹ 10,00,000, ₹ 15,00,000 and ₹ 10,00,000 respectively. Debentures which are having book value of ₹ 15,00,000 are currently trading at ₹ 97 per debenture. The ongoing P/E multiple for the shares of the company stands at 5. You are required to CALCULATE the rate of interest on bank loan and debentures if tax rate applicable is 25%.

Ans. Let the rate of Interest on debenture be x
∴ Rate of Interest on loan = 1.5x

$$\therefore K_d \text{ on debentures} = \frac{\text{Int}(1-t) + \frac{RV - NP}{n}}{\frac{RV + NP}{2}} = \frac{100x(1-25) + \frac{100-97}{3}}{\frac{100+97}{2}} = \frac{75x+1}{98.5}$$

∴ Kd on bank loan = 1.5x (1-0.25) = 1.125x

$$K_e = \frac{FPS}{MPS} = \frac{1}{MPS / EPS} = \frac{1}{P / E} = \frac{1}{5} = 0.2$$

KY = Ke = 0.2

Computation of WACC

Capital	Amount (₹)	Weights	Cost	Product
Equity	10,00,000	0.2	0.2	0.04
Reserves	15,00,000	0.3	0.2	0.06
Debentures	15,00,000	0.3	(75x+1)/98.5	(22.5x + 0.3)/98.5
Bank Loan	10,00,000	0.2	1.125x	0.225x
	50,00,000	1		0.1 + 0.225x + 22.5x + 0.3
				98.5

WACC = 15%

$$\therefore 0.1 + 0.225x + \frac{22.5x}{98.5} + \frac{0.3}{98.5} = 0.15$$

$$\therefore 9.85 + 22.1625x + 22.5x + 0.3 = (0.15)(98.5)$$

$$\therefore 44.6625x = 14.775 - 9.85 - 0.3$$

$$\therefore 44.625x = 4.625$$

$$\therefore x = \frac{4.625}{44.6625}$$

$$\therefore x = 10.36\%$$

$$\therefore \text{Rate of interest on debenture} = x = 10.36\%$$

$$\text{Rate of interest on Bank loan} = 1.5x = (1.5)(10.36\%) = 15.54\%$$

Q.3

Cost of Debt (Kd)

PY Nov 20



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

Year	1	2	3	4	5
PV Factor @ 15%	0.870	0.756	0.658	0.572	0.497

**Ans. Determination of Redemption value:**

Higher of-

- (i) The cash value of debentures = ₹100
(ii) Value of equity shares = 5 shares × ₹ 20 (1+0.04)⁵
= 5 shares × ₹ 24.333
= ₹121.665 rounded to ₹121.67

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

Calculation of Cost of 10% Convertible debenture**(i) Using Approximation Method:**

$$K_d = \frac{I(1-t) + \frac{(RV - NP)}{n}}{\frac{(RV + NP)}{2}} = \frac{10(1 - 0.25) + (121.67 - 100)}{\frac{(121.67 + 100)}{2}} = \frac{7.5 + 4.334}{110.835} = 10.676\%$$

(ii) Using Internal Rate of Return Method

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

$$IRR = L + \frac{NPV_L}{NPV_L - NPV_H} (H - L) = 10\% + \frac{3.982}{3.982 - (-14.382)} (15\% - 10\%)$$

= 0.11084 or 11.084% (approx.)

Q.4

Cost of Debt / Equity / WACC

RTP May 18



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).

Ans.

(i) **Pattern of Raising Additional Finance**

$$\text{Equity} = 10,00,000 \times 60/100 = ₹ 6,00,000$$

$$\text{Debt} = 10,00,000 \times 40/100 = ₹ 4,00,000$$

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 'Kd' 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**

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

Then, $K_e = \frac{2(1.1)}{4} + 0.10 = \frac{2.2}{4} + 0.10 = 0.15$ 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

Q.5

Cost of Debt / Equity / Marginal

RTP Jul 21



Indel Ltd. has the following capital structure, which is considered to be optimum as on 31st March, 2021:

Particulars	(₹)
14% Debentures	60,000
11% Preference shares	20,000
Equity Shares (10,000 shares)	3,20,000
	4,00,000

The company share has a market price of ₹ 47.20. Next year dividend per share is 50% of year 2020 EPS. The following is the uniform trend of EPS for the preceding 10 years which is expected to continue in future.



Year	EPS (₹)	Year	EPS (₹)
2011	2.00	2016	3.22
2012	2.20	2017	3.54
2013	2.42	2018	3.90
2014	2.66	2019	4.29
2015	2.93	2020	4.72

The company issued new debentures carrying 16% rate of interest and the current market price of debenture is ₹ 96. Preference shares of ₹ 18.50 (with annual dividend of ₹ 2.22 per share) were also issued. The company is in 30% tax bracket.

The company is in 30% tax bracket.

- (A) CALCULATE after tax:
- Cost of new debt
 - Cost of new preference shares
 - New equity share (assuming new equity from retained earnings)
- (B) CALCULATE marginal cost of capital when no new shares are issued.
- (C) DETERMINE the amount that can be spent for capital investment before new ordinary shares must be sold, assuming that the retained earnings for next year's investment is 50 percent of earnings of 2020.
- (D) COMPUTE marginal cost of capital when the fund exceeds the amount calculated in assuming new equity is issued at ₹ 40 per share?

Ans.

- (A) (i) **Cost of new debt**

$$K_d = \frac{I(1-t)}{P_0} = \frac{16(1-0.3)}{96} = 0.11667$$

- (ii) **Cost of new preference shares**

$$K_p = \frac{2.22}{18.5} = 0.12$$

- (iii) **Cost of new equity shares**

$$K_e = \frac{D_1}{P_0} + g = \frac{2.36}{47.20} + 0.10$$

$$K_e = 0.05 + 0.10 = 0.15$$

Calculation of g when there is a uniform trend (on the basis of EPS)

$$\frac{EPS(2012) - EPS(2011)}{EPS(2011)} = \frac{2.20 - 2.00}{2.00} = 0.10 \text{ or } 10\%$$

Calculation of D1

$$D_1 = 50\% \text{ of } 2020 \text{ EPS} = 50\% \text{ of } ₹ 4.72 = ₹ 2.36$$

- (B) **Calculation of marginal cost of capital**

Type of Capital	Proportion	Specific Cost	Product
(1)	(2)	(3)	(2) × (3) = (4)
Debentures	0.15	0.11667	0.0175
Preference Share	0.05	0.1200	0.0060

Equity Share	0.80	0.1500	0.1200
Marginal cost of capital			0.1435

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

$$\begin{aligned} \text{Retained earnings} &= 50\% \text{ of EPS of 2020} \times \text{outstanding equity shares} \\ &= 50\% \text{ of } ₹ 4.72 \times 10,000 \text{ shares} = ₹ 23,600 \end{aligned}$$

The ordinary equity (Retained earnings in this case) is 80% of total capital
So, ₹ 23,600 = 80% of Total Capital

(D) If the company spends in excess of ₹ 29,500, it will have to issue new equity shares at ₹ 40 per share.
∴ The cost of new issue of equity shares will be:

$$K_e = \frac{D_1}{P_0} + g = \frac{2.36}{40} + 0.10 = 0.159$$

The marginal cost of capital will be:

Type of Capital	Proportion	Specific Cost	Product
(1)	(2)	(3)	(2) × (3) =
Debentures	0.15	0.11667	0.0175
Preference Shares	0.05	0.1200	0.0060
Equity Shares (New)	0.80	0.1590	0.1272
Marginal cost of			0.1507

Q.6

Cost of Debt / Preference

PY May 22

A company issues:

- 15% convertible debentures of ₹ 100 each at par with a maturity period of 6 years. On maturity, each debenture will be converted into 2 equity shares of the company. The risk-free rate of return is 10%, market risk premium is 18% and beta of the company is 1.25. The company has paid dividend of ₹ 12.76 per share. Five year ago, it paid dividend of 10 per share. Flotation cost is 5% of issue amount.
- 5% preference shares of ₹ 100 each at premium of 10%. These shares are redeemable after 10 years at par. Flotation cost is 6% of issue amount.

Assuming corporate tax rate is 40%.

- Calculate the cost of convertible debentures using the approximation method.
- Use YTM method to calculate cost of preference shares.

Year	1	2	3	4	5	6	7	8	9	10
PVIF 0.03,	0.97	0.94	0.91	0.88	0.86	0.83	0.81	0.78	0.76	0.74
PVIF 0.05,	0.95	0.90	0.86	0.82	0.78	0.74	0.711	0.67	0.64	0.61
PVIFA	0.97	1.913	2.82	3.71	4.58	5.41	6.23	7.02	7.78	8.53
PVIFA	0.95	1.85	2.72	3.54	4.32	5.07	5.78	6.46	7.10	7.72

Interest rate	1%	2%	3%	4%	5%	6%	7%	8%	9%
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FVIF i, 5	1.051	1.104	1.159	1.217	1.27	1.33	1.40	1.46	1.53
FVIF i, 6	1.06	1.126	1.194	1.26	1.34	1.419	1.501	1.58	1.67
FVIF i, 7	1.07	1.149	1.23	1.316	1.40	1.50	1.60	1.714	1.82

Ans. (i) **Calculation of Cost of Convertible Debentures:**

Given that,

$$\begin{aligned}
 R_f &= 10\% & R_m - R_f &= 18\% \\
 B &= 1.25\% & D_0 &= 12.76 \\
 D_5 &= 10 & \text{Flotation Cost} &= 5\%
 \end{aligned}$$

Using CAPM,

$$\begin{aligned}
 K_e &= R_f + \beta(R_m - R_f) = 10\% + 1.25(18\%) \\
 &= 32.50\%
 \end{aligned}$$

Calculation of growth rate in dividend

$$12.76 = 10(1+g)^5$$

$$1.276 = (1+g)^5$$

$$(1+5\%) = 1.276 \dots \dots \text{from FV Table}$$

$$g = 5\%$$

$$\text{Price of share after 6 years} = \frac{D_7}{k_e - g} = \frac{12.76(1.05)^7}{0.325 - 0.05}$$

$$P_6 = \frac{12.75 \times 1.407}{0.275} = 65.28$$

$$\text{Redemption Value of Debenture (RV)} = 65.28 \times 2 = 130.56 \text{ (RV)}$$

$$NP = 95 \quad n = 6$$

$$K_d = \frac{INT(1-t) + \frac{(RV - NP)}{n}}{\frac{RV - NP}{2}} \times 100 = \frac{9 + 5.93}{112.78} \times 100$$

$$K_d = 13.24\%$$

(ii) **Calculation of Cost of Preference Shares:**

$$\begin{aligned}
 \text{Net Proceeds} &= 100(1.1) - 6\% \text{ of } 100 (1.1) \\
 &= 110 - 6.60 \\
 &= 103.40 \\
 \text{Redemption Value} &= 100
 \end{aligned}$$

Year	Cash Flows (₹)	PVF @ 3%	PV (₹)	PVF @ 5%	PV (₹)
0	103.40	1	103.40	1	103.40
1-10	-5	8.530	-42.65	7.722	-38.61

10	-100	0.744	-74.40	0.614	-61.40
			-		3.39

$$K_p = 3\% + \frac{5\% - 3\%}{[3.39 - (-13.65)]} \times 13.65 = 4.6\%$$

Q.7

Cost of Debt / Equity / WACC

PY Nov 19



A Company wants to raise additional finance of ₹ 5 crore in the next year. The company expects to retain ₹ 1 crore earning next year. Further details are as follows:

- The amount will be raised by equity and debt in the ratio of 3: 1.
- The additional issue of equity shares will result in price per share being fixed at ₹ 25.
- The debt capital raised by way of term loan will cost 10% for the first ₹ 75 lakh and 12% for the next ₹ 50 lakh.
- The net expected dividend on equity shares is ₹ 2.00 per share. The dividend is expected to grow at the rate of 5%.
- Income tax rate is 25%.

You are required:

- To determine the amount of equity and debt for raising additional finance.
- To determine the post-tax average cost of additional debt.
- To determine the cost of retained earnings and cost of equity.
- To compute the overall weighted average cost of additional finance after tax.

Ans

- (a) **Determination of the amount of equity and debt for raising additional finance:**

Pattern of raising additional finance

Equity 3/4 of ₹ 5 Crore = ₹ 3.75 Crore

Debt 1/4 of ₹ 5 Crore = ₹ 1.25 Crore

The capital structure after raising additional finance:

Particulars	(₹ Incrore)
Shareholders' Funds	
Equity Capital (3.75 - 1.00)	2.75
Retained earnings	1.00
Debt (Interest at 10% p.a.)	0.75
(Interest at 12% p.a.) (1.25-0.75)	0.50
Total Funds	5.00

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

$$K_d = I(1-t)$$

Where,

I= Interest Rate

t = Corporate tax-rate

$$\text{On ₹ 75,00,000} = 10\% (1 - 0.25) = 7.5\% \text{ or } 0.075$$



On ₹ 50,00,000 = 12% (1 - 0.25) = 9% or 0.09

Average Cost of Debt

$$= \frac{(75,00,000 \times 0.75) + (50,00,000 \times 0.09)}{1,25,00,000} \times 100$$

$$= \frac{5,62,500 + 4,50,000}{1,25,00,000} \times 100 = 8.10\%$$

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

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

Where,

K_e = Cost of equity

D_1 = $D_0(1+g)$

D_0 = Dividend paid (ie= Rs2)

g = Growth rate

P_0 = Current market price per share

Then, $K_e = \frac{2(1.05)}{25} + 0.05 = \frac{2.1}{25} + 0.05 = 0.084 + 0.05 = 0.134 = 13.4\%$

Cost of retained earnings equals to cost of Equity i.e. 13.4%

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

Particular	(₹)	Weights	Cost of funds	Weighted Cost (%)
Equity (including retained earnings)	3,75,00,000	3/4	13.4%	10.05
Debt	1,25,00,000	1/4	8.1%	2.025
WACC	5,00,00,000			12.075

Q.8

Cost of Equity

MTP May 22(1)



Following information is given for WN Ltd.:

Earnings Rs 30 per share

Dividend Rs 9 per share

Cost of capital 15%

Internal Rate of Return on investment 20%

You are required to CALCULATE the market price per share using-

(i) Gordon's formula

(ii) Walter's formula

Ans.

(i) As per Gordon's Model, Price per share is computed using the formula:

$$P_0 = \frac{E_1(1-b)}{K_e - br}$$

Where,

P_0 = Price per share

E_1 = Earnings per share

b = Retention ratio; $(1-b)$ = Pay-out ratio

K_e = Cost of capital

r = IRR

br = Growth rate (g)

Applying the above formula, price per share

$$P_0 = \frac{30 \times 0.3 *}{0.15 - 0.70 \times 0.2} = \frac{9}{0.01} = 900$$

$$* \text{Dividend pay-out ratio} = \frac{9}{30} = 0.3 \text{ or } 30\%$$

(ii) As per Walter's Model, Price per share is computed using the formula:

$$\text{Price (P)} = \frac{D + \frac{r}{K_e}(E - D)}{\frac{k}{e}}$$

Where,

P = Market Price of the share

E = Earnings per share

D = Dividend per share

K_e = Cost of equity/ rate of capitalization/ discount rate

r = Internal rate of return/ return on investment

Applying the above formula, price per share

$$P = \frac{9 + \frac{0.20}{0.15}(30 - 9)}{0.15} = \frac{37}{0.15} = 246.67$$

Q.9

Cost of Debt / Equity

MTP May 21(2)



In March 2021 Tiruv Ltd.'s share was sold for Rs. 219 per share. A long-term earnings growth rate of 11.25% is anticipated. Tiruv Ltd. is expected to pay a dividend of Rs. 5.04 per share.

(i) DETERMINE the rate of return an investor can expect to earn assuming that dividends are expected to grow along with earnings at 11.25% per year in perpetuity?

(ii) It is expected that Tiruv Ltd. will earn about 15% on book equity and shall retain 60% of earnings. In this case, whether there would be any change in growth rate and cost of equity? ANALYSE.

Ans.

(i) According to Dividend Discount Model approach the firm's expected or required return on equity is computed as follows:

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

Where,

K_e = Cost of equity share capital



D_1 = Expected dividend at the end of year 1

P_0 = Current market price of the share.

g = Expected growth rate of dividend.

$$\text{Therefore, } K_e = \frac{5.04}{219} + 0.1125 = 13.55\%$$

- (ii) **With rate of return on retained earnings (r) of 15% and retention ratio (b) of 60%, new growth rate will be as follows:**

$$g = br = 0.60 \times 0.15 = 0.09 \text{ or } 9\%$$

Accordingly, dividend will also get changed and to calculate this, first we shall calculate previous retention ratio (b1) and then EPS assuming that rate of return on retained earning (r) is same.

With previous Growth Rate of 11.25% and $r = 15\%$, the retention ratio comes out to be:

$$0.1125 = b_1 \times 0.15$$

$$b_1 = 0.75 \text{ and payout ratio} = 0.25$$

With 0.25 payout ratio, the EPS will be as follows:

$$\text{EPS} = \frac{5.04}{0.25} = \text{Rs } 20.16$$

With new payout ratio of 40% ($1 - 0.60$) the new dividend will be:

$$D_1 = \text{Rs } 20.16 \times 0.40 = \text{Rs. } 8.064$$

Accordingly new K_e will be:

$$K_e = \frac{8.064}{219} + 0.09 = 12.68\%$$

Q.10

Cost of Equity/ Marginal

PY Nov 22



MR Ltd. is having the following capital structure, which is considered to be optimum as on 31.03.2022.

Equity share capital (50,000 shares) ₹ 8,00,000

12% Pref. share capital ₹ 50,000

15% Debentures ₹ 1,50,000

₹ 10,00,000

The earnings per share (EPS) of the company were ₹ 2.50 in 2021 and the expected growth in equity dividend is 10% per year. The next year's dividend per share (DPS) is 50% of EPS of the year 2021. The current market price per share (MPS) is ₹ 25.00. The 15% new debentures can be issued by the company. The company's debentures are currently selling at ₹ 96 per debenture. The new 12% Pref. share can be sold at a net price of ₹ 91.50 (face value ₹ 100 each). The applicable tax rate is 30%.

You are required to calculate

- (a) After tax cost of
- New debt,
 - New pref. share capital and
 - Equity shares assuming that new equity shares come from retained earnings.
- (b) Marginal cost of capital, How much can be spent for capital investment before sale of new equity shares assuming that retained earnings for next year investment is 50% of 2021?

Ans

- (a) (i) **After tax cost of new Debt:**

$$K_d = \frac{I(1-t)}{P_1} = \frac{15(1-0.3)}{96}$$

$$= 0.1094 \text{ (or) } 10.94\%$$

(ii) After tax cost of New Preference share capital:

$$K_p = \frac{P_D}{P_0} = \left(\frac{12}{91.5} \right) = 0.1311 \text{ (or) } 13.11\%$$

(iii) After tax cost of Equity shares:

$$K_e = \left(\frac{D_1}{P_0} \right) + g = \left[\frac{(2.50 \times 50\%)}{25} \right] + 0.10$$

$$= 0.15 \text{ (or) } 15\%$$

(b) Marginal Cost of Capital

Type of capital	Proportions	Specific cost	Product
Equity Shares	0.80	0.15	0.12
Preference Shares	0.05	0.1311	0.0066
Debentures	0.15	0.1094	0.0164
□ Marginal cost of capital			0.1430

(c) Amount that can be spend for capital investment

Retained earnings = 50% of EPS × No. of outstanding Equity shares
 = 1.25 × 50,000

Proportion of equity (Retained earnings here) capital is 80% of total capital.
 Therefore, ₹ 62,500 is 80% of total capital.

$$\therefore \text{Amount of Capital Investment} = \frac{62,500}{0.80} = ₹ 78,125$$

Q.11

WACC

RTP Nov 18



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?



Ans. (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 = <u>7.2</u>
				<u>9.2%</u>

Above ₹ 2 lakhs & upto to ₹ 5	Debt	0.4	11% (1 - 0.5) = 5.5%	0.4 × 5.5 = 2.2
	Equity	0.6	13%	0.6 × 13 = <u>7.8</u>
				<u>10.0%</u>

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 = <u>8.4</u>
				<u>10.8%</u>

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 = <u>8.7</u>
				<u>11.3%</u>

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.

Q.12

WACC

MTP Nov 23(2)



Q Ltd. has the following capital structure at book-value as on 31st March 2022:

Particulars	(₹)
Equity share capital (10,00,000 shares)	4,00,00,000
12% Preference shares	80,00,000
11% Debentures	2,00,00,000
	<u>6,80,00,000</u>

The equity shares of the company are sold for ₹ 400. It is expected that the company will pay next year a dividend of ₹ 20 per equity share, which is expected to grow by 5% p.a. forever. Assume a 30% corporate tax rate.

Required:

- (i) COMPUTE weighted average cost of capital (WACC) of the company based on the existing capital structure.

(ii) COMPUTE the new WACC, if the company raises an additional ₹ 50 lakhs debt by issuing 12% debentures. This would result in increasing the expected equity dividend to ₹ 25 and leave the growth rate unchanged, but the price of equity share will fall to ₹ 300 per share.

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

Source of Capital	Existing Capital structure (₹)	Weights (a)	After tax cost of capital (%) (b)	WACC (%) (a) × (b)
Equity share capital (W.N.1)	4,00,00,000	0.588	10.00	5.88
12% Preference share capital	80,00,000	0.118	12.00	1.42
11% Debentures (W.N.2)	2,00,00,000	0.294	7.70	2.26
Total	6,80,00,000	1.000		9.56

Working Notes:

1. Cost of Equity Capital:

$$K_e = \frac{\text{Expected dividend}(D_1)}{\text{Current Market Price}(P_0)} + \text{Growth}(g)$$

$$= \frac{20}{400} + 0.05$$

$$= 10\%$$

2. Cost of 10% Debentures

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

$$= \frac{22,00,000(1 - 0.30)}{2,00,00,000}$$

$$= 0.077 \text{ or } 7.7\%$$

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

Source of Capital	New Capital structure (₹)	Weights (a)	After tax cost of capital (%) (b)	WACC (%) (a) × (b)
Equity share capital (W.N.3)	4,00,00,000	0.548	13.33	7.30
12% Preference share capital	80,00,000	0.110	12.00	1.32
11% Debentures (W.N.2)	2,00,00,000	0.274	7.70	2.11
12% Debentures (W.N.4)	50,00,000	0.068	8.40	0.57
Total	7,30,00,000	1.000		11.30

Working Notes:

3. Cost of Equity Capital:

$$K_e = \frac{25}{300} + 0.05$$

$$= 13.33\%$$

4. Cost of 12% Debentures



$$K_d = \frac{6,00,000(1 - 0.30)}{50,00,000}$$

$$= 0.084 \text{ or } 8.4\%$$

Q.13

WACC

MTP May 21(1)



The following is the capital structure of Sharda Ltd. as on 31.12.2020:

	(₹)
Equity shares: 2,00,000 shares (of ₹ 100 each)	2,00,00,000
9% Preference Shares (of ₹ 100 each)	60,00,000
8% Debentures	90,00,000

The market price of the company's share is ₹ 120 and it is expected that a dividend of ₹ 12 per share would be declared for the year 2021. The dividend growth rate is 5% and the company is in the 30% tax bracket.

- (i) CALCULATE the company's weighted average cost of capital.
- (ii) Further, in order to finance an expansion plan, the company intends to borrow a fund of ₹ 2 crores bearing 12% rate of interest. In this situation, WHAT will be the company's revised weighted average cost of capital? This financing decision is expected to increase dividend from ₹ 12 to ₹ 14 per share. However, the market price of equity share is expected to decline from ₹ 120 to ₹ 115 per share.
- In case of both (i) and (ii) above, use market value weight while calculating weighted average cost of capital

Ans. (i) Computation of the weighted average cost of capital

Source of finance	Market Value of capital (₹)	Weight (b)	After tax Cost of capital (%) (c)	WACC (%) (d) = (b) × (c)
Equity share (Working note 1) [₹120 × 2,00,000 shares]	2,40,00,000	0.6154	15	9.231
9% Preference share	60,00,000	0.1538	9	1.3842
8% Debentures	90,00,000	0.2308	5.60	1.2925
	3,90,00,000	1.0000		11.9077

(ii) Computation of Revised Weighted Average Cost of Capital

Source of finance	Market Value of capital	Weight	After tax Cost of capital (%)	WACC (%)
Equity shares (Working note 2) [₹115 × 2,00,000 shares]	2,30,00,000	0.3966	17.17	6.8096
9% Preference shares	60,00,000	0.1034	9.00	0.9306
8% Debentures	90,00,000	0.1552	5.60	0.8691
12% Loan	2,00,00,000	0.3448	8.40	2.8963
	5,80,00,000	1.0000		11.5056

Working Notes:

(1) Cost of Equity Shares

$$\begin{aligned} K_e &= \{ \text{Dividend Per Share (D1)} / \text{Market Price Share (P0)} \} + \text{Growth Rate} \\ &= 12/120 + 0.05 \\ &= 0.15 \text{ or } 15\% \end{aligned}$$

(2) **Revised cost of equity shares (Ke) Revised Ke**

$$\begin{aligned} &= 14/115 + 0.05 \\ &= 0.1717 \text{ or } 17.17\% \end{aligned}$$

Q.14

WACC

MTP May 20



ABC Limited has the following book value capital structure:

Equity Share Capital (1 crore shares @ Rs.10 each)	Rs.1,000 lakh
Reserves and Surplus	Rs.2,250 lakh
9% Preference Share Capital (5 lakh shares @ Rs.100 each)	Rs.500 lakh
8.5% Debentures (1.5 lakh debentures @ Rs.1,000 each)	Rs.1,500 lakh
12% Term Loans from Financial Institutions	Rs.500 lakh

The debentures of ABC Limited are redeemable at par after five years and are quoting at Rs.985 per debenture. The current market price per equity share is Rs.60. The prevailing default-risk free interest rate on 10-year GOI Treasury Bonds is 5.5%. The average market risk premium is 7%. The beta of the company is 1.85

The preference shares of the company are redeemable at 10% premium after 5 years is currently selling at Rs.102 per share. The applicable income tax rate for the company is 35%.

Required: CALCULATE weighted average cost of capital of the company using market value weights.

Ans. Working Notes:

(1) **Computation of cost of debentures (Kd) :**

$$K_d = \frac{85(1 - 0.35) + \frac{(1,000 - 985)}{5}}{\frac{(1,000 + 985)}{2}} = \frac{55.25 + 3}{992.5} = 0.0586 \text{ or } 5.86\%$$

(2) **Computation of cost of term loans (KT) :**

$$\begin{aligned} &= r(1-t) \\ &= 0.12(1-0.35) = 0.078 \text{ or } 7.8\% \end{aligned}$$

(3) **Computation of cost of preference capital (Kp) :**

$$K_p = \frac{\text{Preference Dividend} + (RV - NP)/n}{(RV + NP) / 2}$$

$$\frac{9 + \frac{(110 - 102)}{5}}{\frac{(110 + 102)}{2}} = \frac{9 + 1.6}{106} = 0.1 \text{ or } 10\%$$

(4) **Computation of cost of equity (Ke) :**

$$= R_f + \beta(R_m - R_f)$$

Or, = Risk free rate + (Beta × Risk premium)

$$= 0.055 + (1.85 \times 0.07) = 0.1845 \text{ or } 18.45\%$$

Calculation of Weighted Average cost of capital Using market value weights



Source of Capital	Market value of capital structure	Weights	After tax cost of	WACC (%)
Equity share capital (1 crore shares × Rs.60)	6,000	0.71	18.45	13.09
9% Preference share capital (5 lakh shares @ Rs.102)	510	0.06	10.00	0.60
8.5 % Debentures (1.5 lakh @ Rs.985)	1,477.5	0.17	5.86	0.99
12% Term loans	500	0.06	7.80	0.47
	8,487.50	1.000		15.15

Q.15

WACC

MTP Nov18(1)



JKL Ltd. has the following book-value capital structure as on March 31, 20X8.

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

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

Required:

- COMPUTE weighted average cost of capital (WACC) of the company based on the existing capital structure.
- COMPUTE the new WACC, if the company raises an additional Rs. 20 lakhs debt by issuing 12% debentures. This would result in increasing the expected equity dividend to Rs. 2.40 and leave the growth rate unchanged, but the price of equity share will fall to Rs.16 per share.

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

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

Working Notes (W.N.)

1. Cost of equity capital:

$$K_e = \frac{\text{Expected Dividend}(D_1)}{\text{Current Market Price per Share}(P_0)} + \text{Growth}(g)$$

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

2. **Cost of preference share capital:**

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

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

3. **Cost of 10% Debentures:**

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

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

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

Working Notes (W.N.):

4. **Cost of equity capital:**

$$K_e = \frac{\text{Expected Dividend}(D_1)}{\text{Current Market Price per share}(P_0)} + \text{Growth}(g) = \frac{2.40}{16} + 5\% = 20\%$$

5. **Cost of 12% Debentures**

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

Q.16

WACC

MTP May 18



G Limited has the following capital structure, which it considers to be optimal

Capital Structure	Weightage (in %)
Debt	25
Preference Shares	15
Equity Shares	60
	100

G Limited's expected net income this year is ₹ 34,285.72, its established dividend payout ratio is 30 per cent, its tax rate is 40 per cent, and investors expect earnings and dividends to grow at a constant rate of 9 per cent in the future. It paid a dividend of ₹ 3.60 per share last year, and its shares currently sells at a price of ₹ 54 per



share.G Limited requires additional funds which it can obtain in the following ways:

- Preference Shares: New preference shares with a dividend of ₹ 11 can be sold to the public at a price of ₹95 per share.
- Debt: Debt can be sold at an interest rate of 12 per cent. You are required to:
 - (i) DETERMINE the cost of each capital structure component; and
 - (ii) COMPUTE the weighted average cost of capital (WACC) of G Limited.

Ans. (i) **Computation of Costs of Different Components of Capital:**

(a) Equity Shares:

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

$$= \frac{3.60(1.09)}{54} + 0.09 = 0.0727 + 0.09 = 16.27\%$$

(b) Preference Shares:

$$K_p = \frac{\text{Preference Share Dividend}}{P_0} = \frac{11}{95} = 11.58\%$$

(c) Debt at 12%

$$K_d(1-t) = 12\%(1-0.4) = 12\% \times 0.6 = 7.20\%$$

(ii) **Weighted Average Cost of Capital (WACC)**

$$WACC = W_d K_d + W_p K_p + W_e K_e$$

$$WACC = 0.25(7.2\%) + 0.15(11.58\%) + 0.60(16.27\%)$$

$$= 1.8 + 1.737 + 9.762 = 13.30\%$$

Q.17

WACC

PY Nov 22

FAST
First attempt success tutorials

The following is the extract of the Balance Sheet of M/s KD Ltd.:

Particulars	Amount (₹)
Ordinary shares (Face Value ₹ 10/- per share)	5,00,000
Share Premium	1,00,000
Retained Profits	6,00,000
8% Preference Shares (Face Value ₹25/- per share)	4,00,000
12% Debentures (Face value ₹100/- each)	6,00,000
	22,00,000

The ordinary shares are currently priced at ₹ 39 ex-dividend and preference share is priced at ₹ 18 cum-dividend. The debentures are selling at 120 percent ex-interest. The applicable tax rate to KD Ltd. is 30 percent. KD Ltd.'s cost of equity has been estimated at 19 percent. Calculate the WACC (weighted average cost of capital) of KD Ltd. on the basis of market value.

Ans.

W.N. 1

Cum-dividend price of Preference shares = ₹ 18

Less: Dividend (8/100) × 25 = ₹ 2

∴ Market Price of Preference shares = ₹ 16

$$K_p = \frac{2}{16} = 0.125 \text{ (or) } 12.5\%$$

$$\text{No. of Preference shares} = \left(\frac{4,00,000}{25} \right) = 16,000$$

W.N. 2

$$\text{Market price of Debentures} = \left(\frac{120}{100} \right) \times 100 = \text{Rs } 120$$

$$K_d = \left[\frac{12(1 - 0.3)}{120} \right] = 0.07 \text{ (or) } 7\%$$

$$\text{No. of Debentures} = \left(\frac{6,00,000}{100} \right) = 6,000$$

W.N. 3

Market Price of Equity shares = Rs 39

Ke (given) = 19% or 0.19

No. of Equity shares = 5,00,000 = 50,000

Sources	Market Value (₹)	Nos.	Total Market value (₹)	Weight	Cost of Capital	Product
Equity Shares	39	50,000	19,50,000	0.6664	0.19	0.1266
Preference Shares	16	16,000	2,56,000	0.0875	0.125	0.0109
Debentures	120	6,000	7,20,000	0.2461	0.07	0.0172
					WACC =	0.1547

WACC = 0.1547 or 15.47%



Q.18

WACC

MTP Nov 22(2)



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

Alternative I: Issue 80% of funds with 14% Debenture [Face value (FV) ₹ 100] at par and redeem at a premium of 10% after 10 years and balance by issuing equity shares at 33 $\frac{1}{3}$ % premium.

Alternative II: Raise 10% of funds required by issuing 8% Irredeemable Debentures [Face value (FV) ₹ 100] at par and the remaining by issuing equity shares at current market price of ₹125. Currently, the firm has an Earnings per share (EPS) of ₹ 21

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

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

Balance Sheet as on 31.3.2022

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



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

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

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

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

- I. Earnings per share (EPS) & Market Price per share (MPS)
- II. Financial Leverage
- III. Weighted Average Cost of Capital & Marginal Cost of Capital (using Book Value weights)

Ans.

Calculation of Equity Share capital and Reserves and surplus: Alternative 1:

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

$$\text{Reserves} = ₹10,00,000 + \frac{2,00,000 \times 33.3333}{133.3333} = ₹10,50,000$$

Alternative 2:

$$\text{Equity Share capital} = ₹20,00,000 + \frac{9,00,000 \times 100}{125} = ₹27,20,000$$

$$\text{Reserves} = ₹10,00,000 + \frac{9,00,000 \times 100}{125} = ₹11,80,000$$

Capital Structure Plans

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

Computation of Present Earnings before interest and tax (EBIT)

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

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

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

Particulars	Amount in ₹	
	Alternative I	Alternate II
EBIT	9,10,000	9,10,000
Less: Interest: 10% on long term loan	(1,50,000)	(1,50,000)
14% on Debentures	(1,12,000)	Nil
8% on Irredeemable Debentures	Nil.	(8000)
PBT	6,48,000	7,52,000

Less: Tax @25%	(1,62,000)	(1,88,000)
PAT	4,86,000	5,64,000
No. of equity shares	21,500	27,200
EPS	22.60	20.74
Applicable P/E ratio (Working Note 1)	7	8.5
MPS (EPS X P/E ratio)	158.2	176.29
Financial Leverage EBIT/PBT	1.40	1.21

Working Note 1

	Alternative I	Alternative II
Debt:		
₹15,00,000 + ₹8,00,000	23,00,000	-
₹15,00,000 + ₹1,00,000	-	16,00,000
Total capital Employed (₹)	55,00,000	55,00,000
Debt Ratio (Debt/Capital employed)	=0.4182	=0.2909
	=41.82%	=29.09%
Change in Equity: ₹21,50,000-₹20,00,000	1,50,000	
₹27,20,000-₹20,00,000		7,20,000
Percentage change in equity	7.5%	36%
Applicable P/E ratio	7	8.5

Calculation of Cost of equity and various type of debt

	Alternative I	Alternative II
A) Cost of equity		
EPS	22.60	20.74
DPS (EPS X 60%)	13.56	12.44
Growth (g)	10%	10%
Po (MPS)	158.2	176.29
Ke= Do (1 + g)/ Po	$\frac{13.56 (1.1)}{158.2}$	$\frac{12.44(1.1)}{176.29}$
	=9.43%	=7.76%
B) Cost of Debt:		
10% long term debt	10% + (1-0.25)	10% +(1-0.25)
	= 7.5%	= 7.5%
14% redeemable debentures	$\frac{14(1-0.25)+(110-100/10)}{110+100/2}$	nil
	= 10.5 + 1 / 10.5	
	= 10.95%	
8% irredeemable debenture	NA	8000(1-0.25)/1,00,00 = 6%

Calculation of Weighted Average cost of capital (WACC)

Capital	Alternative 1			Alternative 2		
	Weights	Cost (%)	WACC	Weights	Cost (%)	WACC
Equity Share Capital	0.3909	9.43	3.69%	0.4945	7.76	3.84%



Reserves and Surplus	0.1909	9.43	1.80%	0.2145	7.76	1.66%
10% Long term Debt	0.2727	7.50	2.05%	0.2727	7.50	2.05%
14% Debenture	0.1455	10.95	1.59%			
8% Irredeemable Debentures	-			0.0182	6	0.11%
			9.12%			7.66%

Calculation Marginal Cost of Capital (MACC)

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

Summary of solution:

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

Alternative 1 of financing will be preferred under the criteria of EPS, whereas Alternative II of financing will be preferred under the criteria of MPS, Financial leverage, WACC and marginal cost of capital.

Q.19

WACC / Marginal

MTP Nov 19



Kalyanam Ltd. has an operating profit of ₹ 34,50,000 and has employed Debt which gives total Interest Charge of ₹ 7,50,000. The firm has an existing Cost of Equity and Cost of Debt as 16% and 8% respectively. The firm has a new proposal before it, which requires funds of ₹ 75 Lakhs and is expected to bring an additional profit of ₹ 14,25,000. To finance the proposal, the firm is expecting to issue an additional debt at 8% and will not be issuing any new equity shares in the market. Assume no tax culture.

You are required to CALCULATE the Weighted Average Cost of Capital (WACC) of Kalyanam Ltd.:

- Before the new Proposal
- After the new Proposal

Ans.

Workings:

$$(a) \text{ Value of Debt} = \frac{\text{Interest}}{\text{cost of debt } (k_d)}$$

$$= \frac{7,50,000}{0.08} = ₹ 93,75,000$$

$$(b) \text{ Value of equity capital} = \frac{\text{Operating profit} - \text{Interest}}{\text{Cost of equity } (K_e)}$$

$$= \frac{34,50,000 - 7,50,000}{0.16} = ₹ 1,68,75,000$$

(c) New Cost of equity (K_e) after proposal

$$= \frac{\text{Increased Operating profit} - \text{Interest on Increased debt}}{\text{Equity capital}}$$

$$= \frac{(34,50,000 + 14,25,000) - (7,50,000 + 6,00,000)}{1,68,75,000}$$

$$= \frac{48,75,000 - 13,50,000}{1,68,75,000} = \frac{35,25,000}{1,68,75,000} = 0.209 \text{ or } 20.9\%$$

(i) Calculation of Weighted Average Cost of Capital (WACC) before the new proposal

Sources	Amount (₹)	Weight	Cost of Capital	WACC
Equity	1,68,75,000	0.6429	0.160	0.1029
Debt	93,75,000	0.3571	0.080	0.0286
Total	2,62,50,000	1		0.1315 or 13.15 %

(ii) Calculation of Weighted Average Cost of Capital (WACC) after the new proposal

Sources	Amount (₹)	Weight	Cost of Capital	WACC
Equity	1,68,75,000	0.5000	0.209	0.1045
Debt	1,68,75,000	0.5000	0.080	0.0400
Total	3,37,50,000	1		0.1445 or 14.45 %

Q.20

WACC with Market Weights

PY May 23



Capital structure of D Ltd. as on 31st March, 2023 is given below:

Particulars	₹
Equity share capital (₹ 10 each)	30,00,000
8% Preference share capital (₹ 100 each)	10,00,000
12% Debentures (₹ 100 each)	10,00,000

- Current market price of equity share is ₹ 80 per share. The company has paid dividend of ₹ 14.07 per share. Seven years ago, it paid dividend of ₹ 10 per share. Expected dividend is ₹ 16 per share.
- 8% Preference shares are redeemable at 6% premium after five years. Current market price per preference share is ₹ 104.
- 12% debentures are redeemable at 20% premium after 10 years. Flotation cost is ₹ 5 per debenture.
- The company is in 40% tax bracket.
- In order to finance an expansion plan, the company intends to borrow 15% Long-term loan of ₹ 30,00,000 from bank. This financial decision is expected to increase dividend on equity share from ₹ 16 per share to ₹ 18 per share. However, the market price of equity share is expected to decline from ₹ 80 to ₹ 72 per share, because investors' required rate of return is based on current market conditions.

Required:

- Determine the existing Weighted Average Cost of Capital (WACC) taking book value weights.
- Compute Weighted Average Cost of Capital (WACC) after the expansion plan taking book value weights.



Interest Rate	1%	2%	3%	4%	5%	6%	7%
FVIF _{i,5}	1.051	1.104	1.159	1.217	1.276	1.338	1.403
FVIF _{i,6}	1.062	1.126	1.194	1.265	1.340	1.419	1.501
FVIF _{i,7}	1.072	1.149	1.230	1.316	1.407	1.504	1.606

Ans

- (i) (a) Growth rate in Dividends
 $14.07 = 10 \times \text{FVIF}(i, 7 \text{ years})$
 $\text{FVIF}(i, 7 \text{ years}) = 1.407$
 $\text{FVIF}(5\%, 7 \text{ years}) = 1.407$
 $i = 5\%$ So, Growth rate in dividend = 5%

(b) Cost of Equity

$$K_e = \frac{D_1}{P_0} + g = \frac{16}{80} + 0.05$$

(c) Cost of Preference Shares

$$K_p = \frac{\text{PD} + \frac{(\text{RV} - \text{NP})}{n}}{(\frac{\text{RV} + \text{NP}}{2})} = \frac{8 + \frac{(106-104)}{5}}{(\frac{106+104}{2})}$$

$$K_p = 8.4/105 = 8\%$$

(d) Cost of Debt

$$K_d = \frac{I(1-t) + \frac{(\text{RV} - \text{NP})}{n}}{(\frac{\text{RV} + \text{NP}}{2})} = \frac{12(1 - 0.4) + \frac{(120-95)}{5}}{(\frac{120+95}{2})}$$

$$K_d = (7.2+2.5)/107.5 = 9.02\% = 9.02\%$$

Calculation of existing Weighted Average Cost of Capital (WACC)

Capital	Amount (₹)	Weights	Cost	WACC
Equity Share Capital	30,00,000	0.6	25%	15.00%
Preference Share Capital	10,00,000	0.2	8%	1.60%
Debenture	10,00,000	0.2	9.02%	1.80%
	50,00,000	1		18.40%

Alternative presentation

(i) Computation of existing WACC on book value weights

Source (1)	Book value (₹) (2)	Weight (3)	Cost of capital (%) (4)	Product (2) x (4)
Equity share capital	30,00,000	0.60	25	7,50,000
Preference share capital	10,00,000	0.20	8	80,000
Debentures	10,00,000	0.20	9.02	90,200
Total	50,00,000	1.00		9,20,200

$$\text{WACC} = (\text{Product} / \text{Total book value}) \times 100 = (9,20,200 / 50,00,000) \times 100 = 18.4\%$$

(ii) Cost of Long Term Debt = 15% (1-0.4) = 9%

$$\text{Revised } K_e = \frac{18}{72} + 0.05 = 30\%$$

Calculation of WACC after expansion taking book value weights

Capital	Amount	Weights	Cost	W.C
Equity Share Capital	30,00,000	0.3750	30%	11.25%
Preference Share Capital	10,00,000	0.1250	8%	1.00%
Debenture	10,00,000	0.1250	9.02%	1.13%
Long Term Debt	30,00,000	0.3750	9.00%	3.38%
	80,00,000	1.0000		16.76%

Alternative presentation

(i) Computation of WACC on book value weights after expansion

Source (1)	Book value (₹) (2)	Weight (3)	Cost of capital (%) (4)	Product (2) x (4)
Equity share capital	30,00,000	0.375	30	9,00,000
Preference share capital	10,00,000	0.125	8	80,000
Debentures	10,00,000	0.125	9.02	90,200
Long term loan	30,00,000	0.375	9	2,70,000
Total	80,00,000	1.00		13,40,200

WACC = (Product / Total book value) x 100 = (13,40,200 / 80,00,000) x 100 = 16.76%

Q.21

WACC

PY Jan 21



The Capital structure of PQR Ltd. is as follows:

	₹
10% Debenture	3,00,000
12% Preference Shares	2,50,000
Equity Share (face value ₹ 10 per share)	5,00,000
	10,50,000

Additional Information:

- ₹ 100 per debenture redeemable at par has 2% floatation cost & 10 years of maturity. The market price per debenture is ₹ 110.
- ₹ 100 per preference share redeemable at par has 3% floatation cost & 10 years of maturity. The market price per preference share is ₹ 108.
- Equity share has ₹ 4 floatation cost and market price per share of ₹ 25. The next year expected dividend is ₹ 2 per share with annual growth of 5%. The firm has a practice of paying all earnings in the form of dividends.
- Corporate Income Tax rate is 30%.

Required:

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

Ans

Workings:

$$1. \text{ Cost of Equity } (K_e) = \frac{D_1}{P_0 - F} + g = \frac{2}{25 - 4} + 0.05 = 0.145 \text{ (approx.)}$$

$$2. \text{ Cost of Debt } (K_d) = \frac{l(1-t) + \frac{(RV-NP)}{n}}{\frac{(RV-NP)}{2}}$$



$$= \frac{10(1-0.3) + \frac{(100-98)}{10}}{\frac{(100-98)}{2}} = \frac{7 + 0.2}{99} = 0.073 \text{ (approx.)}$$

$$3. \quad \text{Cost of Preference Shares (Kp)} = \frac{PD + \frac{(RV-NP)}{n}}{\frac{(RV-NP)}{2}}$$

$$= \frac{12 + \frac{(100-97)}{10}}{\frac{(100-97)}{2}} = \frac{12 + 0.3}{98.5} = 0.125 \text{ (approx.)}$$

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 (₹ 110 × 3,000)	3,30,000	0.178	0.073	0.013
12% Preference shares (₹ 108 × 2,500)	2,70,000	0.146	0.125	0.018
Equity shares (₹ 25 × 50,000)	12,50,000	0.676	0.145	0.098
	18,50,000	1.00		0.129

WACC (K_o) = 0.129 or 12.9% (approx.)

Q.22

WACC

MTP May 21(1)



CALCULATE the WACC by using Market value weights.

The capital structure of the company is as under:

	(₹)
Debentures (Rs.100 per debenture)	10,00,000
Preference shares (Rs.100 per share)	10,00,000
Equity shares (Rs.10 per share)	20,00,000
	40,00,000

The market prices of these securities are:

Debentures Rs. 115 per debenture
 Preference shares Rs. 120 per preference share
 Equity shares Rs. 265 each.

Additional information:

- (1) Rs.100 per debenture redeemable at par, 10% coupon rate, 2% floatation cost, 10-year maturity.
- (2) Rs.100 per preference share redeemable at par, 5% coupon rate, 2% floatation cost and 10 - year maturity.
- (3) Equity shares have a floatation cost of Rs. 1 per share.

The next year expected dividend is Rs. 5 with an annual growth of 15%. The firm has the practice of paying all earnings in the form of dividend.

Corporate tax rate is 30%. Use YTM method to calculate cost of debentures and preference shares.

Ans

(i) **Cost of Equity (K_e)**

$$= \frac{D_1}{P_0 - F} + g = \frac{\text{Rs. } 5}{\text{Rs. } 265 - \text{Rs. } 1} + 0.15 = 0.1689 \text{ or } 16.89\%$$

(ii) **Cost of Debt (K_d)**

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

Year	Cash flows (Rs.)	Discount factor @ 5%	Present Value	Discount factor @ 7%	Present Value (Rs.)
0	112.7	1.000	(112.7)	1.000	(112.7)
1 to 10	7	7.722	54.05	7.024	49.17
10	100	0.614	61.40	0.508	50.80
NPV			+2.75		-12.73

Calculation of IRR

$$\text{IRR} = 5\% + \frac{2.75}{2.75 - (-12.73)} (7\% - 5\%) = 5\% + \frac{2.75}{15.48} (7\% - 5\%) = 5.36\%$$

Cost of Debt (K_d) = 5.36%

(i) **Cost of Preference shares (K_p)**

Calculation of NPV at discount rate of 2% and 5%

Year	Cashflow (Rs.)	Discount factor @ 2%	Present Value	Discount factor @ 5%	Present Value (Rs.)
0	117.6	1.000	(117.6)	1.000	(117.6)
1 to 10	5	8.983	44.92	7.722	38.61
10	100	0.820	82.00	0.614	61.40
NPV			+9.32		-17.59

Calculation of IRR 2% *first attempt success tutorials*

$$\frac{9.32}{9.32 - (-17.59)} (5\% - 2\%) = 2\% + \frac{9.32}{26.91} (5\% - 2\%) = 3.04\%$$

Cost of Preference Shares (K_p) = 3.04%

Calculation of WACC using market value weights

Source of capital	Market Value	Weights	After tax cost of capital	WACC (K_o)
	(Rs.)	(a)	(b)	(c) = (a) × (b)
10% Debentures (Rs.115 × 10,000)	11,50,000	0.021	0.0536	0.00113
5% Preference shares (Rs.120 × 10,000)	12,00,000	0.022	0.0304	0.00067
Equity shares (Rs.265 × 2,00,000)	5,30,00,000	0.957	0.1689	0.16164
	5,53,50,000	1.000		0.16344

WACC (K_o) = 0.16344 or 16.344%



Q.23

WACC

RTP May 22



The information relating to book value (BV) and market value (MV) weights of Ex Limited is given below:

Sources	Book Value (₹)	Market Value (₹)
Equity shares	2,40,00,000	4,00,00,000
Retained earnings	60,00,000	-
Preference shares	72,00,000	67,50,000
Debentures	18,00,000	20,80,000

Additional information:

- I. 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 on face value.
 - II. During the previous 5 years, dividends have steadily increased from ₹ 10 to ₹ 16.105 per share. Dividend at the end of the current year is expected to be ₹ 17.716 per share.
 - III. 15% Preference shares with face value of ₹ 100 would realise ₹ 105 per share.
 - IV. 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% on face value.
 - V. Corporate tax rate is 30%.
- You are required to DETERMINE the weighted average cost of capital of Ex Limited using both the weights.

Ans.

$$(i) \text{ Cost of Equity } (K_e) = \frac{D_1}{P_0 - F} + g = \frac{17.716}{125 - 5} + 0.10^*$$

$$K_e = 0.2476$$

*Calculation of g:

$$10(1+g)^5 = 16.105$$

$$\text{Or, } (1+g)^5 = \frac{16.105}{10} = 1.6105$$

Table (FVIF) suggests that ₹ 1 compounds to ₹ 1.6105 in 5 years at the compound rate of 10 percent. Therefore, g is 10 per cent.

$$(ii) \text{ Cost of Retained Earnings } (K_r) = \frac{D_1}{P_0} + g = \frac{17.716}{130} + 0.10 = 0.2363$$

$$(iii) \text{ Cost of Preference Shares } (K_p) = \frac{PD}{P_0} = \frac{15}{105} = 0.1429$$

$$(iv) \text{ Cost of Debentures } (K_d) = \frac{I(1-t) \left(\frac{RV-NP}{n} \right)}{\frac{RV+NP}{2}} = \frac{15(1-0.30) \left(\frac{100-91.75}{11 \text{ years}} \right)}{\frac{100+91.75}{2}} = \frac{15 \times 0.70 + 0.75}{95.875} = \frac{11.25}{95.875} = 0.1173$$

*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) = ₹ 15 ÷ 0.16 = ₹ 93.75

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

Market value (P₀) of debentures can also be found out using the present value method:

P₀ = Annual Interest × PVIFA (16%, 11 years) + Redemption value × PVIF (16%, 11 years)

P₀ = ₹ 15 × 5.0287 + ₹ 100 × 0.1954

P₀ = ₹ 75.4305 + ₹ 19.54 = ₹ 94.9705

Net Proceeds = ₹ 94.9705 - 2% of ₹ 100 = ₹ 92.9705
Accordingly, the cost of debt can be calculated

Total Cost of capital [BV weights and MV weights]

(Amount in ₹ lakh)

Source of capital	Weights		Specific Cost (K)	Total cost	
	BV	MV		(BV × K)	(MV × K)
Equity Shares	240	320**	0.2476	59.4240	79.2320
Retained Earnings	60	80**	0.2363	14.1780	18.9040
Preference Shares	72	67.50	0.1429	10.2888	9.6458
Debentures	18	20.80	0.1173	2.1114	2.4398
Total	390	488.30		86.0022	110.2216

**Market Value of equity has been apportioned in the ratio of Book Value of equity and retained earnings i.e., 240:60 or 4:1.

Weighted Average Cost of Capital (WACC):

Using Book Value = $\frac{86.0022}{390} = 0.2205$ or 22.05%

Using Market Value = $\frac{110.2216}{488.30} = 0.2257$ or 22.57%

Q.24

WACC

RTP May 19



As a financial analyst of a large electronics company, you are required to DETERMINE the weighted average cost of capital of the company using (a) book value weights and (b) market value weights. The following information is available for your perusal.

The Company's present book value capital structure is:

	(₹)
Debentures (₹100 per debenture)	8,00,000
Preference shares (₹100 per share)	2,00,000
Equity shares (₹10 per share)	<u>10,00,000</u>
	<u>20,00,000</u>

All these securities are traded in the capital markets. Recent prices are:

Debentures, ₹110 per debenture, Preference shares, ₹120 per share, and Equity shares, ₹ 22 per share

Anticipated external financing opportunities are:

- ₹ 100 per debenture redeemable at par; 10 year maturity, 11 per cent coupon rate, 4 per cent flotation costs, sale price, ₹ 100
- ₹ 100 preference share redeemable at par; 10 year maturity, 12 per cent dividend rate, 5 per cent flotation costs, sale price, ₹100.
- Equity shares: ₹ 2 per share flotation costs, sale price = ₹ 22.

In addition, the dividend expected on the equity share at the end of the year is ₹ 2 per share, the anticipated growth rate in dividends is 7 per cent and the firm has the practice of paying all its earnings in the form of dividends. The corporate tax rate is 35 per cent.



Ans.

$$(i) \text{ Cost Debt } (K_d) = \frac{\text{Interest}(1-t) + \frac{(RV - NP)}{N}}{\frac{RV - NP}{2}} = \frac{11(1-0.35) + \frac{(100 - 96)}{10\text{years}}}{\frac{100 - 96}{2}}$$

$$= \frac{7.15 + 0.4}{98} = 0.077 \text{ or } 7.70\%$$

$$(ii) \text{ Cost of Preference Shares } (K_p) = \frac{PD + \frac{(RV - NP)}{N}}{\frac{RV - NP}{2}} = \frac{12 + \frac{(100 - 95)}{10\text{years}}}{\frac{100 - 95}{2}}$$

$$= \frac{12 + 0.5}{97.5} = 0.1282 \text{ or } 12.82\%$$

$$(iii) \text{ Cost of Equity shares } (K_e) \quad \frac{D_1}{P_0} + G = \frac{2}{22 - 2} + 0.07 = 0.17 \text{ or } 17\%$$

I - Interest, + - Tax, RV- Redeemable value, NP- Net proceeds, N- No. of years, PD- Preference dividend, D1- Expected Dividend, P0- Price of share (net)

Using these specific costs we can calculate WACC on the basis of book value and market value weights as follows:

(a) Weighted Average Cost of Capital (K₀) based on Book value weights

Source of capital	Book value(₹)	Weights	Specific cost (%)	WACC (%)
Debentures	8,00,000	0.40	7.70	3.08
Preferences shares	2,00,000	0.10	12.82	1.28
Equity shares	10,00,000	0.50	17.00	8.50
	20,00,000	1.00		12.86

(b) Weighted Average Cost of Capital (K₀) based on market value weights:

Source of capital	Market value(₹)	Weights	Specific cost (%)	WACC (%)
Debenture $\frac{8,00,000}{100} \times 110$	8,80,000	0.265	7.70	2.04
Preferences shares $\frac{2,00,000}{100} \times 120$	2,40,000	0.072	12.82	0.92
Equity shares $\frac{10,00,000}{10} \times 22$	22,00,000	0.663	17.00	11.27
	33,20,000	1.000		14.23

Q.25

WACC

MTP May 22(2)



The capital structure of RV Limited as on 31st March, 2022 as per its Balance Sheet is as follows:

Particulars	₹
Equity shares of ₹ 10 each	25,00,000
10% Preference shares of ₹ 100 each	5,00,000
Retained earnings	5,00,000
13% debentures of ₹ 100 each	20,00,000

The market price of equity shares is ₹ 50 per share. Expected dividend on equity shares is ₹ 3 per share. The dividend per share is expected to grow at the rate of 8%.

Preference shares are redeemable after eight years and the current market price is ₹ 80 per share.

Debentures are redeemable after five years and are currently selling at ₹ 90 per debenture.

The tax rate applicable to the company is 35%.

CALCULATE weighted average cost of capital using:

- Book value proportions
- Market value proportions

Ans.

- Cost of Equity (K_e)

$$\frac{D_1}{P} + g = \frac{3}{50} + 0.08 = 0.14 \text{ i.e. } 14\%$$

- Cost of preference shares (K_p)

$$\frac{D + \frac{RV-NP}{n}}{\frac{RV+NP}{2}} = \frac{10 + \frac{(100-80)}{8}}{\frac{100+80}{2}} = \frac{12.5}{90} = 0.1389 = 13.89\%$$

- Cost of debenture (K_d)

$$\frac{I(1-t) + \frac{RV-NP}{n}}{\frac{RV+NP}{2}} = \frac{13(1-0.35) + \frac{(100-90)}{5}}{\frac{100+90}{2}} = \frac{8.45+2}{95} = 0.11 \text{ i.e. } 11\%$$

Or

$$\left[I + \frac{RV-NP}{n} \right] \frac{(1-t)}{\frac{RV+NP}{2}} = \left[\frac{13 + \frac{(100-90)}{5}}{\frac{100+90}{2}} \right] (1-0.35) = 0.1026 \text{ i.e. } 10.26\%$$

Weighted Average cost of capital (Book Value)

	Amount (₹)	Weight (W)	Cost (K)	W × K
Equity shares	25,00,000	0.4546	0.14	0.0636
Preference shares	5,00,000	0.0909	0.1389	0.0126
Retained Earnings	5,00,000	0.0909	0.14	0.0127
Debentures	20,00,000	0.3636	0.1026	0.0373
	55,00,000			0.1262

Or (if K_d is 11%) the WACC = 0.1289

Thus, WACC (Book value based) = 12.62% or 12.89%

Weighted Average cost of capital (Market Value)



	Amount (₹)	Weight (W)	Cost (K)	W × K
Equity shares	1,25,00,000	0.85	0.14	0.119
Preference shares	4,00,000	0.028	0.1389	0.0039
Debentures	18,00,000	0.122	0.1026	0.0125
	1,47,00,000			0.1354

Or (if K_d is 11%) the WACC = 0.1363

Thus, WACC (Market value based) = 13.54% or 13.63%

Q.26

MTP Sept 24 (1)



Gitarth Limited has a current debt equity ratio of 3:7. The company is presently considering several alternative investment proposals costing less than ₹ 25 lakhs. The company will always raise the funds required without disturbing its current capital structure ratio.

The cost of raising debt and equity are as follows-

Cost of Project	K_d	K_e
Upto 5 lakhs	10%	12%
Above 5 lakhs & upto 10 lakhs	12%	13.5%
Above 10 lakhs & upto 20 lakhs	13%	15%
Above 20 lakhs	14%	16%

Corporate tax rate is 30%, CALCULATE:

- Cut off rate for two Projects I & Project II whose fund requirements are 15 lakhs & ₹ 26 lakhs respectively.
- If a project is expected to give an after-tax return of 13%, determine under what conditions it would be acceptable.

Ans.

Calculation of slab wise Overall Cost of Capital

(i)

Project Cost	Capital Source	Weights (w)	Cost (k)	w × k (%)
Upto 5 Lakhs	Debt	0.3	10	3
	Equity	0.7	12	8.4
			Ko	11.4
Above 5 lakhs upto 10 lakhs	Debt	0.3	12	3.6
	Equity	0.7	13.5	9.45
			Ko	13.05
Above 10 lakhs upto 20 lakhs	Debt	0.3	13	3.9
	Equity	0.7	15	10.5
			Ko	14.4
Above 20 lakhs	Debt	0.3	14	4.2
	Equity	0.7	16	11.2
			Ko	15.4

Cost of Raising funds for Project I

Total Capital	Ko(%)	Total Cost (in ₹)
5,00,000	11.40	57,000
5,00,000	13.05	65,250
5,00,000	14.40	72,000
15,00,000		1,94,250

$$\begin{aligned} \text{Overall COC (\%)} &= \text{Total Cost (in ₹)} / \text{Total Capital} \\ &= 1,94,250 / 15,00,000 * 100 \\ &= 12.95\% \end{aligned}$$

Cost of Raising funds for Project II

Total Capital	Ko(%)	Total Cost (in ₹)
5,00,000	11.4	57,000
5,00,000	13.05	65,250
10,00,000	14.4	1,44,000
6,00,000	15.4	92,400
26,00,000		3,58,650

$$\text{Overall COC (\%)} = 358650 / 2600000 * 100 = 13.79\%$$

- (ii) If any project is expected to give an after-tax return of 13%, it can be accepted only if the maximum Overall COC (%) of that project equals 13% or less, as at 13%, project would be at break-even i.e earning 13% from the project and incurring 13% COC.

So, under that scenario, Project I can be taken as its COC is 12.95% whereas Project II can't be taken as its COC is 13.79%.

Maximum Value of the Project that can be taken at 13% is approx. (Using IRR technique Interpolation)

At 15 Lakhs Ko = 12.95%

At 26 Lakhs Ko = 13.79%

By interpolation, maximum value of Project at 13% will be 15 Lakhs + {(0.05 × 11)/0.84}

= **15.6548 lakhs**

Q.27

PY Jan 25



The following information pertain to CMC Limited:

Number of Equity Shares	20,00,000
Book Value of 10% Convertible Debentures	₹ 1,00,00,000
Book Value of 12% Bank Term Loan	₹ 25,00,000
Market Price of Equity Share	₹ 55
Market Value of 10% Convertible Debenture	₹ 108
Face Value of Equity Share	₹ 10
Face Value of 10% Convertible Debenture	₹ 100
Beta coefficient of Equity shares of CMC Ltd.	1.5
Risk free rate of return	4.5%
Equity risk Premium	9%
Rate of taxation	30%



The company expects that the share prices will rise in future at an average rate of 6% per annum. The 10% convertible debentures of 100 each will be converted in six years' time into equity shares of the company in the ratio of 1: 4 (4 equity shares for each debenture).

The market value of 12% bank term loan is at par. You are required to calculate:

- Cost of Equity Share Capital by applying Capital Asset Pricing Model (CAPM) Approach
- Cost of Convertible Debenture by using approximation method,
- Cost of Bank Term Loan
- Weighted Average Cost of Capital using Market Value weights

Ans.

(i) Cost of equity share

$$R_f = 4.5\%$$

$$R_m - R_f = 9\%$$

$$B = 1.5$$

Using CAPM,

$$K_e = R_f + \beta (R_m - R_f)$$

$$= 4.5\% + 1.5 (9\%)$$

$$= 18\%$$

(ii) Cost of convertible debenture (based on Market Value)

$$\text{Price of share after 6 years} = 55 (1+0.06)^6$$

$$= ₹ 78.018$$

$$\text{Redemption Value of Debenture (RV)} = 78.018 \times 4 = 312.07 \text{ (RV) NP} = 108 \text{ (MV)}$$

$$\text{NP} = 108 \text{ (MV)}$$

$$n = 6$$

$$K_d = \frac{\text{INT}(1+t) + \frac{\text{RV} - \text{NP}}{n}}{\frac{(\text{RV} - \text{NP})}{2}} \times 100$$

$$= \frac{10(1+0.3) + \frac{(312.07 - 108)}{6}}{\frac{(312.07 + 108)}{2}} \times 100$$

$$= \frac{7 + 34.012}{210.035} \times 100$$

$$K_d = 19.52\%$$

(iii) Cost of bank term loan

$$K_d = I (1 - t)$$

$$= 12\% (1-0.3) = 8.4\%$$

(iv) Calculation of Weighted Average Cost of Capital (WACC) using Market Value Weights

Source	(₹) in lakhs	Weight	Cost of Capital after tax	WACC
Equity Share Capital	11,00,00,000	0.892	0.180	0.1606
10% Convertible Debenture	1,08,00,000	0.088	0.195	0.0171

12% Bank Term Loan	25,00,000	0.020	0.084	0.0017
Total	12,33,00,000	1		0.1794

WACC = 17.94%

Alternative Solution to Part (ii) and (iv)

(ii) Cost of convertible debenture

$$\begin{aligned} \text{Price of share after 6 years} &= 55 (1+0.06)^6 \\ &= ₹ 78.018 \end{aligned}$$

$$\text{Redemption Value of Debenture (RV)} = 78.018 \times 4 = \mathbf{312.07 (RV)}$$

$$\text{NP} = 100$$

$$n = 6$$

$$k_d = \frac{\text{INT}(1+t) + \frac{\text{RV} - \text{NP}}{n}}{(\text{RV} - \text{NP})} \times 100$$

$$\begin{aligned} &= \frac{10(1 - 0.3) + \frac{(312.07 - 108)}{6}}{(312.07 + 100)} \times 100 \\ &= \frac{7 + 35.345}{206.035} \times 100 \\ \text{Kd} &= 20.55\% \end{aligned}$$

(iv) Calculation of Weighted Average Cost of Capital (WACC) using Market Value Weights

Source	(₹) in lakhs	Weight	Cost of Capital after tax	WACC
Equity Share Capital	11,00,00,000	0.892	0.180	0.1606
10% Convertible Debenture	1,08,00,000	0.088	0.205	0.0180
12% Bank Term Loan	25,00,000	0.020	0.084	0.0017
Total	12,33,00,000	1		0.1803

WACC = 18.03%

Q.28

PY Nov 23



Z Ltd. wishes to raise additional fund of ₹ 25,00,000 for meeting its investment plan. It has ₹ 5,25,000 in the form of retained earnings available for investment purposes. Further details are as following:

Combination of debt and equity	2:3
Cost of debt	
Upto ₹ 2,50,000	8% (before tax)
Above ₹ 2,50,000 and to upto ₹ 5,00,000	10% (before tax)
Beyond ₹ 5,00,000	12% (after tax)
Earning of company	₹ 50,00,000
Retention Ratio	40%
Expected growth of dividend	15%
Market price per share	₹ 500



Number of outstanding equity shares	1,00,000
Tax Rate	30%

You are required to calculate:

- Cost of debt
- Cost of retained earnings and cost of equity
- Weighted average cost of capital

Ans.

Equity	60% of ₹ 25,00,000	= ₹ 15,00,000
Debt	40% of ₹ 25,00,000	= ₹ 10,00,000

The capital structure after raising additional finance:

		(₹)
Shareholders' funds		
Equity Capital	(₹ 15,00,000 - ₹ 5,25,000)	9,75,000
Retained earnings		5,25,000
Debt (Interest at 8% p.a.)		2,50,000
(Interest at 10% p.a.)	(₹ 5,00,000 - ₹ 2,50,000)	2,50,000
(Interest at 12% p.a.)	(₹ 10,00,000 - ₹ 5,00,000)	5,00,000
Total Funds		25,00,000

- (i) **Determination of post-tax average cost of additional debt:**

$$K_d = I(1 - t)$$

Where,

I = Interest Rate t = tax-rate

$$\text{On ₹ 2,50,000} = 8\% (1 - 0.3) = 5.6\% \text{ or } 0.056$$

$$\text{On ₹ 2,50,000} = 10\% (1 - 0.3) = 7\% \text{ or } 0.07$$

$$\text{On ₹ 5,00,000} = 12\% \text{ or } 0.12$$

Average Cost of Debt first attempt success tutorials

$$= \frac{(2,50,000 \times 0.056) + (2,50,000 \times 0.07) + (5,00,000 \times 0.12)}{10,00,000} \times 100 = 9.15\%$$

- (ii) **Determination of cost of retained earnings and cost of equity by applying Dividend growth model:**

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

Where,

$$D_0 = \text{Dividend paid} = 60\% \text{ of EPS} = 60\% \times ₹ 50 = ₹ 30$$

$$g = \text{Growth rate} = 15\%$$

$$P_0 = \text{Current market price per share} = ₹ 500$$

$$\text{So, } K_e \text{ or } K_r = \frac{30(1+0.15)}{500} + 0.15 = 0.069 + 0.15 = 21.9\%$$

- (iii) **Computation of overall weighted average after tax cost of additional finance:**

Particulars	(₹)	Weights	Cost of funds	Weighted Cost (%)
Equity (including retained earnings)	15,00,000	0.60	21.9%	13.14
Debt	10,00,000	0.40	9.15%	3.66
WACC	25,00,000			16.80

Alternative Presentation

Particulars (1)	(₹) (2)	Cost of funds (3)	Product (2) × (3)
Equity (including retained earnings)	15,00,000	21.9%	3,28,500
Debt	10,00,000	9.15%	91,500
Total	25,00,000		4,20,000

WACC = (Product / Total book value) × 100 = (4,20,000 / 25,00,000) × 100 = 16.8%

Alternative Solution for 4(ii) and 4(iii)

If we assume expected growth rate of Dividend as 5%.

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

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

Where,

D_0 = Dividend paid = 60% of EPS = 60% × ₹ 50 = ₹ 30

g = Growth rate = 5%

P_0 = Current market price per share = ₹ 500

$$\text{So, } K_e \text{ or } K_r = \frac{30(1+0.05)}{500} + 0.05 = 0.063 + 0.05 = 11.3\%$$

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

Particulars	(₹)	Weights	Cost of funds	Weighted Cost (%)
Equity (including retained earnings)	15,00,000	0.60	11.3%	6.78
Debt	10,00,000	0.40	9.15%	3.66
WACC	25,00,000			10.44

Alternative Presentation

Particulars (1)	(₹) (2)	Cost of funds (3)	(2) × (3)
Equity (including retained earnings)	15,00,000	11.3%	1,69,500
Debt	10,00,000	9.15%	91,500
Total	25,00,000		2,61,000

WACC = (Product / Total book value) × 100 = (2,61,000 / 25,00,000) × 100 = **10.44%**

Q.29

RTP SEP 2025



Lavanya Limited wishes to raise additional finance of ₹ 20 lakhs for meeting its investment plans. It has ₹ 4,20,000 in the form of retained earnings available for investment purposes. Further details are as following:

(1)	Debt / Equity mix	3:7
(2)	Cost of debt:	
	Upto ₹ 3,60,000	8% (before tax)
	Beyond ₹ 3,60,000	12% (before tax)
(3)	Earnings per share	₹ 5
(4)	Dividend pay out	40% of earnings
(5)	Retained Earnings	60%
(6)	Rate of Return on Retained Earnings	10%
(7)	Current market price per share	₹ 53
(8)	Tax rate	30%



You are required to:

- DETERMINE the pattern for raising the additional finance.
- DETERMINE the post-tax average cost of additional debt.
- DETERMINE the cost of retained earnings and cost of equity.
- COMPUTE the overall weighted average after tax cost of additional finance.

Ans.

- (a) Pattern for raising the additional finance:

Equity 70% of ₹ 20,00,000 = ₹14,00,000

Debt 30% of ₹ 20,00,000 = ₹ 6,00,000

The capital structure after raising additional finance:

	(₹)
Shareholders' funds	
Equity Capital (₹ 14,00,000 - ₹ 4,20,000)	9,80,000
Retained earnings	4,20,000
Debt (Interest at 8% p.a.)	3,60,000
(Interest at 12% p.a.) (₹ 6,00,000 - ₹ 3,60,000)	2,40,000
Total Funds	20,00,000

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

$$K_d = I(1 - t)$$

Where,

I = Interest Rate

t = Corporate tax-rate

$$\text{On ₹ 3,60,000} = 8\% (1 - 0.3) = 5.6\% \text{ or } 0.056$$

$$\text{On ₹ 2,40,000} = 12\% (1 - 0.3) = 8.4\% \text{ or } 0.084$$

Average Cost of Debt

$$= \frac{(\text{₹ } 3,60,000 \times 0.056) + (\text{₹ } 2,40,000 \times 0.084)}{\text{₹ } 6,00,000} \times 100 = 6.72\%$$

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

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

Where,

$$D_0 = \text{Dividend paid} = 40\% \text{ of EPS} = 40\% \times ₹ 5 = ₹ 2$$

$$g = \text{Growth rate} = \text{Retained Earnings} \times \text{Rate of Return}$$

$$= 0.6 \times 0.10 = 0.06 \text{ or } 6\%$$

$$P_0 = \text{Current market price per share} = ₹ 53$$

$$K_e \text{ or } K_r = \frac{2(1+0.06)}{53} + 0.06 = \frac{2.12}{53} + 0.06 = 0.04 + 0.06 = 0.10 \text{ or } 10\%$$

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

Particulars	Amount (₹)	Weights	Cost of funds	Weighted Cost (%)
Equity (including retained earnings)	14,00,000	0.70	10%	7
Debt	6,00,000	0.30	6.72%	2.016
WACC	20,00,000			9.016

Q. 30

JC Ltd. is planning an equity issue in current year. It has an earning per share (EPS) of ₹20 and proposes to pay 60% dividend at the current year end with a P/E ratio 6.25, it wants to offer the issue at market price. The flotation cost is expected to be 4% of the issue price. You are required to determine rate of return for equity share (cost of equity) before the issue and after the issue.

Ans.	Market price of share (MPS/P ₀)	=	EPS × PE	=	₹20 × 6.25	=	₹125
	Net proceeds	=	125 - 4%	=		=	₹120
	Return on Equity (ROE)	=	1/PE	=	1/6.25	=	16%
	Growth rate	=	r × b	=	16% × 40%	=	6.40%
	K _e (before issue)	=	$\frac{D_1}{P_0} + g$	=	$\frac{60\% \text{ of } 20}{125} + 6.40\%$	=	16%
	K _e (after issue)	=	$\frac{D_1}{NP} + g$	=	$\frac{60\% \text{ of } 20}{120} + 6.40\%$	=	16.40%

Q. 31

Following is the capital structure of RBT Ltd. As on 31st March 2016:

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

Market price of equity shares is ₹40 per share and it is expected that a dividend of ₹4 per share would be declared. The dividend per share is expected to grow at the rate of 8% every year. Income tax rate applicable to the company is 40% and shareholder's personal income tax rate is 20%.

You are required to calculate:

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

Ans. (i) **Calculation of cost of capital for each source of capital:**

K _e	=	$\frac{D_1}{P_0} + g$	=	$\frac{4}{40} + 0.08$	=	18%
K _r	=	K _e (1 - PT)	=	18% (1 - 0.20)	=	14.40%
K _d	=	I (1 - t)	=	14% (1 - 0.40)	=	8.40%
K _p	=	Rate of PD	=	11%		

(ii) Calculation of WACC (K_o) using book value proportions

Name of Source	Amount	Proportion	K	K _o
Equity Share Capital	50,00,000	0.50	18%	9.00%
Retained Earnings	13,00,000	0.13	14.40%	1.87%
Preference Share Capital	7,00,000	0.07	11%	0.77%
Debentures	30,00,000	0.30	8.40%	2.52%
Total	1,00,00,000	1.00	WACC	14.16%

(iii) Calculation of WACC (K_o) using market value proportions



Name of Source	Amount	Proportion	K	Ko
Equity Share Capital	83,33,333	0.555	18%	9.99%
Retained Earnings	21,66,667	0.145	14.40%	2.09%
Preference Share Capital	9,00,000	0.060	11%	0.66%
Debentures	36,00,000	0.240	8.40%	2.02%
Total	1,50,00,000	1.000	WACC	14.76%

Market value of Equity Share Capital = ₹1,05,00,000 × 50/63 = ₹83,33,333

Market value of Retained Earnings = ₹1,05,00,000 × 13/63 = ₹21,66,667

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

Q. 32

XYZ Ltd. has the following book value capital structure:

Equity Share Capital (₹10 each, fully paid up at par)	₹15 crores
11% Preference Share Capital (₹100 each, fully paid up at par)	₹1 crores
Retained Earnings	₹20 crores
13.5% Debentures (of ₹100 each)	₹10 crores
15% Terms 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 10 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%.

Required:

- Calculate the weighted average cost of capital (Ko) using:
 - Book value proportions; and
 - Market value proportions.
- Define the weighted marginal cost of capital schedule for the company, if it raises ₹10 crores next year, given the following information:
 - The amount will be raised by equity and debt in equal proportions;
 - The company expects to retain ₹1.5 crores earnings next year;
 - The additional issue of equity shares will result in the net price per share being fixed at ₹32;
 - The debt capital raised by way of term loans will cost 15% for the first ₹2.5 crores and 16% for the next ₹2.5 crores.

Ans

(i) Calculation of WACC (Ko)

(a) By Using Book Value Proportions

Name of Source	Amount	Proportion	K	Ko
Equity Share Capital	15,00,00,000	0.2564	16%	4.1024%
Retained Earnings	20,00,00,000	0.3419	16%	5.4704%
Debentures	10,00,00,000	0.1709	12.70%	2.1704%
Preference Share Capital	1,00,00,000	0.0171	15.43%	0.2639%
Term Loan	12,50,00,000	0.2137	9%	1.9233%
Total	58,50,00,000	1.0000	WACC	13.9304%

(b) By Using Market Value Proportions

Name of Source	Amount	Proportion	K	Ko
*Equity & Retained Earnings	60,00,00,000	0.7385	16%	11.816%
Debentures	8,00,00,000	0.0985	12.70%	1.2510%
Preference Share Capital	75,00,000	0.0092	15.43%	0.1420%
Term Loan	12,50,00,000	0.1538	9%	1.3842%
Total	81,25,00,000	1.0000	WACC	14.5931%

* K_e & K_r are same, so calculated together.

(ii) **Weighted Marginal Cost of Capital Schedule and Marginal WACC:**

Marginal Cost of Capital Schedule:

Finance through Equity:

Retained earnings	=	₹1.5 crores
New issue	=	₹3.5 crores

Finance through Debt:

15% Debt	=	₹2.5 crores
16% Debt	=	₹2.5 crores

Marginal Cost of Capital

Name of Source	Amount	Proportion	K	Ko
Equity Share Capital (New)	3,50,00,000	0.35	18.25%	6.3875%
Retained Earnings	1,50,00,000	0.15	16%	2.4000%
15% Debt	2,50,00,000	0.25	9%	2.2500%
16% Debt	2,50,00,000	0.25	9.60%	2.4000%
Total	10,00,00,000	1.00	WACC	13.4375%

Working Notes:

Calculation of existing K_e , K_r , K_d , K_p and K_{TL} :

$$K_e = \frac{D_1}{P_0} + g = \frac{3.60}{40} + 0.07 = 16\%$$

$$K_r = K_e = 16\%$$

$$K_d = \frac{I(1-t) + \left(\frac{RV-NP}{n}\right)}{\frac{RV+NP}{2}} \times 100 = \frac{13.50(1-0.40) + \left(\frac{100-80}{6}\right)}{\frac{100+80}{2}} \times 100$$

$$= 12.70\%$$

$$K_p = \frac{PD + \left(\frac{RV-NP}{n}\right)}{\frac{RV+NP}{2}} \times 100 = \frac{11 + \left(\frac{100-75}{10}\right)}{\frac{100+75}{2}} \times 100 = 15.43\%$$

$$K_{TL} = I(1-t) = 15\%(1-0.40) = 9\%$$

Calculation of revised K_e , K_r , K_{d1} and K_{d2}

$$K_e = \frac{D_1}{P_0} + g = \frac{3.60}{40} + 0.07 = 18.25\%$$

$$K_r = K_e \text{ (existing)} = 16\%$$

$$K_{d1} = I(1-t) = 15\%(1-0.40) = 9\%$$

$$K_{d2} = I(1-t) = 16\%(1-0.40) = 9.60\%$$

Q.33



Bulldog Ltd. has a debt of 14% in the past. It can raise a fresh debt at 12.5%. The company is in a tax bracket of 35%. Bulldog Ltd. plans to follow dividend discount model to estimate the cost of equity. The company plans to pay ₹4 per share as dividends in the next year. The DPS of the company is expected to grow at the rate of 8%



p.a. The current MPS of the company's equity shares is ₹40.

You are required to compute the marginal weighted average cost of capital if the target debt to value ratio of the company is 20%.

Ans. Marginal WACC = $K_e W_e + K_d W_d = 18\% \times 0.80 + 8.125\% \times 0.20 = 16.025\%$

Calculation of Marginal K_e and K_d

$$K_e = \frac{D_1}{P_0} + g = \frac{4}{40} + .08 = 18\%$$

$$K_d = I(1 - t) = 12.50\%(1 - 0.35) = 8.125\%$$

Q.34



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

Sources of Fund	Book Value	Market Value
Equity Shares	₹1,20,00,000	₹2,00,00,000
Retained Earnings	₹30,00,000	Nil
Preference Shares	₹36,00,000	₹33,75,000
Debentures	₹9,00,000	₹10,40,000

Additional Information:

- 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.
- 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.
- Preference Shares:** 15% Preference shares with face value of ₹100 would realise ₹105 per share.
- 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%.
- Tax:** Corporate tax rate is 35%. Ignore dividend tax. Flotation cost would be calculated on face value.

Ans.

(a) Calculation of Weighted Average Cost of Capital by Using Book Value Weight

Particulars	Book Value	Weight (W)	Cost (K)	Weighted cost
Equity Shares	₹1,20,00,000	0.615	0.1850	0.1138
Retained Earnings	₹30,00,000	0.154	0.1754	0.0270
Preference Shares	₹36,00,000	0.185	0.1429	0.0264
Debentures	₹9,00,000	0.046	0.1095	0.0050
Total	₹1,95,00,000	1.000	WACC	0.1722

(b) Calculation of Weighted Average Cost of Capital by Using Market Value Weight

Particulars	Market Value	Weight (W)	Cost (K)	Weighted cost
*Equity Shares	₹1,60,00,000	0.655	0.1850	0.1212
*Retained Earnings	₹40,00,000	0.164	0.1754	0.0288
Preference Shares	₹33,75,000	0.138	0.1429	0.0197
Debentures	₹10,40,000	0.043	0.1095	0.0047
Total	₹2,44,15,000	1.000	WACC	0.1744

Working notes:



6

CHAPTER

DIVIDEND DECISIONS

Q.1

Dividend Payout

PY May 23



Following information are given for a company:

Earnings per share	₹ 10
P/E ratio	12.5
Rate of return on investment	12%
Market price per share as per Walter's Model	₹ 130

You are required to calculate:

- Dividend payout ratio.
- Market price of share at optimum dividend payout ratio.
- P/E ratio, at which the dividend policy will have no effect on the price of share.
- Market price of share at this P/E ratio.
- Market price of share using Dividend growth model.

Ans

- (i) The EPS of the firm is ₹ 10, $r = 12\%$. The P/E Ratio is given at 12.5 and the cost of capital (K_e) may be taken as the inverse of P/E ratio. Therefore, K_e is 8% (i.e., $1/12.5$). The value of the share is ₹ 130 which may be equated with Walter Model as follows:

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e} \quad \text{or} \quad P = \frac{D + \frac{12\%}{8\%}(10 - D)}{8\%}$$

$$\text{or } [D + 1.5(10 - D)] / 0.08 = 130 \quad \text{or}$$

$$D + 15 - 1.5D = 10.4$$

$$\text{or } -0.5D = -4.6$$

$$\text{So, } D = ₹ 9.2$$

The firm has a dividend pay-out of 92% (i.e., $9.2/10$).

- (ii) Since the rate of return of the firm (r) is 12% and it is more than the K_e of 8%, therefore, by distributing 92% 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:

$$P = \frac{D + \frac{12\%}{8\%}(10 - 0)}{8\%}$$

$$P = ₹ 187.5$$

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

- (iii) 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 12% ($= r$) at the P/E ratio of $1/12\% = 8.33$. Therefore, at the P/E ratio of 8.33, the dividend policy would have no effect on the value of the share.
- (iv) If the P/E is 8.33 instead of 12.5, then the K_e which is the inverse of P/E ratio, would be 12% and in such a situation $K_e = r$ and the market price, as per Walter's model would be:

$$P = \frac{D + \frac{r}{k_e}(E - D)}{k_e} = \frac{9.2 + \frac{12\%}{0.12}(10\% - 9.2)}{0.12} = ₹ 83.33$$

Dividend Growth Model applying growth on dividend

$k_e = 8\%$, $r = 12\%$, $D_0 = 9.2$, $b = 0.08$

$g = b \cdot r$

$g = 0.08 \times 0.12 = 0.96\%$

$D_1 = D_0(1+g) = 9.2(1+0.0096) = ₹ 9.2883$

$$P = \frac{D_1}{(k_e - g)} = \frac{9.2883}{(0.08 - 0.0096)} = \frac{9.2883}{0.0704} = ₹ 131.936$$

Alternative

Alternatively, without applying growth on dividend

$$P = \frac{E(1-b)}{k_e - br} = \frac{10(1-0.08)}{0.08 - (0.08 \cdot 0.12)} = ₹ 130.68$$

Q.2

Growth Model

MTP May 18



A company had paid dividend of ₹ 2 per share last year. The estimated growth of the dividends from the company is estimated to be 5% p.a. DETERMINE the estimated market price of the equity share if the estimated growth rate of dividends (i) rises to 8%, and (ii) falls to 3%. Also COMPUTE the present market price of the share, given that the required rate of return of the equity investors is 15.5%.

Ans

In this case the company has paid dividend of ₹2 per share during the last year. The growth rate (g) is 5%. Then, the current year dividend (D₁) with the expected growth rate of 5% will be ₹ 2.10

$$\begin{aligned} \text{The share price is } = P_0 &= \frac{D_1}{k_e - g} \\ &= \frac{2.10}{0.155 - 0.05} \\ &= ₹ 20 \end{aligned}$$

(i) In case the growth rate rises to 8% then the dividend for the current year (D₁) would be ₹ 2.16 and market price would be-

$$\begin{aligned} &= \frac{2.16}{0.155 - 0.08} \\ &= ₹ 28.80 \end{aligned}$$

(ii) In case growth rate falls to 3% then the dividend for the current year (D₁) would be ₹2.06 and market price would be-

$$\begin{aligned} &= \frac{2.16}{0.155 - 0.03} \\ &= ₹16.48 \end{aligned}$$

So, the market price of the share is expected to vary in response to change in expected growth rate is dividends.

Q.3

MM Approach

RTP May 23



Rambo Limited Has 1,00,000 equity shares outstanding for the year 2022. The current market price of the shares is ₹ 100 each. Company is planning to pay dividend of ₹ 10 per share. Required rate of return is 15%. Based on Modigliani-Miller approach, calculate the market price of the share of the company when the recommended



dividend is 1) declared and 2) not declared.

How many new shares are to be issued by the company at the end of the year on the assumption that net income for the year is ₹ 40 Lac and the investment budget is ₹ 50,00,000 when dividend is declared, or dividend is not declared.

PROOF that the market value of the company at the end of the accounting year will remain same whether dividends are distributed or not distributed.

Ans

CASE 1: Value of the firm when dividends are not paid.

Step 1: Calculate price at the end of the period

$$K_e = 15\%, \quad P_0 = ₹100, \quad D_1 = 0$$

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$₹100 = \frac{P_1 + 0}{1 + 0.15}$$

$$P_1 = ₹115$$

Step 2: Calculation of funds required for investment

Earning	₹ 40,00,000
Dividend distributed	Nil
Fund available for investment	₹ 40,00,000
Total Investment	₹ 50,00,000
Balance Funds required	₹ 50,00,000 - ₹ 40,00,000 = ₹ 10,00,000

Step 3: Calculation of No. of shares required to be issued for balance funds

$$\text{No. of shares} = \frac{\text{Funds required}}{P_1}$$

$$\Delta n = \frac{₹10,00,000}{₹115}$$

Step 4: Calculation of value of firm $nP_0 = [(n + \Delta n)P_1 - I + E] / (1 + K_e)$

$$nP_0 = \frac{[(100000 + 1000000 / ₹115) ₹115 - ₹5000000 + ₹4000000]}{(1.15)}$$

$$= ₹1,00,00,000$$

CASE 2: Value of the firm when dividends are paid.

Step 1: Calculate price at the end of the period

$$K_e = 15\%, \quad P_0 = ₹100, \quad D_1 = ₹10$$

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$₹100 = \frac{P_1 + 10}{1 + 0.15}$$

$$P_1 = ₹105$$

Step 2: Calculation of funds required for investment

Dividend distributed	10,00,000
Fund available for investment	₹ 30,00,000
Total Investment	₹ 50,00,000
Balance Funds required	₹ 50,00,000 - ₹ 30,00,000 = ₹ 20,00,000

Step 3: Calculation of No. of shares required to be issued for balance fund

$$\text{No. of shares} = \text{Funds Required}/P_1$$

$$\Delta n = ₹2000000/₹105$$

Step 4: Calculation of value of firm

$$nP_0 = [(n+\Delta n)P_1 - I+E]/(1+K_e)$$

$$nP_0 = [(100000 + 2000000/₹105) ₹105 - ₹5000000 + ₹4000000]/(1.15) = ₹1,00,00,000$$

Thus, it can be seen from the above calculations that the value of the firm remains the same in either case.

Q.4

MM Approach

RTP Nov 22



Ordinary shares of a listed company are currently trading at ₹ 10 per share with two lakh shares outstanding. The company anticipates that its earnings for next year will be ₹ 5,00,000. Existing cost of capital for equity shares is 15%. The company has certain investment proposals under discussion which will cause an additional 26,089 ordinary shares to be issued if no dividend is paid or an additional 47,619 ordinary shares to be issued if dividend is paid.

Applying the MM hypothesis on dividend decisions, CALCULATE the amount of investment and dividend that is under consideration by the company.

Ans

$$P_0 = ₹ 10, n = 2,00,000, E = ₹ 5,00,000$$

$$K_e = 15\%, \Delta n = 26,089, I = ?$$

$$P_0 = \frac{P_1}{1+K_e}$$

$$10 = \frac{P_1}{1.15}$$

$$P_1 = 11.5$$

$$\Delta n = \frac{I - E + nD_1}{P_1}$$

$$26,089 = \frac{I - 5,00,000}{11.5}$$

$$I = 8,00,024$$

Now,

$$P_0 = ₹ 10, n = ₹ 2,00,000,$$

$$E = ₹ 5,00,000, I = 8,00,024, K_e = 15\%, \Delta n 47,619, D_1 = ?$$

$$P = \frac{P_1 + D_1}{1+K_e}$$

$$10 = \frac{P_1 + D_1}{1.15}$$

$$P_1 = 11.5$$





$$\Delta n = \frac{I - E + nD_1}{P_1}$$

$$26,089 = \frac{I - 5,00,000}{11.5}$$

$$I = 8,00,024$$

Now,

$$P_0 = ₹ 10, n = ₹ 2,00,000,$$

$$E = ₹ 5,00,000, I = 8,00,024, K_e = 15\%, \Delta n = 47,619, D_1 = ?$$

$$P = \frac{P_1 + D_1}{1 + K_e}$$

$$10 = \frac{P_1 + D_1}{1.15}$$

$$P_1 + D_1 = 11.5$$

$$P_1 = 11.5 - D_1 \dots\dots\dots 1$$

$$\Delta n = \frac{I - E + nD_1}{P_1}$$

$$47,619 = \frac{8,00,024 - 5,00,000 + 2,00,000D_1}{P_1}$$

$$47,619 P_1 = 2,00,000 D_1 + 3,00,024$$

From 1,

$$47,619 (11.5 - D_1) = 2,00,000 D_1 + 3,00,024$$

$$5,47,618.5 - 47,619 D_1 = 2,00,000 D_1 + 3,00,024$$

$$2,47,594.5 = 2,00,000 D_1 + 47,619 D_1$$

$$2,47,594.5 = 2,47,619 D_1$$

$$D_1 = \frac{2,47,594.5}{2,47,619} = 0.99 \text{ ₹ } 1$$

$$P_1 = 11.5 - D_1$$

$$P_1 = 11.5 - 1$$

$$P_1 = 10.5$$

$$n.P_0 = \frac{(n + Dn)P_1 - I + E}{1 + K_e}$$

$$\frac{(2,00,000 + 47,619)(10.5) - 8,00,024 + 5,00,000}{1.15}$$

$$n.P_0 = ₹ 19,99,979 = ₹ 20,00,000$$

Using direct calculation,

$$n.P_0 = 2,00,000 \times 10 = ₹ 20,00,000$$

Q.5

MM Approach

RTP Dec 21



Aakash Ltd. has 10 lakh equity shares outstanding at the start of the accounting year 2021.

The existing market price per share is ₹ 150. Expected dividend is ₹ 8 per share. The rate of capitalization appropriate to the risk class to which the company belongs is 10%.

- (i) CALCULATE the market price per share when expected dividends are: (a) declared, and (b) not declared, based on the Miller - Modigliani approach.
- (ii) CALCULATE number of shares to be issued by the company at the end of the accounting year on the assumption that the net income for the year is ₹ 3 crore, investment budget is ₹ 6 crores, when (a) Dividends are declared, and (b) Dividends are not declared.
- (iii) PROOF that the market value of the shares at the end of the accounting year will remain unchanged irrespective of whether (a) Dividends are declared, or (ii) Dividends are not declared.

Ans

(i) Project N.

Calculation of market price per share

According to Miller - Modigliani (MM) Approach:

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

Where,

Existing market price (P₀) = ₹ 150

Expected dividend per share (D₁) = ₹ 8

Capitalization rate (k_e) = 0.10

Market price at year end (P₁) = to be determined

(a) If expected dividends are declared, then

$$\begin{aligned} ₹ 150 &= \frac{P_1 + 8}{1 + 0.10} \\ P_1 &= ₹ 157 \end{aligned}$$

(b) If expected dividends are not declared, then

$$\begin{aligned} ₹ 150 &= \frac{P_1 + 0}{1 + 0.10} \\ P_1 &= ₹ 165 \end{aligned}$$

(ii) Calculation of number of shares to be issued

	(a)	(b)
	Dividends are declared (₹ lakh)	Dividends are not Declared (₹ lakh)
Net income	300	300
Total dividends	(80)	-
Retained earnings	220	300
Investment budget	600	600
Amount to be raised by new issues	380	300
Relevant market price (₹ per share)	157	165



No. of new shares to be issued (in lakh) (₹ 380 ÷ 157; ₹ 300 ÷ 165)	2.42	1.82
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(iii) Calculation of market value of the shares

	(a) Dividends are declared	(b) Dividends are not Declared
Existing shares (in lakhs)	10.00	10.00
New shares (in lakhs)	2.42	1.82
Total shares (in lakhs)	12.42	11.82
Market price per share (₹)	157	165
Total market value of shares at the end of the year (₹ in lakh)	12.42 × 157 = 1,950 (approx.)	11.82 × 165 = 1,950 (approx.)

Hence, it is proved that the total market value of shares remains unchanged irrespective of whether dividends are declared, or not declared.

Q.6

MM Approach

MTP May 23 (1)



Roma Nov Ltd. has a capital of ₹25,00,000 in equity shares of ₹100 each. The shares are currently quoted at ₹120. The company proposes to declare a dividend of ₹15 per share at the end of the current financial year. The capitalization rate for the risk class of which the company belongs is 15%. COMPUTE market price of the share at the end of the year, if

(i) Dividend is not declared.

(ii) Dividend is declared.

Assuming that the company pays the dividend and has net profits of ₹9,00,000 and makes new investments of ₹15,00,000 during the period, CALCULATE number of new shares to be issued? Use the MM model.

Ans

Cost of Equity (Ke)	15%
Number of shares in the beginning (n)	25,000
Current Market Price (P ₀)	120
Net Profit (E)	9,00,000
Expected Dividend (D ₁)	15
Investment (I)	15,00,000

Computation of market price per share, when:

(i) No dividend is declared:

$$P_0 = P_1 + D_1 \frac{P_1 + D_1}{1 + k_e}$$

$$₹120 = \frac{P_1 + 0}{1 + 0.15}$$

$$P_1 = ₹138 - 0 = ₹138 \quad \text{(ii) Dividend is declared:}$$

$$₹120 = \frac{P_1 + 15}{1 + 0.15}$$

$$P_1 = ₹138 - ₹15 = ₹123$$

Calculation of number of shares required for investment.

	₹
Earnings	9,00,000
Dividend distributed	3,75,000
Fund available for investment	12,75,000
Total Investment	15,00,000
Balance Funds required	15,00,000 - 12,75,000 = 2,25,000

$$\begin{aligned} \text{No. of shares} &= \frac{\text{Funds required}}{\text{Price at end}(P_1)} \\ &= \frac{2,25,000}{123} = 1,830 \text{ Shares (approx.)} \end{aligned}$$

Q.7

MM Approach

MTP Nov 18(1)



RST Ltd. has a capital of Rs. 10,00,000 in equity shares of Rs. 100 each. The shares are currently quoted at par. The company proposes to declare a dividend of Rs. 10 per share at the end of the current financial year. The capitalization rate for the risk class of which the company belongs is 12%. COMPUTE the market price of the share at the end of the year, if

- (i) a dividend is not declared?
- (ii) a dividend is declared?
- (iii) assuming that the company pays the dividend and has net profits of Rs.5,00,000 and makes new investments of Rs.10,00,000 during the period, how many new shares must be issued? Use the MM model.

Ans

As per MM model, the current market price of equity share is:

$$P_0 = \frac{1}{1 + k_e} \times (D_1 + P_1)$$



(i) If the dividend is not declared:

$$100 = \frac{1}{1 + 0.12} \times (0 + P_1)$$

$$100 = \frac{P_1}{1.12}$$

$$P_1 = \text{Rs.}112$$

The Market price of the equity share at the end of the year would be Rs.112.

(ii) If the dividend is declared:

$$100 = \frac{1}{1 + 0.12} \times (10 + P_1)$$

$$100 = \frac{P_1}{1.12} =$$

$$112 = 10 + P_1$$

$$P_1 = 112 - 10 = \text{Rs.}102$$

The market price of the equity share at the end of the year would be Rs.102.



- (iii) In case the firm pays dividend of Rs.10 per share out of total profits of Rs. 5,00,000 and plans to make new investment of Rs. 10,00,000, the number of shares to be issued may be found as follows:

Total Earnings	Rs.5,00,000
- Dividends paid	(1,00,000)
Retained earnings	4,00,000
Total funds required	<u>10,00,000</u>
Fresh funds to be raised	<u>6,00,000</u>
Market price of the share	102
Number of shares to be issued (Rs.6,00,000 / 102)	5,882.35 or, the
firm would issue 5,883 shares at the rate of Rs.102	

Q.8

Gordan's Model

RTP Nov 23



HM Ltd. is listed on Bombay Stock Exchange which is currently been evaluated by Mr. A on certain parameters. Mr. A collated following information:

- (a) The company generally gives a quarterly interim dividend. ₹ 2.5 per share is the last dividend declared.
 (b) The company's sales are growing by 20% on a 5-year Compounded Annual Growth Rate (CAGR) basis, however the company expects following retention amounts against probabilities mentioned as contention is dependent upon cash requirements for the company. Rate of return is 10% generated by the company.

Situation	Prob.	Retention Ratio
A	30%	50%
B	40%	60%
C	30%	50%

- (c) The current risk-free rate is 3.75% and with a beta of 1.2 company is having a risk premium of 4.25%. You are required to help Mr. A in calculating the current market price using Gordon's formula.

Ans

Market price using Gordon's formula

$$D_0 (1 + g)$$

$$P_0 = \frac{D_0 (1 + g)}{k_e - g}$$

$D_0 = 2.5 \times 4 = 10$ per share (annual)

$g = br$ or retention ratio \times rate of return

Calculation of expected retention ratio

Situation	Prob.	Retention Ratio	Expected Retention Ratio
A	30%	50%	0.15
B	40%	60%	0.24
C	30%	50%	0.15
Total			0.54

$$g = 0.54 \times 0.10 = 0.054 \text{ or } 5.4\% P_0$$

$$P_0 = \frac{D_0 (1 + g)}{k_e - g}$$

$$P_0 = \frac{10(1 + 0.054)}{0.0885 - 0.054} = \frac{10.54}{0.0345} = 305.51$$

$$k_e = \text{Risk free rate} + (\text{Beta} \times \text{Risk Premium})$$

$$= 3.75\% + (1.2 \times 4.25\%) = 8.85\%$$

Q.9

MPS Using Gordon's Model

PY Dec 21



X Ltd. is a multinational company. Current market price per share is ₹ 2,185. During the F.Y. 2020-21, the company paid ₹ 140 as dividend per share. The company is expected to grow @ 12% p.a. for next four years, then 5% p.a. for an indefinite period. Expected rate of return of shareholders is 18% p.a.

- (i) Find out intrinsic value per share.
- (ii) State whether shares are overpriced or under priced.

Year	1	2	3	4	5
Discounting Factor @ 18%	0.847	0.718	0.608	0.515	0.436

Ans

As per Dividend discount model, the price of share is calculated as follows:

$$P = \frac{D_1}{(1+K_e)^1} + \frac{D_2}{(1+K_e)^2} + \frac{D_3}{(1+K_e)^3} + \frac{D_4}{(1+K_e)^4} + \frac{D_4(1+g)}{(K_e-g)} \times \frac{1}{(1+K_e)^4}$$

Where,

P = Price per share

K_e = Required rate of return on equity

g = Growth rate

$$P = \frac{140 \times 1.12}{(1+0.18)^1} + \frac{156.80 \times 1.12}{(1+0.18)^2} + \frac{175.62 \times 1.12}{(1+0.18)^3} + \frac{196 \times 1.12}{(1+0.18)^4} + \frac{220.29(1+0.05)}{(0.18-0.05)} \times \frac{1}{(1+0.18)^4}$$

$$P = 132.81 + 126.10 + 119.59 + 113.45 + 916.34 = ₹ 1,408.29$$

Intrinsic value of share is ₹ 1,408.29 as compared to latest market price of ₹ 2,185. Market price of share is over-priced by ₹ 776.71.

Q.10

MPS using Gordon's Model

MTP Nov 22(2)



The annual report of XYZ Ltd. provides the following information for the Financial Year 2019-20:

Particulars	Amount (₹)
Net Profit	78 lakhs
Outstanding 15% preference shares	120 lakhs
No. of equity shares	6 lakhs
Return on Investment	20%
Cost of capital i.e. (K _e)	16%

CALCULATE price per share using Gordon's Model when dividend pay-out is-

- (i) 30%;
- (ii) 50%;
- (iii) 100%.

Ans

Price per share according to Gordon's Model is calculated as follows:

Particulars	Amount in ₹
Net Profit	78 lakhs
Less: Preference dividend (120 lakhs @ 15%)	18 lakhs
Earnings for equity shareholders	60 lakhs
Earnings Per Share	60 lakhs / 6 lakhs = ₹ 10.00

Price per share according to Gordon's Model is calculated as follows:



$$P_0 = \frac{E_1(1-b)}{K_e - br}$$

Here, $E_1 = 10$, $K_e = 16\%$

(i) When dividend pay-out is 30%

$$P_0 = \frac{10 \times 0.30}{0.16 - (0.70 \times 0.2)} = \frac{3}{0.16 - 0.14} = ₹150$$

(ii) When dividend pay-out is 50%

$$P_0 = \frac{10 \times 0.5}{0.16 - (0.5 \times 0.2)} = \frac{5}{0.16 - 0.10} = ₹83.33$$

(iii) When dividend pay-out is 100%

$$P_0 = \frac{10 \times 1}{0.16 - (0 \times 0.2)} = \frac{10}{0.16} = ₹62.5$$

Q. 11

Walter Model

RTP Nov 18



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.

Ans

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%	$\frac{5 + \left(\frac{0.05}{0.10}\right)(10 - 5)}{0.10}$	$\frac{7.5 + \left(\frac{0.05}{0.10}\right)(10 - 7.5)}{0.10}$	$\frac{10 + \left(\frac{0.05}{0.10}\right)(10 - 10)}{0.10}$

	$= \frac{7.5}{0.10} = ₹75$	$= \frac{8.75}{0.10} = ₹87.5$	$= \frac{10}{0.10} = ₹100$
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Q.12

Walter & Gordon Model

PY May 19



The following information is supplied to you :

Total Earning	₹ 40 Lakhs
No. of Equity Shares (of ₹ 100 each)	4,00,000
Dividend Per Share	₹ 4
Cost of Capital	16%
Internal rate of return on investment	20%
Retention ratio	60%

Calculate the market price of a share of a company by using :

- Walter's Formula
- Gordon's Formula

Ans

$$\text{Earning Per share}(E) = \frac{40 \text{ Lakhs}}{4,00,000} = ₹ 10$$

Calculation of Market price per share by

$$(i) \text{ Walter's formula: Market Price } (P) = \frac{D + \frac{r}{K_e}(E-D)}{K_e}$$

Where,

- P = Market Price of the share.
- E = Earnings per share.
- D = Dividend per share.
- K_e = Cost of equity/ rate of capitalization/ discount rate.
- R = Internal rate of return/ return on investment

$$P = \frac{4 + \frac{0.20}{0.16}(10-4)}{0.16} = \frac{4 + 7.5}{0.16} = ₹ 71.88$$

- Gordon's formula: When the growth is incorporated in earnings and dividend, the present value of market price per share (P_0) is determined as follows

$$\text{Gordon's theory: } P_0 = \frac{E(1-b)}{k-br}$$

Where,

- P_0 = Present market price per share. E = Earnings per share
- b = Retention ratio (i.e. % of earnings retained)
- r = Internal rate of return
- (IRR) Growth rate (g) = br

$$\text{Now } P_0 = \frac{10(1-.60)}{16 - (.60 \times .20)} = \frac{4}{.04} = ₹ 100$$



Q.13

Optimum Payout using Walter Model

RTP July 21



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/ Earnings ratio	12.5

Applying Walter's Model:

- ANALYSE whether the company is following an optimal dividend policy.
- COMPUTE P/E ratio at which the dividend policy will have no effect on the value of the share.
- Will your decision change if the P/E ratio is 8 instead of 12.5? ANALYSE.

Ans

- The EPS of the firm is ₹ 10 (i.e., ₹ 2,00,000/ 20,000) and $r = 2,00,000 / (20,000 \text{ shares} \times ₹100) = 10\%$. The P/E Ratio is given at 12.5 and the cost of capital, K_e , may be taken at the inverse of P/E ratio. Therefore, K_e 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:

$$P = \frac{D + \frac{r}{K_e} (E - D)}{K_e} = \frac{7.5 + \frac{0.1}{0.08} (10 - 7.5)}{0.08} = ₹ 132.81$$

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 K_e 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-

$$P = \frac{0 + \frac{0.1}{0.08} (10 - 0)}{0.08} = ₹ 156.25$$

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

- 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.
- 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:

$$P = \frac{D + \frac{r}{K_e} (E - D)}{K_e} = \frac{7.5 + \frac{0.1}{0.125} (10 - 7.5)}{0.125} = ₹ 76$$

Q.14

Optimum Payout using Walter Model

MTP May 22(1)



The following figures have been extracted from the annual report of Xee Ltd.:

Net Profit	₹ 75 lakhs
Outstanding 12% preference shares	₹ 250 lakhs

No. of equity shares	3 lakhs
Return on Investment	20%
Cost of capital i.e. (Ke)	16%

COMPUTE the approximate dividend pay-out ratio so as to keep the share price at ₹ 105 by using Walter's model?

Ans

Particulars	(₹ in lakhs)
Net Profit	75
Less: Preference dividend	30
Earnings for equity shareholders	45
Earnings per share	45/3 = ₹ 15

Let, the dividend per share be D to get share price of ₹ 105

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

$$105 = \frac{D + \frac{0.20}{0.16} (15 - D)}{0.16}$$

$$16.8 = \frac{0.16D + 3 - 0.20D}{0.16}$$

$$0.04D = 3 - 2.688$$

$$D = 7.80$$

$$D/P \text{ ratio} = \frac{DPS}{EPS} \times 100 = \frac{7.80}{15} \times 100 = 52\%$$

So, the required dividend pay-out ratio will be = 52%



Q.15

Optimum Payout using Walter Model

MTP Dec 21(2)



The following information is supplied to you:

Particulars	₹
Total Earnings	5,00,000
Equity shares (of ₹ 100 each)	50,00,000
Dividend paid	3,75,000
Price/ Earnings ratio	12.5

Applying Walter's Model:

- ANALYSE whether the company is following an optimal dividend policy.
- COMPUTE P/E ratio at which the dividend policy will have no effect on the value of the share.
- Will your decision change, if the P/E ratio is 8 instead of 12.5? ANALYSE.

Ans

- The EPS of the firm is ₹ 10 (i.e. ₹ 5,00,000/ 50,000). $r = 5,00,000/ 50,00,000 = 10\%$ The P/E Ratio is given at 12.5 and the cost of capital, K_e , may be taken at the inverse of P/E ratio. Therefore, K_e is 8 (i.e., $1/12.5$). The firm is distributing total dividends of ₹ 3,75,000 among 50,000 shares, giving a dividend per share of ₹ 7.50. The value of the share as per Walter's model may be found as follows:

$$P = \frac{D + \frac{r}{K_e} (E - D)}{K_e} = \frac{7.5 + \frac{0.1}{0.08} (10 - 7.5)}{0.08} = ₹ 132.81$$



The firm has a dividend payout of 75% (i.e., ₹ 3,75,000) out of total earnings of ₹ 5,00,000. Since, the rate of return of the firm, r , is 10% and it is more than the K_e 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,

$$P = \frac{0 + \frac{0.1}{0.08} (10 - 0)}{0.08} = ₹ 156.25$$

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:

$$P = \frac{D + \frac{r}{K_e} (E - D)}{K_e} = \frac{7.5 + \frac{0.1}{0.125} (10 - 7.5)}{0.125} = ₹ 76$$

Q.16

FM Nov 23



INFO Ltd is a listed company having share capital of ₹ 2400 Crores of ₹ 5 each.

During the year 2022-23

Dividend distributed	1000%
Expected Annual growth rate in dividend	14%
Expected rate of return on its equity capital	18%

Required:

- (a) Calculate price of share applying Gordon's growth Model.
- (b) What will be the price of share if the Annual growth rate in dividend is only 10%?
- (c) According to Gordon's growth Model, if Internal Rate of Return is 25%, then what should be the optimum dividend payout ratio in case of growing stage of company? Comment.

Ans.

- (a) In the present situation, the current MPS is as follows:

$$P = \frac{D_0(1+g)}{K_e - g}$$

Where

P = Market price per share

D_0 = current year dividend

g = growth rate of dividends

K_e = cost of equity capital/ expected rate of return

$$P = \frac{50(1+0.14)}{0.18 - 0.14} = ₹ 1425$$

- (b) The impact of changes in growth rate to 10% on MPS will be as follows:

$$P = \frac{50(1+0.10)}{0.18 - 0.10} = ₹ 687.5$$

- (c) If Internal rate of return, $r = 25%$ and $K_e = 18%$

As per Gordon's model, when $r > K_e$, optimum dividend payout ratio is 'Zero'. When IRR is greater than cost of capital, the price per share increases and dividend pay-out decreases.

Q.17

FM Nov 23



Paarath Limited had recently repurchased 20,000 equity shares at a premium of 10% to its prevailing market price. The book value per share (after repurchasing) is ₹ 193.20.

Other Details of the company are as follows:

Earnings of the company (before buyback) = ₹ 18,00,000 Current MPS is ₹ 270 with a P/E Ratio of 18.

CALCULATE the Book Value per share of the company before the re-purchase.

Ans.

- i. No of Eq. Shares (before buyback) = Total Earnings (before buy back)/EPS
 $= 18,00,000 / (270/18)$
 $= 1,20,000$ shares
- ii. Buyback price = $270 + 10\%$ premium = 297
- iii. No of Eq. shares (after buyback) = $1,20,000 (-) 20,000 = 1,00,000$ shares
- iv. Total Book Value of Equity (after buyback) = $1,00,000 \times 193.20$
 $= 1,93,20,000$
- Now,
 Total BV of Eq. (after buyback) = Total BV of Eq.(before buyback) (-)
 Amt of buyback
 $1,93,20,000 = x (-) (20,000 \times 297)$
 Therefore x = Total BV (before buyback)
 $= 2,52,60,000$
 BV per share (before buyback) = $2,52,60,000 / 1,20,000$
 $= 210.50$ per share

Q.18

MTP Jan 25(2)



Return on Equity (ROE) is Satva Limited is 15% and the capitalization rate applicable to the company is at 20%. Satva Limited's Book Value per share (BVPS) is Rs 125. Calculate the intrinsic value of the share today using Gordon's model and Walter's model if the company's policy is to retain 65% of the earning.

Ans.

EPS = ROE × BVPS (WN 1)

EPS = $0.15 \times 125 = ₹ 18.75$

Growth = ROE × Retention Ratio

= 0.15×0.65

= 9.75%

$D_1 = D_0 (1 + g)$

= $(18.75 \times 35\%)(1 + 0.0975)$

= ₹ 7.20

Intrinsic Value of share today - Gordon's Formula

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

$$= \frac{7.20}{0.20 - 0.0975}$$

$P_0 = ₹ 70.24$

Intrinsic Value of share today - Walter's Model

$$P_0 = \frac{D + \frac{r}{K_e}(E - D)}{K_e}$$

Here D = Do assuming it would remain constant through infinity

$$P_0 = \frac{6.5625 + \frac{0.15}{0.20}(18.75 - 6.5625)}{0.20}$$


 $P_0 = ₹ 78.51$
WN 1 - Relationship between ROE-EPS-BVPS

$$ROE = \frac{\text{Earnings for Equity Shareholders}}{\text{Equity shareholders funds}}$$

If we divide the numerator and denominator with "No of equity shares"

$$ROE = \frac{\text{Earnings for Equity Shareholders} / \text{No of equity shares}}{\text{Equity shareholders funds} / \text{No of equity shares}}$$

Therefore, $ROE = EPS / BVPS$

Q.19

PY Nov 23



- (i) EPS of a company is ₹ 60 and Dividend payout ratio is 60%. Multiplier is 5. Determine price per share as per Graham & Dodd model.
- (ii) Last year's dividend is ₹ 6.34, adjustment factor is 45%, target payout ratio is 60% and current year's EPS is ₹ 12. Compute current year's dividend using Linter's model.

Ans.

(i) Price per share (P) = $m \left(D + \frac{E}{3} \right)$

Where,

m = Multiplier

D = Dividend

E = EPS

$$P = 5 \left(60 \times 0.6 + \frac{60}{3} \right)$$

$$P = 5(36 + 20) = ₹ 280$$

(ii) $D_1 = D_0 + [(EPS \times \text{Target payout}) - D_0] \times \text{Adjustment factor}$

$$D_1 = 6.34 + [(12 \times 60\%) - 6.34] \times 0.45$$

$$D_1 = 6.34 + 0.387 = ₹ 6.727$$



Q.20

MTP Sept 25(2)



ABC Ltd. is a listed company operating in the FMCG sector. The company is currently facing a dilemma regarding its dividend policy. The financial controller has been asked to prepare a report for the Board of Directors evaluating whether the company should retain more profits or distribute higher dividends.

The following financial data is available for the year ended 31st March 2025:

Earnings per share (EPS)	:	₹ 10
Dividend per share (proposed)	:	₹ 6
Number of equity shares	:	10,00,000
Return on investment (r)	:	15%
Cost of equity capital (Ke)	:	12%
Current market price per share	:	₹ 100
Retention ratio	:	40%
Tax rate	:	30%

Corporate bond yield: 8% (for comparison with cost of equity)

Further, the company has an investment proposal requiring ₹ 30,00,000 with an expected return of 14%. If the dividend is increased to ₹ 7/share, the share price is expected to rise to ₹ 104 and if the dividend is reduced to

₹ 4/share, the share price may fall to ₹ 95. The CFO believes that MM hypothesis should be followed, but the Board is inclined towards Walter's model of valuation.

You are required to:

- (i) CALCULATE the value of the share using Walter's Model, and comment whether the current dividend policy is optimal.
- (ii) Apply Gordon's Model to ESTIMATE the market value of the share.
- (iii) HOW by way of MM's Dividend Irrelevance Theory, whether a change in dividend payout (from ₹ 6 to ₹ 7 or ₹ 4) has any impact on the firm's valuation, assuming no taxes and perfect capital markets.

Ans.

(i) Calculation of value of the share using Walter's Model

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

$$= \frac{6 + \frac{0.15}{0.12} (10 - 6)}{0.12}$$

$$= \frac{6 + 1.25 \times 4}{0.12} = \frac{6 + 5}{0.12}$$

$$= ₹ 91.67$$

Since the market price is ₹100, and Walter's model gives ₹91.67, the current dividend policy is not optimal.

(ii) Calculation of value of the share using Gordon's Model

$$P = \frac{E(1 - b)}{K_e - br}$$

$$g = br = 0.4 \times 0.15 = 0.06$$

$$\text{So, } P = \frac{10 \times 0.6}{(0.12 - 0.06)} = ₹100$$

This supports the current market price. Since the model gives the same value as the market, the current retention and dividend policy appears acceptable.

(iii) MM's Dividend Irrelevance Theory

$$P_0 = \frac{D_1 + P_1}{1 + K_e}$$

Situation 1:

D = ₹6, P₁ = ₹100, K_e = 12%

₹6 + 100

$$\text{So, } P_0 = \frac{6 + 100}{(1.12)} = ₹94.64$$

Situation 2:

D = ₹7, P₁ = ₹104, K_e = 12%

$$P_0 = \frac{7 + 104}{(1.12)} = ₹99.11$$

Situation 3:

D = ₹4, P₁ = ₹95, K_e = 12%

$$P_0 = \frac{4 + 95}{(1.12)} = ₹88.39$$

So, a change in dividend payout has indeed impacted the firm's valuation.



Q.21

RTP SEP 2025



In the month of April of the current Financial Year, shares of PQR Ltd. were sold for ₹ 1,570 per share. A long-term earnings growth rate of 8% is anticipated. PQR Ltd. paid dividend of ₹ 25 per share.

- CALCULATE rate of return an investor can expect to earn assuming that dividends are expected to grow along with earnings at 8% per year in perpetuity.
- It is expected that PQR Ltd. will earn about 10% on retained earnings and shall retain 60% of earnings. In this case, STATE whether, there would be any change in growth rate and cost of Equity?

Ans.

- According to Dividend Discount Model approach, the firm's expected or required return on equity is computed as follows:

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

$$K_e = \frac{25 (1 + 0.08)}{1,570} + 0.08$$

$$= 0.0172 + 0.08 = 0.0972 \text{ or } 9.72\%$$

- With rate of return on retained earnings (r) is 10% and retention ratio (b) is 60%, new growth rate will be as follows:

$$g = br = 0.10 \times 0.60 = 0.06$$

Accordingly, dividend will also get changed and to calculate this, first we shall calculate previous retention ratio (b1) and then EPS assuming that rate of return on retained earnings (r) is same.

With previous Growth Rate of 8% and $r = 10\%$, the retention ratio comes out to be:

$$0.08 = b_1 \times 0.10$$

$$b_1 = 0.80. \text{ So, payout ratio} = 0.20$$

With 0.20 payout ratio the EPS will be as follows:

$$\frac{\text{₹ } 25}{0.20} = \text{₹ } 125$$

With new 0.40 (1 - 0.60) payout ratio, the new dividend will be

$$D_1 = \text{₹ } 125 \times 0.40 = \text{₹ } 50$$

Accordingly, new K_e will be

$$K_e = \frac{50}{1,570} + 0.06$$

$$\text{or, } K_e = 9.18\%$$

Q.22



By taking the following data of three different firms i.e. growth, normal and declining firm calculate the current price of share by using the Gordon model after that again calculate revised price of share with 0.4 retained earning and check the relationship between Gordon and Walter model.

Factors	Growth Firm $r > K_e$	Normal Firm $r = k_e$	Declining Firm $r < k_e$
R (Rate of Return on Retained Earnings)	15%	10%	8%
K (Cost of Capital)	10%	10%	10%
E (Earning Per Share)	₹10	₹10	₹10
B (Retained Earning)	0.6	0.6	0.6
1 - B	0.4	0.4	0.4

Ans. Calculation of current price of share as per Gordon model:

$$P_0 = \frac{D_1}{k_e - g}$$

Growth	=	$\frac{10 \times 0.4}{0.10 - 0.09}$	=	₹400
Normal	=	$\frac{10 \times 0.4}{0.10 - 0.06}$	=	₹100
Declining	=	$\frac{10 \times 0.4}{0.10 - 0.048}$	=	₹76.92

Working note:

G	=	b × r		
Growth	=	15% × .6	=	9%
Normal	=	10% × .6	=	6%
Declining	=	8% × .6	=	4.8%

Calculation of revised price of share as per Gordon model when b is 0.4 and payout is 0.6:

Growth	=	$\frac{10 \times 0.6}{0.10 - 0.06}$	=	₹ 150
Normal	=	$\frac{10 \times 0.6}{0.10 - 0.04}$	=	₹100
Declining	=	$\frac{10 \times 0.6}{0.10 - 0.032}$	=	₹88.23

Working note:

G	=	b × r		
Growth	=	15% × .4	=	6%
Normal	=	10% × .4	=	4%
Declining	=	8% × .4	=	3.2%

From the above analysis it can be concluded that:

When $r > k$, the market value increases with retention ratio, when $r < k$, the market value of share stands to decrease and when $r = k$, the market value is not affected by dividend policy.

The conclusion of the Gordon's model is similar to that of Walter's model

Q.23



A N Ltd. gives you the following information:

The appropriate market rate of discount is 8% and that the company is expected to enjoy an above average performance for eight years with dividends growing at say 10% per annum. After that time, because of competition and the company losing its present technological or marketing lead, the growth in dividends will revert to the average for all companies-say 4%. The present dividend is ₹0.10 per share.

Compute the current value of equity share of the company.



Ans.

Calculation of Present Value or Current Market Value of Share

Year	Expected benefits	PVF @ 8%	DCF
1	0.10 + 10% = ₹0.11	0.926	0.101
2	0.11 + 10% = ₹0.121	0.857	0.103
3	0.121 + 10% = ₹0.133	0.794	0.106
4	0.133 + 10% = ₹0.146	0.735	0.107
5	0.146 + 10% = ₹0.161	0.681	0.110
6	0.161 + 10% = ₹0.177	0.630	0.112
7	0.177 + 10% = ₹0.195	0.583	0.114
8	0.195 + 10% = ₹0.214	0.540	0.116
(9 to ∞)	P8 = ₹5.55	0.540	3.00
Present value of all future benefits or Current market value of Share			₹3.87

$$P_8 = \frac{D_9}{K_e - g} = ₹5.55$$

Q.24

The following information regarding the equity shares of M Ltd. is given that Market price is ₹58.33, Dividend per share is ₹5 and Multiplier is 7.

According to the Graham & Dodd approach to the dividend policy, compute the EPS.

Ans.

$$P = M(D + E/3)$$

$$58.33 = 7(5 + E/3)$$

$$E = ₹9.99 \text{ or } ₹10 \text{ approx.}$$

Q.25

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.

Ans.

Since the dividend payout ratio is 40%

$$D = 40\% \text{ of } E \text{ i.e. } 0.4E$$

$$P = M(D + E/3) = 9(D + E/3) = 9(0.4E + E/3)$$

$$P = 9(0.4E + E/3) = 9\left(\frac{1.2E + E}{3}\right) = 3(2.2E) = 6.6E$$

$$P/E \text{ ratio} = \frac{MPS}{EPS} = \frac{P}{E} = \frac{6.6E}{E} = 6.6 \text{ times}$$

Q.26

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 using Linter's model.

Ans.

$$D_1 = D_0 + [(EPS \times \text{Target payout}) - D_0] \times Af$$

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

Q.27

In the month of May of the current financial year, shares of RT Ltd. was sold for ₹1,460 per share. A long term earnings growth rate of 7.5% is anticipated. RT Ltd. is expected to pay dividend of ₹20 per share.

- Calculate rate of return an investor can expect to earn assuming that dividends are expected to grow along with earnings at 7.5% per year in perpetuity?
- It is expected that RT Ltd. will earn about 10% on retained earnings and shall retain 60% of earnings. In this case, State whether, there would be any change in growth rate and cost of Equity?

Ans.

$$(a) \quad K_e = \frac{D_1}{P_0} + g = \frac{20}{1,460} + 7.5\% = 8.87\%$$

- (b) With rate of return on retained earnings (r) 10% and retention ratio (b) 60%, new growth rate will be as follows:

$$g \text{ (revised growth rate)} = b \times r = 0.10 \times 0.60 = 0.06 \text{ or } 6\%$$

Accordingly, dividend will also get changed and to calculate this, first we shall calculate previous retention ratio (b₁) and then EPS assuming that rate of return on retained earnings (r) is same. With previous growth rate of 7.5% and r = 10%, the retention ratio comes out to be:

$$0.075 = b_1 \times 0.10$$

$$b_1 = 0.75 \quad \text{and} \quad \text{payout ratio} = 0.25$$

$$\text{EPS} = ₹20 \div 0.25 \text{ (.75 retention)} = ₹80$$

$$\text{Revised } D_1 = ₹80 \times 0.40 = ₹32$$

$$\text{Revised } K_e = \frac{D_1}{P_0} + g = \frac{32}{1,460} + 6\% = 8.19\%$$

Q.28

Mr H is currently holding 1,00,000 shares of HM Ltd, and currently the share of HM Ltd is trading on Bombay Stock Exchange at ₹50 per share. Mr A have a policy to re-invest the amount of any dividend received into the shared back again of HM Ltd. If HM Ltd has declared a dividend of ₹10 per share.

Determine the no of shares that Mr A would hold after he re-invests dividend in shares of HM Ltd.

Ans.

Ex-dividend price of Share	= ₹40 (50 - 10)
Dividend received	= ₹10,00,000 (1,00,000 shares × ₹10)
Additional shares purchased	= ₹10,00,000 ÷ ₹40 = 25,000
Total holding	= 1,00,000 + 25,000 = 1,25,000 Shares



7

CHAPTER

CASH MANAGEMENT

Q.1

Optimum Cash Balance

PY Nov 22



K Ltd. has a Quarterly cash outflow of ₹ 9,00,000 arising uniformly during the Quarter. The company has an Investment portfolio of Marketable Securities. It plans to meet the demands for cash by periodically selling marketable securities. The marketable securities are generating a return of 12% p.a. Transaction cost of converting investments to cash is ₹ 60. The company uses Baumol model to find out the optimal transaction size for converting marketable securities into cash. Consider 360 days in a year.

You are required to calculate

- Company's average cash balance,
- Number of conversions each year and
- Time interval between two conversions.

Ans.

(i) **Computation of Average Cash balance:**

$$\text{Annual cash outflow (U)} = 9,00,000 \times 4 = ₹ 36,00,000$$

$$\text{Fixed cost per transaction (P)} = ₹ 60$$

$$\text{Opportunity cost of one rupee p.a. (S)} = \frac{12}{100} = 0.12$$

$$\text{Optimum cash balance (C)} = \sqrt{\frac{2UP}{S}} = \sqrt{\frac{2 \times 36,00,000 \times 60}{0.12}} = ₹ 60,000$$

$$\therefore \text{Average Cash balance} = \frac{(0 + 60,000)}{2} = ₹ 30,000$$

(ii) **Number of conversions p.a.**

$$\text{Annual cash outflow} = ₹ 36,00,000$$

$$\text{Optimum cash balance} = ₹ 60,000$$

$$\therefore \text{No. of conversions p.a.} = \frac{36,00,000}{60,000} = 60$$

(iii) **Time interval between two conversions**

$$\text{No. of days in a year} = 360$$

$$\text{No. of conversions p.a.} = 60$$

$$\therefore \text{Time interval} = \frac{360}{60} = 6 \text{ days}$$

Q.2

Cash Budget

PY Dec 21



A garment trader is preparing cash forecast for first three months of calendar year 2021. His estimated sales for the forecasted periods are as below:

	January (₹ '000)	February (₹ '000)	March (₹ '000)
Total sales	600	600	800

- The trader sells directly to public against cash payments and to other entities on credit. Credit sales are expected to be four times the value of direct sales to public. He expects 15% customers to pay in the month in which credit sales are made, 25% to pay in the next month and 58% to pay in the next to next month. The outstanding balance is expected to be written off.

- (ii) Purchases of goods are made in the month prior to sales and it amounts to 90% of sales and are made on credit. Payments of these occur in the month after the purchase. No inventories of goods are held.
- (iii) Cash balance as on 1st January, 2021 is ₹ 50,000.
- (iv) Actual sales for the last two months of calendar year 2020 are as below:

	November (₹ '000)	December (₹ '000)
Total sales	640	880

You are required to prepare a monthly cash, budget for the three months from January to March, 2021

Ans.

- (1) Calculation of cash and credit sales (₹ in thousands)

	Nov.	Dec.	Jan.	Feb.	Mar.
Total Sales	640	880	600	600	800
Cash Sales (1/5 th of total)	128	176	120	120	160
Credit Sales (4/5 th of total)	512	704	480	480	640

- (2) Calculation of Credit Sales Receipts

Month	Nov.	Dec.	Jan.	Feb.	Mar.
Forecast Credit sales (Working note 1)	512.00	704.00	480.00	480.00	640.00
Receipts:					
15% in the month of sales			72.00	72.00	96.00
25% in next month			176.00	120.00	120.00
58% in next to next month			296.96	408.32	278.40
Total			544.96	600.32	494.40

Cash Budget (₹ in thousands)

	Nov.	Dec.	Jan.	Feb.	Mar.
Opening Balance (A)			50.00	174.96	355.28
Sales	640.00	880.00	600.00	600.00	800.00
Receipts:					
Cash Collection (Working note 1)			120.00	120.00	160.00
Credit Collections (Working note 2)			544.96	600.32	494.40
Total (B)			664.96	720.32	654.40
Purchases (90% of sales in the prior to sales)		540	540	720	
Payments:					
Payment for purchases (next month)			540	540	720
Total (C)			540	540	720
Closing balance(D) = (A + B - C)			174.96	355.28	289.68

Q.3

Monthly Cash Budget

RTP Nov 22



A company was incorporated w.e.f. 1st April, 2021. Its authorised capital was ₹ 1,00,00,000 divided into 10 lakh equity shares of ₹ 10 each. It intends to raise capital by issuing equity shares of ₹ 50,00,000 (fully paid) on 1st April. Besides this, a loan of ₹ 6,50,000 @ 12% per annum will be obtained from a financial institution on 1st April



and further borrowings will be made at same rate of interest on the first day of the month in which borrowing is required. All borrowings will be repaid along with interest on the expiry of one year. The company will make payment for the following assets in April.

Particulars	(₹)
Plant and Machinery	10,00,000
Land and Building	20,00,000
Furniture	5,00,000
Motor Vehicles	5,00,000
Stock of Raw Materials	5,00,000

The following further details are available:

(1) Projected Sales (April-September):

	(₹)
April	15,00,000
May	17,50,000
June	17,50,000
July	20,00,000
August	20,00,000
September	22,50,000

(2) Gross profit margin will be 25% on sales.

(3) The company will make credit sales only and these will be collected in the second month following sales

(4) Creditors will be paid in the first month following credit purchases. There will be credit purchases only.

(5) The company will keep minimum stock of raw materials of ₹ 5,00,000.

(6) Depreciation will be charged @ 10% per annum on cost on all fixed assets.

(7) Payment of miscellaneous expenses of ₹ 50,000 will be made in April.

(8) Wages and salaries will be ₹ 1,00,000 each month and will be paid on the first day of the next month.

(9) Administrative expenses of ₹ 50,000 per month will be paid in the month of their incurrence.

(10) No minimum cash balance is required.

You are required to PREPARE the monthly cash budget (April-September), the projected Income Statement for the 6 months period and the projected Balance Sheet as on 30th September, 2021.

Ans.

Monthly Cash Budget (April-September)

	(₹)					
	April	May	June	July	August	September
Opening cash balance	-	10,50,000	-	1,37,500	5,25,000	7,25,000
A. Cash inflows						
Equity shares	50,00,000	-	-	-	-	-
Loans (Refer to working note 1)	6,50,000	1,25,000	-	-	-	-
Receipt from debtors	-	-	<u>15,00,000</u>	<u>17,50,000</u>	<u>17,50,000</u>	<u>20,00,000</u>
Total (A)	<u>56,50,000</u>	<u>11,75,000</u>	<u>15,00,000</u>	<u>18,87,500</u>	<u>22,75,000</u>	<u>27,25,000</u>
B. Cash Outflows						
Plant and Machinery	10,00,000	-	-	-	-	-

Land and Building	20,00,000	-	-	-	-	-
Furniture	5,00,000	-	-	-	-	-
Motor Vehicles	5,00,000	-	-	-	-	-
Stock of raw materials (Minimum stock)	5,00,000	-	-	-	-	-
Miscellaneous expenses	50,000	-	-	-	-	-
Payment to creditors for credit purchases (Refer to working note 2)	-	10,25,000	12,12,500	12,12,500	14,00,000	14,00,000
Wages and salaries	-	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000
Admn. expenses	50,000	50,000	50,000	50,000	50,000	50,000
Total : (B)	46,00,000	11,75,000	13,62,500	13,62,500	15,50,000	15,50,000
Closing balance (A)-(B)	10,50,000	-	1,37,500	5,25,000	7,25,000	11,75,000

Budgeted Income Statement for six-month period ending 30th September

Particulars	(₹)	Particulars	(₹)
To Purchases	83,37,500	By Sales	1,12,50,000
To Wages and Salaries	6,00,000	By Closing stock	5,00,000
To Gross profit c/d	28,12,500		
	1,17,50,000		1,17,50,000
To Admn. expenses	3,00,000	By Gross profit b/d	28,12,500
To Depreciation	2,00,000		
To Accrued interest on loan	45,250		
To Miscellaneous expenses	50,000		
To Net profit c/d	22,17,250		
	28,12,500		28,12,500

Projected Balance Sheet as on 30th September, 2021

Liabilities	Amount (₹)	Assets	Amount (₹)
Share Capital:		Fixed Assets:	
Authorised capital 10,00,000 equity shares of ₹10 each Issued,	1,00,00,000	Land and Building	20,00,000
		Less: Depreciation	<u>1,00,000</u>
			19,00,000
		Plant and Machinery	10,00,000
		Less: Depreciation	<u>50,000</u>
		Furniture	5,00,000
			9,50,000



Subscribed and Paid up capital 5,00,000 equity Shares of ₹10 each		50,00,000	Less: Depreciation Motor Vehicles Less: Depreciation	<u>25,000</u> 5,00,000 <u>25,000</u>	4,75,000 <u>4,75,000</u>		38,00,000
Reserve and Surplus: Profit and Loss		22,17,250	Current Assets: Stock Sundry debtors Cash		5,00,000 42,50,000 <u>11,75,000</u>		59,25,000
Long-term loans		7,75,000					
Current liabilities and provisions: Sundry creditors Accrued interest Outstanding expenses	15,87,500 45,250 <u>1,00,000</u>	 <u>17,32,750</u> 97,75,000					97,75,000

Working Notes:

Subsequent Borrowings Needed

(₹)

	April	May	June	July	August	September
A. Cash Inflow						
Equity shares	50,00,000					
Loans	6,50,000					
Receipt from debtors	-	-	<u>15,00,000</u>	<u>17,50,000</u>	<u>17,50,000</u>	<u>20,00,000</u>
Total (A)	<u>56,50,000</u>	-	<u>15,00,000</u>	<u>17,50,000</u>	<u>17,50,000</u>	<u>20,00,000</u>
B. Cash Outflow						
Purchase of fixed assets	40,00,000					
Stock	5,00,000					
Miscellaneous expenses	50,000					
Payment to creditors	-	10,25,000	12,12,500	12,12,500	14,00,000	14,00,000
Wages and salaries	-	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000
Administrative expenses	<u>50,000</u>	<u>50,000</u>	<u>50,000</u>	<u>50,000</u>	<u>50,000</u>	<u>50,000</u>
Total	<u>46,00,000</u>	<u>11,75,000</u>	<u>13,62,500</u>	<u>13,62,500</u>	<u>15,50,000</u>	<u>15,50,000</u>
Surplus/ (Deficit)	10,50,000	(11,75,000)	1,37,500	3,87,500	2,00,000	4,50,000
Cumulative balance	10,50,000	(1,25,000)	12,500	4,00,000	6,00,000	10,50,000

- There is shortage of cash in May of ₹ 1,25,000 which will be met by borrowings in May.
- Payment to Creditors

Purchases = Cost of goods sold - Wages and salaries

Purchases for April = (75% of 15,00,000) - ₹ 1,00,000 = ₹ 10,25,000

(Note: Since gross margin is 25% of sales, cost of manufacture i.e. materials plus wages and salaries should be 75% of sales)

Hence, Purchases = Cost of manufacture minus wages and salaries of ₹ 1,00,000)

The creditors are paid in the first month following purchases.

Therefore, payment in May is ₹ 10,25,000

The same procedure will be followed for other months.

April	(75% of 15,00,000)	-	₹ 1,00,000	=	₹ 10,25,000
May	(75% of 17,50,000)	-	₹ 1,00,000	=	₹ 12,12,500
June	(75% of 17,50,000)	-	₹ 1,00,000	=	₹ 12,12,500
July	(75% of 20,00,000)	-	₹ 1,00,000	=	₹ 14,00,000
August	(75% of 20,00,000)	-	₹ 1,00,000	=	₹ 14,00,000
September	(75% of 22,50,000)	-	₹ 1,00,000	=	₹ 15,87,500
Minimum Stock					₹ 5,00,000
Total Purchases					₹ 83,37,500
- Accrued Interest on Loan

12% interest on ₹ 6,50,000 for 6 months	39,000
Add: 12% interest on ₹ 1,25,000 for 5 months	6,250
	45,250

Q.4

Cash Budget in next 3 years

RTP May 22



You are given below the Profit & Loss Accounts for two years for a company:

Profit and Loss Account

	Year 1	Year 2		Year 1	Year 2
	(₹)	(₹)		(₹)	(₹)
To Opening stock	32,00,000	40,00,000	By Sales	3,20,00,000	4,00,00,000
To Raw materials	1,20,00,000	1,60,00,000	By Closing stock	40,00,000	60,00,000
To Stores	38,40,000	48,00,000	By Misc. Income	4,00,000	4,00,000
To Manufacturing Expenses	51,20,000	64,00,000			
To Other Expenses	40,00,000	40,00,000			
To Depreciation	40,00,000	40,00,000			
To Net Profit	42,40,000	72,00,000		-	-
	3,64,00,000	4,64,00,000		3,64,00,000	4,64,00,000

Sales are expected to be ₹ 4,80,00,000 in year 3.

As a result, other expenses will increase by ₹ 20,00,000 besides other charges. Only raw materials are in stock. Assume sales and purchases are in cash terms and the closing stock is expected to go up by the same amount as between year 1 and 2. You may assume that no dividend is being paid. The Company can use 75% of the cash generated to service a loan. COMPUTE how much cash from operations will be available in year 3 for the purpose? Ignore income tax.



Ans.

Projected Profit and Loss Account for the year 3

Particulars	Year 2 Actual (₹ in lakhs)	Year 3 Projected (₹ in lakhs)	Particulars	Year 2 Actual (₹ in lakhs)	Year 3 Projected (₹ in lakhs)
To Materials consumed	140.00	168.00	By Sales	400.00	480.00
To Stores	48.00	57.60	By Misc. Income	4.00	4.00
To Mfg. Expenses	64.00	76.80			
To Other expenses	40.00	60.00			
To Depreciation	40.00	40.00			
To Net profit	72.00	81.60			
	404.00	484.00		484.00	484.00

Cash Flow:

Particulars	(₹ in lakhs)
Profit	81.60
Add: Depreciation	<u>40.00</u>
	121.60
Less: Cash required for increase in stock	20.00
Net cash inflow	101.60

Available for servicing the loan: 75% of ₹ 1,01,60,000 or ₹ 76,20,000

Working Notes:

- (i) Material consumed in year 1 = $(32 + 120 - 40)/320 = 35\%$
 Material consumed in year 2 = $(40 + 160 - 60)/400 = 35\%$
 Likely consumption in year 3 = $480 \times \frac{35}{100} = ₹ 168$ (lakhs)
- (ii) Stores are 12% of sales & Manufacturing expenses are 16% of sales for both the years.

Q.5

Monthly Cash Budget

MTP May 21(1)



PREPARE monthly cash budget for the first six months of 2021 on the basis of the following information:

- (i) Actual and estimated monthly sales are as follows:

Actual	(Rs.)	Estimated	(Rs.)
October 2020	2,00,000	January 2021	60,000
November 2020	2,20,000	February 2021	80,000
December 2020	2,40,000	March 2021	1,00,000
		April 2021	1,20,000
		May 2021	80,000
		June 2021	60,000
		July 2021	1,20,000

- (ii) Operating Expenses (including salary & wages) are estimated to be payable as follows:

Month	(Rs.)	Month	(Rs.)
January 2021	22,000	April 2021	30,000
February 2021	25,000	May 2021	25,000
March 2021	30,000	June 2021	24,000

- (iii) Of the sales, 75% is on credit and 25% for cash. 60% of the credit sales are collected after one month, 30% after two months and 10% after three months.
- (iv) Purchases amount to 80% of sales and are made on credit and paid for in the month preceding the sales.
- (v) The firm has 12% debentures of Rs.1,00,000. Interest on these has to be paid quarterly in January, April and so on.
- (vi) The firm is to make an advance payment of tax of Rs. 5,000 in April.
- (vii) The firm had a cash balance of Rs. 40,000 at 31st Dec. 2020, which is the minimum desired level of cash balance. Any cash surplus/deficit above/below this level is made up by temporary investments/liquidation of temporary investments or temporary borrowings at the end of each month (interest on these to be ignored).

Ans. Monthly Cash Budget for first six months of 2021

(Amount in Rs.)

Particulars	Jan.	Feb.	Mar.	April	May	June
Opening balance	40,000	40,000	40,000	40,000	40,000	40,000
Receipts:						
Cash sales	15,000	20,000	25,000	30,000	20,000	15,000
Collection from debtors	1,72,500	97,500	67,500	67,500	82,500	70,500
Total cash available (A)	2,27,500	1,57,500	1,32,500	1,37,500	1,42,500	1,25,500
Payments:						
Purchases	64,000	80,000	96,000	64,000	48,000	96,000
Operating Expenses	22,000	25,000	30,000	30,000	25,000	24,000
Interest on debentures	3,000	-	-	3,000	-	-
Tax payment	-	-	-	5,000	-	-
Total payments (B)	89,000	1,05,000	1,26,000	1,02,000	73,000	1,20,000
Minimum cash balance desired	40,000	40,000	40,000	40,000	40,000	40,000
Total cash needed (C)	1,29,000	1,45,000	1,66,000	1,42,000	1,13,000	1,60,000
Surplus/(deficit) (A - C)	98,500	12,500	(33,500)	(4,500)	29,500	(34,500)
Investment/financing						
Temporary Investments	(98,500)	(12,500)	-	-	(29,500)	-
Liquidation of temporary investments or temporary borrowings			33,500	4,500	-	34,500
Total effect of investment/financing(D)	(98,500)	(12,500)	33,500	4,500	(29,500)	34,500
Closing cash balance (A + D - B)	40,000	40,000	40,000	40,000	40,000	40,000

Workings:



1. Collection from debtors:

(Amount in Rs.)

	Year 2020			Year 2021					
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June
Total sales	2,00,000	2,20,000	2,40,000	60,000	80,000	1,00,000	1,20,000	80,000	60,000
Credit sales (75% of total sales)	1,50,000	1,65,000	1,80,000	45,000	60,000	75,000	90,000	60,000	45,000
Collections:									
One month		90,000	99,000	1,08,000	27,000	36,000	45,000	54,000	36,000
Two months		0	45,000	49,500	54,000	13,500	18,000	22,500	27,000
Three months				15,000	16,500	18,000	4,500	6,000	7,500
Total collections				1,72,500	97,500	67,500	67,500	82,500	70,500

2. Payment to Creditors:

(Amount in Rs.)

	Year 2021						
	Jan	Feb	Mar	Apr	May	Jun	Jul
Total sales	60,000	80,000	1,00,000	1,20,000	80,000	60,000	1,20,000
Purchases (80% of total sales)	48,000	64,000	80,000	96,000	64,000	48,000	96,000
Payment:							
One month prior	64,000	80,000	96,000	64,000	48,000	96,000	

Q.6

The following information relates to Zeta Limited, a publishing company:

The selling price of a book is ₹15, and sales are made on credit through a book club and invoiced on the last day of the month. Variable costs of production per book are materials (₹5), labour (₹4), and overhead (₹2). The sales manager has forecasted the following volumes:

Month	No. of Books
November	1,000
December	1,000
January	1,000
February	1,250
March	1,500
April	2,000
May	1,900
June	2,200
July	2,200
August	2,300

Customers are expected to pay as follows:

One month after sale	40%
Two months after the sale	60%

The company produces the books two months before they are sold and the creditors for materials are paid two months after production. Variable overheads are paid in the month following production and are expected to

increase by 25% in April; 75% of wages are paid in the month of production and 25% in the following month. A wage increase of 12.5% will take place on 1st March.

The company is going through a restructuring and will sell one of its freehold properties in May for ₹25,000, but it is also planning to buy a new printing press in May for ₹10,000. Depreciation is currently ₹1,000 per month, and will rise to ₹1,500 after the purchase of the new machine.

The company's corporation tax (of ₹10,000) is due for payment in March. The company presently has a cash balance at bank on 31st December 2023, of ₹1,500.

You are required to prepare a cash budget for the six months from January to June, 2023.

Ans.

Monthly Cash Budget for Six Months, January to June 2023

Particulars	Jan	Feb	March	April	May	June
Opening balance	1,500	3,250	1,500	(11,912)	(15,024)	576
Receipts:						
Sales receipts	15,000	15,000	16,500	20,250	25,500	29,400
Sell of property	-	-	-	-	25,000	-
Cash available (A)	16,500	18,250	18,000	8,338	35,476	29,976
Payments:						
Payment for purchases	5,000	6,250	7,500	10,000	9,500	11,000
Variable overheads	2,500	3,000	4,000	3,800	5,500	5,500
Wages	5,750	7,500	8,412	9,562	9,900	10,237
Printing press	-	-	-	-	10,000	-
Corporation tax	-	-	10,000	-	-	-
Total payments (B)	13,250	16,750	29,912	23,362	34,900	26,737
Closing balance (A - B)	3,250	1,500	(11,912)	(15,024)	576	3,239

Working note:

Calculation of Sales receipts, payment for Purchases, Variable overheads and Wages:

Particulars	Nov	Dec	Jan	Feb	March	April	May	June
Forecast sales in units (no. of books)	1,000	1,000	1,000	1,250	1,500	2,000	1,900	2,200
1. Sales receipts:								
Sales @ ₹15/unit	15,000	15,000	15,000	18,750	22,500	30,000	28,500	33,000
1 month 40%	-	6,000	6,000	6,000	7,500	9,000	12,000	11,400
2 months 60%	-	-	9,000	9,000	9,000	11,250	13,500	18,000
	-	-	15,000	15,000	16,500	20,250	25,500	29,400
2. Pay for purchase:								
Quantity produced (2 months before sales)	1,000	1,250	1,500	2,000	1,900	2,200	2,200	2,300
Materials cost @ ₹5 p.u.	5,000	6,250	7,500	10,000	9,500	11,000	11,000	11,500
Payment after 2 month	-	-	5,000	6,250	7,500	10,000	9,500	11,000
3. Pay for variable oh:								
Quantity produced	1,000	1,250	1,500	2,000	1,900	2,200	2,200	2,300
Variable oh @ ₹2 and ₹2.50 p.u. from April	2,000	2,500	3,000	4,000	3,800	5,500	5,500	5,750



Payment next month	-	2,000	2,500	3,000	4,000	3,800	5,500	5,500
4. Pay for wages:								
Quantity produced	1,000	1,250	1,500	2,000	1,900	2,200	2,200	2,300
Wages @ ₹4 and ₹4.50 p.u. from March	4,000	5,000	6,000	8,000	8,550	9,900	9,900	10,350
Same month 75%	3,000	3,750	4,500	6,000	6,412	7,425	7,425	7,762
Next month 25%	-	1,000	1,250	1,500	2,000	2,137	2,475	2,475
	-	4,750	5,750	7,500	8,412	9,562	9,900	10,237

Q.7



On 30th September, 2023, the balance sheet of Maharaja Ltd. (retailer) was as under:

Liabilities	₹	Assets	₹
Equity share of ₹10 each	20,000	Equipment (at cost)	20,000
Reserves	10,000	Less: Depreciation	(5,000)
Trade creditors	40,000	Stock	20,000
Proposed dividend	15,000	Trade debtors	15,000
		Balance at bank	35,000
	85,000		85,000

The company is developing a system of forward planning and on 1st October 2023 it supplies the following information:

Months	Sales		Purchases
	Credit	Cash	
September	15,000	14,000	40,000
October	18,000	5,000	23,000
November	20,000	6,000	27,000
December	25,000	8,000	26,000

All trade debtors are allowed one month's credit and are expected to settle promptly. All trade creditors are paid in the months following delivery.

On 1st October'23 all equipments were replaced at a cost of ₹30,000 and ₹14,000 was allowed in exchange for the old equipment and a net payment of ₹16,000 was made. The proposed dividend will be paid in December, 2023.

The following expenses will be paid:

Wages	₹3,000 per month
Administration	₹1,500 per month
Rent (to be paid in October'23)	₹3,600 for the year upto 30th September'24

You are required to prepare a cash budget for the months of October, November and December, 2023.

Ans.

Cash Budget of Maharaja Ltd. for the quarter ending 31st December, 2023

Particulars	October	November	December	Total
Opening Balance	35,000	(9,100)	(12,600)	35,000
Cash Sales	5,000	6,000	8,000	19,000
Collection of credit sales	15,000	18,000	20,000	53,000
Total A	55,000	14,900	15,400	1,07,000
Payments of creditors	40,000	23,000	27,000	90,000

Wages	3,000	3,000	3,000	9,000
Payment of new equipment	16,000	-	-	16,000
Administration expenses	1,500	1,500	1,500	4,500
Rent	3,600	-	-	3,600
Dividend	-	-	15,000	15,000
Total B	64,100	27,500	46,500	1,38,100
Closing balance (A - B)	(9,100)	(12,600)	(31,100)	(31,100)

Q.8



Vivek and Company are manufactures of check valves which are sold at ₹50 each.

The cost data are

- (a) Variable manufacturing cost : ₹25 per unit.
 (b) Variable selling expenses : ₹5 per unit.
 (c) Fixed manufacturing cost paid in cash : ₹1,50,000 per month
 Fixed selling expenses : ₹1,00,000 p.m. payable in cash
 (d) Depreciation : ₹30,000 per month.

Other data:

- The company's policy is to hold at the end of each month an inventory of finished goods representing targeted sales for next two months. Opening inventory on 1st January was 30,000 units.
- The raw material required each month is purchased in cash which is the included in variable manufacturing cost of ₹25. No inventory of raw material is held.
- All sales are on credit. Collection is 50% in the same month and the balance in the following month. The Debtors balance was ₹4,00,000 on 1st January.
- All manufacturing costs are paid in cash in the month of production.
- The company pays 80% of its variable selling expenses in the month of sale and the balance in the following month. On 1st January the company owed ₹25,000 for December expenses.
- The minimum desired cash balance is ₹50,000 which is held on 1st January.
- The company borrows at the beginning of the month and repays at the end amount available in excess of ₹50,000. Ignore interest.
- The sales budget is:

Month	Units	Month	Units
January	15,000	February	20,000
March	25,000	April	27,000
May	30,000	June	30,000

Prepare cash budget of the company (i) for January, February and March; and (ii) in total.

Ans.

Cash Budget of Vivek & Company for the period January to March

Particulars	January	February	March	Total
Opening Balance	50,000	50,000	50,000	50,000
Collection from debtors:				
50% of current month	3,75,000	5,00,000	6,25,000	15,00,000
Previous period	4,00,000	3,75,000	5,00,000	12,75,000
Total A	8,25,000	9,25,000	11,75,000	28,25,000
Variable manufacturing cost @ ₹25 each	7,50,000	6,75,000	7,50,000	21,75,000
Fixed manufacturing cost				
Fixed selling expenses	1,50,000	1,50,000	1,50,000	4,50,000



Variable selling expenses:	1,00,000	1,00,000	1,00,000	3,00,000
Current month 80%	60,000	80,000	1,00,000	2,40,000
Next month 20%	25,000	15,000	20,000	60,000
Total B	10,85,000	10,20,000	11,20,000	32,25,000
Balance (A - B)	(2,60,000)	(95,000)	55,000	(4,00,000)
Add: Borrowing	3,10,000	1,45,000	-	4,50,000
Less: Repayment	-	-	(5,000)	-
Closing balance	50,000	50,000	50,000	50,000

Working Notes:**Calculation of units to be produced**

Particulars	January	February	March
Sales	15,000	20,000	25,000
Add: Closing stock (next two months requirements)	45,000	52,000	57,000
	60,000	72,000	82,000
Less: Opening stock	(30,000)	(45,000)	(52,000)
Production	30,000	27,000	30,000

Q.9



From the following information relating to a departmental store, you are required to prepare for the three months ending 31st March, 2023:

- Month-wise cash budget on receipts and payments basis; and
- Statement of Sources and uses of funds for the three months period.

It is anticipated that the working capital at 1st January, 2023 will be as follows:

Particulars	₹ in '000's		
Cash in hand and at bank			545
Short term investments			300
Debtors			2,570
Stock			1,300
Trade creditors			2,110
Other creditors			200
Dividends payable			485
Tax due			320
Plant			800

Budgeted Profit Statement	₹ in '000's		
	January	February	March
Sales	2,100	1,800	1,700
Cost of sales	1,635	1,405	1,330
Gross Profit	465	395	370
Administrative, Selling and Distribution Expenses	315	270	255
Net Profit before tax	150	125	115

Budgeted balances at the end of each months	₹ in '000's		
	31st Jan.	28th Feb.	31st March
Short term investments	700	-	200
Debtors	2,600	2,500	2,350
Stock	1,200	1,100	1,000
Trade creditors	2,000	1,950	1,900

Other creditors	200	200	200
Dividends payable	485	-	-
Tax due	320	320	320
Plant (depreciation ignored)	800	1,600	1,550

Depreciation amount to ₹60,000 is included in the budgeted expenditure for each month.

Ans.

(a) **Cash Budget**
(3 months ending 31st March, 2023)

Particulars	₹ in '000's		
	Jan.	Feb.	March
Opening Cash Balances	545	315	65
Add: Receipts:			
From Debtors	2,070	1,900	1,850
Sale of Investments	-	700	-
Sale of Plant	-	-	50
Total (A)	2,615	2,915	1,965
Payments:			
Creditors	1,645	1,355	1,280
Cash Expenses (Exp - 60,000 for depreciation)	255	210	195
Purchase of Plant	-	800	-
Payment of dividend	-	485	-
Purchase of Investments	400	-	200
Total (B)	2,300	2,850	1,675
Closing Cash Balance (A - B)	315	65	290

(b) **Statement of Sources and uses of Funds**
(3 months ending 31st March, 2023)

Sources of Funds		₹ in '000's
Funds from Operations:		
Net profit (150 + 125 + 115)	390	
Add: Depreciation (60 × 3)	<u>180</u>	570
Sale of Plant		50
Decrease in Working Capital (W.N.)		665
Total (A)		1,285
Uses of Funds		₹ in '000's
Purchase of Plant		800
Dividend Payment		485
Total (B)		1,285

Working Note:

1. Calculation of receipts from debtors and payment to creditors:

Workings	₹ in '000's		
	Jan' 23	Feb' 23	March' 23
Opening balance of debtors	2,570	2,600	2,500
Add: Sales	2,100	1,800	1,700
Less: Closing balance of debtors	(2,600)	(2,500)	(2,350)
Receipts from debtors	2,070	1,900	1,850
Cost of sales	1,635	1,405	1,330
Add: Closing stock	1,200	1,100	1,000



Less: Opening stock	(1,300)	(1,200)	(1,100)
Purchases	1,535	1,305	1,230
Add: Opening balance of creditors	2,110	2,000	1,950
Less: Closing balance of creditors	(2,000)	(1,950)	(1,900)
Payment to creditors	1,645	1,355	1,280

2. Statement of Changes in Working Capital

Particulars	₹ in '000's	
	January' 23	March' 23
(A) Current Assets:		
Cash in hand and at Bank	545	290
Short term Investments	300	200
Debtors	2,570	2,350
Stock	1,300	1,000
Total	4,715	3,840
(B) Current Liabilities:		
Trade Creditors	2,110	1,900
Other Creditors	200	200
Tax Due	320	320
Total	2,630	2,420
Working Capital (A - B)	2,085	1,420
Decrease in Working Capital	-	(665)

Q.10

Prachi Ltd is a manufacturing company producing and selling a range of cleaning products to wholesale customers. It has three suppliers and two customers. Prachi Ltd relies on its cleared funds forecast to manage its cash. You are an accounting technician for the company and have been asked to prepare a cleared funds forecast for the period Monday 7 August to Friday 11 August 2023 inclusive. You have been provided with the following information:

(1) Receipts from customers:

Customers	Credit terms	Payment method	7 Aug 2023 sales	7 July 2023 sales
W Ltd	1 Calendar month	BACS	₹1,50,000	₹1,30,000
X Ltd	None	Cheque	₹1,80,000	₹1,60,000

(a) Receipt of money by BACS (Bankers' Automated Clearing Services) is instantaneous.

(b) X Ltd's cheque will be paid into Prachi Ltd's bank account on the same day as the sale is made and will clear on the third day following this (excluding day of payment).

(2) Payments to suppliers:

Supplier	Credit terms	Payment method	7 Aug 2023 Purchase	7 July 2023 purchases	7 June 2023 purchases
A Ltd	1 Calendar month	BAC	₹65,000	₹55,000	₹45,000
B Ltd	2 Calendar months	Cheque	₹85,000	₹80,000	₹75,000
C Ltd	None	Cheque	₹95,000	₹90,000	₹85,000

(a) Prachi Ltd has set up a standing order for ₹45,000 a month to pay for supplies from A Ltd. This will leave Prachi's bank account on 7 August.

Every few months, an adjustment is made to reflect the actual cost of supplies purchased (you do not need to make this adjustment).

(b) Prachi Ltd will send out, by post, cheques to B Ltd and C Ltd on 7 August. The amounts will leave its bank account on the second day following this (excluding the day of posting).

(3) Wages and salaries:

	July 2023	August 2023
Weekly wages	₹12,000	₹13,000
Monthly salaries	₹56,000	₹59,000

(a) Factory workers are paid cash wages (weekly). They will be paid one week's wages, on 11 August, for the last week's work done in July (i.e. they work a week in hand).

(b) All the office workers are paid salaries (monthly) by BACS. Salaries for July will be paid on 7 August.

(4) Other miscellaneous payments:

(a) Every Monday morning, the petty cashier withdraws ₹200 from the company bank account for the petty cash. The money leaves Prachi's bank account straight away.

(b) The room cleaner is paid ₹30 from petty cash every Wednesday morning.

(c) Office stationery will be ordered by telephone on Tuesday 8 August to the value of ₹300. This is paid for by company debit card. Such payments are generally seen to leave the company account on the next working day.

(d) Five new softwares will be ordered over the Internet on 10 August at a total cost of ₹6,500. A cheque will be sent out on the same day. The amount will leave Prachi Ltd's bank account on the second day following this (excluding the day of posting).

(5) Other information: The balance on Prachi's bank account will be ₹200,000 on 7 August 2023. This represents both the book balance and the cleared funds.

Prepare a cleared funds forecast for the period Monday 7 August to Friday 11 August 2023 inclusive using the information provided. Show clearly the uncleared funds float each day.

Ans.

Particulars	Clear Fund Forecast				
	7 Aug 23 (Monday)	8 Aug 23 (Tuesday)	9 Aug 23 (Wednesday)	10 Aug 23 (Thursday)	11 Aug 23 (Friday)
Receipts:					
W Ltd	1,30,000	-	-	-	-
X Ltd	-	-	-	1,80,000	-
Total A	1,30,000	-	-	1,80,000	-
Payments:					
A Ltd	45,000	-	-	-	-
B Ltd	-	-	75,000	-	-
C Ltd	-	-	95,000	-	-
Wages	-	-	-	-	12,000
Salaries	56,000	-	-	-	-
Petty Cash	200	-	-	-	-
Stationery	-	-	300	-	-
Total B	1,01,200	-	1,70,300	-	12,000
Cleared Excess Receipts (A - B)	28,800	-	(1,70,300)	1,80,000	(12,000)
Add: Opening Cleared Balance	2,00,000	2,28,800	2,28,800	58,500	2,38,500
Closing Cleared Balance (C)	2,28,800	2,28,800	58,500	2,38,500	2,26,500
Uncleared Float:					
Uncleared receipts	1,80,000	1,80,000	1,80,000	-	-
Less: Uncleared Payments	(1,70,000)	(1,70,300)	-	(6,500)	(6,500)
Uncleared Balance (D)	10,000	9,700	1,80,000	(6,500)	(6,500)
Total Book Balance (C + D)	2,38,800	2,38,500	2,38,500	2,32,000	2,20,000

*1,70,000 = Cheque to B Ltd for ₹75,000 and Cheque to C Ltd for ₹95,000



Q.29



JPL has two dates when it receives its cash inflows i.e. February 15 and August 15. On each of these dates, it expects to receive ₹15 crores. Cash expenditures are expected to be steady throughout the subsequent 6 months period. Presently the ROI in marketable securities is 8% per annum, and the cost of transfer from securities to cash is ₹125 each time a transfer occurs.

- (a) What is the optimal transfer size using the EOQ model? What is the average cash balance?
 (b) What would be your Solution to part (a), if the ROI were 12% per annum and the transfer costs were ₹75? Why do they differ from those in part (a)?

Ans.

- (a) Optimal transfer size and average cash:

$$\text{Optimal transfer size} = \sqrt{\frac{2UP}{S}}$$

Where,

- U = Total annual cash required.
 P = Transaction cost per transfer.
 S = Interest rate per annum.

$$\text{Optimal transfer size} = \sqrt{\frac{2 \times 30,00,00,000 \times 125}{0.08}} = 9,68,246$$

$$\text{Average cash balance} = \frac{1}{2} \times 9,68,246 = 4,84,123$$

- (b) Revised optimum transfer and average cash:

$$\text{Optimal transfer size} = \sqrt{\frac{2 \times 30,00,00,000 \times 75}{0.12}} = 6,12,372$$

$$\text{Average cash balance} = \frac{1}{2} \times 6,12,372 = 3,61,186$$

Causes of difference in figure (b) from the figure of part (a):

- (i) Transaction cost is lower as comparison to part (a),
 (ii) Higher opportunity cost of holding as comparison to part (a).

Q.30

VK Co. Ltd. has total cash disbursement amounting ₹22,50,000 in the year 2017 and maintains a separate account for cash disbursements. Company has an administrative and transaction cost on transferring cash to disbursement account ₹15 per transfer. The yield rate on marketable securities is 12% per annum.

Determine the optimum cash balance according to William J Baumol model.

Ans.

$$\text{Optimal transfer size} = \sqrt{\frac{2UP}{S}} = \sqrt{\frac{2 \times 22,50,000 \times 15}{0.12}} = 23,717$$

8 CHAPTER

DEBTORS MANAGEMENT

Q.1

Accept Factoring or Not

MTP May 19(2)



Navya Ltd has annual credit sales of Rs. 45 lakhs. Credit terms are 30 days, but its management of receivables has been poor and the average collection period is 50 days, Bad debt is 0.4 per cent of sales. A factor has offered to take over the task of debt administration and credit checking, at an annual fee of 1 per cent of credit sales. Navya Ltd. estimates that it would save Rs. 35,000 per year in administration costs as a result. Due to the efficiency of the factor, the average collection period would reduce to 30 days and bad debts would be zero. The factor would advance 80 per cent of invoiced debts at an annual interest rate of 11 per cent. Navya Ltd. is currently financing receivables from an overdraft costing 10 per cent per year.

If occurrence of credit sales is throughout the year, COMPUTE whether the factor's services should be accepted or rejected. Assume 365 days in a year.

Ans

	Rs.
Present level of receivables is 45 lakh× 50/365	6,16,438
In case of factor, receivables would reduce to 45 lakhs× 30/365	3,69,863
The costs of the existing policy are as follows:	
Cost of financing existing receivables: 6,16,438×10%	61,644
Cost of bad debts: 45 lakhs × 0.4%	18,000
Cost of current policy	79,644
The cost under the factor are as follows:	
Cost of financing new receivable through factor: (Rs. 3,69,863 × 0.8 × 0.11) + (Rs. 3,69,863 × 0.2 × 0.10) = (32,548 + 7,397)	39,945
Factor's annual fee: 45 Lakhs × 0.01	45,000
Administration costs saved:	(35,000)
Net cost under factor:	49,945

From the above analysis it is clear that the factor's services are cheaper than Existing policy by Rs. 29,699 (Rs. 79,644 - Rs.49,945) per year. Hence, the services of the factor should be accepted.

Q.2

Bank Loan, Factoring, Credit

RTP Dec 21



The Alliance Ltd., a Petrochemical sector company had just invested huge amount in its new expansion project. Due to huge capital investment, the company is in need of an additional ₹ 1,50,000 in working capital immediately. The Finance Manger has determined the following three feasible sources of working capital funds:

- (i) Bank loan: The Company's bank will lend ₹ 2,00,000 at 15%. A 10% compensating balance will be required, which otherwise would not be maintained by the company.
- (ii) Trade credit: The company has been offered credit terms from its major supplier of 3/30, net 90 for purchasing raw materials worth ₹ 1,00,000 per month.
- (iii) Factoring: A factoring firm will buy the company's receivables of ₹ 2,00,000 per month, which have a collection period of 60 days. The factor will advance up to 75 % of the face value of the receivables at 12% on an annual basis. The factor will also charge commission of 2% on all receivables purchased. It has been estimated that the factor's services will save the company a credit department expense and bad debt expense of ₹ 1,250 and ₹ 1,750 per month respectively.

On the basis of annual percentage cost, ADVISE which alternative should the company select? Assume 360 days year.

Ans.

(i) **Bank loan:** Since the compensating balance would not otherwise be maintained, the real annual cost of taking bank loan would be:

$$= \frac{15}{90} \times 100 = 16.67\% \text{ p.a.}$$

(ii) **Trade credit:** Amount upto ₹ 1,50,000 can be raised within 2 months or 60 days. The real annual cost of trade credit would be:

$$= \frac{3}{97} \times \frac{360}{60} \times 100 = 18.56\% \text{ p.a.}$$

(iii) **Factoring:**

$$\text{Commission charges per year} = 2\% \times (\text{₹ } 2,00,000 \times 12) = \text{₹ } 48,000$$

$$\text{Total Savings per year} = (\text{₹ } 1,250 + \text{₹ } 1,750) \times 12 = \text{₹ } 36,000$$

$$\text{Net factoring cost per year} = \text{₹ } 48,000 - \text{₹ } 36,000 = \text{₹ } 12,000$$

Annual Cost of Borrowing ₹ 1,50,000 receivables through factoring would be:

$$= \frac{12\% \times 1,50,000 + 12,000}{1,50,000} \times 100$$

$$= \frac{18,000 + 12,000}{1,50,000} \times 100$$

$$= 20\% \text{ p.a.}$$

Advise: The company should select alternative of Bank Loan as it has the lowest annual cost i.e. 16.67% p.a.

Q.3

Change in Credit Terms

PY May 23



A company has current sale of ₹ 12 lakhs per year. The profit-volume ratio is 20% and post-tax cost of investment in receivables is 15%. The current credit terms are 1/10, net 50 days and average collection period is 40 days. 50% of customers in terms of sales revenue are availing cash discount and bad debt is 2% of sales.

In order to increase sales, the company want to liberalize its existing credit terms to 2/10, net 35 days. Due to which, expected sales will increase to ₹ 15 lakhs. Percentage of default in sales will remain same. Average collection period will decrease by 10 days. 80% of customers in terms of sales revenue are expected to avail cash discount under this proposed policy.

Tax rate is 30%.

ADVISE, should the company change its credit terms. (Assume 360 days in a year.)

Ans

(i) Calculation of Cash Discount

$$\text{Cash Discount} = \text{Total credit sales} \times \% \text{ of customers who take up discount} \times \text{Rate}$$

$$\text{Present Policy} = \frac{12,00,000 \times 50 \times 0.01}{100} = \text{₹ } 6,000$$

$$\text{Proposed Policy} = 15,00,000 \times 0.80 \times 0.02 = \text{₹ } 24,000$$

(ii) Opportunity Cost of Investment in Receivables

$$\text{Present Policy: Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection period}}{360} \times \frac{\text{Rate of Return}}{100}$$

$$= 9,60,000 \times \frac{40}{360} \times \frac{15}{100} = \text{₹ } 16,000$$

$$\text{Proposed Policy:} = \text{Total Cost} \times \frac{\text{Collection period}}{360} \times \frac{\text{Rate of Return}}{100}$$

$$= 12,00,000 \times \frac{30}{360} \times \frac{15}{100} = ₹ 15,000$$

Statement showing Evaluation of Credit Policies

Particulars	Present Policy	Proposed Policy
Credit Sales	12,00,000	15,00,000
Variable Cost @ 80%* of sales	9,60,000	12,00,000
Bad Debts @ 2%	24,000	30,000
Cash Discount	6,000	24,000
Profit before tax	2,10,000	2,46,000
Tax @ 30%	63,000	73,800
Profit after Tax	1,47,000	1,72,200
Opportunity Cost of Investment in Receivables	16,000	15,000
Net Profit	1,31,000	1,57,200

*Only relevant or variable costs are considered for calculating the opportunity costs on the funds blocked in receivables. Since 20% is profit-volume ratio, hence the relevant costs are taken to be 80% of the respective sales.

Advise: Proposed policy should be adopted since the net benefit is increased by (₹ 1,57,200 - ₹ 1,31,000) = ₹ 26,200.

Alternative presentation using incremental approach

	₹
Incremental sales (15,00,000 - 12,00,000)	3,00,000
Less: Incremental variable cost (12,00,000 - 9,60,000)	2,40,000
Less: Incremental Bad debts (30,000 - 24,000)	6,000
Less: Incremental Cash discount (24,000 - 6,000)	18,000
Increase in Profit Before Tax	36,000
Less: Tax @ 30%	10,800
Increase in Profit After Tax	25,200
Add: Savings in opportunity cost (16,000 - 15,000)	1,000
Increase in Net Profit	26,200

Advise: Proposed policy should be adopted since the net benefit is increased by (₹ 1,57,200 - ₹ 1,31,000) = ₹ 26,200.

Q.4

Collection Expenses

PY Jul 21



Current annual sale of SKD Ltd. is ₹ 360 lakhs. It's expenditure on receivables management is too high considering following two new alternate credit policies:

directors are of the opinion that company's current and with a view to reduce the expenditure they are

	Policy X	Policy Y Average
collection period	1.5 months	1 month
% of default	2%	1%

Annual collection expenditure ₹ 12 lakh ₹ 20 lakh

Selling price per unit of product is ₹ 150. Total cost per unit is ₹ 120. Current credit terms are 2 months and percentage of default is 3%.

Current annual collection expenditure is ₹ 8 lakh. Required rate of return on investment of SKD Ltd. is 20%. Determine which credit policy SKD Ltd. should follow.

Ans

Statement showing the Evaluation of Credit policies (Total Approach)

Particulars	Present Policy (2 Months)	Proposed Policy X(1.5 Months)	Proposed Policy Y (1 Month)
	₹ in lakhs	₹ in lakhs	₹ in lakhs
A.	Expected Profit:		
(a) Credit Sales*	360	360	360
(b) Total Cost other than Bad Debts and collection expenditure (360/150 x 120)	288	288	288
(c) Bad Debts	10.8	7.2	3.6
	(360 x 0.03)	(360 x 0.02)	(360 x 0.01)
(d) Collection expenditure	8	12	20
(e) Expected Profit [(a) - (b) - (c) - (d)]	53.2	52.8	48.4
B. Opportunity Cost of Investments in Receivables (Working Note)	9.6	7.2	4.8
C. Net Benefits (A - B)	43.6	45.6	43.6

Recommendation: The Proposed Policy X should be followed since the net benefits under this policy are higher as compared to other policies.

*Note: It is assumed that all sales are on credit.

Working Note:

Calculation of Opportunity Cost of Average Investments

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection period}}{12} \times \frac{\text{Rate of Return}}{100}$$

$$\text{Present Policy} = ₹ 288 \text{ lakhs} \times \frac{2}{12} \times \frac{20}{100} = ₹ 9.6 \text{ lakhs}$$

$$\text{Policy X} = ₹ 288 \text{ lakhs} \times \frac{1.5}{12} \times \frac{20}{100} = ₹ 7.2 \text{ lakhs}$$

$$\text{Policy Y} = ₹ 288 \text{ lakhs} \times \frac{1}{12} \times \frac{20}{100} = ₹ 4.8 \text{ lakhs}$$

Alternatively

Statement showing the Evaluation of Credit policies (Incremental Approach)

Particulars	Present Policy (2 Months)	Proposed Policy X (1.5 Months)	Proposed Policy Y (1 Month)
	₹ in lakhs	₹ in lakhs	₹ in lakhs

	(a) Credit Sales*	360	360	360
	(b) Cost of sales (360/150 x 120)	288	288	288
	(c) Receivables (Refer Working Note)	48	36	24
	(d) Reduction in receivables from present policy	-	12	24
(A)	Savings in Opportunity Cost of Investment in Receivables (@ 20%)	-	2.4	4.8
	(e) Bad Debts	10.8	7.2	3.6
		(360 x 0.03)	(360 x 0.02)	(360 x 0.01)
(B)	Reduction in bad debts from present policy	-	3.6	7.2
	(f) Collection expenditure	8	12	20
(C)	Increase in Collection expenditure from Present policy	-	4	12
(D)	Net Benefits (A +B-C)		2	0

Recommendation: The Proposed Policy X should be followed since the net benefits under this policy are higher as compared to other policies.

*Note: It is assumed that all sales are on credit.

Working Note:

$$\text{Calculation of Investment in Receivables} = \text{Total Cost} \times \frac{\text{Collection period}}{12}$$

$$\text{Present Policy} = ₹ 288 \text{ lakhs} \times \frac{2}{12} = ₹ 48 \text{ lakhs}$$

$$\text{Policy X} = ₹ 288 \text{ lakhs} \times \frac{1.5}{12} = ₹ 36 \text{ lakhs}$$

$$\text{Policy Y} = ₹ 288 \text{ lakhs} \times \frac{1}{12} = ₹ 24 \text{ lakhs}$$



Q.5

Credit policy

PY Nov 18



MN Ltd. has a current turnover of ₹ 30,00,000 p.a. Cost of Sale is 80% of turnover and Bad Debts are 2% of turnover, Cost of Sales includes 70% variable cost and 30% Fixed Cost, while company's required rate of return is 15%. MN Ltd. currently allows 15 days credit to its customer, but it is considering increase this to 45 days credit in order to increase turnover.

It has been estimated that this change in policy will increase turnover by 20%, while Bad Debts will increase by 1%. It is not expected that the policy change will result in an increase in fixed cost and creditors and stock will be unchanged.

Should MN Ltd. introduce the proposed policy? (Assume 360 days year)

Ans

Statement Showing Evaluation of Credit Policies

	Particulars	Present Policy	Proposed Policy
A.	Expected Contribution		
	(a) Credit Sales	30,00,000	36,00,000
	(b) Less: Variable Cost	<u>16,80,000</u>	<u>20,16,000</u>
	(c) Contribution	<u>13,20,000</u>	<u>15,84,000</u>
	(d) Less: Bad Debts	<u>60,000</u>	<u>1,08,000</u>
	(e) Contribution after Bad debt [(c)-(d)]	<u>12,60,000</u>	<u>14,76,000</u>
B.	Opportunity Cost of investment in Receivables	<u>15,000</u>	<u>54,000</u>

C.	Net Benefits [A-B]	<u>12,45,000</u>	<u>14,22,000</u>
D.	Increase in Benefit		<u>1,77,000</u>

Recommendation: Proposed Policy i.e credit from 15 days to 45 days should be implemented by NM Ltd since the net benefit under this policy are higher than those under present policy

1 Working Note:

	Present Policy (₹)	Propose Policy (₹)
Sales	30,00,000	36,00,000
Cost of Sales (80% of sales)	24,00,000	28,80,000
Variable cost (70% of cost of sales)	16,80,000	20,16,000

2. Opportunity Costs of Average Investments

$$\text{Variable Cost} \times \frac{\text{Collection period}}{\text{Return}} \times \text{Rate of}$$

$$\text{Present Policy} = ₹ 24,00,000 \times \frac{45}{360} \times 15\% = ₹ 54,000$$

$$\text{Proposed Policy} = \frac{15}{360} = 15\% = ₹ 18,000$$

Q.6

Credit Policy

RTP Nov 20



A company wants to follow a more prudent policy to improve its sales for the region which is ₹ 9 lakhs per annum at present, having an average collection period of 45 days. After certain researches, the management consultant of the company reveals the following information:

Credit Policy	Increase in collection period	Increase in sales	Present default anticipated
W	15 days	₹ 60,000	1.5%
X	30 days	₹ 90,000	2%
Y	45 days	₹ 1,50,000	3%
Z	70 days	₹ 2,10,000	4%

The selling price per unit is ₹ 3. Average cost per unit is ₹ 2.25 and variable costs per unit are ₹ 2. The current bad debt loss is 1%. Required return on additional investment is 20%. (Assume 360 days year)

ANALYSE which of the above policies would you recommend for adoption?

Ans

A. Statement showing the Evaluation of Debtors Policies (Total Approach)

(Amount in ₹)

Particulars		Present Policy 45 days	Proposed Policy W	Proposed Policy X	Proposed Policy Y	Proposed Policy Z 115 days
I.	Expected Profit:					
	(a) Credit Sales	9,00,000	9,60,000	9,90,000	10,50,000	11,10,000
	(b) Total Cost other than Bad Debts					
	(i) Variable Costs	6,00,000	6,40,000	6,60,000	7,00,000	7,40,000

	[Sales × 2/3]					
(ii) Fixed Costs		75,000	75,000	75,000	75,000	75,000
		6,75,000	7,15,000	7,35,000	7,75,000	8,15,000
(c) Bad Debts		9,000	14,400	19,800	31,500	44,400
(d) Expected Profit		2,16,000	2,30,600	2,35,200	2,43,500	2,50,600
	[(a) - (b) - (c)]					
II. Opportunity Cost of Investments in Receivables		16,875	23,833	30,625	38,750	52,069
III. Net Benefits (I - II)		1,99,125	2,06,767	2,04,575	2,04,750	1,98,531

Recommendation: The Proposed Policy W (i.e. increase in collection period by 15 days or total 60 days) should be adopted since the net benefits under this policy are higher as compared to other policies.

Working Notes:

- (i) Calculation of Fixed Cost = [Average Cost per unit - Variable Cost per unit] × No. of Units sold
 = [₹ 2.25 - ₹ 2.00] × (₹ 9,00,000/3)
 = ₹ 0.25 × 3,00,000 = ₹ 75,000

- (ii) Calculation of Opportunity Cost of Average Investments

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection period}}{360} \times \frac{\text{Rate of Return}}{100}$$

$$\text{Present Policy} = 6,75,000 \times \frac{45}{360} \times \frac{20}{100} = 16,875$$

$$\text{Policy W} = 7,15,000 \times \frac{60}{360} \times \frac{20}{100} = 23,833$$

$$\text{Policy X} = 7,35,000 \times \frac{75}{360} \times \frac{20}{100} = 30,625$$

$$\text{Policy Y} = 7,75,000 \times \frac{90}{360} \times \frac{20}{100} = 38,750$$

$$\text{Policy Z} = 8,15,000 \times \frac{115}{360} \times \frac{20}{100} = 52,069$$

- B. Another method of solving the problem is Incremental Approach. Here we assume that sales are all credit sales.

(Amount in ₹)

Particulars	Present	Proposed	Proposed	Proposed	Proposed
	Policy 45 days	Policy W 60 days	Policy X 75 days	Policy Y 90 days	Policy Z 115 days
I. Incremental Expected Profit:					
(a) Incremental Credit Sales	0	60,000	90,000	1,50,000	2,10,000
(b) Incremental Costs					



(i) Variable Costs	6,00,000	40,000	60,000	1,00,000	1,40,000
(ii) Fixed Costs	75,000	-	-	-	-
(c) Incremental Bad Debt	9,000	5,400	10,800	22,500	35,400
(d) Incremental Expected Profit (a - b - c)]		14,600	19,200	27,500	34,600
II. Required Return on Incremental Investments:					
(a) Cost of Credit Sales	6,75,000	7,15,000	7,35,000	7,75,000	8,15,000
(b) Collection period	45	60	75	90	115
(c) Investment in Receivable (a × b/360)	84,375	1,19,167	1,53,125	1,93,750	2,60,347
(d) Incremental Investment in Receivables	-	34,792	68,750	1,09,375	1,75,972
(e) Required Rate of Return (in %)		20	20	20	20
(f) Required Return on Incremental Investments	-	6,958	13,750	21,875	35,194
III. Net Benefits (I - II)	-	7,642	5,450	5,625	(594)

Recommendation: The Proposed Policy W should be adopted since the net benefits under this policy are higher than those under other policies.

C. Another method of solving the problem is by computing the Expected Rate of Return

$$\text{Expected Rate of Return} = \frac{\text{Incremental Expected Profit}}{\text{Incremental Investment in Receivables}} \times 100$$

$$\text{For Policy W} = \frac{14,500}{34,792} \times 100 = 41.96\%$$

$$\text{For Policy X} = \frac{19,200}{68,750} \times 100 = 27.93\%$$

$$\text{For Policy Y} = \frac{27,500}{109,375} \times 100 = 25.14\%$$

$$\text{For Policy Z} = \frac{34,600}{1,75,972} \times 100 = 19.66\%$$

Recommendation: The Proposed Policy W should be adopted since the Expected Rate of Return (41.96%) is more than the Required Rate of Return (20%) and is highest among the given policies compared.

Q.7

Credit Policy

RTP May 20



TM Limited, a manufacturer of colour TV sets is considering the liberalization of existing credit terms to three of their large customers A, B and C. The credit period and likely quantity of TV sets that will be sold to the customers in addition to other sales are as follows:

Quantity sold (No. of TV Sets)

Credit Period (Days)	A	B	C
0	10,000	10,000	-
30	10,000	15,000	-
60	10,000	20,000	10,000
90	10,000	25,000	15,000

The selling price per TV set is ₹15,000. The expected contribution is 50% of the selling price. The cost of carrying receivable averages 20% per annum.

You are required to COMPUTE the credit period to be allowed to each customer. (Assume 360 days in a year for calculation purposes).

Ans

In case of customer A, there is no increase in sales even if the credit is given. Hence comparative statement for B & C is given below:

Particulars	Customer B				Customer C			
	0	30	60	90	0	30	60	90
1. Credit period (days)	0	30	60	90	0	30	60	90
2. Sales Units	10,000	15,000	20,000	25,000	-	-	10,000	15,000
	₹ in lakh				₹ in lakh			
3. Sales Value	1,500	2,250	3,000	3,750	-	-	1,500	2,250
4. Contribution at 50% (A)	750	1,125	1,500	1,875	-	-	750	1,125
5. Receivables:- Credit Period × Sale 360	-	187.5	500	937.5	-	-	250	562.5
6. Debtors at cost	-	93.75	250	468.75	-	-	125	281.25
7. Cost of carrying debtors at 20% (B)	-	18.75	50	93.75	-	-	25	56.25
8. Excess of contributions over cost of carrying debtors (A - B)	750	1,106.25	1,406.25	1,781.25	-	-	725	1,068.75

The excess of contribution over cost of carrying Debtors is highest in case of credit period of 90 days in respect of both the customers B and C. Hence, credit period of 90 days should be allowed to B and C.

Q.8

Credit Policy

RTP Nov 19



A regular customer of your company has approached to you for extension of credit facility for purchasing of goods. On analysis of past performance and on the basis of information supplied, the following pattern of payment schedule emerges:

Pattern of Payment Schedule	
At the end of 30 days	20% of the bill
At the end of 60 days	30% of the bill.
At the end of 90 days	30% of the bill.
At the end of 100 days	18% of the bill.
Non-recovery	2% of the bill.

The customer wants to enter into a firm commitment for purchase of goods of ₹30 lakhs in 2019, 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 ₹300 on which a profit of ₹10 per unit is expected to be made. It is anticipated that taking up of this contract would mean an extra recurring expenditure of ₹10,000 per annum. If the opportunity cost is 18% per annum, would you as the finance manager of the company RECOMMEND the grant of credit to the customer? Assume 1 year = 360 days.



Ans

Statement showing the Evaluation of credit Policies

Particulars	Proposed Policy ₹
A. Expected Profit:	
(a) Credit Sales	30,00,000
(b) Total Cost	
(i) Variable Costs	29,00,000
(ii) Recurring Costs	10,000
	29,10,000
(c) Bad Debts	60,000
(d) Expected Profit [(a) - (b) - (c)]	30,000
B. Opportunity Cost of Investments in Receivables	1,00,395
C. Net Benefits (A - B)	(70,395)

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

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection Period}}{360} \times \frac{\text{Rate of Return}}{100}$$

Particulars	20%	30%	30%	18%	Total
A. Total Cost	5,82,000	8,73,000	8,73,000	5,23,800	28,51,800
B. Collection period	30/360	60/360	90/360	100/360	
C. Required Rate of Return	18%	18%	18%	18%	
D. Opportunity Cost (A × B × C)	8,730	26,190	39,285	26,190	1,00,395

Q.9

Credit Policy

MTP Nov 22(2)

Avesh Pvt. Ltd. is considering relaxing its present credit policy for accounts receivable and is in the process of evaluating two proposed policies. Currently, the company has annual credit sales of ₹ 55 lakhs and accounts receivable turnover ratio of 5 times a year. The current level of loss due to bad debts is ₹ 2,00,000. The company is required to give a return of 15% on the investment in new accounts receivable. The company's variable costs are 75% of the selling price. Given the following information, IDENTIFY which is the better policy?

(Amount in ₹)

Particulars	Present Policy	Proposed Policy 1	Proposed Policy 2
Annual credit sales	55,00,000	65,00,000	70,00,000
Accounts receivable turnover ratio	5 times	4 times	3 times
Bad debt losses	2,00,000	3,50,000	5,00,000

Ans

Statement showing the Evaluation of Accounts Receivable Policies

(Amount in ₹)

A	Particulars	Present Policy	Proposed Policy 1	Proposed Policy 2
	Expected Profit:			
	(a) Credit Sales	55,00,000	65,00,000	70,00,000
	(b) Total Cost other than Bad Debts:			
	(i) Variable Costs (75%)	41,25,000	48,75,000	52,50,000
	(c) Bad Debts	2,00,000	3,50,000	5,00,000

	(d) Expected Profit [(a) - (b) - (c)]	11,75,000	12,75,000	12,50,000
B	Opportunity Cost of Investments in Accounts Receivable (Working Note)	1,23,750	1,82,813	2,62,500
C	Net Benefits (A - B)	10,51,250	10,92,187	9,87,500

Recommendation: The Proposed Policy 1 should be adopted since the net benefits under this policy are higher as compared to other policies.

Working Note:

Calculation of Opportunity Cost of Average Investments

Opportunity Cost = Total Cost × Collection period/12 × Rate of Return/100

Present Policy = ₹ 41,25,000 × 2.4/12 × 15% = ₹ 1,23,750

Proposed Policy 1 = ₹ 48,75,000 × 3/12 × 15% = ₹ 1,82,813

Proposed Policy 2 = ₹ 52,50,000 × 4/12 × 15% = ₹ 2,62,500

Q.10

Credit Policy

MTP Nov 22(1)



GT Ltd. is taking into account the revision of its credit policy with a view to increasing its sales and profit. Currently, all its sales are on one month credit. Other information is as follows:

Contribution 2/5th of Sales Revenue

Additional funds raising cost 20% per annum

The marketing manager of the company has given the following options along with estimates for considerations:

Particulars	Current Position	Option I	Option II	Option III
Sales Revenue (₹)	40,00,000	42,00,000	44,00,000	50,00,000
Credit period (in months)	1	1½	2	3
Bad debts (% of sales)	2	2½	3	5
Cost of Credit administration (₹)	24,000	26,000	30,000	60,000

You are required to ADVISE the Company for the best option.

Ans

Statement Showing Evaluation of Credit Policies

(₹ in lakhs)

Particulars	Current position (1 month)	Option I (1.5 months)	Option II (2 months)	Option III (3 months)
Sales Revenue	40,00,000	42,00,000	44,00,000	50,00,000
Contribution @ 40%	16,00,000	16,80,000	17,60,000	20,00,000
Increase in contribution over Current level price (A)	-	80,000	1,60,000	4,00,000
Debtors = Average Collection period × Credit Sale 12	-	$\frac{1 \times 40,00,000}{12}$ = 3,33,333.33	$\frac{1.5 \times 42,00,000}{12}$ = 5,25,000	$\frac{3 \times 50,00,000}{12}$ = 12,50,000
Increase in debtors over current level	-	1,91,666.67	4,00,000.00	9,16,666.67
Cost of funds for additional amount of debtos @ 20% (B)	-	38,333.33	80,000.00	1,83,333.33
Credit administrative cost	24,000	26,000	30,000	60,000
Increase in credit administration cost over present level (c)	-	2,000	6,000	36,000
Bad debts	80,000	1,05,000	1,32,000	2,50,000



Increase in bad debts over current levels (D)	-	25,000	52,000	1,70,000
Net gain/loss A - (B + C + D)	-	14,666.67	22,000.00	10,666.67

Advise: It is suggested that the company GT Ltd. should implement Option II with a net gain of ₹ 22,000 which has a credit period of 2 months

Q.11

Credit Policy

MTP Nov 18(1)



RST Limited is considering relaxing its present credit policy and is in the process of evaluating two proposed policies. Currently, the firm has annual credit sales of Rs 225 lakhs and accounts receivable turnover ratio of 5 times a year. The current level of loss due to bad debts is Rs.7,50,000. The firm is required to give a return of 20% on the investment in new accounts receivables. The company's variable costs are 60% of the selling price. Given the following information, DETERMINE which is a better option?

(Amount in lakhs)

	Present Policy	Policy Option I	Policy Option II
Annual credit sales (Rs)	225	275	350
Accounts receivable turnover ratio	5	4	3
Bad debt losses (Rs)	7.5	22.5	47.5

Ans

Statement showing Evaluation of Credit Policies

(Amount in lakhs)

	Particulars	Present Policy (Rs.)	Proposed Policy I (Rs.)	Proposed Policy II (Rs.)
A	Expected Profit :			
	(a) Credit Sales	225.00	275.00	350.00
	(b) Total Cost other than Bad Debts:			
	Variable Costs	135.00	165.00	210.00
	(c) Bad Debts	7.50	22.50	47.50
	(d) Expected Profit [(a)-(b)-(c)]	82.50	87.50	92.50
B	Opportunity Cost of Investment in Receivables*	5.40	8.25	14.00
C	Net Benefits [A-B]	77.10	79.25	78.50

Recommendation: The Proposed Policy I should be adopted since the net benefits under this policy is higher than those under other policies.

Working Note:

*Calculation of Opportunity Cost of Average Investments

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection Period}}{12} \times \frac{\text{Rate of Return}}{100}$$

$$\text{Present Policy} = \text{Rs.135 lakhs} \times 2.4/12 \times 20\% = \text{Rs. 5.40 lakhs}$$

$$\text{Proposed Policy I} = \text{Rs.135 lakhs} \times 2.4/12 \times 20\% = \text{Rs. 5.40 lakhs}$$

$$\text{Proposed Policy II} = \text{Rs. 210 lakhs} \times 4/12 \times 20\% = \text{Rs. 14.00 lakhs}$$

Q.12

Factoring

PY Dec 21



A factoring firm has offered a company to buy its accounts receivables.

The relevant information is given below:

- The current average collection period for the company's debt is 80 days and $\frac{1}{2}\%$ of debtors default. The factor has agreed to pay over money due to the company after 60 days and it will suffer all the losses of bad debts also.
 - Factor will charge commission @2%.
 - The company spends ₹ 1,00,000 p.a. on administration of debtor. These are avoidable cost.
 - Annual credit sales are ₹ 90 lakhs. Total variable costs is 80% of sales. The company's cost of borrowing is 15% per annum. Assume 365 days in a year.
- Should the company enter into agreement with factoring firm?

Ans

Particulars		(₹)
A.	Annual Savings (Benefit) on taking Factoring Service	
	Cost of credit administration saved	1,00,000
	Bad debts avoided (₹ 90 lakh × ½%)	45,000
	Interest saved due to reduction in average collection period [₹ 90 lakh × 0.80 × 0.15 × (80 days - 60 days)/365 days]	59,178
	Total	2,04,178
B.	Annual Cost of Factoring to the Firm:	
	Factoring Commission [₹ 90 lakh × 2%]	1,80,000
	Total	1,80,000
C.	Net Annual Benefit of Factoring to the Firm (A - B)	24,178

Advice: Since savings to the firm exceeds the cost to the firm on account of factoring, therefore, the company should enter into agreement with the factoring firm.

Q.13

Payment to Debtor

MTP May 19(1)



A bank is analysing the receivables of J Ltd. in order to identify acceptable collateral for a short-term loan. The company's credit policy is 2/10 net 30. The bank lends 80 percent on accounts where customers are not currently overdue and where the average payment period does not exceed 10 days past the net period. A schedule of J Ltd.'s receivables has been prepared. ANALYSE, how much will the bank lend on pledge of receivables, if the bank uses a 10 per cent allowance for cash discount and returns?

Account	Amount Rs.	Days Outstanding in days	Average Payment Period historically
74	25,000	15	20
91	9,000	45	60
107	11,500	22	24
108	2,300	9	10
114	18,000	50	45
116	29,000	16	10
123	14,000	27	48
	1,08,800		

Ans

Analysis of the receivables of J Ltd. by the bank in order to identify acceptable collateral for a short-term loan:

(i) The J Ltd.'s credit policy is 2/10 net 30.

The bank lends 80 per cent on accounts where customers are not currently overdue and where the average payment period does not exceed 10 days past the net period i.e. thirty days. From the schedule of receivables of J Ltd. Account No. 91 and Account No. 114 are currently overdue and for Account No. 123 the average payment period exceeds 40 days. Hence Account Nos. 91, 114 and 123 are eliminated. Therefore, the selected Accounts are Account Nos. 74, 107, 108 and 116.

(ii) Statement showing the calculation of the amount which the bank will lend on a pledge of receivables if the bank uses a 10 per cent allowances for cash discount and returns

Account No.	Amount (Rs.)	90 per cent of amount (Rs.)	80% of amount (Rs.)
	(a)	(b) = 90% of (a)	(c) = 80% of (b)



74	25,000	22,500	18,000
107	11,500	10,350	8280
108	2,300	2,070	1,656
116	29,000	26,100	20,880
Total loan amount			48,816

Q.14

FM May 24



Following is the sales information in respect of Bright Ltd:

Annual Sales (90 % on credit)	₹ 7,50,00,000
Credit period	45 days
Average Collection period	70 days
Bad debts	0.75%
Credit administration cost (out of which 2/5th is avoidable)	₹ 18,60,000

A factor firm has offered to manage the company's debtors on a non-recourse basis at a service charge of 2%. Factor agrees to grant advance against debtors at an interest rate of 14% after withholding 20% as reserve. Payment period guaranteed by factor is 45 days. The cost of capital of the company is 12.5%. One time redundancy payment of ₹ 50,000 is required to be made to factor.

Calculate the effective cost of factoring to the company. (Assume 360 days in a year)

Ans.

Evaluation of Factoring Proposal

	Particulars	₹	₹
A.	Savings due to factoring		
	Bad Debts saved	$0.75\% \times 7.5 \text{ crores} \times 90\%$	₹ 5,06,250
	Administration cost saved	$18.6 \text{ lakhs} \times 2/5$	₹ 7,44,000
	Interest saved due to reduction in average collection period	$7.5 \text{ crores} \times 90\% \times (70-45) / 360 \times 12.5\%$	₹ 5,85,937.5
	Total		₹ 18,36,187.5
B.	Costs of factoring:		
	Service charge	$7.5 \text{ crores} \times 90\% \times 2\%$	₹ 13,50,000
	Interest cost	$₹ 1,15,171.875 \times 360/45$	₹ 9,21,375
	Redundancy Payment		₹ 50,000
	Total		₹ 23,21,375
C.	Net Annual cost to the Firm: (A-B)		₹ 4,85,187.5
	Rate of effective cost of factoring	$₹ 4,85,187.5 / ₹ 64,66,078.125 \times 100$	7.504%

Advice: Since the rate of effective cost of factoring is less than the existing cost of capital, therefore, the proposal is acceptable.

Credit Sales = ₹ 7.5 crores × 90%	= ₹ 6,75,00,000
Average level of receivables = ₹ 6.75 crores × 45/360	= ₹ 84,37,500

Service charge = 2% of ₹ 84,37,500	₹ 1,68,750
Reserve = 20% of ₹ 84,37,500	<u>₹ 16,87,500</u>
Total (i)	₹ 18,56,250
Thus, the amount available for advance is	
Average level of receivables	₹ 84,37,500
Less: Total (i) from above	<u>₹ 18,56,250</u>
(ii)	₹ 65,81,250
Less: Interest @ 14% p.a. for 45 days	<u>₹ 1,15,171.875</u>
Net Amount of Advance available.	<u>₹ 64,66,078.125</u>

Note: Alternatively, if redundancy cost is taken as irrelevant for decision making, then Net Annual cost to the Firm will be ₹ 4,35,187.5 and Rate of effective cost of factoring will be ₹ 4,35,187.5/₹ 64,66,078.125 × 100 = 6.730%

If average level of receivables is considered for 70 days then the calculation can be done in following way:

Evaluation of Factoring Proposal

Credit Sales = ₹ 7.5 crores × 90%	= ₹ 6,75,00,000
Average level of receivables = ₹ 6.75 crores × 70/360	= ₹ 1,31,25,000
Service charge = 2% of ₹ 1,31,25,000	₹ 2,62,500
Reserve = 20% of ₹ 1,31,25,000	₹ 26,25,000
Total (i)	₹ 28,87,500
Thus, the amount available for advance is	
Average level of receivables	₹ 1,31,25,000
Less: Total (i) from above	₹ 28,87,500
(ii)	₹ 1,02,37,500
Less: Interest @ 14% p.a. for 45 days	<u>₹ 1,79,156.25</u>
Net Amount of Advance available.	<u>₹ 1,00,58,343.75</u>

Note 1: Accordingly, interest cost will be ₹ 14,33,250 cost of factoring will be ₹ 28,33,250. Therefore, Rate of effective cost of factoring is 9.913%

Note 2: Alternatively, if redundancy cost is taken as irrelevant for decision making, then Net Annual cost to the Firm will be ₹ 9,47,062.5 and Rate of effective cost of factoring will be ₹ 9,47,062.5/ ₹ 1,00,58,343.75 × 100 = 9.416%.

Advice: Since the rate of effective cost of factoring is less than the existing cost of capital, therefore, the proposal is acceptable.

Q. 15

Sukrut Limited has annual credit sales of ₹ 75,00,000/-. Actual credit terms are 30 days, but its management of receivables has been poor, and the average collection period is about 60 days. Bad debt is 1 per cent of total sales.

A factor has offered to take over the task of debt administration and credit checking, at an annual fee of 1.5 per cent of credit sales.

Sukrut Limited estimates that it would save ₹ 45,000 per year in administration costs as a result. Due to the efficiency of the factor, the average collection period would come back to the original credit offered of 30 days and bad debts would come to 0.5% on recourse basis.

The factor would pay net advance of 80 percent to the company at an annual interest rate of 12 per cent after withholding a reserve of 10%. Sukrut Limited is currently financing its receivables from an overdraft costing 10 per cent per year and will continue to finance the balance fund needed (which is not financed by factor) through the overdraft facility.

If occurrence of credit sales is throughout the year, COMPUTE whether the factor's services should be accepted or rejected. Assume 360 days in a year.



Ans. Evaluation of Factoring Proposal -

	PARTICULARS	₹	₹
(A)	Savings (Benefit) to the firm		
	Administration Cost	45,000	45,000
	Bad Debts Cost (On Recourse basis)		
	In House - 75 lakhs X 1%		
	Factoring - 75 lakhs X 0.5%		
	Net Savings in bad debts cost	(75 lakhs X 0.5%)	37,500
	Cost of Carrying Debtors Cost	(WN - 1)	1,06,750
	TOTAL		1,89,250
(B)	Cost to the Firm:		
	Factor Commission [Annual credit Sales × % of Commission]	75 lakhs X 1.5%	1,12,500
	Interest Cost on Net advances	(See WN - 1)	53,100
	TOTAL		1,65,600
(C)	Net Benefits to the Firm (A - B)		23,650

Advice: Since the savings to the firm exceed the cost due to factoring, the proposal is acceptable.

WN-1 : Calculation of Savings in Interest Cost of Carrying Debtors

(I) In house Management:

Interest Cost = Credit Sales X Avg Collection Period / 360 X Interest (%) p.a

= 75,00,000 × 60/360 × 10%

= 1,25,000

(II) If Factoring services availed: If factoring services are availed, then Sukrut Limited must raise the funds blocked in receivables to the extent which is not funded by the factor (i.e amount of factor reserve (+) amount of factor commission for 30 days (+) 20% of net advances)

Calculation of Net Advances to the firm -

Debtors = 75 lakhs × 30/360 = 6,25,000

(-) Factor Reserve = 10% of above = (62,500)

(-) Factor Commission = 1.5% of Debtors = (9,375)

Net Advance = 5,53,125

Advance from Factor = 5,53,125 × 80% = 4,42,500

Int cost on Advance from Factor = 4,42,500 × 12% = 53,100

Now, the amount that is not funded by the factor (6,25,000 - 4,42,500) needs to be funded by Sukrut Limited from overdraft facility at 10%

Therefore, Int cost on Overdraft (Cost of carrying debtors)

= 1,82,500 × 10% = 18,250

Net Savings in Interest Cost of Carrying Debtors = 1,25,000 (-) 18,250 = 1,06,750

Q.16

MTP Sept 24 (1)



The financial statements of Gurunath Ltd is furnished below -

Balance Sheet as at 31st March

Particulars as at 31st March		Note	₹
I	EQUITY AND LIABILITIES:		
(1)	Shareholders' Funds:		10,00,000
(2)	Non-Current Liabilities: 10% Debt		6,00,000
(3)	Current Liabilities		1,56,000
	Total		17,56,000
II	ASSETS		
(1)	Non-Current Assets		16,56,000
(2)	Current Assets - Trade Receivables		1,00,000
	Total		17,56,000

Additional Information:

- The existing credit terms are 1/10, net 45 days and average collection period is 30 days. The current bad debts loss is 1.5%. In order to accelerate the collection process further as also to increase sales, the company is contemplating liberalization of its existing credit terms to 2/10, net 45 days.
- It is expected that sales are likely to increase by 1/3 of existing sales, bad debts increase to 2% of sales and average collection period to decline to 20 days.
- Credit period allowed by the supplier is 60 days. Generally, operating expenses are paid 2 months in arrears. Total Variable expenses of the company constitute Purchases of stock in trade and operating expenses only.
- Opportunity cost of investment in receivables is 15%. 50% and 80% of customers in terms of sales revenue are expected to avail cash discount under existing and liberalization scheme respectively. The tax rate is 30%.
- The Company considers only the relevant or variable costs for calculating the opportunity costs on the funds blocked in receivables. Assume 360 days in a year and 30 days in a month.

Should the company change its credit terms?

Ans.

Particulars	Result
Current liabilities	1,56,000
Total Variable expenses = Purchases & Operating Expenses	$1,56,000 \div 60 \times 360 = 9,36,000$
Variable expenses % of Sales	$9,36,000 \div 12,00,000 \times 100 = 78\%$

Particulars	Present	Proposed
1. Sales	$1 \text{ Lakh} \div 30 \times 360$ = 12,00,000	12 Lakhs + 1/3rd = 16,00,000
2. Variable Cost at 78%	9,36,000	12,48,000
3. Cash Discount	$12 \text{ Lakh} \times 50\% \times 1\%$ = 6,000	$16 \text{ Lakh} \times 80\% \times 2\%$ = 25,600
4. Bad debts	$12 \text{ Lakh} \times 1.5\%$ = 18,000	$16 \text{ Lakh} \times 2\%$ = 32,000
5. Profit before Tax	2,40,000	2,94,400
6. Tax @ 30%	72,000	88,320



7. Profit after Tax	1,68,000	2,06,080
8. Opportunity Cost of Invest. in Debtors	$9,36,000 \times 30/360 \times 70\% \times 15\% = 8,190$	$12,48,000 \times 20/360 \times 70\% \times 15\% = 7,280$
9. Net Benefit	1,59,810	1,98,800

Advise: Proposed policy should be adopted since the net benefit is increased by $(\text{₹ } 1,98,800 - 1,59,810) = \text{₹ } 38,990$.

Q. 17

MTP Jan25 (1)



Zomo Ltd. currently has a turnover of ₹ 120 lakhs, 75% of which is on credit. The variable cost ratio is 80%, and the credit terms offered are 2/10, net 30. On the current sales volume, the bad debts are 1%, and the company spends

₹ 1,20,000 annually on administering its credit sales, including staff salaries for credit checking and collection. These costs are avoidable.

In addition:

- 60% of customers avail of the 2% cash discount, and the remaining customers take 60 days on average to pay after the date of sale.
- The book debts are financed by a mix of bank borrowings and owned funds in a 1:1 ratio, with annual costs of 15% and 14%, respectively.

However, Zomo Ltd. is also considering dynamic discounting for its cash customers, which might incentivize more customers to pay earlier by increasing the discount rate. This could lead to a potential reduction in bad debts to 0.8% but may also increase the cost of the discount offered to 2.5%.

A factoring firm has proposed a deal with the following terms: (i) Factor reserve: 12% (ii) Guaranteed payment: 25 days (iii) Interest charges: 15% (iv) Commission: 4% of receivables.

In addition, the company also has the option to extend the credit period for its remaining customers (who do not avail of the discount) to 75 days, which might increase sales by 10% but could result in an increase in bad debts to 1.5%.

Given:

1. The cost of funds is expected to rise to 16% next year.
2. Zomo Ltd. plans to introduce late payment penalties (for customers who take more than 60 days) at 5% of outstanding receivables after 60 days.

Assume a 360-day year.

Required:

- SHOULD Zomo Ltd. opt for dynamic discounting or the factoring firm's offer?
- ANALYZE the impact of extending the credit period on the company's finances.

COMPARE all options and RECOMMEND whether to continue with in-house management, dynamic discounting, or accept the factoring firm's offer.

Ans.

1. In-House Management of Receivables (With Dynamic Discounting) Particulars:

1. **Cash Discount Cost:**

- Revised discount rate: 2.5%
- 60% of customers avail discount.
- Cost of Discount: $\text{₹ } 90,00,000 \times 60\% \times 2.5\% = \text{₹ } 1,35,000$

2. **Bad Debts (Reduced to 0.8% due to dynamic discounting):**

- $\text{₹ } 90,00,000 \times 0.8\% = \text{₹ } 72,000$

3. **Administration Cost: ₹ 1,20,000**

4. **Cost of Financing Receivables:**

- Working Note 1 (Average Collection Period): $(10 \text{ days} \times 60\%) + (60 \text{ days} \times 40\%) = 30 \text{ days}$

- Working Note 2 (Average Receivables): ₹ 90,00,000 × (30/360) = ₹ 7,50,000
- Working Note 3 (Cost of Financing):
 - Cost of Bank Funds: ₹ 7,50,000 × 1/2 × 15% = ₹ 56,250
 - Cost of Owned Funds: ₹ 7,50,000 × 1/2 × 14% = ₹ 52,500
 - **Total Cost of Financing Receivables: ₹ 1,08,750**

Total Cost with In-House Receivables Management and Dynamic Discounting:

Particulars	Amount (₹)
Cash Discount (₹ 90,00,000 × 60% × 2.5%)	1,35,000
Bad Debts (₹ 90,00,000 × 0.8%)	72,000
Admin Cost	1,20,000
Cost of Financing Receivables	1,08,750
Total Cost (In-House with Dynamic Discounting):	4,35,750

2. Factoring Firm's Offer: Particulars:

1. **Factoring Commission:** ₹ 90,00,000 × 4% = ₹ 3,60,000
2. **Interest Charges on Receivables: Factor Reserve:** 12%, so financing on 88% of receivables.
Interest for 25 days: (₹ 90,00,000 - 3,60,000) × 88% × 15% × (25/360) = ₹ 79,200
3. **Cost of Owned Funds (Receivables not factored):** ₹ 13,96,800 × 14% × (25/360) = ₹ 13,580
Owned Funds: (₹ 90,00,000 - 3,60,000) × 12% + 3,60,000 = ₹ 13,96,800

Total Cost with Factoring Firm:

Particulars	Amount (₹)
Factoring Commission (₹ 90,00,000 × 4%)	3,60,000
Interest Charges on Receivables	79,200
Cost of Owned Funds	13,580
Total Cost with Factoring:	4,52,780

3. Impact of Extending Credit Period:

If Zomo Ltd. extends the credit period to 75 days:

- Sales increase: 10% of ₹ 120,00,000 = ₹ 12,00,000
New total turnover = ₹ 120,00,000 + ₹ 12,00,000 = ₹ 1,32,00,000
Credit Sales (75%) = ₹ 99,00,000
 - Increased Bad Debts (1.5%): ₹ 99,00,000 × 1.5% = ₹ 1,48,500
 - Late Payment Penalty: Customers delaying beyond 60 days (40%):
₹ 99,00,000 × 40% × 5% = ₹ 1,98,000
- A. **Cash Discount Cost:**
 - Discount rate: 2% (since there's no mention of dynamic discounting in this case)
 - Percentage of customers availing discount: 60%
 - Calculation: ₹ 99,00,000 × 60% × 2% = ₹ 1,18,800
 - B. **Bad Debts (Increased to 1.5%):**
 - Calculation: ₹ 99,00,000 × 1.5% = ₹ 1,48,500
 - C. **Administration Costs (Remains the same):**
 - The administration cost stays fixed at ₹ 1,20,000, as no change in admin structure is mentioned.
 - D. **Cost of Financing Receivables (Based on the new extended credit period):**
 - **Working Note 1 (Average Collection Period):** Credit period has been extended to 75 days for customers who don't take the discount (40% of customers).
 - Revised Average Collection Period: (10 days × 60%) + (75 days × 40%) = 36 days
 - **Working Note 2 (Average Receivables):** ₹ 99,00,000 × (36/360) = ₹ 9,90,000

- **Working Note 3 (Cost of Financing Receivables):**
 - Cost of Bank Funds (15%): ₹ 9,90,000 × 1/2 × 15% = ₹ 74,250
 - Cost of Owned Funds (14%): ₹ 9,90,000 × 1/2 × 14% = ₹ 69,300
 - Total Cost of Financing Receivables: ₹ 74,250 + ₹ 69,300 = ₹ 1,43,550

Revised Bad Debts after Penalty:

- **Bad debts before penalty:** ₹ 1,48,500
- **Penalty earned:** ₹ 1,98,000
- **Net effect on bad debts:** ₹ 1,48,500 - ₹ 1,98,000 = (-₹ 49,500) (Zomo Ltd. would effectively earn ₹ 49,500 from penalties, reducing bad debt cost.)

4. Total Cost Calculation:

Now, summing up all the components:

Particulars	Amount (₹)
Cash Discount (₹ 99,00,000 × 60% × 2%)	1,18,800
Net Bad Debts after Penalty (-₹ 49,500)	-49,500
Administration Costs	1,20,000
Cost of Financing Receivables	1,43,550
Total Cost (In-House with Extended Credit Period)	₹ 3,32,850

5. Final Decision:

Option	Total Cost (₹)
In-House with Dynamic Discounting	4,35,750
Factoring Firm's Offer	4,52,780
In-House with Extended Credit Period	3,32,850

Recommendation: Zomo Ltd. should extend the credit period and continue in-house management. This option will not only reduce costs (due to lower bad debts offset by penalties) but also increase sales by 10%. Factoring is the least beneficial due to its high commission charges, and dynamic discounting offers only marginal savings compared to the credit extension option.

Q.18

MTP SEP 25 (2)



Oggy Limited has a current credit sales of ₹ 7,20,000. It is considering revising its credit policy. The proposed terms of credit will be "2/10, net 30" against the present policy of "net 30".

As a result, Oggy Limited's credit sales are expected to increase by ₹ 20,000 and the average collection period will reduce from 30 days to 20 days. It is also expected that 50 percent of the customers will take the discounts and pay on the 10th day and rest of the customers will pay on the 30th day. Bad debt losses will remain at 2 percent of sales. The variable cost ratio is 70 percent.

Its corporate tax rate is 50 percent and opportunity cost of investment in receivables is 10 percent.

ADVISE whether Oggy Limited should change its credit period?

Ans.

Advise to Oggy Limited regarding Change in Credit Policy

Particulars	(₹)
Current Credit Sales	7,20,000

Increase in Credit Sales	20,000
New Level of Credit Sales	7,40,000
Current Average Collection Period (Days)	30
New Average Collection Period (Days)	20
Current Level of Receivables $\left(₹ 7,20,000 \times \frac{30}{360} \right)$	60,000
New Level of Receivables $\left(₹ 7,40,000 \times \frac{20}{360} \right)$	41,111
Cash Discount	2%
Discount Period (Days)	10
Percentage of Customers Taking Discount	50%
Bad Debt Losses	2%
Variable Cost	70%
Corporate Tax Rate	50%
Opportunity Cost of Capital	10%
(A) Increased Credit Sales	20,000
(B) Contribution from Increased Credit Sales $[A \times (1-0.70)]$	6,000
(C) Bad Debt Loss $[A \times 2\%]$	400
(D) Cost of Cash Discount $[₹ 740,000 \times 0.02 \times 0.5]$	7,400
(E) After-tax Profit $[(B - C - D) \times (1-0.5)]$	(900)
(F) Decrease in Receivable Investment $[₹ 41,111 - ₹ 60,000]$	(18,889)
(G) Expected Return (E/F)	4.8%
(H) Net Gain % $[10\% - G]$	5.2%

Therefore, Oggy Limited should change the credit policy because it results in net gain of 5.2%.

Q. 19

RTP SEP 2025

A firm has a total sale 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 1.5% 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.

- DETERMINE the effective cost of factoring? Consider year as 360 days.
- If bank finance for working capital is available at 12% interest, ADVISE, should the firm avail of factoring service

Ans.

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 $[(40 \times 0.5) + (120 \times 0.5)]$	80 days
Average level of Receivables $(₹ 1,60,00,000 \times 80/360)$	₹ 35,55,556
Factoring Commission $(₹ 35,55,556 \times 2/100)$	₹ 71,111
Factoring Reserve $(₹ 35,55,556 \times 10/100)$	₹ 3,55,556

Amount available for advance {₹ 35,55,556 - (3,55,556 + 71,111)}	₹ 31,28,889
<ul style="list-style-type: none"> Factor will deduct his interest @ 18%: Interest = $\frac{₹ 31,28,889 \times 18 \times 80}{100 \times 360}$ 	₹ 1,25,156
<ul style="list-style-type: none"> 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)	<u>5,63,200</u>
	Total	<u>8,83,200</u>
B.	Firm's Savings on taking Factoring Service:	₹
	Cost of credit administration saved	2,40,000
	Bad Debts (₹ 160,00,000 × 1.5/100) avoided	<u>2,40,000</u>
	Total	<u>4,80,000</u>
C.	Net Cost to the firm (A - B) (₹ 8,83,200 - ₹ 4,80,000)	<u>4,03,200</u>

$$\text{Effective cost of factoring} = \frac{₹ 4,03,200}{₹ 30,03,733} \times 100 = 13.42\%$$

* If cost of factoring is calculated on the basis of total amount available for advance, then, it will be =

$$\frac{₹ 4,03,200}{₹ 31,28,889} \times 100 = 12.89\%$$

- (ii) If Bank finance for working capital is available at 12%, firm will not avail factoring service as 12% is less than 13.42% (or 12.89%)

Q. 20

The sales manager of AB Limited suggests that if credit period is given for 1.5 months then sales may likely to increase by ₹1,20,000 per annum. Cost of sales amounted to 90% of sales. The risk of non payment is 5%. Income tax rate is 30%. The expected return on investment is ₹3,375 (after tax).

Should the company accept the suggestion of sales manager?

Ans.

Statement of Evaluation

Particulars		₹
	Increase in sales	1,20,000
	Less: Cost of sales @ 90%	1,08,000
	Profit before cost of credit	12,000
	Less: Risk of non payments @ 5%	6,000
	Expected PBT	6,000
	Less: Tax @ 30%	1,800
	Expected PAT	4,200
	Less: Required return after tax	3,375
	Net Benefit	825

Conclusion:

Since company has positive benefit after fulfillment of required return from investment in debtors, Suggestion of the sales manager should be accepted.

Q.21



ABC Ltd has been offered credit terms from its major supplier 2/10 net 45. If ABC Ltd. can invest the additional cash and can obtain an annual return of 25% per annum and the amount of invoice is ₹10,000. Should ABC Ltd accept the discount offer?

Ans.

Statement of Evaluation of Discount Offer

Particulars	Refuse	Accept
Payment to supplier	10,000	9,800
Less: Return from investing ₹9,800 between day 10 and day 45 (₹9,800 × 35/365 × 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.

Q.22



A Ltd. is in manufacturing business and it acquires raw material from X Ltd. on a regular basis. As per the terms of agreement the payment must be made within 40 days of purchase. However, A Ltd. has a choice of paying ₹98.50 per ₹100 it owes to X Ltd. on or before 10th day of purchase. Examine whether A Ltd. should accept the offer of discount assuming average billing of A Ltd. is ₹10,00,000 and an alternative investment yield a return of 15% and company pays the invoice.

Ans.

Statement of Evaluation of Discount Offer

Particulars	Refuse	Accept
Payment to supplier	10,00,000	9,85,000
Less: Return from investing ₹9,85,000 between day 10 and day 40 (₹9,85,000 × 30/365 × 15%)	(12,144)	-
Net Cost	9,87,856	9,85,000

Advise: Thus it is cheaper for the company to accept the discount.

Q.23



A company offers standard credit terms of 60 days net. Its cost of short term borrowings is 16% per annum. Determine whether a 2.5% discount should be offered for payment within 7 days to customers who would normally pay after (i) 60 days (ii) 80 days, and (iii) 105 days.

Ans.

This cost of using a discount to obtain funds and improve liquidity should be compared with alternative sources of finance. If the cost of short term borrowings is 16%, then cost of discount offer must be less than this, otherwise discount need not be offered. A customer who is paying after 60, 80 or 105 days involves a cost @ 16% per annum for the respective period.

If the firm offers a discount @ 2.5% for payment within 7 days, then it means that 97.5% of the fund will be available for 53 days, 73 days and 98 days respectively. The percentage cost of getting funds for respective period is ₹2.50/₹97.50.

However, the annual percentage cost of the discount in each case is the discount should be offered to customers who would have paid after 80 or 105 days, and not to those who would have paid after 60 days. The reason is being that the cost of funds is 16% and the customers who would have paid after 60 days, would inflict a cost of 17.66% if the discount terms are offered to them.

9 CHAPTER

WORKING CAPITAL

Q.1

Balance Sheet & W.Cap required

RTP Nov 23



Consider the following figures and ratios:

(i) Sales for the year (all credit)	₹ 1,05,00,000
(ii) Gross Profit ratio	35 percent
(iii) Fixed assets turnover (based on cost of goods sold)	1.5
(iv) Stock turnover (based on cost of goods sold)	6
(v) Liquid ratio	1.5:1
(vi) Current ratio	2.5:1
(vii) Receivables (Debtors) collection period	1 month
(viii) Reserves and surplus to Share capital	1:1.5
(ix) Capital gearing ratio	0.7875
(x) Fixed assets to net worth	1.3 : 1

You are required to PREPARE:

- Balance Sheet as on 31/3/2022 based on above details.
- The statement showing working capital requirement if the company wants to make a provision for contingencies @ 14 percent of net working capital.

Ans

Working Notes:

- $$\begin{aligned} \text{Cost of Goods Sold} &= \text{Sales} - \text{Gross Profit (35\% of Sales)} \\ &= ₹ 1,05,00,000 - ₹ 36,75,000 \\ &= ₹ 68,25,000 \end{aligned}$$
- $$\begin{aligned} \text{Closing Stock} &= \frac{\text{Cost of Goods Sold}}{\text{Stock Turnover}} \\ &= \frac{68,25,000}{6} = ₹ 11,37,500 \end{aligned}$$
- $$\begin{aligned} \text{Fixed Assets} &= \frac{\text{Cost of Goods Sold}}{\text{Fixed Assets Turnover}} \\ &= \frac{68,25,000}{1.5} \\ &= ₹ 45,50,000 \end{aligned}$$
- Current Assets:

$$\begin{aligned} \text{Current Ratio} &= 2.5 \text{ and Liquid Ratio} = 1.5 \\ \text{Inventories (Stock)} &= 2.5 - 1.5 = 1 \\ \text{Current Assets} &= \text{Amount of Inventories (Stock)} \times \frac{2.5}{1} \\ &= ₹ 11,37,500 \times \frac{2.5}{1} = ₹ 28,43,750 \end{aligned}$$
- Liquid Assets (Receivables and Cash)

$$\begin{aligned} &= \text{Current Assets} - \text{Inventories (Stock)} \\ &= ₹ 28,43,750 - ₹ 11,37,500 \\ &= ₹ 17,06,250 \end{aligned}$$
- $$\begin{aligned} \text{Receivables (Debtors)} &= \text{Sales} \times \frac{\text{Debtors Collection period}}{12} \\ &= ₹ 1,05,00,000 \times \frac{1}{12} \\ &= ₹ 8,75,000 \end{aligned}$$
- Cash = Liquid Assets - Receivables (Debtors)



- $= ₹ 17,06,250 - ₹ 8,75,000 = ₹ 8,31,250$
 (viii) Net worth $= \frac{\text{Fixed Assets}}{1.3}$
 $= \frac{45,50,000}{1.3} = ₹ 35,00,000$
 (ix) Reserves and Surplus
 Reserves and Share Capital = Net worth
 Net worth $= 1 + 1.5 = 2.5$
 Reserves and Surplus $= ₹ 35,00,000 \times \frac{1}{2.5}$
 $= ₹ 14,00,000$
 (x) Share Capital = Net worth - Reserves and Surplus
 $= ₹ 35,00,000 - ₹ 14,00,000$
 $= ₹ 21,00,000$
 (xi) Current Liabilities = Current Assets / Current Ratio
 $= \frac{28,43,750}{2.5} = ₹ 11,37,500$
 (xii) Long-term Debts
 Capital Gearing Ratio = Long-term Debts / Equity Shareholders' Fund
 Long-term Debts $= ₹ 35,00,000 \times 0.7875 = ₹ 27,56,250$

(a) **Balance Sheet**

Particulars	Figures as at 31-03-2022 (₹)	Figures as at 31-03-2021 (₹)
I. EQUITY AND LIABILITIES		
Shareholders' funds		
(a) Share capital	21,00,000	-
(b) Reserves and surplus	14,00,000	-
Non-current liabilities		
(a) Long-term borrowings	27,56,250	-
Current liabilities	11,37,500	-
TOTAL	73,93,750	-
II. ASSETS		
Non-current assets		
Fixed assets	45,50,000	-
Current assets		
Inventories	11,37,500	-
Trade receivables	8,75,000	-
Cash and cash equivalents	8,31,250	-
TOTAL	73,93,750	-

(b) **Statement Showing Working Capital Requirement**

Particulars	(₹)	(₹)
A. Current Assets		
(i) Inventories (Stocks)		11,37,500
(ii) Receivables (Debtors)		8,75,000
(iii) Cash in hand & at bank		8,31,250

Total Current Assets		28,43,750
B. Current Liabilities:		
Total Current Liabilities		
Net Working Capital (A - B)		17,06,250
Add: Provision for contingencies (14% of Net Working Capital)		2,38,875
Working capital requirement		19,45,125

Q.2

Max. Bank Finance

RTP May 23



Kalyan limited has provided you the following information for the year 2021-22:

By working at 60% of its capacity the company was able to generate sales of ₹ 72,00,000. Direct labour cost per unit amounted to ₹ 20 per unit. Direct material cost per unit was 40% of the selling price per unit. Selling price was 3 times the direct labour cost per unit. Profit margin was 25% on the total cost. For the year 2022-23, the company makes the following estimates:

Production and sales will increase to 90% of its capacity. Raw material per unit price will remain unchanged. Direct expense per unit will increase by 50%. Direct labour per unit will increase by 10%. Despite the fluctuations in the cost structure, the company wants to maintain the same profit margin on sales.

Raw materials will be in stock for one month whereas finished goods will remain in stock for two months. Production cycle is for 2 months. Credit period allowed by suppliers is 2 months. Sales are made to three zones:

Zone	Percentage of sale	Mode of Credit
A	50%	Credit period of 2 months
B	30%	Credit period of 3 months
C	20%	Cash Sales

There are no cash purchases and cash balance will be ₹ 1,11,000

The company plans to apply for a working capital financing from bank for the year 2022-23. ESTIMATE Net Working Capital of the Company receivables to be taken on sales and also COMPUTE the maximum permissible bank finance for the company using 3 criteria of Tandon Committee Norms. (Assume stock of finished goods to be a core current asset)

Ans

Cost Structure

Particulars	Calculations	2021-22		2022-23		
		P.U.	Amount (p.u. X units)	Calculations	P.U.	Amount (p.u. X units)
Direct Material	40% of SP	₹24	₹28,80,000	Same as PY	₹24	₹43,20,000
Direct labour	Given	₹20	₹24,00,000	20*1.1	₹22	₹39,60,000
Direct Expenses	bal. fig.	₹4	₹4,80,000	4*1.5	₹6	₹10,80,000
Total Cost	SP - Profit	₹48	₹57,60,000		₹52	₹93,60,000
Profit	(SP/125x25)	₹12	₹14,40,000	52*25%	₹13	₹23,40,000
Sales	3 x Direct Labour p.u.	₹60	₹72,00,000		₹65	₹1,17,00,000
*units=			₹72,00,000/ ₹60 =1,20,000			1,20,000/60 x90 =1,80,000



Operating Cycle

Raw material holding period	1 months
Finished Goods holding period	2 months
WIP conversion period	2 months
Creditor Payment Period	2 months
Receiveable collection Period	2/3 months

Estimation of Working Capital

Particulars	Calculation	Amount
Current Assets		
Stock of Raw Material	$43,20,000 \times 1/12$	₹3,60,000
RM cost	₹43,20,000	
Labour cost	₹19,80,000	
Direct Exp cost	₹5,40,000	
Total WIP Cost	₹68,40,000	
Stock of WIP	$68,40,000 \times 2/12$	₹11,40,000
Stock of Finished Goods	$93,60,000 \times 2/12$	₹15,60,000
Receivables (on sales)		
A	$1,17,00,000 \times 50\% \times 2/12$	₹9,75,000
B	$1,17,00,000 \times 30\% \times 3/12$	₹8,77,500
C	NIL	-
Cash Balance	Given	₹1,11,000
Total Current Assets		₹ 50,23,500
Current Liabilities		
Payables	$* ₹44,40,000 \times 2/12$	₹7,40,000
Net Working Capital		₹ 42,83,500

Opening RM stock = $28,80,000 \times 1/12 = ₹2,40,000$

* RM purchased = RM consumed - Opening Stock + Closing Stock
 = $₹43,20,000 - ₹2,40,000 + ₹3,60,000 = ₹44,40,000$

Computation of Maximum Permissible Bank Finance

Method	Formula	Calculation	₹
I	$75\% \times (\text{Current Assets} - \text{Current Liabilities})$	$75\% \times (₹50,23,500 - ₹7,40,000)$	₹32,12,625
I	$75\% \times \text{Current Assets} - \text{Current Liabilities}$	$75\% \times ₹50,23,500 - ₹7,40,000$	₹30,27,625
II	$75\% \times (\text{Current Assets} - \text{Core CA}) - \text{Current Liabilities}$	$75\% \times (₹50,23,500 - ₹7,40,000)$	₹18,57,625

Q.3

Maximum Bank Finance

MTP Nov 18(2)



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	Rs. 80 per unit
Direct wages	Rs. 30 per unit
Overheads (exclusive of depreciation)	Rs. 60 per unit
Total cost	Rs. 170 per unit
Selling price	Rs. 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 $1\frac{1}{2}$ weeks

Cash at banks (for smooth operation) is expected to be Rs.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.

CALCULATE

- Net Working Capital required;
- Maximum Permissible Bank finance under first and second methods of financing as per Tandon Committee Norms.

Ans

(i) Estimate of the Requirement of Working Capital

	(Rs.)	(Rs.)
A. Current Assets:		
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) Debtors/ Receivables (Refer to Working note 5) Cash and Bank balance	13,60,000 29,53,846 <u>25,000</u>	55,03,461
B. Current Liabilities:		
Creditors for raw materials (Refer to Working note 6) Creditors for wages (Refer to Working note 7)	7,15,740 <u>91,731</u>	(8,07,471)
Net Working Capital (A-B)		<u>46,95,990</u>

(ii) The maximum permissible bank finance as per Tandon Committee Norms

First Method:

75% of the net working capital financed by bank i.e. 75% of Rs.46,95,990 (Refer to (i) above)

= Rs. 35,21,993

Second Method:

(75% of Current Assets) - Current liabilities

= 75% of Rs. 55,03,461 - Rs. 8,07,471 (Refer to (i) above)

= Rs. 41,27,596 - Rs. 8,07,471

= Rs. 33,20,125

Working Notes:

1. Annual cost of production

Rs.



Raw material requirements (1,04,000 units x Rs. 80)	83,20,000
Direct wages (1,04,000 units x Rs. 30)	31,20,000
Overheads (exclusive of depreciation) (1,04,000 x Rs. 60)	<u>62,40,000</u>
	<u>1,76,80,000</u>

2. Work in progress stock

	Rs.
Raw material requirements (4,000 units x Rs. 80)	3,20,000
Direct wages (50% x 4,000 units x Rs. 30)	60,000
Overheads (50% x 4,000 units x Rs.60)	<u>1,20,000</u>
	<u>5,00,000</u>

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:

	Rs.
For Finished goods	83,20,000
For Work in progress	<u>3,20,000</u>
	<u>86,40,000</u>

Raw material stock $\frac{86,40,000}{52 \text{ weeks}} \times 4 \text{ weeks}$ i.e. Rs. 6,64,615

4. Finished goods stock

8,000 units @ Rs. 170 per unit = Rs. 13,60,000

5. Debtors for sale

Credit allowed to debtors	Average 8 weeks
Credit sales for year (52 weeks) i.e. (1,04,000 units-8,000 units)	96,000 units
Selling price per unit	Rs.200
Credit sales for the year (96,000 units XRs. 200)	Rs. 1,92,00,000

Debtors $\frac{1,92,00,000}{52 \text{ weeks}} \times 8 \text{ weeks}$ i.e. Rs. 29,53,846

(Debtor can also be calculated based on Cost of goods sold)

6. Creditors for raw material:

Credit allowed by suppliers	Average 4 weeks
Purchases during the year (52 weeks) i.e. (Rs. 83,20,000 + Rs. 3,20,000 + Rs. 6,64,615) (Refer to Working notes 1,2 and 3 above)	Rs. 93,04,615

Creditors $\frac{93,04,615}{52 \text{ weeks}} \times 4 \text{ weeks}$ i.e. Rs. 7,15,740

7. Creditors for wages

Lag in payment of wages Average $1\frac{1}{2}$ weeks

Direct wages for the year (52 weeks) i.e. Rs. 31,80,000

(Rs. 31,20,000 + Rs. 60,000)

(Refer to Working notes 1 and 2 above)

Creditors Rs. $\frac{31,80,000}{52 \text{ weeks}} \times 1\frac{1}{2} \text{ weeks}$ i.e. Rs. 91,731

Q.4

Net Working Capital

PY May 18



Day Ltd., a newly formed company has applied to the Private 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	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.

Ans

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:

$$24,000 \text{ units @ ₹ (40+15+30) per unit} = ₹20,40,000$$

$$\text{(v) Debtors for sale: } ₹ 6,12,000 \times \frac{60 \text{ days}}{360\text{days}} = ₹1,02,000$$

(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:

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

Q.5

Operating Cycle

PY Jan 21



The following information is provided by MNP Ltd. for the year ending 31st March, 2020:

Raw Material Storage period

45 days

Work-in-Progress conversion period	20 days
Finished Goods storage period	25 days
Debt Collection period	30 days
Creditors payment period	60 days
Annual Operating Cost	₹ 25,00,000
(Including Depreciation of ₹ 2,50,000)	

Assume 360 days in a year. You are required to calculate:

- Operating Cycle period
- Number of Operating Cycle in a year.
- Amount of working capital required for the company on a cost basis.
- The company is a market leader in its product and it has no competitor in the market. Based on a market survey it is planning to discontinue sales on credit and deliver products based on pre-payments in order to reduce its working capital requirement substantially. You are required to compute the reduction in working capital requirement in such a scenario.

Ans

- (i) Calculation of Operating Cycle Period:

$$\begin{aligned} \text{Operating Cycle Period} &= R + W + F + D - C \\ &= 45 + 20 + 25 + 30 - 60 = 60 \text{ days} \end{aligned}$$

- (ii) Number of Operating Cycle in a Year

$$= \frac{360}{\text{Operating cycle period}} = \frac{360}{60} = 6$$

- (iii) Amount of Working Capital Required

$$\begin{aligned} &= \frac{\text{Annual operating cost}}{\text{Number of operating cycle}} = \frac{25,00,000 - 2,50,000}{6} \\ &= \frac{22,50,000}{6} = ₹ 3,75,000 \end{aligned}$$

- (iv) Reduction in Working Capital

$$\begin{aligned} \text{Operating Cycle Period} &= R + W + F - C \\ &= 45 + 20 + 25 - 60 = 30 \text{ days} \end{aligned}$$

$$\text{Amount of Working Capital Required} = \frac{22,50,000}{360} \times 30 = ₹ 1,87,500$$

$$\text{Reduction in Working Capital} = ₹ 3,75,000 - ₹ 1,87,500 = ₹ 1,87,500$$

Note: If we use Total Cost basis, then amount of Working Capital required will be ₹ 4,16,666.67 (approx.) and Reduction in Working Capital will be ₹ 2,08,333.33 (approx.)

Q.6

Operating Cycle

RTP May 18



Following information is forecasted by the Puja Limited for the year ending 31st March, 20X8:

	Balance as at 1st April, 20X7(₹)	Balance as at 31st March, 20X8(₹)
Raw Material	45,000	65,356
Work-in-progress	35,000	51,300
Finished goods	60,181	70,175
Debtors	1,12,123	1,35,000
Creditors	50,079	70,469
Annual purchases of raw material (all credit)		4,00,000
Annual cost of production		7,50,000
Annual cost of goods sold		9,15,000
Annual operating cost		9,50,000
Annual sales (all credit)		11,00,000

You may take one year as equal to 365 days.

Required:



CALCULATE

- (i) Net operating cycle period.
- (ii) Number of operating cycles in the year.
- (iii) Amount of working capital requirement using operating cycles.

Ans

Working Notes:

1. Raw Material Storage Period (R)

$$= \frac{\text{Average Stock of Raw Material}}{\text{Annual Consumption of Raw Material}} \times 365$$

$$= \frac{45,000 + 65,356}{2} \div 3,79,644 \times 365$$

$$= 53 \text{ days.}$$

$$\text{Annual Consumption of Raw Material} = \text{Opening Stock} + \text{Purchases} - \text{Closing Stock}$$

$$= ₹ 45,000 + ₹ 4,00,000 - ₹ 65,356$$

$$= ₹ 3,79,644$$

2. Work-in-Progress (WIP) Conversion Period (W)

$$\text{WIP Conversion Period} = \frac{\text{Average Stock of WIP}}{\text{Annual Cost of Production}} \times 365$$

$$= \frac{35,000 + 51,300}{2} \div 7,50,000 \times 365$$

$$= 21 \text{ days}$$

3. Finished Stock Storage Period (F)

$$= \frac{\text{Average Stock of Finished Goods}}{\text{Cost of Goods Sold}} \times 365$$

$$= \frac{65,178}{9,15,000} \times 365 = 26 \text{ days.}$$

$$\text{Average Stock} = \frac{60,181 + 70,175}{2}$$

$$= ₹ 65,178.$$

4. Debtors Collection Period (D)

$$= \frac{\text{Average Debtors}}{\text{Annual Credit Sales}} \times 365$$

$$= \frac{1,12,123.50}{11,00,000} \times 365$$

$$= 41 \text{ days}$$

$$\text{Average debtors} = \frac{1,12,123 + 1,35,000}{2} = 1,23,561.50$$

5. Creditors Payment Period (C)

$$= \frac{\text{Average Creditors}}{\text{Annual Net Credit Purchases}} \times 365$$

$$= \frac{70,469}{4,00,000} \times 365$$

$$= 55 \text{ days}$$

(i) Operating Cycle Period

$$= R + W + F + D - C$$

$$= 53 + 21 + 26 + 41 - 55$$

$$= 86 \text{ days}$$

(ii) Number of Operating Cycles in the Year

$$= \frac{365}{\text{Operating}} = \frac{365}{86} = 4.244$$

(iii) Amount of Working Capital Required

$$= \frac{\text{Annual Operating Cost}}{\text{Number of Operating Cycles}} = \frac{9,50,000}{4.244} = ₹2,23,845.42$$

Q.7

Working Cap Requirement

PY Nov 20



PK Ltd., a manufacturing company, provides the following information:

	(₹)
Sales	1,08,00,000
Raw Material Consumed	27,00,000
Labour Paid	21,60,000
Manufacturing Overhead (Including Depreciation for the year ₹ 3,60,000)	32,40,000
Administrative & Selling Overhead	10,80,000

Additional Information:

- Receivables are allowed 3 months' credit.
- Raw Material Supplier extends 3 months' credit.
- Lag in payment of Labour is 1 month.
- Manufacturing Overhead are paid one month in arrear.
- Administrative & Selling Overhead is paid 1 month advance.
- Inventory holding period of Raw Material & Finished Goods are of 3 months.
- Work-in-Progress is Nil.
- PK Ltd. sells goods at Cost plus 33%.
- Cash Balance ₹ 3,00,000.
- Safety Margin 10%.

You are required to compute the Working Capital Requirements of PK Ltd. on Cash Cost basis.

Ans

Statement showing the requirements of Working Capital (Cash Cost basis)

Particulars	(₹)	(₹)
A. Current Assets:		
Inventory:		
Stock of Raw material (₹ 27,00,000 × 3/12)	6,75,000	
Stock of Finished goods (₹ 77,40,000 × 3/12)	19,35,000	
Receivables (₹ 88,20,000 × 3/12)	22,05,000	
Administrative and Selling Overhead (₹ 10,80,000 × 1/12)	90,000	
Cash in Hand	3,00,000	
Gross Working Capital	52,05,000	52,05,000
B. Current Liabilities:		
Payables for Raw materials* (₹ 27,00,000 × 3/12)	6,75,000	
Outstanding Expenses:		
Wages Expenses (₹ 21,60,000 × 1/12)	1,80,000	
Manufacturing Overhead (₹ 28,80,000 × 1/12)	2,40,000	
Total Current Liabilities	10,95,000	10,95,000
Net Working Capital (A-B)		41,10,000
Add: Safety margin @ 10%		4,11,000
Total Working Capital requirements		45,21,000

**Working Notes:**

(i)

(A) Computation of Annual Cash Cost of Production	(₹)
Raw Material consumed	27,00,000
Wages (Labour paid)	21,60,000
Manufacturing overhead (₹ 32,40,000 - ₹ 3,60,000)	28,80,000
Total cash cost of production	77,40,000
(B) Computation of Annual Cash Cost of Sales	(₹)
Cash cost of production as in (A) above	77,40,000
Administrative & Selling overhead	10,80,000
Total cash cost of sales	88,20,000

*Purchase of Raw material can also be calculated by adjusting Closing Stock and Opening Stock (assumed nil). In that case Purchase will be Raw material consumed +Closing Stock -Opening Stock i.e ₹27,00,000 + ₹6,75,000 - Nil = ₹33,75,000. Accordingly, Total Working Capital requirements (₹ 43,35,375) can be calculated.

Q.8

Working Capital Requirement

PY May 19



Bitra Limited manufactures used in the steel industry. The following information regarding the company is given for your consideration:

- (i) Expected level of production 9000 units per annum.
- (ii) Raw materials are expected to remain in store for an average of two months before issue to production.
- (iii) Work-in-progress (50 percent complete as to conversion cost) will approximate to 1/2 month's production.
- (iv) Finished goods remain in warehouse on an average for one month.
- (v) Credit allowed by suppliers is one month.
- (vi) Two month's credit is normally allowed to debtors.
- (vii) A minimum cash balance of ₹ 67,500 is expected to be maintained.
- (viii) Cash sales are 75 percent less than the credit sales.
- (ix) Safety margin of 20 percent to cover unforeseen contingencies.
- (x) The production pattern is assumed to be even during the year.
- (xi) The cost structure for Bitra Limited's product is as follows:

Raw Materials	80 per unit
Direct Labour	20 per unit
Overheads (including depreciation ₹ 20)	80 per
unit Total Cost	180
per unit Profit	20
per unit Selling Price	200 per unit

You are required to estimate the working capital requirement of Bitra limited.

Ans**Statement showing Estimate of Working Capital Requirement**

	(Amount in ₹)	(Amount in ₹)
A. Current Assets		
(i) Inventories:		

- Raw material inventory $\left(\frac{9,000 \text{ units} \times 80}{12 \text{ months}} \times 2 \text{ months} \right)$		1,20,000
- Work in Progress:		
Raw material $\left(\frac{9,000 \text{ units} \times 20}{12 \text{ months}} \times 0.5 \text{ months} \right)$	30,000	
Wages $\left(\frac{9,000 \text{ units} \times 80}{12 \text{ months}} \times 0.5 \text{ months} \right) \times 50\%$	3,750	
Overheads $\left(\frac{9,000 \text{ units} \times 60}{12 \text{ months}} \times 0.5 \text{ months} \right) \times 50$ (Other than Depreciation)	11,250	45,000
Finished goods (inventory held for 1 months) $\left(\frac{9,000 \text{ units} \times 160}{12 \text{ months}} \times 1 \text{ months} \right)$		1,20,000
(ii) Debtors (for 2 months) $\left(\frac{9,000 \text{ units} \times 160}{12 \text{ months}} \times 2 \text{ months} \right) \times 80\%$ or $\left(\frac{11,52,000}{12 \text{ months}} \times 2 \text{ months} \right)$		1,92,000
(iii) Cash balance expected		67,500
Total Current assets		5,44,500
B. Current Liabilities		
(i) Creditors for Raw material (1 month) $\left(\frac{9,000 \text{ units} \times 80}{12 \text{ months}} \times 1 \text{ months} \right)$		60,000
Total current liabilities		60,000
Net working capital (A - B)		4,84,500
Add: Safety margin of 20 percent		96,900
Working capital Requirement		5,81,400

Working Notes:

- If Credit sales is x then cash sales is x-75% of x i.e. x/4.
Or $x + 0.25x = ₹ 18,00,000$
Or $x = ₹ 14,40,000$
So, credit Sales is ₹ 14,40,000
Hence, Cash cost of credit sales $\left(\frac{14,40,000}{5} \times 4 \right) = ₹ 11,52,000$
- It is assumed that safety margin of 20% is on net working capital.
- No information is given regarding lag in payment of wages, hence ignored assuming it is paid regularly.



4. Debtors/Receivables is calculated based on total cost.

[If Debtors/Receivables is calculated based on sales, then debtors will be

$$\left(\frac{9,000 \text{ units} \times 200}{12 \text{ months}} \times 2 \text{ month} \right) \times 80\% \left(\frac{14,40,000}{12 \text{ months}} \times 2 \text{ month} \right) = ₹2,40,000$$

Then Total Current assets will be ₹ 5,92,500 and accordingly Net working capital and Working capital requirement will be ₹ 5,32,500 and ₹ 6,39,000 respectively].

Q.9

Working Capital Requirement

RTP Nov 22



Trading and Profit and Loss Account of Beat Ltd. for the year ended 31st March, 2022 is given below:

Particulars	Amount (₹)	Amount (₹)	Particulars	Amount (₹)	Amount (₹)
To Opening Stock:			By Sales (Credit)		1,60,00,000
- Raw Materials	14,40,000		By Closing Stock:		
- Work-in-progress	4,80,000		- Raw Materials	16,00,000	
- Finished Goods	20,80,000	40,00,000	- Work-in-progress	8,00,000	
To Purchases (credit)		88,00,000	- Finished Goods	24,00,000	48,00,000
To Wages		24,00,000			
To Production Exp.		16,00,000			
To Gross Profit c/d		40,00,000			
		2,08,00,000			2,08,00,000
To Administration Exp.		14,00,000	By Gross Profit b/d		40,00,000
To Selling Exp.		6,00,000			
To Net Profit		20,00,000			
		40,00,000			40,00,000

The opening and closing payables for raw materials were ₹ 16,00,000 and ₹ 19,20,000 respectively whereas the opening and closing balances of receivables were ₹ 12,00,000 and ₹ 16,00,000 respectively. You are required to ASCERTAIN the working capital requirement by operating cycle method.

Ans

Computation of Operating Cycle

(1) Raw Material Storage Period (R)

$$\begin{aligned} \text{Raw Material Storage Period (R)} &= \frac{\text{Average Stock of Raw Material}}{\text{Daily Average Consumption of Raw material}} \\ &= \frac{(14,40,000 + 16,00,000) / 2}{86,40,000 / 365} = 64.21 \text{ Days} \end{aligned}$$

$$\begin{aligned} \text{Raw Material Consumed} &= \text{Opening Stock} + \text{Purchases} - \text{Closing Stock} \\ &= ₹ 14,40,000 + ₹ 88,00,000 - ₹ 16,00,000 = ₹ 86,40,000 \end{aligned}$$

(2) Conversion/Work-in-Process Period (W)

$$\begin{aligned} \text{Conversion/Processing Period} &= \frac{\text{Average Stock of WIP}}{\text{Daily Average Production}} \\ &= \frac{(4,80,000 + 8,00,000) / 2}{1,23,20,000 / 365} = 18.96 \text{ days} \end{aligned}$$

Production Cost:	₹
Opening Stock of WIP	4,80,000
Add: Raw Material Consumed	86,40,000
Add: Wages	24,00,000
Add: Production Expenses	16,00,000

	1,31,20,000
Less: Closing Stock of WIP	<u>8,00,000</u>
Production Cost	<u>1,23,20,000</u>

(3) Finished Goods Storage Period (F)

$$\begin{aligned} \text{Finished Goods Storage Period} &= \frac{\text{Average Stock of Finished Goods}}{\text{Daily Average Cost of Good Sold}} \\ &= \frac{(20,80,000 + 24,00,000) / 2}{1,20,00,000 / 365} = 68.13 \text{ Days} \end{aligned}$$

Cost of Goods Sold	₹
Opening Stock of Finished Goods	20,80,000
Add: Production Cost	<u>1,23,20,000</u>
	<u>1,44,00,000</u>
Less: Closing Stock of Finished Goods	<u>(24,00,000)</u>
	<u>1,20,00,000</u>

(4) Receivables Collection Period (D)

$$\begin{aligned} \text{Receivables Collection Period} &= \frac{\text{Average Receivables}}{\text{Daily average credit sales}} \\ &= \frac{(12,00,000 + 16,00,000) / 2}{1,60,00,000 / 365} = 31.94 \text{ Days} \end{aligned}$$

(5) Payables Payment Period (C)

$$\begin{aligned} \text{Payables Payment Period} &= \frac{\text{Average Payable}}{\text{Daily average credit sales}} \\ &= \frac{(16,00,000 + 19,20,000) / 2}{88,00,000 / 365} = 73 \text{ Days} \end{aligned}$$

(6) Duration of Operating Cycle (O)

$$\begin{aligned} O &= R + W + F + D - C \\ &= 64.21 + 18.96 + 68.13 + 31.94 - 73 \\ &= 110.24 \text{ days} \end{aligned}$$

Computation of Working Capital

(i) Number of Operating Cycles per Year

$$= 365 / \text{Duration Operating Cycle} = 365 / 110.24 = 3.311$$

(ii) Total Operating Expenses

Total Cost of Goods sold	1,20,00,000
Add: Administration Expenses	14,00,000
Add: Selling Expenses	<u>6,00,000</u>
	<u>1,40,00,000</u>

(iii) Working Capital Required

$$\begin{aligned} \text{Working Capital Required} &= \frac{\text{Total Operating Expenses}}{\text{Number of Operating Cycles per year}} \\ &= \frac{1,40,00,000}{3.311} = ₹ 42,28,329.81 \end{aligned}$$



Q.10

Working Capital Requirement

RTP July 21



MT Ltd. has been operating its manufacturing facilities till 31.3.2021 on a single shift working with the following cost structure:

	Per unit (₹)
Cost of Materials	24
Wages (out of which 60% variable)	20
Overheads (out of which 20% variable)	20
	64
Profit	8
Selling Price	72

As at 31.3.2021 with the sales of ₹ 17,28,000, the company held:

	(₹)
Stock of raw materials (at cost)	1,44,000
Work-in-progress (valued at prime cost) Finished goods (valued at total cost) Sundry debtors	88,000
	2,88,000
	4,32,000

In view of increased market demand, it is proposed to double production by working an extra shift. It is expected that a 10% discount will be available from suppliers of raw materials in view of increased volume of business. Selling price will remain the same. The credit period allowed to customers will remain unaltered. Credit availed from suppliers will continue to remain at the present level i.e. 2 months. Lag in payment of wages and overheads will continue to remain at one month.

You are required to CALCULATE the additional working capital requirements, if the policy to increase output is implemented, to assess the impact of double shift for long term as a matter of production policy.

Ans

(1) Statement of cost at single shift and double shift working

	24,000 units		48,000 Units	
	Per unit (₹)	Total (₹)	Per unit (₹)	Total (₹)
Raw materials	24	5,76,000	21.6	10,36,000
Wages:				
Variable	12	2,88,000	12	5,76,000
Fixed	8	1,92,000	4	1,92,000
Overheads:				
Variable	4	96,000	4	1,92,000
Fixed	16	3,84,000	8	3,84,000
Total cost	64	15,36,000	49.6	23,80,800
Profit	8	1,92,000	22.4	10,75,200
Sales	72	17,28,000	72	34,56,000

$$(2) \text{ Sales in units 2020-21} = \frac{\text{Sales}}{\text{Unit selling price}} = \frac{17,28,000}{72} = 24,000 \text{ units}$$

(3) Stock of Raw Materials in units on 31.3.2021

$$= \frac{\text{Value of stock}}{1,44,000} = 6,000 \text{ units}$$

Cost per unit ₹ 24

(4) Stock of work-in-progress in units on 31.3.2021

$$= \frac{\text{Value of work-in-progress}}{\text{Prime Cost per unit}} = \frac{88,000}{(24+20)} = 2,000 \text{ units}$$

(5) Stock of finished goods in units 2020-213

$$= \frac{\text{Value of stock}}{\text{Total Cost per unit}} = \frac{2,88,000}{64} = 4,500 \text{ units.}$$

Comparative Statement of Working Capital Requirement

	Single Shift (24,000 units)			Double Shift (48,000 units)		
	Units	Rate (₹)	Amount (₹)	Units	Rate (₹)	Amount (₹)
Current Assets						
Inventories:						
Raw Materials	6,000	24	1,44,000	12,000	21.6	2,59,200
Work-in-Progress	2,000	44	88,000	2,000	37.6	75,200
Finished Goods	4,500	64	2,88,000	9,000	49.6	4,46,400
Sundry Debtors	6,000	64	3,84,000	12,000	49.6	5,95,200
Total Current Assets (A)			9,04,000			13,76,000
Current Liabilities						
Creditors for Materials	4,000	24	96,000	8,000	21.6	1,72,800
Creditors for Wages	2,000	20	40,000	4,000	16	64,000
Creditors for Overheads	2,000	20	40,000	4,000	12	48,000
Total Current Liabilities (B)			1,76,000			2,84,800
Working Capital (A) - (B)			7,28,000			10,91,200

Analysis: Additional Working Capital requirement = ₹ 10,91,200 - ₹ 7,28,000 = ₹ 3,63,200, if the policy to increase output is implemented.

Q.11

Working Capital Requirement

MTP May 22(2)



The following annual figures relate to manufacturing entity:

- A. Sales at one month credit 84,00,000
- B. Material consumption 60% of sales value
- C. Wages (paid in a lag of 15 days) 12,00,000
- D. Cash Manufacturing Expenses 3,00,000
- E. Administrative Expenses 2,40,000
- F. Creditors extend 3 months credit for payment.
- G. Cash manufacturing and administrative expenses are paid 1 months in arrear.

The company maintains stock of raw material equal to economic order quantity. The company incurs ₹ 100 as per ordering cost per order and opportunity cost of capital is 15% p.a. The optimum cash balance is determined using Baumol's model. The bank charges ₹ 10 for each cash withdrawal. Finished goods are held in stock for 1 month. The company maintains a bank balance of ₹ 12,00,000 on an average. Creditors are paid through net banking and all other expenses are incurred in cash which is withdrawn from bank.

Assuming a 20% safety margin, you are required to ESTIMATE the amount of working capital that needs to be invested by the Company.

Ans

Statement of working capital Requirement

Particular	(₹)	(₹)
A. Current Assets		
Stock of Raw Material (W.N. 2)	81,975	



Stock of finished Goods $\left(65,40,000 \times \frac{1}{12}\right)$	5,45,000	
Average Receivables (at Cost) $\left(67,80,000 \times \frac{1}{12}\right)$	5,65,000	
Bank Balance	12,00,000	
Cash Balance (W.N. 3)	15,232	
Gross Working Capital		24,07,207
B. Current Liabilities		
Average Creditor for materials $\left(50,40,000 \times \frac{3}{12}\right)$	12,60,000	
Outstanding Wages $\left(12,00,000 \times \frac{0.5}{12}\right)$	50,000	
Outstanding Cash Manufacturing Expenses $\left(3,00,000 \times \frac{1}{12}\right)$	25,000	
Outstanding administrative Expenses $\left(240,000 \times \frac{1}{12}\right)$	20,000	
		13,55,000
Net Working Capital (A-B)		10,52,207
add: Safety Margin @ 20%		2,10,441
Total Working Capital Requirement		12,62,648

Working Notes:

1. Computation of annual cash Cost of Production & Sales

Material Consumed $(84,00,000 \times 60\%)$	50,40,000
Wages	12,00,000
Manufacturing expenses	3,00,000
Cash Cost of production	65,40,000
(+) Administrative Expenses	2,40,000
Cash Cost of Sales	67,80,000

2. Computation of stock of Raw Material

$$A = 50,40,000$$

$$B = 100$$

$$C = 0.15$$

$$EOQ = \sqrt{\frac{2AB}{c}} = \sqrt{\frac{2 \times 50,40,000 \times 100}{0.15}} = ₹ 81,975$$

3. Calculation of Cash Balance

$$A = 12,00,000 + 3,00,000 + 2,40,000$$

$$A = 17,40,000$$

$$B = 10$$

$$C = 0.15$$

$$\text{Optimal Cash Balance} = \sqrt{\frac{2AB}{c}} = \sqrt{\frac{2 \times 17,40,000 \times 10}{0.15}} = ₹ 15,232$$

Q.12

Cash Cost Basis

RTP July 21



While applying for financing of working capital requirements to a commercial bank, TN Industries Ltd. projected the following information for the next year:

Cost Element	Per unit (₹)	Per unit (₹)
Raw materials		
X	30	
Y	7	
Z	6	43
Direct Labour		25
Manufacturing and administration overheads (excluding depreciation)		20
Depreciation		10
Selling overheads		15
		113

Additional Information:

- Raw Materials are purchased from different suppliers leading to different credit period allowed as follows:
X - 2 months; Y- 1 months; Z - $\frac{1}{2}$ month
- Production cycle is of $\frac{1}{2}$ month. Production process requires full unit of X and Y in the beginning of the production. Z is required only to the extent of half unit in the beginning and the remaining half unit is needed at a uniform rate during the production process.
- X is required to be stored for 2 months and other materials for 1 month. (d) Finished goods are held for 1 month.
- 25% of the total sales is on cash basis and remaining on credit basis. The credit allowed by debtors is 2 months.
- Average time lag in payment of all overheads is 1 months and $\frac{1}{2}$ months for direct labour.
- Minimum cash balance of ₹ 8,00,000 is to be maintained.

CALCULATE the estimated working capital required by the company on cash cost basis if the budgeted level of activity is 1,50,000 units for the next year. The company also intends to increase the estimated working capital requirement by 10% to meet the contingencies. (You may assume that production is carried on evenly throughout the year and direct labour and other overheads accrue similarly.)

Ans

Statement showing Working Capital Requirements of TN Industries Ltd. (on cash cost basis)

	Amount in (₹)	Amount in (₹)
A. Current Assets		
(i) Inventories:		
Raw material		
$x \left(\frac{1,50,000 \text{ units} \times \text{Rs.} 30}{12 \text{ months}} \times 2 \text{ months} \right)$	7,50,000	
$y \left(\frac{1,50,000 \text{ units} \times 7}{12 \text{ months}} \times 1 \text{ months} \right)$	87,500	
$z \left(\frac{1,50,000 \text{ units} \times 6}{12 \text{ months}} \times 1 \text{ months} \right)$	75,000	



WIP $\left(\frac{1,50,000 \text{ units} \times 64}{12 \text{ months}} \times 0.5 \text{ months} \right)$	4,00,000	
Finished goods $\left(\frac{1,50,000 \text{ units} \times 88}{12 \text{ months}} \times 1 \text{ month} \right)$	11,00,000	24,12,500
(ii) Receivables (Debtors) $\left(\frac{1,50,000 \text{ units} \times 103}{12 \text{ months}} \times 2 \text{ months} \right) \times 0.75$		19,31,250
(iii) Cash and bank balance		8,00,000
Total Current Assets		51,43,750
B. Current Liabilities:		
(i) Payables (Creditors) for Raw materials		
X $\left(\frac{1,50,000 \text{ units} \times 30}{12 \text{ months}} \times 2 \text{ months} \right)$	7,50,000	
Y $\left(\frac{1,50,000 \text{ units} \times 7}{12 \text{ months}} \times 1 \text{ month} \right)$	87,500	
Z $\left(\frac{1,50,000 \text{ units} \times 6}{12 \text{ months}} \times 0.5 \text{ months} \right)$	37,500	8,75,000
(ii) Outstanding Direct Labour $\left(\frac{1,50,000 \text{ units} \times 25}{12 \text{ months}} \times 1 \text{ month} \right)$		1,56,250
(iii) Outstanding Manufacturing and administration overheads $\left(\frac{1,50,000 \text{ units} \times 20}{12 \text{ months}} \times 1 \text{ month} \right)$		2,50,000
(iv) Outstanding Selling overheads $\left(\frac{1,50,000 \text{ units} \times 15}{12 \text{ months}} \times 1 \text{ month} \right)$		1,87,500
Total Current Liabilities		14,68,750
Net Working Capital Needs (A - B)		36,75,000
Add: Provision for contingencies @ 10%		3,67,500
Working capital requirement		40,42,500

Workings:

1.

(i) Computation of Cash Cost of Production	Per unit (₹)
Raw Material consumed	43
Direct Labour	25
Manufacturing and administration overheads	20
Cash cost of production	88
(ii) Computation of Cash Cost of Sales	Per unit (₹)
Cash cost of production as in (i) above	88
Selling overheads	15
Cash cost of sales	103

2. Calculation of cost of WIP

Particulars	Per unit (₹)
Raw material (added at the beginning):	
X	30
Y	7
Z (₹ 6 × 50%)	3
Cost during the year:	
Z {(₹ 6 × 50%) × 50%}	1.5
Direct Labour (₹ 25 × 50%)	12.5
Manufacturing and administration overheads (₹ 20 × 50%)	10
	64

Q.13

Cash Cost Basis

RTP May 20



Day Ltd., a newly formed company has applied to the Private 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	Completed Units of Production 31,200 plus unit of work in progress 12,000
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	24,000 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.

Ans

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

[*Note: Alternatively, Total Cash Cost of Sales = (31,200 units - 24,000 units) × (₹ 40 + ₹ 15 + ₹ 30) = ₹ 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:

$$24,000 \text{ units @ ₹ (40+15+30) per unit} = ₹ 20,40,000$$

(v) Debtors for sale: ₹ 6,12,000 × $\frac{60 \text{ days}}{360 \text{ days}}$ = ₹ 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 [(₹ 17,28,000 × 30 days) / 360 days]	₹ 1,44,000
	<u>₹ 18,72,000</u>

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

(vii) Creditors for wages:

$$\text{Outstanding wage payment} = [(31,200 \text{ units} \times ₹ 15) + (12,000 \text{ units} \times ₹ 15 \times .50)] \times 15 \text{ days} / 360 \text{ days}$$

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

Q.14

Working Capital Estimate

RTP May 22



PQR Ltd., a company newly commencing business in the year 2021-22, provides the following projected Profit and Loss Account:

	(₹)	(₹)
Sales		5,04,000
Cost of goods sold		3,67,200
Gross Profit		1,36,800
Administrative Expenses	33,600	
Selling Expenses	31,200	64,800
Profit before tax		72,000
Provision for taxation		24,000
Profit after tax		48,000
The cost of goods sold has been arrived at as under:		
Materials used	2,01,600	
Wages and manufacturing Expenses	1,50,000	
Depreciation	56,400	
	<u>4,08,000</u>	
Less: Stock of Finished goods (10% of goods produced not yet sold)	40,800	
	3,67,200	

The figure given above relate only to finished goods and not to work-in-progress. Goods equal to 15% of the year's production (in terms of physical units) will be in process on the average requiring full materials but only 40% of the other expenses. The company believes in keeping materials equal to two months' consumption in stock. All expenses will be paid one month in advance. Suppliers of materials will extend 1 -1/2 months credit. Sales will be 20% for cash and the rest at two months' credit. 70% of the Income tax will be paid in advance in quarterly instalments. The company wishes to keep ₹ 19,200 in cash. 10% must be added to the estimated figure for unforeseen contingencies. PREPARE an estimate of working capital.

Ans

Statement showing the requirements of Working Capital

Particulars	(₹)	(₹)
A. Current Assets:		
Inventory:		
Stock of Raw material (₹ 2,31,840 × 2/12)	38,640	
Stock of Work-in-progress (As per Working Note)	39,240	
Stock of Finished goods (₹ 3,51,600 × 10/100)	35,160	
Receivables (Debtors) (₹3,04,992 × 2/12)	50,832	
Cash in Hand	19,200	
Prepaid Expenses:		
Wages & Mfg. Expenses (₹ 1,59,000 × 1/12)	13,250	
Administrative expenses (₹ 33,600 × 1/12)	2,800	
Selling & Distribution Expenses (₹ 31,200 × 1/12)	2,600	
Advance taxes paid {(70% of ₹ 24,000) × 3/12}	4,200	
Gross Working Capital	2,05,922	2,05,922
B. Current Liabilities:		
Payables for Raw materials (₹ 2,70,480 × 1.5/12)	33,810	
Provision for Taxation (Net of Advance Tax) (₹ 24,000 × 30/100)	7,200	
Total Current Liabilities	41,010	41,010



C. Excess of CA over CL		1,64,912
Add: 10% for unforeseen contingencies		16,491
Net Working Capital requirements		1,81,403

Working Notes:

(i) Calculation of Stock of Work-in-progress

Particulars	(₹)
Raw Material (₹ 2,01,600 × 15%)	30,240
Wages & Mfg. Expenses (₹ 1,50,000 × 15% × 40%)	9,000
Total	39,240

(ii) Calculation of Stock of Finished Goods and Cost of Sales

Particulars	(₹)
Direct material Cost [₹ 2,01,600 + ₹ 30,240]	2,31,840
Wages & Mfg. Expenses [₹ 1,50,000 + ₹ 9,000]	1,59,000
Depreciation	0
Gross Factory Cost	3,90,840
Less: Closing W.I.P.	(39,240)
Cost of goods produced	3,51,600
Add: Administrative Expenses	33,600
	3,85,200
Less: Closing stock	(35,160)
Cost of Goods Sold	3,50,040
Add: Selling and Distribution Expenses	31,200
Total Cash Cost of Sales	3,81,240
Debtors (80% of cash cost of sales)	3,04,992

(iii) Calculation of Credit Purchase

Particulars	(₹)
Raw material consumed	2,31,840
Add: Closing Stock	38,640
Less: Opening Stock	-
Purchases	2,70,480

Q.15

Working Capital Estimate

RTP Dec 21



The management of Trux Company Ltd. is planning to expand its business and consults you to prepare an estimated working capital statement. The records of the company reveals the following annual information:

	(₹)
Sales - Domestic at one month's credit	18,00,000
Export at three month's credit (sales price 10% below domestic price)	8,10,000
Materials used (suppliers extend two months credit)	6,75,000
Lag in payment of wages - $\frac{1}{2}$ month	5,40,000
Lag in payment of manufacturing expenses (cash) - 1 month	7,65,000
Lag in payment of Administration Expenses - 1 month	1,80,000
Selling expenses payable quarterly in advance	1,12,500
Income tax payable in four installments, of which one falls in the next financial year	1,68,000

Rate of gross profit is 20%. Ignore work-in-progress and depreciation.

The company keeps one month's stock of raw materials and finished goods (each) and believes in keeping ₹2,50,000 available to it including the overdraft limit of ₹ 75,000 not yet utilized by the company. The management is also of the opinion to make 10% margin for contingencies on computed figure. You are required to PREPARE the estimated working capital statement for the next year.

Ans

Preparation of Statement of Working Capital Requirement for Trux Company Ltd.

	(₹)	(₹)
A. Current Assets		
(i) Inventories:		
Material (1 month) $\left(\frac{6,75,000}{12\text{months}} \times 1\text{ month}\right)$	56,250	
Finished goods (1 month) $\left(\frac{21,60,000}{12\text{months}} \times 1\text{ month}\right)$	1,80,000	2,36,250
(ii) Receivables (Debtors)		
For Domestic Sales $\left(\frac{15,17,586}{12\text{months}} \times 1\text{ month}\right)$	1,26,466	
(iii) Prepayment of Selling expenses $\left(\frac{1,12,500}{12\text{months}} \times 3\text{ month}\right)$		28,125
(iii) Cash in hand & at bank		1,75,000
Total Current Assets		7,54,570
B. Current Liabilities:		
(i) Payables (Creditors) for materials (2 months) $\left(\frac{6,75,000}{12\text{months}} \times 2\text{ month}\right)$		1,12,500
(ii) Outstanding wages (0.5 months) $\left(\frac{5,40,000}{12\text{months}} \times 0.5\text{ month}\right)$		22,500
(iii) Outstanding manufacturing expenses $\left(\frac{7,65,000}{12\text{months}} \times 1\text{ month}\right)$		63,750
(iv) Outstanding administrative expenses $\left(\frac{1,80,000}{12\text{months}} \times 1\text{ month}\right)$		15,000
(v) Income tax payable		42,000
Total Current Liabilities		2,55,750
Net Working Capital (A - B)		4,98,820
Add: 10% contingency margin		49,882
Total Working Capital required		5,48,702

**Working Notes:****1. Calculation of Cost of Goods Sold and Cost of Sales**

	Domestic (₹)	Export (₹)	Total (₹)
Domestic Sales	18,00,000	8,10,000	26,10,000
Less: Gross profit @ 20% on domestic sales and 11.11% on export sales (Working note-2)	3,60,000	90,000	4,50,000
Cost of Goods Sold	14,40,000	7,20,000	21,60,000
Add: Selling expenses (Working note-3)	77,586	34,914	1,12,500
Cash Cost of Sales	15,17,586	7,54,914	22,72,500

2. Calculation of gross profit on Export Sales

Let domestic selling price is ₹ 100. Gross profit is ₹ 20, and then cost per unit is ₹ 80

Export price is 10% less than the domestic price i.e. ₹ 100 - (1- 0.1) = ₹ 90

Now, gross profit will be = ₹ 90 - ₹ 80 = ₹ 10

So, Gross profit ratio at export price will be = $\frac{10}{90} \times 100 = 11.11\%$

3. Apportionment of Selling expenses between Domestic and Exports sales:

Apportionment on the basis of sales value:

$$\text{Domestic Sales} = \frac{1,12,500}{26,10,000} \times 18,00,000 = ₹ 77,586$$

$$\text{Exports Sales} = \frac{1,12,500}{26,10,000} \times ₹ 8,10,000 = ₹ 34,914$$

4. Assumptions

(i) It is assumed that administrative expenses is related to production activities.

(ii) Value of opening and closing stocks are equal.

Q.16

Working Capital Estimate

MTP Dec 21(2)

success tutorials

On 01st April, 2020, the Board of Director of ABC Ltd. wish to know the amount of working capital that will be required to meet the programme they have planned for the year. From the following information, PREPARE a working capital requirement forecast and a forecast profit and loss account and balance sheet:

Issued share capital ₹ 6,00,000

10% Debentures ₹ 1,00,000

Fixed Assets ₹ 4,50,000

Production during the previous year was 1,20,000 units; it is planned that this level of activity should be maintained during the present year.

The expected ratios of cost to selling price are: raw materials 60%, direct wages 10% overheads 20% Raw materials are expected to remain in store for an average of two months before issue to production. Each unit of production is expected to be in process for one month. The time lag in wage payment is one month.

Finished goods will stay in the warehouse awaiting dispatch to customers for approximately three months.

Credit allowed by creditors is two months from the date of delivery of raw materials. Credit given to debtors is three months from the date of dispatch.

Selling price is ₹ 5 per unit.

There is a regular production and sales cycle and wages and overheads accrue evenly.

Ans

Forecast Profit and Loss Account for the period 01.04.2020 to 31.03.2021

Particulars	₹	Particulars	₹
Materials consumed	3,60,000	By Sales 1,20,000 @ ₹ 5	6,00,000

1,20,000 @ ₹ 3				
Direct wages :	60,000			
Overheads :	1,20,000			
1,20,000 @ ₹ 1				
Gross profit c/d	60,000	By gross profit b/d		
	6,00,000			6,00,000
Debenture interest	10,000			60,000
(10% of 1,00,000)				
Net profit c/d	50,000			
	60,000			60,000

Working Capital Requirement Forecast for the year 01.04.2020 to 31.03.2021

Particulars	Period (Months)	Total (₹)	Current Assets (₹)				Current Liabilities(₹)
			Raw materials	Work-in-progress	Finished goods	Debtors	Creditors
1. Material							
In store	2		60,000				
In work-in-progress	1			30,000			
In finished goods	3				90,000		
Credit to debtors	<u>3</u>					90,000	
	9						
Less : Credit from creditors	<u>2</u>						60,000
Net block period	<u>7</u>	2,10,000					
2. Wages:							
In work-in-progress	1/2			2,500			
In finished goods	3				15,000		
Credit to debtors	<u>3</u>					15,000	
	6½						
Less : Time lag in payment	<u>1</u>						5,000
Net block period	<u>5½</u>	27,500					
3. Overhead							
In work-in-progress	½			5,000			
In finished goods	3				30,000		



Credit to debtors	<u>3</u>					30,000	
Net block period	<u>6½</u>	65,000					
4.Profit							
Credit to debtors	<u>3</u>					15,000	
Net block period	<u>3</u>	15,000					
Total (₹)		3,17,500	60,000	37,500	1,35,000	1,50,000	65,000

Forecast Balance Sheet as on 31.03.2021

	(₹)		(₹)
Issued share capital	6,00,000	Fixed Assets	4,50,000
Profit and Loss A/c	50,000	Current Assets:	
10% Debentures	1,00,000	Stock:	
Sundry creditors	65,000	Raw materials	60,000
Bank overdraft-		Work-in-progress	37,500
Balancing figure	17,500	Finished goods	1,35,000
		Debtors	1,50,000
	8,32,500		8,32,500

The Total amount of working capital, thus, stands as follows:

Requirement as per working capital	₹ 3,17,500
Less: Bank overdraft as per balance sheet	17,500
Net requirement	<u>3,00,000</u>

Notes:

- Average monthly production: $1,20,000 \div 12 = 10,000$ units
- Average cost per month:

Raw Material	$10,000 \times (\text{₹ } 5 \times 0.6) = \text{₹ } 30,000$
Direct wages	$10,000 \times (\text{₹ } 5 \times 0.1) = \text{₹ } 5,000$
Overheads	$10,000 \times (\text{₹ } 5 \times 0.2) = \text{₹ } 10,000$
- Average profit per month: $10,000 \times (\text{₹ } 5 \times 0.1) = \text{₹ } 5,000$
- Wages and overheads accrue evenly over the period and, hence, are assumed to be completely introduced for half the processing time.

Q.17

Working Capital Estimate

RTP May 19



A company is considering its working capital investment and financial policies for the next year. Estimated fixed assets and current liabilities for the next year are ₹ 2.60 crores and ₹ 2.34 crores respectively. Estimated Sales and EBIT depend on current assets investment, particularly inventories and book-debts. The Financial Controller of the company is examining the following alternative Working Capital Policies:

Working Capital Policy	Investment in Current Assets	Estimated Sales	EBIT
Conservative	4.50	12.30	1.23
Moderate	3.90	11.50	1.15
Aggressive	2.60	10.00	1.00

the adoption of the moderate working capital policy. The company is now examining the use of long-term and

short-term borrowings for financing its assets. The company will use ₹ 2.50 crores of the equity funds. The corporate tax rate is 35%.

The company is considering the following debt alternatives.

Financing Policy	Short-term Debt	Long-term Debt
Conservative	0.54	1.12
Moderate	1.00	0.66
Aggressive	1.50	0.16
Interest rate-Average	12%	16%

You are required to CALCULATE the following:

- (i) Working Capital Investment for each policy:
 - (a) Net Working Capital position
 - (b) Rate of Return
 - (c) Current ratio
- (ii) Financing for each policy:
 - (a) Net Working Capital position.
 - (b) Rate of Return on Shareholders' equity.
 - (c) Current ratio.

Ans

- (i) Statement showing Working Capital Investment for each policy

	Working Capital Policy		
	Conservative	Moderate	Aggressive
Current Assets: (i)	4.50	3.90	2.60
Fixed Assets: (ii)	2.60	2.60	2.60
Total Assets: (iii)	7.10	6.50	5.20
Current liabilities: (iv)	2.34	2.34	2.34
Net Worth: (v) = (iii) - (iv)	4.76	4.16	2.86
Total liabilities: (iv) + (v)	7.10	6.50	5.20
Estimated Sales: (vi)	12.30	11.50	10.00
EBIT: (vii)	1.23	1.15	1.00
(a) Net working capital position: (i) - (iv)	2.16	1.56	0.26
(b) Rate of return: (vii) / (iii)	17.32%	17.69%	19.23%
(c) Current ratio: (i) / (iv)	1.92	1.67	1.11

- (ii) Statement Showing Effect of Alternative Financing Policy

(₹ in crore)

Financing Policy	Conservative	Moderate	Aggressive
Current Assets (i)	3.90	3.90	3.90
Fixed Assets (ii)	2.60	2.60	2.60
Total Assets (iii)	6.50	6.50	6.50
Current Liabilities (iv)	2.34	2.34	2.34
Short term Debt (v)	0.54	1.00	1.50
Total current liabilities	2.88	3.34	3.84
(vi) = (iv) + (v)			
Long term Debt (vii)	1.12	0.66	0.16
Equity Capital (viii)	2.50	2.50	2.50



Total liabilities (ix) = (vi)+(vii)+(viii)	6.50	6.50	6.50
Forecasted Sales	11.50	11.50	11.50
EBIT (x)	1.15	1.15	1.15
Less: Interest on short-term debt	0.06	0.12	0.18
	(12% of ₹0.54)	(12% of ₹ 1)	(12% of ₹ 1.5)
Interest on long term debt	0.18	0.11	0.03
	(16% of ₹1.12)	(16% of ₹0.66)	(16% of ₹0.16)
Earnings before tax (EBT) (xi)	0.91	0.92	0.94
Taxes @ 35% (xii)	0.32	0.32	0.33
Earnings after tax: (xiii) = (xi) - (xii)	0.59	0.60	0.61
(a) Net Working Capital Position: (i) - [(iv) + (v)]	1.02	0.56	0.06
(b) Rate of return on shareholders Equity capital : 23.6% (xiii)/ (viii)		24.0%	24.4%
(c) Current Ratio (i) / (vi)	1.35	1.17	1.02

Q.18

RTP May 24



PQ Ltd. has commenced new business segment in 2023-24. The following information has been ascertained for annual production of 25,000 units which is the full capacity.

	Cost per unit (₹)
Material	100
Labour and variable overhead expenses	50
Fixed manufacturing expenses	35
Depreciation	15
Selling expenses (80% variable)	10

In the first two years of operations, production and sales are expected to be as follows:

Year	Production (No. of units)	Sales (No. of units)
1	12,000	10,000
2	18,000	19,000

The selling price is expected to be ₹ 250 .

To assess the working capital requirements, the following additional information is available:

- Stock of materials 2 months' average consumption
- Debtors 1.5 month's average sales.
- Cash balance ₹ 50,000
- Creditors for supply of materials 1 month's average purchase during the year.
- Expenses All expenses will be paid 1 month in advance during the year.

Goods equal to 15% of the year's production (in terms of physical units) will be in process on the average requiring full materials but only 40% of the other expenses.

The management is also of the opinion to make 10% margin for contingencies on computed figure and value the closing stock at cost of production.

PREPARE, for the two years:

- (i) A projected statement of Profit/Loss (Ignoring taxation); and
- (ii) A projected statement of working capital requirements on a cash cost basis.

Ans.

(i)

PQ Limited
Projected Statement of Profit / Loss
(Ignoring Taxation)

	Year 1	Year 2
Production (Units)	12,000	18,000
Sales (Units)	10,000	19,000
	(₹)	(₹)
Sales revenue (A) (Sales unit × ₹ 250)	25,00,000	47,50,000
Cost of production:		
Materials cost (Units produced × ₹ 100)	12,00,000	18,00,000
Direct labour and variable expenses (Units produced × ₹ 50)	6,00,000	9,00,000
Fixed manufacturing expenses (Production Capacity: 25,000 units × ₹ 35)	8,75,000	8,75,000
Depreciation (Production Capacity: 25,000 units × ₹ 15)	3,75,000	3,75,000
Gross Factory Cost	30,50,000	39,50,000
Add: Opening W.I.P.	-	2,91,000
Less: Closing W.I.P.	2,91,000	3,99,000
Cost of goods produced	27,59,000	38,42,000
Add: Opening stock of finished goods (Year 1 : Nil; Year 2 : 2,000 units)	-	4,59,833
Cost of Goods available for sale (Year 1: 12,000 units; Year 2: 20,000 units)	27,59,000	43,01,833
Less: Closing stock of finished goods at average cost (year 1: 2000 units, year 2 : 1000 units) (Cost of Production × Closing stock/ units produced)	4,59,833	2,13,444
Cost of Goods Sold	22,99,167	40,88,389
Add: Selling expenses - Variable (Sales unit × ₹ 8)	80,000	1,52,000
Add: Selling expenses -Fixed (25,000 units × ₹ 2)	50,000	50,000
Cost of Sales : (B)	24,29,167	42,90,389
Profit (+) / Loss (-): (A - B)	70,833	4,59,611

Working Notes:

Calculation of Stock of Work-in-progress

Particulars	Year 1	Year 2
	(₹)	(₹)
Raw Material (material cost × 15%)	1,80,000	2,70,000
Labour & Mfg. Expenses (Labour & mfg. expenses × 15% × 40%)	88,500	1,06,500
Depreciation (Depreciation × 15% × 40%)	22,500	22,500
Total	2,91,000	3,99,000



1. Calculation of creditors for supply of materials:

	Year 1 (₹)	Year 2 (₹)
Materials consumed during the year	12,00,000	18,00,000
Add: Closing stock (2 month's average consumption)	<u>2,00,000</u>	<u>3,00,000</u>
	14,00,000	21,00,000
Less: Opening Stock	-	2,00,000
Purchases during the year	14,00,000	19,00,000
Average purchases per month (Creditors)	1,16,667	1,58,333

2. Prepayment for expenses:

	Year 1 (₹)	Year 2 (₹)
Direct labour and variable expenses	6,00,000	9,00,000
Fixed manufacturing expenses	8,75,000	8,75,000
Selling expenses (variable + fixed)	<u>1,30,000</u>	<u>2,02,000</u>
Total	16,05,000	19,77,000
Average per month	1,33,750	1,64,750

(ii)

Projected Statement of Working Capital Requirement (Cash Cost Basis)

	Year 1 (₹)	Year 2 (₹)
(A) Current Assets		
Inventories:		
- Stock of Raw Material (12,000 units ₹ 100 2/12); (18,000 units ₹ 100 2/12)	2,00,000	3,00,000
- Finished Goods (Refer working note 3)	4,01,083	1,92,611
- Work In Process (Refer working note 5)	2,68,500	3,76,500
Receivables (Debtors) (Refer working note 4)	2,66,927	4,84,684
Prepayment for Expenses (Refer working note 2)	1,33,750	1,64,750
Minimum Cash balance	50,000	50,000
Total Current Assets/ Gross working capital (A)	13,20,260	15,68,545
(B) Current Liabilities		
Creditors for raw material (Refer working note 1)	1,16,667	1,58,333
Total Current Liabilities	1,16,667	1,58,333
Net Working Capital (A - B)	12,03,594	14,10,212
Add: 10% contingency margin	1,20,359	1,41,021
Total Working capital required	13,23,953	15,51,233

Working Note:

3. Cash Cost of Production:

	Year 1 (₹)	Year 2 (₹)
Gross Factory Cost as per projected Statement of P&L	30,50,000	39,50,000
Add: Opening W.I.P	-	2,68,500
Less: Closing W.I.P	2,68,500	3,76,500
Cost of goods produced	27,81,500	38,42,000
Less: Depreciation	(3,75,000)	(3,75,000)
Cash Cost of Production	24,06,500	34,67,000

Add: Opening Stock at Average Cost:	-	4,01,083
Cash Cost of Goods Available for sale	24,06,500	38,68,083
Less: Closing Stock at Avg. Cost	4,01,083	1,92,611
$\left(\frac{24,06,500 \times 2,000}{12,000} \right)$		
$\left(\frac{34,67,000 \times 1,000}{18,000} \right)$		
Cash Cost of Goods Sold	20,05,417	36,75,472

4. **Receivables (Debtors)**

	Year 1 (₹)	Year 2 (₹)
Cash Cost of Goods Sold	20,05,417	36,75,472
Add: Selling expenses - Variable (Sales unit × ₹ 8)	80,000	1,52,000
Add: Selling expenses -Fixed (25,000 units × ₹ 2)	50,000	50,000
Cash Cost of Debtors	21,35,417	38,77,472
Average Debtors	2,66,927	4,84,684

Calculation of Stock of Work-in-progress (Cash Cost Basis)

Particulars		(₹)
Raw Material (material cost × 15%)	1,80,000	2,70,000
Labour & Mfg. Expenses (Labour mfg. & expenses × 15% × 40%)	88,500	1,06,500
Total	2,68,500	3,76,500

Q.19

A firm has the following data for the year ending 31st March, 2023:

Sales (1,00,000 @ ₹20)	₹20,00,000
Earnings before Interest and Taxes	₹2,00,000
Fixed Assets	₹5,00,000

The three possible current assets holdings of the firm are ₹5,00,000, ₹4,00,000 and ₹3,00,000. It is assumed that fixed assets level is constant and profits do not vary with current assets levels.

Explain the effect of the three alternative current assets policies.

Ans.

Effect of Alternative Working Capital Policy

Particulars	Conservative	Moderate	Aggressive
Sales	20,00,000	20,00,000	20,00,000
Earnings before interest and tax (EBIT)	2,00,000	2,00,000	2,00,000
Current Assets	5,00,000	4,00,000	3,00,000
Fixed Assets	5,00,000	5,00,000	5,00,000
Total Assets	10,00,000	9,00,000	8,00,000
Return on Total Assets (EBIT ÷ Total Assets)	20%	22.22%	25%
Current Assets/Fixed Assets	1.00	0.80	0.60

The aforesaid calculation shows that the conservative policy provides greater liquidity (solvency) to the firm, but lower return on total assets. On the other hand, the aggressive policy gives higher return, but low liquidity and thus



is very risky. The moderate policy generates return higher than Conservative policy but lower than aggressive policy. This is less risky than aggressive policy but riskier than conservative policy.

Q.20

On 1st January, the Managing Director of Naureen Ltd. wishes to know the amount of working capital that will be required during the year. From the following information prepare the working capital requirements forecast. Production during the previous year was 60,000 units. It is planned that this level of activity would be maintained during the present year.

The expected ratios of the cost to selling prices are Raw materials 60%, Direct wages 10% and Overheads 20%. Raw materials are expected to remain in store for an average of 2 months before issue to production. Each unit is expected to be in process for one month, the raw materials being fed into the pipeline immediately and the labour and overhead costs accruing evenly during the month. Finished goods will stay in the warehouse awaiting dispatch to customers for approximately 3 months. Credit allowed by creditors is 2 months from the date of delivery of raw material. Credit allowed to debtors is 3 months from the date of dispatch.

Selling price is ₹ 5 per unit. There is a regular production and sales cycle. Wages and overheads are paid on the 1st of each month for the previous month. The company normally keeps cash in hand to the extent of ₹ 20,000.

You are required to prepare the forecast statement. The finance manager is particularly interested in applying the quantitative techniques for forecasting the working capital needs of the company.

Ans.

Statement of Working Capital Requirement

Particulars	₹
(A) Current Assets:	
Raw materials $(1,80,000 \times 2/12)$	30,000
work in progress:	
Material $(1,80,000 \times 100\% \times 1/12)$	15,000
Labour and Overheads $(30,000 + 60,000 \times 50\% \times 1/12)$	3,750
Finished goods $(2,70,000 \times 3/12)$	67,500
Debtors $(2,70,000 \times 3/12)$	67,500
Cash	20,000
Total (A)	2,03,750
(B) Current Liabilities:	
Creditors $(1,80,000 \times 2/12)$	30,000
Outstanding labour $(30,000 \times 1/12)$	2,500
Outstanding overhead $(60,000 \times 1/12)$	5,000
Total (B)	37,500
Working Capital (A - B)	1,66,250

Working Notes:

Projected Income Statement

Particulars	₹
Raw materials $(60,000 \times 5 \times 60\%)$	1,80,000
Direct Labour $(60,000 \times 5 \times 10\%)$	30,000
Overheads including depreciation $(60,000 \times 5 \times 20\%)$	60,000
Total cost	2,70,000
Profit $(60,000 \times 5 \times 10\%)$	30,000
Sales $(60,000 \times 5)$	3,00,000

10 CHAPTER

INVESTING DECISION

Q.1

Accept Mutually Excl. Project

PY May 19



Kanoria Enterprises wishes to evaluate two mutually exclusive projects X and Y. The particulars are as under :

	Project X	Project Y
Initial Investment	1,20,000	1,20,000
Estimated cash inflows (per annum for 8 years)		
Pessimistic	26,000	12,000
Most Likely	28,000	28,000
Optimistic	36,000	52,000

The cut off rate is 14%. The discount factor at 14% are :

Year	1	2	3	4	5	6	7	8	9
Discount factor	0.877	0.769	0.675	0.592	0.519	0.456	0.400	0.351	0.308

Advise management about the acceptability of projects X and Y.

Ans.

The possible outcomes of Project x and Project y are as follows

Estimates	Project X				Project Y			
	Estimated Annual Cash inflows (₹)	PVF @ 14% for 8 years	PV of Cash flow (₹)	NPV (₹)	Estimated Annual Cash inflows (₹)	PVF @ 14% for 8 years	PV of Cash flow (₹)	NPV (₹)
Pessimistic	26,000	4.639	1,20,614	614	12,000	4.639	55,668	(-64,332)
Most likely	28,000	4.639	1,29,892	9,892	28,000	4.639	1,29,892	9,892
Optimistic	36,000	4.639	2,41,228	47,004	52,000	4.639	2,41,228	1,21,228

In pessimistic situation project X will be better as it gives low but positive NPV whereas Project Y yield highly negative NPV under this situation. In most likely situation both the project will give same result. However, in optimistic situation Project Y will be better as it will gives very high NPV. So, project X is a risk less project as it gives positive NPV in all the situation whereas Y is a risky project as it will result into negative NPV in pessimistic situation and highly positive NPV in optimistic situation. So acceptability of project will largely depend on the risk taking capacity (Risk seeking/ Risk aversion) of the management.

Q.2

NPV Method (Accept/Not)

RTP May 23



Dharma Ltd, an existing profit-making company, is planning to introduce a new product with a projected life of 8 years. Initial equipment cost will be ₹ 240 lakhs and additional equipment costing ₹ 26 lakhs will be needed at the beginning of third year. At the end of 8 years, the original equipment will have resale value equivalent to the cost of removal, but the additional equipment would be sold for ₹ 2 lakhs. Working Capital of ₹ 25 lakhs will be needed at the beginning of the operations. The 100% capacity of the plant is of 4,00,000 units per annum, but the production and sales volume expected are as under:



Year	Capacity (%)
1	20
2	30
3-5	75
6-8	50

A sale price of ₹ 100 per unit with a profit volume ratio (contribution/sales) of 60% is likely to be obtained. Fixed operating cash cost are likely to be ₹ 16 lakhs per annum. In addition to this the advertisement expenditure will have to be incurred as under:

Year	1	2	3-5	6-8
Expenditure (₹ Lakhs each year)	30	15	10	4

The company is subjected to 50% tax rate and consider 12% to be an appropriate cost of capital. Straight line method of depreciation is followed by the company. ADVISE the management on the desirability of the project.

Ans.

Calculation of Cash Flow After tax

Year	1	2	3 to 5	6 to 8
A Capacity	20%	30%	75%	50%
B Units	80000	120000	300000	200000
C Contribution p.u.	₹60	₹60	₹60	₹60
D Contribution	₹48,00,000	₹72,00,000	₹1,80,00,000	₹1,20,00,000
E Fixed Cash Cost	₹16,00,000	₹16,00,000	₹16,00,000	₹16,00,000
F Original Equipment (₹240Lakhs/8)	₹30,00,000	₹30,00,000	₹30,00,000	₹30,00,000
G Additional Equipment (₹24Lakhs/6)			₹4,00,000	₹4,00,000
H Advertisement Expenditure	₹30,00,000	₹15,00,000	₹10,00,000	₹4,00,000
I Profit Before Tax (D- E-F-G-H)	₹ (28,00,000)	₹11,00,000	₹1,20,00,000	₹66,00,000
J Tax savings/ (expenditure)	₹14,00,000	₹(5,50,000)	₹(60,00,000)	₹ (33,00,000)
K Profit After Tax	₹ (14,00,000)	₹5,50,000	₹60,00,000	₹33,00,000
L Add: Depreciation (F+G)	₹30,00,000	₹30,00,000	₹34,00,000	₹34,00,000
M Cash Flow After Tax	₹16,00,000	₹35,50,000	₹94,00,000	₹67,00,000

Calculation of NPV				
Year	Particula	Cash Flows	PV factor	PV
0	Initial Investment	₹ (2,40,00,000)	1.000	₹ (2,40,00,000)
0	Working Capital Introduced	₹ (25,00,000)	1.000	₹ (25,00,000)
1	CFAT	₹16,00,000	0.893	₹ 14,28,800
2	CFAT	₹ 35,50,000	0.797	₹ 28,29,350
2	Additional Equipment	₹ (26,00,000)	0.797	₹ (20,72,200)
3	CFAT	₹ 94,00,000	0.712	₹ 66,92,800

4	CFAT	₹ 94,00,000	0.636	₹ 59,78,400
5	CFAT	₹ 94,00,000	0.567	₹ 53,29,800
6	CFAT	₹ 67,00,000	0.507	₹ 33,96,900
7	CFAT	₹ 67,00,000	0.452	₹ 30,28,400
8	CFAT	₹ 67,00,000	0.404	₹ 27,06,800
8	WC Released	₹ 25,00,000	0.404	₹ 10,10,000
8	Salvage Value	₹ 2,00,000	0.404	₹ 80,800
Net Present Value				₹ 39,09,850

Since the NPV is positive, the proposed project should be implemented.

Q. 3

NPV Method (Accept/Not)

MTP Dec 21(2)



Superb Ltd. constructs customized parts for satellites to be launched by USA and Canada. The parts are constructed in eight locations (including the central headquarter) around the world. The Finance Director, Ms. Kuthrapali, chooses to implement video conferencing to speed up the budget process and save travel costs. She finds that, in earlier years, the company sent two officers from each location to the central headquarter to discuss the budget twice a year. The average travel cost per person, including air fare, hotels and meals, is ₹ 27,000 per trip. The cost of using video conferencing is ₹ 8,25,000 to set up a system at each location plus ₹ 300 per hour average cost of telephone time to transmit signals. A total 48 hours of transmission time will be needed to complete the budget each year. The company depreciates this type of equipment over five years by using straight line method. An alternative approach is to travel to local rented video conferencing facilities, which can be rented for ₹ 1,500 per hour plus ₹ 400 per hour average cost for telephone charges. You are Senior Officer of Finance Department. You have been asked by Ms. Kuthrapali to EVALUATE the proposal and SUGGEST if it would be worthwhile for the company to implement video conferencing.

Ans.

Option I : Cost of travel, in case Video Conferencing facility is not provided

Total Trip = No. of Locations × No. of Persons × No. of Trips per Person = 7 × 2 × 2 = 28 Trips

Total Travel Cost (including air fare, hotel accommodation and meals) (28 trips × ₹ 27,000 per trip) = ₹ 7,56,000

Option II : Video Conf. Facility is provided by Installation of Own Equipment at Different Locations

Cost of Equipment at each location (₹ 8,25,000 × 8 locations) = ₹ 66,00,000

Economic life of Machines (5 years). Annual depreciation (66,00,000/5) = ₹ 13,20,000

Annual transmission cost (48 hrs. transmission × 8 locations × ₹ 300 per hour) = ₹ 1,15,200

Annual cost of operation (13,20,000 + 1,15,200) = ₹ 14,35,200

Option III : Engaging Video Conferencing Facility on Rental Basis

Rental cost (48 hrs. × 8 location × ₹ 1,500 per hr) = ₹ 5,76,000

Telephone cost (48 hrs. × 8 locations × ₹ 400 per hr.) = ₹ 1,53,600

Total rental cost of equipment (5,76,000 + 1,53,600) = ₹ 7,29,600

Analysis: The annual cash outflow is minimum, if video conferencing facility is engaged on rental basis Therefore, Option III is suggested.

Q. 4

Adjusted PV & Disc Rate

PY May 18



(a) XYZ Ltd. is presently all equity financed. The directors of the company have been evaluating investment in a project which will require ₹ 270 lakhs capital expenditure on new machinery. They expect the capital investment to provide annual cash flows of ₹ 42 lakhs indefinitely which is net of all tax adjustments. The discount rate which it applies to such investment decisions is 14% net.

The directors of the company believe that the current capital structure fails to take advantage of tax benefits of debt, and propose to finance the new project with undated perpetual debt secured on the



company's assets. The company intends to issue sufficient debt to cover the cost of capital expenditure and the after tax cost of issue.

The current annual gross rate of interest required by the market on corporate undated debt of similar risk is 10%. The after tax costs of issue are expected to be ₹ 10 lakhs. Company's tax rate is 30%.

You are required to calculate:

- (i) The adjusted present value of the investment,
 - (ii) The adjusted discount rate and
 - (iii) Explain the circumstances under which this adjusted discount rate may be used to evaluate future investments.
- (b) What are Masala Bonds?

Ans.

(a) (i) Calculation of Adjusted Present Value of Investment (APV)

Adjusted PV = Base Case PV + PV of financing decisions associated with the project

Base Case NPV for the project:

$$\begin{aligned} (-) ₹ 270 \text{ lakhs} + (₹ 42 \text{ lakhs} / 0.14) &= (-) ₹ 270 \text{ lakhs} + ₹ 300 \text{ lakhs} \\ &= ₹ 30 \end{aligned}$$

$$\text{Issue costs} = ₹ 10 \text{ lakhs}$$

$$\text{Thus, the amount to be raised} = ₹ 270 \text{ lakhs} + ₹ 10 \text{ lakhs}$$

$$= ₹ 280 \text{ lakhs}$$

$$\text{Annual tax relief on interest payment} = ₹ 280 \times 0.1 \times 0.3$$

$$= ₹ 8.4 \text{ lakhs in perpetuity}$$

$$\text{The value of tax relief in perpetuity} = ₹ 8.4 \text{ lakhs} / 0.1$$

$$= ₹ 84 \text{ lakhs}$$

$$\text{Therefore, APV} = \text{Base case PV} - \text{Issue Costs} + \text{PV of Tax Relief on debt interest}$$

$$= ₹ 30 \text{ lakhs} - ₹ 10 \text{ lakhs} + 84 \text{ lakhs} = ₹ 104 \text{ lakhs}$$

(ii) Calculation of Adjusted Discount Rate (ADR)

Annual Income / Savings required to allow an NPV to zero

Let the annual income be x.

$$(-) ₹ 280 \text{ lakhs} \times (\text{Annual Income} / 0.14) = (-) ₹ 104 \text{ lakhs}$$

$$\text{Annual Income} / 0.14 = (-) ₹ 104 + ₹ 280 \text{ lakhs}$$

$$\text{Therefore, Annual income} = ₹ 176 \times 0.14 = ₹ 24.64 \text{ lakhs}$$

$$\text{Adjusted discount rate} = (₹ 24.64 \text{ lakhs} / ₹ 280 \text{ lakhs}) \times 100$$

$$= 8.8\%$$

(iii) Useable circumstances

This ADR may be used to evaluate future investments only if the business risk of the new venture is identical to the one being evaluated here and the project is to be financed by the same method on the same terms. The effect on the company's cost of capital of introducing debt into the capital structure cannot be ignored.

(b) Masala Bond:

Masala (means spice) bond is an Indian name used for Rupee denominated bond that Indian corporate borrowers can sell to investors in overseas markets. These bonds are issued outside India but denominated in Indian Rupees. NTPC raised ₹2,000 crore via masala bonds for its capital expenditure in the year 2016.

Q.5

Annualised Yeild

PY Dec 21



Stand Ltd. is contemplating replacement of one of its machines which has become outdated and inefficient. Its financial manager has prepared a report outlining two possible replacement machines. The details of each machine are as follows:

	Machine 1	Machine 2
Initial investment	₹ 12,00,000	₹ 16,00,000

Estimated useful life	3 years	5 years
Residual value	₹ 1,20,000	₹ 1,00,000
Contribution per annum	₹ 11,60,000	₹ 12,00,000
Fixed maintenance costs per annum	₹ 40,000	₹ 80,000
Other fixed operating costs per annum	₹ 7,20,000	₹ 6,10,000

The maintenance costs are payable annually in advance. All other cash flows apart from the initial investment assumed to occur at the end of each year. Depreciation has been calculated by straight line method and has been included in other fixed operating costs. The expected cost of capital for this project is assumed as 12% p.a
Required:

- Which machine is more beneficial, using Annualized Equivalent Approach? Ignore tax.
- Calculate the sensitivity of your recommendation in part (i) to changes in the contribution generated by machine 1.

Year	1	2	3	4	5	6
$PVIF_{0.12,t}$	0.893	0.797	0.712	0.636	0.567	0.507
$PVIFA_{0.12,t}$	0.893	1.690	2.402	3.038	3.605	4.112

Ans.

Calculation of Net Cash flows

Machine 1

Other fixed operating costs (excluding depreciation) = $7,20,000 - [(12,00,000 - 1,20,000) / 3] = ₹ 3,60,000$

Year	Initial Investment (₹)	Contribution (₹)	Fixed maintenance costs (₹)	Other fixed operating costs (excluding depreciation) (₹)	Residual Value (₹)	Net cash flow (₹)
0	(12,00,000)		(40,000)			(12,40,000)
1		11,60,000	(40,000)	(3,60,000)		7,60,000
2		11,60,000	(40,000)	(3,60,000)		7,60,000
3		11,60,000		(3,60,000)	1,20,000	9,20,000

Machine 2

Other fixed operating costs (excluding depreciation) = $6,10,000 - [(16,00,000 - 1,00,000) / 5] = ₹ 3,10,000$

Year	Initial Investment (₹) (16,00,000)	Contribution (₹)	Fixed maintenance costs (₹) (80,000)	Other fixed operating costs (excluding depreciation) (₹)	Residual Value (₹)	Net cash flow (₹) (16,80,000)
0						
1		12,00,000	(80,000)	(3,10,000)		8,10,000
2		12,00,000	(80,000)	(3,10,000)		8,10,000
3		12,00,000	(80,000)	(3,10,000)		8,10,000
4		12,00,000	(80,000)	(3,10,000)		8,10,000
5		12,00,000		(3,10,000)	1,00,000	9,90,000

Calculation of Net Present Value

Year	12% discount factor	Machine 1		Machine 2	
		Net cash flow (₹)	Present value (₹)	Net cash flow (₹)	Present value (₹)
0	1.000	(12,40,000)	(12,40,000)	(16,80,000)	(16,80,000)
1	0.893	7,60,000	6,78,680	8,10,000	7,23,330



2	0.797	7,60,000	6,05,720	8,10,000	6,45,570
3	0.712	9,20,000	6,55,040	8,10,000	5,76,720
4	0.636			8,10,000	5,15,160
5	0.567			9,90,000	5,61,330
NPV @ 12%			6,99,440		13,42,110
PVAF @ 12%			2.402		3.605
Equivalent Annualized Criterion			2,91,190.674		3,72,291.262

Recommendation: Machine 2 is more beneficial using Equivalent Annualized Criterion.

(ii) Calculation of sensitivity of recommendation in part (i) to changes in the contribution generated by machine 1

Difference in Equivalent Annualized Criterion of Machines required for changing the recommendation in part (i) = 3,72,291.262 - 2,91,190.674 = ₹ 81,100.588

∴ Sensitivity relating to contribution $\frac{81,100.588}{11,60,000.00} \times 100 = 6.991$ or **7% yearly**

Alternatively,

The annualized equivalent cash flow for machine 1 is lower by ₹ (3,72,291.262 - 2,91,190.674) = ₹ 81,100.588 than for machine 2. Therefore, it would need to increase contribution for **complete 3 years** before the decision would be to invest in this machine.

Sensitivity w.r.t contribution = $81,100.588 / (11,60,000 \times 2.402) \times 100 = 2.911\%$

Q.6

NPV Method (Best Option)

PY Nov 22



A firm is in need of a small vehicle to make deliveries. It is intending to choose between two options. One option is to buy a new three wheeler that would cost ₹ 1,50,000 and will remain in service for 10 years.

The other alternative is to buy a second hand vehicle for ₹ 80,000 that could remain in service for 5 years.

Thereafter the firm, can buy another second hand vehicle for ₹ 60,000 that will last for another 5 years.

The scrap value of the discarded vehicle will be equal to its written down value (WDV). The firm pays 30% tax and is allowed to claim depreciation on vehicles @ 25% on WDV basis.

The cost of capital of the firm is 12%.

You are required to advise the best option.

Given:

t	1	2	3	4	5	6	7	8	9	10
PVIF (t,12%)	0.892	0.797	0.711	0.635	0.567	0.506	0.452	0.403	0.360	0.322

Ans.

Selection of Investment Decision

Tax shield on Purchase of New vehicle			
Year	WDV	Dep. @ 25%	Tax shield @ 30%
1	1,50,000	37,500	11,250
2	1,12,500	28,125	8,437
3	84,375	21,094	6,328
4	63,281	15,820	4,746
5	47,461	11,865	3,560
6	35,596	8,899	2,670
7	26,697	6,674	2,002
8	20,023	5,006	1,502
9	15,017	3,754	1,126

10	11,263	2,816	845
11	8,447	Scrap value	

Tax shield on Purchase of Second hand vehicles

Year	WDV	Dep. @ 25%	Tax shield @ 30%
1	80,000	20,000	6,000
2	60,000	15,000	4,500
3	45,000	11,250	3,375
4	33,750	8,437	2,531
5	25,313	6,328	1,898
6	60,000	15,000	4,500
7	45,000	11,250	3,375
8	33,750	8,437	2,531
9	25,313	6,328	1,898
10	18,985	4,746	1,424

Scrap value = ₹ 18,985

Scrap value = ₹ 14,239

Calculation of PV of Net outflow of New Vehicle

Year	Cash OF/IF	PV Factor	PV of OF/IF
0	1,50,000	1	1,50,000
1	(11,250)	0.892	(10,035)
2	(8,437)	0.797	(6,724)
3	(6,328)	0.711	(4,499)
4	(4,746)	0.635	(3,014)
5	(3,560)	0.567	(2,018)
6	(2,670)	0.506	(1,351)
7	(2,002)	0.452	(905)
8	(1,502)	0.403	(605)
9	(1,126)	0.360	(405)
10	(845 + 8447)	0.322	(2,992)
		PVNOF	1,17,452

Calculation of PV of Net outflow of Second hand Vehicles

Year	Cash OF/IF	PV Factor	PV of OF/IF
0	80,000	1	80,000
1	(6,000)	0.892	(5,352)
2	(4,500)	0.797	(3,587)
3	(3,375)	0.711	(2,400)
4	(2,531)	0.635	(1,607)
5	(60000 - 18985 - 1898) = 39,117	0.567	22,179
6	(4,500)	0.506	(2,277)
7	(3,375)	0.452	(1,525)



8	(2,531)	0.403	(1,020)
9	(1,898)	0.360	(683)
10	(1424 + 14239) = (15,663)	0.322	(5,043)
		PVNOF	78,686

Advise: The PV of net outflow is low in case of buying the second hand vehicles. Therefore, it is advisable to buy second hand vehicles.

Q.7

NPV Method (Buy M/c or not)

PY Nov 22



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. Consider tax rate of 30% and Discounting Rate as 10%.

Advise:

Whether it would be profitable for the hospital to purchase the machine?

Give your recommendation as per Net Present Value method and Present Value Index method under below mentioned two situations:

- If Commission income of ₹ 12,000 p.a. is before taxes.
- If Commission income of ₹ 12,000 p.a. is net of taxes

Given:

t	1	2	3	4	5	6	7	8
PVIF (t, 10%)	0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467

Ans.

Analysis of Investment Decisions

Determination of Cash inflows	Situation-(i) Commission Income before taxes	Situation-(ii) Commission Income after taxes
<i>Cash flow up-to 7th year:</i>		
Sales Revenue	40,000	40,000
Less: Operating Cost	(7,500)	(7,500)
	32,500	32,500
Less: Depreciation (80,000 - 6,000) ÷ 8	(9,250)	(9,250)
Net Income	23,250	23,250
Tax @ 30%	(6,975)	(6,975)
Earnings after Tax (EAT)	16,275	16,275
Add: Depreciation	9,250	9,250
Cash inflow after tax per annum	25,525	25,525
Less: Loss of Commission Income	(8,400)	(12,000)
Net Cash inflow after tax per annum	17,125	13,525
<i>In 8th Year:</i>		
Net Cash inflow after tax	17,125	13,525
Add: Salvage Value of Machine	6,000	6,000
Net Cash inflow in year 8	23,125	19,525

Calculation of Net Present Value (NPV) and Profitability Index (PI)

Particulars	PV factor @10%	Situation-(i) [Commission Income before taxes]	Situation-(ii) [Commission Income after taxes]
A Present value of cash inflows (1 st to 7 th year)	4.867	83,347.38 (17,125 × 4.867)	65,826.18 (13,525 × 4.867)
B Present value of cash inflow at 8 th year	0.467	10,799.38 (23,125 × 0.467)	9,118.18 (19,525 × 0.467)
C PV of cash inflows		94,146.76	74,944.36
D Less: Cash Outflow	1.00	(80,000)	(80,000)
E Net Present Value (NPV)		14,146.76	(5,055.64)
F PI = (C÷D)		1.18	0.94

Recommendation: The hospital may consider purchasing of diagnostic machine in situation (i) where commission income is 12,000 before tax as NPV is positive and PI is also greater than 1. Contrary to situation (i), in situation (ii) where the commission income is net of tax, the recommendation is reversed to not purchase the machine as NPV is negative and PI is also less than 1.

Q.8

Buy New Machine

RTP July 21



The General Manager of Merry Ltd. is considering the replacement of five-year-old equipment. The company has to incur excessive maintenance cost of the equipment. The equipment has zero written down value. It can be modernized at a cost of ₹ 1,40,000 enhancing its economic life to 5 years. The equipment could be sold for ₹ 30,000 after 5 years. The modernization would help in material handling and in reducing labour, maintenance & repairs costs.

The company has another alternative to buy a new machine at a cost of ₹ 3,50,000 with an economic life of 5 years and salvage value of ₹ 60,000. The new machine is expected to be more efficient in reducing costs of material handling, labour, maintenance & repairs, etc.

The annual cost are as follows:

	Existing Equipment (₹)	Modernization (₹)	New Machine (₹)
Wages & Salaries	45,000	35,500	15,000
Supervision	20,000	10,000	7,000
Maintenance	25,000	5,000	2,500
Power	30,000	20,000	15,000
	1,20,000	70,500	39,500

Assuming tax rate of 50% and required rate of return of 10%, should the company modernize the equipment or buy a new machine? PV factor at 10% are as follows:

Year	1	2	3	4	5
PV factor	0.909	0.826	0.751	0.683	0.621

Ans.

Workings:

Calculation of Depreciation:

$$\text{On Modernized Equipment} = \frac{140000 - 30000}{5 \text{ years}} = ₹ 22,000 \text{ p.a.}$$

$$\text{On New machine} = \frac{350000 - 60000}{5 \text{ years}} = ₹ 58,000 \text{ p.a.}$$

(i) Calculation of Incremental annual cash inflows/ savings:



Particulars	Existing Equipment (₹)	Modernization		New Machine	
		Amount (₹)	Savings (₹)	Amount (₹)	Savings (₹)
	(1)	(2)	(3)=(1)-(2)	(4)	(5)=(1)-(4)
Wages & Salaries	45,000	35,500	9,500	15,000	30,000
Supervision	20,000	10,000	10,000	7,000	13,000
Maintenance	25,000	5,000	20,000	2,500	22,500
Power	30,000	20,000	10,000	15,000	15,000
Total	1,20,000	70,500	49,500	39,500	80,500
Less: Depreciation (Refer Workings)			22,000		58,000
Total Savings			27,500		22,500
Less: Tax @ 50%			13,750		11,250
After Tax Savings			13,750		11,250
Add: Depreciation			22,000		58,000
Incremental Annual Cash Inflows			35,750		69,250

(ii) Calculation of Net Present Value (NPV)

Particulars	Year	Modernization (₹)	New Machine (₹)
Initial Cash outflow (A)	0	1,40,000.00	3,50,000.00
Incremental Cash Inflows	1-5	1,35,492.50 (₹ 35,750 × 3.790)	2,62,457.50 (₹ 69,250 × 3.790)
Salvage value	5	18,630.00 (₹ 30,000 × 0.621)	37,260.00 (₹ 60,000 × 0.621)
PV of Cash inflows (B)		1,54,122.50	2,99,717.50
Net Present Value (B - A)		14,122.50	(50,282.50)

Advise: The company should modernize its existing equipment and not buy a new machine because NPV is positive in modernization of equipment.

Q.9

Buy New Machine

RTP Nov 20



A large profit making company is considering the installation of a machine to process the waste produced by one of its existing manufacturing process to be converted into a marketable product. At present, the waste is removed by a contractor for disposal on payment by the company of ₹ 150 lakh per annum for the next four years. The contract can be terminated upon installation of the aforesaid machine on payment of a compensation of ₹ 90 lakh before the processing operation starts. This compensation is not allowed as deduction for tax purposes. The machine required for carrying out the processing will cost ₹ 600 lakh to be financed by a loan repayable in 4 equal instalments commencing from end of the year 1. The interest rate is 14% per annum. At the end of the 4th year, the machine can be sold for ₹ 60 lakh and the cost of dismantling and removal will be ₹ 45 lakh. Sales and direct costs of the product emerging from waste processing for 4 years are estimated as under:

Year	(₹ In lakh)			
	1	2	3	4
Sales	966	966	1,254	1,254

Material consumption	90	120	255	255
Wages	225	225	255	300
Other expenses	120	135	162	210
Factory overheads	165	180	330	435
Depreciation (as per income tax rules)	150	114	84	63

Initial stock of materials required before commencement of the processing operations is ₹60 lakh at the start of year 1. The stock levels of materials to be maintained at the end of year 1, 2 and 3 will be ₹ 165 lakh and the stocks at the end of year 4 will be nil. The storage of materials will utilise space which would otherwise have been rented out for ₹ 30 lakh per annum. Labour costs include wages of 40 workers, whose transfer to this process will reduce idle time payments of ₹ 45 lakh in the year - 1 and ₹ 30 lakh in the year - 2. Factory overheads include apportionment of general factory overheads except to the extent of insurance charges of ₹ 90 lakh per annum payable on this venture. The company's tax rate is 30%.

Present value factors for four years are as under:

Year	1	2	3	4
PV factors @14%	0.877	0.769	0.674	0.592

ADVISE the management on the desirability of installing the machine for processing the waste. All calculations should form part of the answer.

Ans.

Statement of Operating Profit from processing of waste (₹ in lakh)

Year	1	2	3	4
Sales :(A)	966	966	1,254	1,254
Material consumption	90	120	255	255
Wages	180	195	255	300
Other expenses	120	135	162	210
Factory overheads (insurance only)	90	90	90	90
Loss of rent on storage space (opportunity cost)	30	30	30	30
Interest @14%	84	63	42	21
Depreciation (as per income tax rules)	150	114	84	63
Total cost: (B)	744	747	918	969
Profit (C)=(A)-(B)	222	219	336	285
Tax (30%)	66.6	65.7	100.8	85.5
Profit after Tax (PAT)	155.4	153.3	235.2	199.5

Statement of Incremental Cash Flows (₹ in lakh)

Year					
Material stock	(60)	(105)	-	-	165
Compensation for contract	(90)	-	-	-	-
Contract payment saved	-	150	150	150	150
Tax on contract payment	-	(45)	(45)	(45)	(45)
Incremental profit	-	222	219	336	285
Depreciation added back	-	150	114	84	63
Tax on profits	-	(66.6)	(65.7)	(100.8)	(85.5)
Loan repayment	-	(150)	(150)	(150)	(150)
	-	-	-	-	15



Profit on sale of machinery (net)	(150)	155.4	222.3	274.2	397.5
Total incremental cash flows	1.00	0.877	0.769	0.674	0.592
Present value factor	(150)	136.28	170.95	184.81	235.32
Present value of cash flows					
Net present value					577.36

Advice: Since the net present value of cash flows is ₹ 577.36 lakh which is positive the management should install the machine for processing the waste.

Notes:

- Material stock increases are taken in cash flows.
- Idle time wages have also been considered.
- Apportioned factory overheads are not relevant only insurance charges of this project are relevant.
- Interest calculated at 14% based on 4 equal instalments of loan repayment.
- Sale of machinery- Net income after deducting removal expenses taken. Tax on Capital gains ignored.
- Saving in contract payment and income tax thereon considered in the cash flows.

Q.10

Buy or Rent

PY May 18



Maruti Ltd. requires a plant costing ₹ 200 Lakhs for a period of 5 years. The company can use the plant for the stipulated period through leasing arrangement or the requisite amount can be borrowed to buy the plant. In case of leasing, the company received a proposal to pay annual lease rent of ₹ 48 Lakhs at the end of each year for a period of 5 years.

In case of purchase, the company would have a 12%, 5 years loan to be paid in equated annual installment, each installment becoming due in the beginning of each year. It is estimated that plant can be sold for ₹ 40 Lakhs at the end of 5th year. The company uses straight line method of depreciation. Corporate tax rate is 30%. Cost of Capital after tax for the company is 10%.

The PVIF @ 10% and 12% for the five years are given below:

Year	1	2	3	4	5
PVIF @ 10	0.909	0.826	0.751	0.683	0.621
PVIF @ 12	0.893	0.797	0.712	0.636	0.567

You are required to advise whether the plant should be purchased or taken on lease.

Ans.

Purchase Option

Loan installment = ₹ 200 lakhs / (1 + PVIFA 12%, 4)
 = ₹ 200 lakhs / (1 + 3.038) = ₹ 49.53 lakhs
 Interest payable = (₹ 49.53 X 5) - ₹ 200 lakhs = ₹ 47.65 lakhs

Working note:

Amortisation of Loan Installment

Year	Loan amount (₹ In Lakhs)	Installment (₹ In Lakhs)	Interet (₹ In Lakhs)	Principal (₹ In Lakhs)	O/S Amount (₹ In Lakhs)
0	200	49.53	0.00	49.53	150.47
1	150.47	49.53	18.06	31.47	119.00
2	119.00	49.53	14.28	35.25	83.75
3	83.75	49.53	10.05	39.48	44.27
4	44.27	49.53	*5.26	44.27	-
5	0	0	0	0	0

Calculation of PV of outflow under Purchase Option

(₹ In Lakhs)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
End	Debt Payment	Int. of the o/s Principal	Dep.	Tax Shield [(3) + (4)] × 0.3	Net Cash out flows (2) - (5)	PV factors @ 10%	PV
0	49.53	0.00	0.00	0.00	49.53	1.000	49.53
1	49.53	18.06	32.00	15.02	34.51	0.909	31.37
2	49.53	14.28	32.00	13.88	35.65	0.826	29.44
3	49.53	10.05	32.00	12.61	36.92	0.751	27.72
4	49.53	*5.26	32.00	11.18	38.35	0.683	26.19
5	49.53	0	32.00	9.60	(9.60)	0.621	(5.96)
		47.65	160.00				158.29
Less: PV of Salvage Value (₹40 lakhs × 0.621) =							24.84
Total PV of Outflow							133.45

*Balancing Figure

Leasing Option

PV of Outflows under lease @ 10% = ₹ 48 lakhs × (1-0.30) × 3.790
= ₹ 127.34 lakhs

Decision: The plant should be taken on lease because the PV of outflows is less as compared to purchase option.

Q.11

Equivalent Method

MTP Nov 23(1)

A new project "Ambar" requires an initial outlay of ₹ 4,50,000. The company uses certainty equivalent method approach to evaluate the project. The risk-free rate is 7%. Following information is available:

Year	Cash Flow After Tax (₹)	Certainty Equivalent Coefficient
1	1,50,000	0.90
2	2,25,000	0.80
3	1,75,000	0.58
4	1,50,000	0.56
5	70,000	0.50

PV Factor at 7%

Year	1	2	3	4	5
PV Factor	0.935	0.873	0.816	0.763	0.713

Is investment in the project beneficial based on above information?

Ans.

Calculation of Net Present Value of the Project

Year	Cash Inflows After Tax (in ₹)	C.E.	Adjusted Cash Inflows (in ₹)	Present Value Factor	Present Value (in ₹)
1	1,50,000	0.90	1,35,000	0.935	1,26,225
2	2,25,000	0.80	1,80,000	0.873	1,57,140
3	1,75,000	0.58	1,01,500	0.816	82,824
4	1,50,000	0.56	84,000	0.763	64,092



5	70,000	0.50	35,000	0.713	24,955
Total Present Value of Cash Inflows					4,55,236
Less: Initial Investment or Cash Outflow required for "Ambar"					(4,50,000)
Net Present Value					5,236

Conclusion:
As the Net Present Value of the project after considering

the Certainty Equivalent factors is still positive, it may be advised to invest in project "Ambar".

Q.12

NPV Method (Invest Appraisal)

RTP Nov 23



PQR Limited is considering buying a new machine which would have a useful economic life of five years, at a cost of ₹ 40,00,000 and a scrap value of ₹ 5,00,000, with 80 per cent of the cost being payable at the start of the project and 20 per cent at the end of the first year. The machine would produce 80,000 units per annum of a new product with an estimated selling price of ₹ 400 per unit. Direct costs would be ₹ 375 per unit and annual fixed costs, including depreciation calculated on a straight-line basis, would be ₹ 10,40,000 per annum. In the first year and the second year, special sales promotion expenditure, not included in the above costs, would be incurred, amounting to ₹ 1,25,000 and ₹ 1,75,000 respectively.

EVALUATE the project using the NPV method of investment appraisal, assuming the company's cost of capital to be 12 percent.

Ans.

Calculation of Net Cash flows

Contribution = $(400 - 375) \times 80,000 = ₹ 20,00,000$

Fixed costs = $10,40,000 - [(40,00,000 - 5,00,000)/5] = ₹ 3,40,000$

Year	Capital (₹)	Contribution (₹)	Fixed costs (₹)	Promotion (₹)	Net cash flow (₹)
0	(32,00,000)				(32,00,000)
1	(8,00,000)	20,00,000	(3,40,000)	(1,25,000)	7,35,000
2		20,00,000	(3,40,000)	(1,75,000)	14,85,000
3		20,00,000	(3,40,000)		16,60,000
4		20,00,000	(3,40,000)		16,60,000
5	5,00,000	20,00,000	(3,40,000)		21,60,000

Calculation of Net Present Value

Year	Net cash flow	12% discount factor	Present value (₹)
0	(32,00,000)	1.000	(32,00,000)
1	7,35,000	0.893	6,56,355
2	14,85,000	0.797	11,83,545
3	16,60,000	0.712	11,81,920
4	16,60,000	0.636	10,55,760
5	21,60,000	0.567	12,24,720
			21,02,30

The net present value of the project is ₹21,02,300.

Q.13

NPV Method (Buy M/c or not)

RTP May 19



BT Pathology Lab Ltd. is using X-ray machines which reached at the end of their useful lives. Following new X-ray machines are of two different brands with same features are available for the purchase.

Brand	Cost of Machine	Life of Machine	Maintenance Cost			Rate of Depreciation
			Year 1-5	Year 6-10	Year 11-15	
XYZ	₹6,00,000	15 years	₹ 20,000	₹ 28,000	₹ 39,000	4%
ABC	₹4,50,000	10 years	₹ 31,000	₹ 53,000	--	6%

Residual Value of both of above machines shall be dropped by 1/3 of Purchase price in the first year and thereafter shall be depreciated at the rate mentioned above.

Alternatively, the machine of Brand ABC can also be taken on rent to be returned back to the owner after use on the following terms and conditions:

- Annual Rent shall be paid in the beginning of each year and for first year it shall be ₹ 1,02,000.
- Annual Rent for the subsequent 4 years shall be ₹ 1,02,500.
- Annual Rent for the final 5 years shall be ₹ 1,09,950.
- The Rent Agreement can be terminated by BT Labs by making a payment of ₹ 1,00,000 as penalty. This penalty would be reduced by ₹ 10,000 each year of the period of rental agreement.

You are required to:

- ADVISE which brand of X-ray machine should be acquired assuming that the use of machine shall be continued for a period of 20 years.
- STATE which of the option is most economical if machine is likely to be used for a period of 5 years? The cost of capital of BT Labs is 12%.

Ans.

Since the life span of each machine is different and time span exceeds the useful lives of each model, we shall use Equivalent Annual Cost method to decide which brand should be chosen.

- If machine is used for 20 years

Present Value (PV) of cost if machine of Brand XYZ is purchased

Period	Cash Outflow(₹)	PVF@12%	Present Value
0	6,00,000	1.000	6,00,000
1-5	20,000	3.605	72,100
6-10	28,000	2.045	57,260
11-15	39,000	1.161	45,279
15	(64,000)	0.183	(11,712)
			7,62,927

PVAF for 1-15 years 6.811

$$\text{Equivalent Annual Cost} = \frac{762927}{6.811} = ₹ 1,12,014$$

Present Value (PV) of cost if machine of Brand ABC is purchased

Period	Cash Outflow (₹)	PVF@12%	Present Value
0	4,50,000	1.000	4,50,000
1 - 5	31,000	3.605	1,11,755
6 -10	53,000	2.045	1,08,385
10	(57,000)	0.322	(18,354)
			6,51,786

PVAF for 1-10 years 5.65

$$\text{Equivalent Annual Cost} = \frac{651786}{5.65} = ₹ 1,15,360$$

Present Value (PV) of cost if machine of Brand ABC is taken on Rent



Period	Cash Outflow(₹)	PVF@12%	Present Value
0	1,02,000	1.000	1,02,000
1 - 4	1,02,500	3.037	3,11,293
5-9	1,09,950	2.291	2,51,895
			6,65,188

PVAF for 1-10 years =

5.65

Equivalent Annual Cost =

$$\frac{665188}{5.65} = ₹ 1,17,732$$

Decision: Since Equivalent Annual Cash Outflow is least in case of purchase of Machine of brand XYZ the same should be purchased.

(ii) **If machine is used for 5 years**

(a) Scrap Value of Machine of Brand XYZ

$$= ₹ 6,00,000 - ₹ 2,00,000 - ₹ 6,00,000 \times 0.04 \times 4 = ₹ 3,04,000$$

(b) Scrap Value of Machine of Brand ABC

$$= ₹ 4,50,000 - ₹ 1,50,000 - ₹ 4,50,000 \times 0.06 \times 4 = ₹ 1,92,000$$

Present Value (PV) of cost if machine of Brand XYZ is purchased

Period	Cash Outflow(₹)	PVF@12%	Present Value
0	6,00,000	1.000	6,00,000
1 - 5	20,000	3.605	72,100
5	(3,04,000)	0.567	(1,72,368)
			4,99,732

Present Value (PV) of cost if machine of Brand ABC is purchased

Period	Cash Outflow(₹)	PVF@12%	Present Value
0	4,50,000	1.000	4,50,000
1-5	31,000	3.605	1,11,755
5	(1,92,000)	0.567	(1,08,864)
			4,52,891

Present Value (PV) of cost if machine of Brand ABC is taken on Rent

Period	Cash Outflow(₹)	PVF@12%	Present Value
0	1,02,000	1.000	1,02,000
1-4	1,02,500	3.037	3,11,293
5	50,000	0.567	28,350
			4,41,643

Decision: Since Cash Outflow is least in case of lease of Machine of brand ABC the same should be taken on rent.

Q. 14

Disposing Garbage Car

MTP May 22(1)



A manufacturing company is presently paying a garbage disposer company ₹ 0.50 per kilogram to dispose-off the waste resulting from its manufacturing operations. At normal operating capacity, the waste is about 2,00,000 kilograms per year.

After spending ₹ 1,20,000 on research, the company discovered that the waste could be sold for ₹ 5 per kilogram if it was processed further. Additional processing would, however, require an investment of ₹ 12,00,000 in new equipment, which would have an estimated life of 10 years with no salvage value. Depreciation would be calculated by straight line method.

No change in the present selling and administrative expenses is expected except for the costs incurred in advertising ₹ 40,000 per year, if the new product is sold. Additional processing costs would include variable cost of ₹ 2.50 per kilogram of waste put into process along with fixed cost of ₹ 60,000 per year (excluding Depreciation).

There will be no losses in processing, and it is assumed that the total waste processed in a given year will be sold in the same year. Estimates indicate that 2,00,000 kilograms of the product could be sold each year.

The management when confronted with the choice of disposing off the waste or processing it further and selling it, seeks your ADVICE. Which alternative would you RECOMMEND? Assume that the firm's cost of capital is 15% and it pays on an average 50% Tax on its income.

Consider Present value of Annuity of ₹ 1 per year @ 15% p.a. for 10 years as 5.019.

Ans.

Evaluation of Alternatives:

Savings in disposing off the waste

Particulars	(₹)
Outflow (2,00,000 × ₹ 0.50)	1,00,000
Less: tax savings @ 50%	50,000
Net Outflow per year	50,000

Calculation of Annual Cash inflows in Processing of waste Material

Particulars	Amount (₹)	Amount (₹)
Sale value of waste (₹ 5 × 2,00,000 kilograms)		10,00,000
Less: Variable processing cost (₹ 2.50 × 2,00,000 kilograms)	5,00,000	
Less: Fixed processing cost	60,000	
Less: Advertisement cost	40,000	
Less: Depreciation	1,20,000	(7,20,000)
Earnings before tax (EBT)		2,80,000
Less: Tax @ 50%		(1,40,000)
Earnings after tax (EAT)		1,40,000
Add: Depreciation		1,20,000
Annual Cash inflows		2,60,000

Total Annual Benefits = Annual Cash inflows + Net savings (adjusting tax) in disposal cost
= ₹ 2,60,000 + ₹ 50,000 = ₹ 3,10,000

Calculation of Net Present Value

Year	Particulars	Amount (₹)
0	Investment in new equipment	(12,00,000)
1 to 10	Total Annual benefits × PVAF(10 years, 15%)	15,55,890
	Net Present Value	3,55,890

Recommendation: Processing of waste is a better option as it gives a positive Net Present Value.



Note- Research cost of ₹ 1,20,000 is not relevant for decision making as it is sunk cost.

Q.15

Calculate NPV & IRR

MTP May 18



You are a financial analyst of B Limited. The director of finance has asked you to analyse two capital investments proposals, Projects X and Y. Each project has a cost of ₹10,000 and the cost of capital for each project is 12 per cent. The project's expected net cash flows are as follows:

Year	Expected net cash flows	
	Project X (₹)	Project Y (₹)
0	(10,000)	(10,000)
1	6,500	3,500
2	3,000	3,500
3	3,000	3,500
4	1,000	3,500

- (i) CALCULATE each project's payback period, net present value (NPV) and internal rate of return (IRR).
(ii) DETERMINE, which project or projects should be accepted if they are independent?

Ans.

- (i)
- Payback Period Method**

The cumulative cash flows for each project are as follows

Year	Cumulative Cash Flows	
	Project X (₹)	Project Y (₹)
0	(10,000)	(10,000)
1	(3,500)	(6,500)
2	(500)	(3,000)
3	2,500	500
4	3,500	4,000

$$\text{Payback}_x = 2 + \frac{500}{3000} = 2.17 \text{ years.}$$

$$\text{Payback}_y = 2 + \frac{3000}{3500} = 2.86 \text{ years.}$$

Net Present Value (NPV)

$$\text{NPV}_x = -₹ 10,000 + \frac{6500}{(1.12)^1} - \frac{3000}{(1.12)^2} - \frac{3000}{(1.12)^3} - \frac{1000}{(1.12)^4} = ₹ 966.01$$

$$\text{NPV}_y = -₹ 10,000 + \frac{3500}{(1.12)^1} - \frac{3500}{(1.12)^2} - \frac{3500}{(1.12)^3} - \frac{3500}{(1.12)^4} = -630.72.$$

Internal Rate of Return (IRR)

To solve for each project's IRR, find the discount rates that equate each NPV to zero: IRR_x = 18.0%.
IRR_y = 15.0%.

- (ii) The following table summarizes the project rankings by each method:

	Project that ranks higher
Payback	X
NPV	X
IRR	X

Analysis: All methods rank Project X over Project Y. In addition, both projects are acceptable under the NPV and IRR criteria. Thus, both projects should be accepted if they are independent

Q. 16

MPV & PI Method

PY May 22



Alpha Limited is a manufacturer of computers. It wants to introduce artificial intelligence while making computers. The estimated annual saving from introduction of the artificial intelligence (AI) is as follows:

- reduction of five employees with annual salaries of ₹ 3,00,000 each
- reduction of ₹ 3,00,000 in production delays caused by inventory problem
- reduction in lost sales ₹ 2,50,000 and
- Gain due to timely billing ₹ 2,00,000

The purchase price of the system for installation of artificial intelligence is ₹ 20,00,000 and installation cost is ₹ 1,00,000. 80% of the purchase price will be paid in the year of purchase and remaining will be paid in next year.

The estimated life of the system is 5 years and it will be depreciated on a straight -line basis. However, the operation of the new system requires two computer specialists with annual salaries of ₹ 5,00,000 per person.

In addition to above, annual maintenance and operating cost for five years are as below:

(Amount in ₹)

Year	1	2	3	4	5
Maintenance & Operating Cost	2,00,000	1,80,000	1,60,000	1,40,000	1,20,000

Maintenance and operating cost are payable in advance.

The company's tax rate is 30% and its required rate of return is 15%.

Year	1	2	3	4	5
PVIF 0.10, t	0.909	0.826	0.751	0.683	0.621
PVIF 0.12, t	0.893	0.797	0.712	0.636	0.567
PVIF 0.15, t	0.870	0.756	0.658	0.572	0.497

Evaluate the project by using Net Present Value and Profitability Index

Ans.

Computation of Annual Cash Flow after Tax						
Particulars	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Savings in Salaries		15,00,000	15,00,000	15,00,000	15,00,000	15,00,000
Reduction in Production Delays		3,00,000	3,00,000	3,00,000	3,00,000	3,00,000
Reduction in Lost Sales		2,50,000	2,50,000	2,50,000	2,50,000	2,50,000
Gain due to Timely Billing		2,00,000	2,00,000	2,00,000	2,00,000	2,00,000
Salary to Computer Specialist		(10,00,000)	(10,00,000)	(10,00,000)	(10,00,000)	(10,00,000)
Maintenance and Operating Cost (payable in advance)		(2,00,000)	(1,80,000)	(1,60,000)	(1,40,000)	(1,20,000)



Depreciation (21 lakhs/5)		(4,20,000)	(4,20,000)	(4,20,000)	(4,20,000)	(4,20,000)
Gain Before Tax		6,30,000	6,50,000	6,70,000	6,90,000	7,10,000
Less: Tax (30%)		1,89,000	1,95,000	2,01,000	2,07,000	2,13,000
Gain After Tax		4,41,000	4,55,000	4,69,000	4,83,000	4,97,000
Add: Depreciation		4,20,000	4,20,000	4,20,000	4,20,000	4,20,000
Add: Maintenance and Operating Cost (payable in advance)		2,00,000	1,80,000	1,60,000	1,40,000	1,20,000
Less: Maintenance and Operating Cost (payable in advance)	(2,00,000)	(1,80,000)	(1,60,000)	(1,40,000)	(1,20,000)	-
Net CFAT	(2,00,000)	8,81,000	8,95,000	9,09,000	9,23,000	10,37,000

Note: Annual cash flows can also be calculated Considering tax shield on depreciation & maintenance and operating cost. There will be no change in the final cash flows after tax.

Computation of NPV				
Particulars	Year	Cash Flows (₹)	PVF	PV (₹)
Initial Investment (80% of 20 Lacs)	0	16,00,000	1	16,00,000
Installation Expenses	0	1,00,000	1	1,00,000
Instalment of Purchase Price	1	4,00,000	0.870	3,48,000
PV of Outflows (A)				20,48,000
CFAT	0	(2,00,000)	1	(2,00,000)
CFAT	1	8,81,000	0.870	7,66,470
CFAT	2	8,95,000	0.756	6,76,620
CFAT	3	9,09,000	0.658	5,98,122
CFAT	4	9,23,000	0.572	5,27,956
CFAT	5	10,37,000	0.497	5,15,389
PV of Inflows (B)				28,84,557
NPV (B-A)				8,36,557
Profitability Index (B/A)				1.408 or 1.41

Evaluation: Since the NPV is positive (i.e. ₹ 8,36,557) and Profitability Index is also greater than 1 (i.e. 1.41), Alpha Ltd. may introduce artificial intelligence (AI) while making computers.

Q.17

Calculate NPV, PI & Disc Payback

PY Jan 21



A company wants to buy a machine, and two different models namely A and B are available. Following further particulars are available:

Particulars	Machine-A	Machine-B
Original Cost (₹)	8,00,000	6,00,000
Estimated Life in years	4	4
Salvage Value (₹)	0	0

The company provides depreciation under Straight Line Method. Income tax rate applicable is 30%.

The present value of ₹ 1 at 12% discounting factor and net profit before depreciation and tax are as under:

Year	Net Profit Before Depreciation and tax		PV Factor
	Machine-A ₹	Machine-B ₹	
1.	2,30,000	1,75,000	0.893
2.	2,40,000	2,60,000	0.797
3.	2,20,000	3,20,000	0.712
4.	5,60,000	1,50,000	0.636

Calculate:

- NPV (Net Present Value)
- Discounted pay-back period
- PI (Profitability Index)

Suggest: Purchase of which machine is more beneficial under Discounted pay-back period method, NPV method and PI method.

Ans.

Workings:

(i) Calculation of Annual Depreciation

$$\text{Depreciation on Machine - A} = \frac{800000}{4} = ₹ 2,00,000$$

$$\text{Depreciation on Machine - B} = \frac{600000}{4} = ₹ 1,50,000$$

(ii) Calculation of Annual Cash Inflows

Particulars	Machine-A (₹)			
	1	2	3	4
Net Profit before Depreciation and Tax	2,30,000	2,40,000	2,20,000	5,60,000
Less: Depreciation	2,00,000	2,00,000	2,00,000	2,00,000
Profit before Tax	30,000	40,000	20,000	3,60,000
Less: Tax @ 30%	9,000	12,000	6,000	1,08,000
Profit after Tax	21,000	28,000	14,000	2,52,000
Add: Depreciation	2,00,000	2,00,000	2,00,000	2,00,000
Annual Cash Inflows	2,21,000	2,28,000	2,14,000	4,52,000

Particulars	Machine-B (₹)			
	1	2	3	4
Net Profit before Depreciation and Tax	1,75,000	2,60,000	3,20,000	1,50,000
Less: Depreciation	1,50,000	1,50,000	1,50,000	1,50,000
Profit before Tax	25,000	1,10,000	1,70,000	0
Less: Tax @ 30%	7,500	33,000	51,000	0
Profit after Tax	17,500	77,000	1,19,000	0
Add: Depreciation	1,50,000	1,50,000	1,50,000	1,50,000
Annual Cash Inflows	1,67,500	2,27,000	2,69,000	1,50,000

(iii) Calculation of PV of Cash Flows



Year	Machine - A				Machine - B		
	PV of Re 1 @ 12%	Cash flow (₹)	PV (₹)	Cumulative PV (₹)	Cash flow (₹)	PV (₹)	Cumulative PV (₹)
1	0.893	2,21,000	1,97,353	1,97,353	1,67,500	1,49,578	1,49,578
2	0.797	2,28,000	1,81,716	3,79,069	2,27,000	1,80,919	3,30,497
3	0.712	2,14,000	1,52,368	5,31,437	2,69,000	1,91,528	5,22,025
4	0.636	4,52,000	2,87,472	8,18,909	1,50,000	95,400	6,17,425

1. NPV (Net Present Value)

Machine - A

$$\text{NPV} = ₹ 8,18,909 - ₹ 8,00,000 = ₹ 18,909$$

Machine - B

$$\text{NPV} = ₹ 6,17,425 - ₹ 6,00,000 = ₹ 17,425$$

2. Discounted Payback Period

Machine - A

$$\begin{aligned} \text{Discounted Payback Period} &= 3 + \frac{800000 - 531437}{287472} \\ &= 3 + 0.934 \\ &= 3.934 \text{ years or 3 years 11.21 months} \end{aligned}$$

Machine - B

$$\begin{aligned} \text{Discounted Payback Period} &= 3 + \frac{600000 - 522025}{95400} \\ &= 3 + 0.817 \\ &= 3.817 \text{ years or 3 years 9.80 months} \end{aligned}$$

3. PI (Profitability Index)

Machine - A

$$\text{Profitability Index} = \frac{818909}{800000} = 1.024$$

Machine - B

$$\text{Profitability Index} = \frac{617425}{600000} = 1.029$$

Suggestion:

Method	Machine - A	Machine - B	Suggested Machine
Net Present Value	₹ 18,909	₹ 17,425	Machine A
Discounted Payback Period	3.934 years	3.817 years	Machine B
Profitability Index	1.024	1.029	Machine B

Q. 18

Calculate NPV

MTP May 21(2)



- (a) SG Ltd. is considering a project "Z" with an initial outlay of Rs. 7,50,000 and life of 5 years. The estimates of project are as follows:

	Lower Estimates	Base	Upper Estimates
Sales (units)	4,500	5,000	5,500
	(Rs.)	(Rs.)	(Rs.)
Selling Price p.u.	175	200	225

Variable cost p.u.	100	125	150
Fixed Cost	50,000	75,000	1,00,000

Depreciation included in Fixed cost is Rs. 35,000 and corporate tax is 25%.

Assuming the cost of capital as 15%, DETERMINE NPV in three scenarios i.e worst, base and best case scenario. PV factor for 5 years at 15% are as follows:

Years	1	2	3	4	5
P.V. factor	0.870	0.756	0.658	0.572	0.497

Ans.

(i) **Calculation of Yearly Cash Inflow**

In worst case: High costs and Low price (Selling price) and volume(Sales units) are taken.

In best case: Low costs and High price(Selling price) and volume(Sales units) are taken.

	Worst Case	Base	Best Case
Sales (units) (A)	4,500	5,000	5,500
	(Rs.)	(Rs.)	(Rs.)
Selling Price p.u.	175	200	225
Less: Variable cost p.u.	150	125	100
Contribution p.u. (B)	25	75	125
Total Contribution (A x B)	1,12,500	3,75,000	6,87,500
Less: Fixed Cost	1,00,000	75,000	50,000
EBT	12,500	3,00,000	6,37,500
Less: Tax @ 25%	3,125	75,000	1,59,375
EAT	9,375	2,25,000	4,78,125
Add: Depreciation	35,000	35,000	35,000
Cash Inflow	44,375	2,60,000	5,13,125

(ii) **Calculation of NPV in different scenarios**

	Worst Case	Base	Best Case
Initial outlay (A) (Rs.)	7,50,000	7,50,000	7,50,000
Cash Inflow (c) (Rs.)	44,375	2,60,000	5,13,125
Cumulative PVF @ 15% (d)	3.353	3.353	3.353
PV of Cash Inflow (B = c x d) (Rs.)	1,48,789.38	8,71,780	17,20,508.13
NPV (B - A) (Rs.)	(6,01,210.62)	1,21,780	9,70,508.13

Q 19

Calculate NPV

MTP Nov 19



H Ltd. is considering a new product line to supplement its range of products. It is anticipated that the new product line will involve cash investments of Rs.70,00,000 at time 0 and Rs.1,00,00,000 in year 1. After-tax cash inflows of Rs. 25,00,000 are expected in year 2, Rs.30,00,000 in year 3, Rs.35,00,000 in year 4 and Rs.40,00,000 each year thereafter through year 10. Although the product line might be viable after year 10, the company prefers to be conservative and end all calculations at that time.

- If the required rate of return is 15 per cent, FIND OUT the net present value of the project? Is it acceptable?
- COMPUTE NPV if the required rate of return were 10 per cent?
- COMPUTE the internal rate of return?



Ans.

(i)

Year	Cash flow (Rs.)	Discount Factor (15%)	Present value (Rs.)
0	(70,00,000)	1.000	(70,00,000)
1	(1,00,00,000)	0.870	(87,00,000)
2	25,00,000	0.756	18,90,000
3	30,00,000	0.658	19,74,000
4	35,00,000	0.572	20,02,000
5-10	40,00,000	2.163	86,52,000
		Net Present Value	(11,82,000)

As the net present value is negative, the project is unacceptable.

(ii) Similarly, NPV at 10% discount rate can be computed as follows:

Year	Cash flow (Rs.)	Discount Factor (10%)	Present value (Rs.)
0	(70,00,000)	1.000	(70,00,000)
1	(1,00,00,000)	0.909	(90,90,000)
2	25,00,000	0.826	20,65,000
3	30,00,000	0.751	22,53,000
4	35,00,000	0.683	23,90,500
5-10	40,00,000	2.974	1,18,96,000
		Net Present Value	25,14,500

Since NPV = Rs.25,14,500 is positive, hence the project would be acceptable.

$$\begin{aligned}
 \text{(iii) } \text{IRR} &= L + \frac{\text{NPV}_L}{\text{NPV}_L - \text{NPV}_H} (H - L) \\
 &= 10\% + \frac{2514500}{2514500 - (-)1182000} \times (15\% - 10\%) \\
 &= 10\% + 3.4012 \text{ or } 13.40\%
 \end{aligned}$$

Q. 20

Calculate NPV

MTP May 19(2)



Probabilities for net cash flows for 3 years of a project of Ganesh Ltd are as follows:

Year 1		Year 2		Year 3	
Cash Flow (Rs.)	Probability	Cash Flow (Rs.)	Probability	Cash Flow (Rs.)	Probability
2,000	0.1	2,000	0.2	2,000	0.3
4,000	0.2	4,000	0.3	4,000	0.4
6,000	0.3	6,000	0.4	6,000	0.2
8,000	0.4	8,000	0.1	8,000	0.1

CALCULATE the expected net cash flows and the present value of the expected cash flow, using 10 per cent discount rate. Initial Investment is Rs. 10,000

Ans.

Year 1			Year 2			Year 3		
Cash Flow (Rs.)	Probability	Expected Value (Rs.)	Cash Flow (Rs.)	Probability	Expected Value (Rs.)	Cash Flow (Rs.)	Probability	Expected Value (Rs.)
2,000	0.1	200	2,000	0.2	400	2,000	0.3	600
4,000	0.2	800	4,000	0.3	1200	4,000	0.4	1,600
6,000	0.3	1,800	6,000	0.4	2400	6,000	0.2	1,200
8,000	0.4	3,200	8,000	0.1	800	8,000	0.1	800
ENCF		6,000			4,800			4,200

The present value of the expected value of cash flow at 10 per cent discount rate has been determined as follows:

$$\begin{aligned} \text{Present Value of cash flow} &= \frac{\text{ENCF}_1}{(1+K)^1} + \frac{\text{ENCF}_2}{(1+K)^2} + \frac{\text{ENCF}_3}{(1+K)^3} \\ &= \frac{6000}{(1.1)^1} + \frac{4800}{(1.1)^2} + \frac{4200}{(1.1)^3} \end{aligned}$$

$$= (6,000 \times 0.909) + (4,800 \times 0.826) + (4,200 \times 0.751) = 12,573$$

Expected Net Present value = Present Value of cash flow - Initial Investment

$$= \text{Rs. } 12,573 - \text{Rs. } 10,000 = \text{Rs. } 2,573.$$

Q. 21

MPV & Payback Method

PY Nov 18

PD Ltd. an existing company, is planning to introduce a new product with projected life of 8 years. Project cost will be ₹ 2,40,00,000. At the end of 8 years no residual value will be realized. Working capital of ₹ 30,00,000 will be needed. The 100% capacity of the project is 2,00,000 units p.a. but the Production and Sales Volume is expected are as under :

Year	Number of Units
1	60,000 units
2	80,000 units
3-5	1,40,000 units
6-8	1,20,000 units

Other Information:

- Selling price per unit ₹ 200
- Variable cost is 40 of sales.
- Fixed cost p.a. ₹ 30,00,000.
- In addition to these advertisement expenditure will have to be incurred as under:

Year	1	2	3-5	6-8
Expenditure (₹)	50,00,000	25,00,000	10,00,000	5,00,000

- Income Tax is 25%.
- Straight line method of depreciation is permissible for tax purpose.
- Cost of capital is 10%.
- Assume that loss cannot be carried forward.



Year	1	2	3	4	5	6	7	8
PVF@ 10	0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467

Advise about the project acceptability.

Ans.

Computation of initial cash outlay(COF)

	(₹ in lakhs)
Project Cost	240
Working Capital	<u>30</u>
	<u>270</u>

Calculation of Cash Inflows(CIF):

Years	1	2	3-5	6-8
Sales in units	60,000	80,000	1,40,000	1,20,000
	₹	₹	₹	₹
Contribution (₹ 200 × 60% × No. of Unit)	<u>72,00,000</u>	<u>96,00,000</u>	<u>1,68,00,000</u>	<u>1,44,00,000</u>
Less: Fixed cost	30,00,000	30,00,000	30,00,000	30,00,000
Less: Advertisement	50,00,000	25,00,000	10,00,000	5,00,000
Less: Depreciation (24000000/8) = 30,00,000	<u>30,00,000</u>	<u>30,00,000</u>	<u>30,00,000</u>	<u>30,00,000</u>
Profit/(loss)	(38,00,000)	11,00,000	98,00,000	79,00,000
Less: Tax @ 25%	NIL	<u>2,75,000</u>	<u>24,50,000</u>	<u>19,75,000</u>
Profit/(Loss) after tax	(38,00,000)	8,25,000	73,50,000	59,25,000
Add: Depreciation	<u>30,00,000</u>	<u>30,00,000</u>	<u>30,00,000</u>	<u>30,00,000</u>
Cash inflow	(8,00,000)	38,25,000	1,03,50,000	89,25,000

(Note: Since variable cost is 40%, Contribution shall be 60% of sales)

Computation of PV of CIF

Year	CIF	PV Factor	₹
	₹	@ 10%	
1	(8,00,000)	0.909	(7,27,200)
2	38,25,000	0.826	31,59,450
3	1,03,50,000	0.751	77,72,850
4	1,03,50,000	0.683	70,69,050
5	1,03,50,000	0.621	64,27,350
6	89,25,000	0.564	50,33,700
7	89,25,000	0.513	45,78,525
8	89,25,000		
Working Capital	30,00,000	0.467	55,68,975
			3,88,82,700
	PV of COF		2,70,00,000
		NPV	1,18,82,700

Recommendation: Accept the project in view of positive NPV.

Q. 22

NPV Method (Accept/Not)

PY May 19



AT Limited is considering three projects A, B and C. The cash flows associated with the projects are given below:

Cash flows associated with the Three Projects (₹)

Project	C ₀	C ₁	C ₂	C ₃	C ₃
A	(10,000)	2,000	2,000	6,000	0
B	(2,000)	0	2,000	4,000	6,000
C	(10,000)	2,000	2,000	6,000	10,000

You are required to :

- Calculate the payback period of each of the three projects.
- If the cut-off period is two years, then which projects should be accepted?
- Projects with positive NPVs if the opportunity cost of capital is 10 percent.
- "Payback gives too much weight to cash flows that occur after the cut-off date". True or false?
- "If a firm used a single cut-off period for all projects, it is likely to accept too many short lived projects." True or false?

True or false?

P.V. Factor @ 10 %

Year	0	1	2	3	4	5
P.V.	1.000	0.909	0.826	0.751	0.683	0.621

Ans.

(a) Payback Period of Projects

Projects	C ₀ (₹)	C ₁ (₹)	C ₂ (₹)	C ₃ (₹)	Payback
A	(10,000)	2000	2000	6,000	2,000+2,000+6,000 = 10,000 i.e 3 years
B	(2,000)	0	2,000	NA	0+2,000 = 2,000 i.e 2 years
C	(10,000)	2000	2000	6,000	2,000+2,000+6,000 = 10,000 i.e 3 years

first attempt success tutorials

(b) If standard payback period is 2 years, Project B is the only acceptable project.

(c) Calculation of NPV

Year	PVF @ 10%	Project A		Project B		Project C	
		Cash Flows (₹)	PV of cash flows (₹)	Cash Flows (₹)	PV of cash flows (₹)	Cash Flows (₹)	PV of cash flows (₹)
0	1	(10,000)	(10,000)	(2,000)	(2,000)	(10,000)	(10,000)
1	0.909	2,000	1,818	0	0	2,000	1,818
2	0.826	2,000	1,652	2,000	1,652	2,000	1,652
3	0.751	6,000	4506	4,000	3004	6,000	4,506
4	0.683	0	0	6,000	4,098	10,000	6,830
NPV			(-2,024)		6,754		4,806

So, Projects with positive NPV are Project B and Project C

(d) **False.** Payback gives no weightage to cash flows after the cut-off date.

(e) **True.** The payback rule ignores all cash flows after the cutoff date, meaning that future years' cash inflows are not considered. Thus, payback is biased towards short-term projects.



Q. 23

NPV Method (Machine Replace)

RTP Nov 18



Shiv Limited is thinking of replacing its existing machine by a new machine which would cost ₹ 60 lakhs. The company's current production is 80,000 units, and is expected to increase to 1,00,000 units, if the new machine is bought. The selling price of the product would remain unchanged at ₹ 200 per unit. The following is the cost of producing one unit of product using both the existing and new machine:

Unit cost (₹)			
	Existing Machine (80,000 units)	New Machine (1,00,000 units)	Difference
Materials	75.0	63.75	(11.25)
Wages & Salaries	51.25	37.50	(13.75)
Supervision	20.0	25.0	5.0
Repairs and Maintenance	11.25	7.50	(3.75)
Power and Fuel	15.50	14.25	(1.25)
Depreciation	0.25	5.0	4.75
Allocated Corporate Overheads	<u>10.0</u>	<u>12.50</u>	<u>2.50</u>
	<u>183.25</u>	<u>165.50</u>	<u>(17.75)</u>

The existing machine has an accounting book value of ₹ 1,00,000, and it has been fully depreciated for tax purpose. It is estimated that machine will be useful for 5 years. The supplier of the new machine has offered to accept the old machine for ₹ 2,50,000. However, the market price of old machine today is ₹ 1,50,000 and it is expected to be ₹ 35,000 after 5 years. The new machine has a life of 5 years and a salvage value of ₹ 2,50,000 at the end of its economic life. Assume corporate Income tax rate at 40%, and depreciation is charged on straight line basis for Income-tax purposes. Further assume that book profit is treated as ordinary income for tax purpose. The opportunity cost of capital of the Company is 15%.

Required:

- ESTIMATE net present value of the replacement decision.
- CALCULATE the internal rate of return of the replacement decision.
- Should Company go ahead with the replacement decision? ANALYSE.

Year (t)	1	2	3	4	5
PVIF _{0.15t}	0.8696	0.7561	0.6575	0.5718	0.4972
PVIF _{0.20t}	0.8333	0.6944	0.5787	0.4823	0.4019
PVIF _{0.25t}	0.80	0.64	0.512	0.4096	0.3277
PVIF _{0.30t}	0.7692	0.5917	0.4552	0.3501	0.2693
PVIF _{0.35t}	0.7407	0.5487	0.4064	0.3011	0.2230

Ans.

- (i) Net Cash Outlay of New Machine

Purchase Price	₹ 60,00,000
Less: Exchange value of old machine	
[2,50,000 - 0.4(2,50,000 - 0)]	<u>1,50,000</u>
	<u>₹ 58,50,000</u>

Market Value of Old Machine: The old machine could be sold for ₹ 1,50,000 in the market. Since the exchange value is more than the market value, this option is not attractive. This opportunity will be lost whether the old machine is retained or replaced. Thus, on incremental basis, it has no impact.

Depreciation base: Old machine has been fully depreciated for tax purpose.

Thus, the depreciation base of the new machine will be its original cost i.e. ₹ 60,00,000.

Net Cash Flows: Unit cost includes depreciation and allocated overheads. Allocated overheads are allocated from corporate office therefore they are irrelevant. The depreciation tax shield may be computed separately. Excluding depreciation and allocated overheads, unit costs can be calculated. The company will obtain additional revenue from additional 20,000 units sold.

Thus, after-tax saving, excluding depreciation, tax shield, would be

$$= \{100,000(200 - 148) - 80,000(200 - 173)\} \times (1 - 0.40)$$

$$= \{52,00,000 - 21,60,000\} \times 0.60$$

$$= ₹ 18,24,000$$

After adjusting depreciation tax shield and salvage value, net cash flows and net present value are estimated.

Calculation of Cash flows and Project Profitability

₹ ('000)						
	0	1	2	3	4	5
1 After-tax savings	-	1824	1824	1824	1824	1824
2 Depreciation (₹ 60,00,000 - 2,50,000)/5	-	1150	1150	1150	1150	1150
3 Tax shield on depreciation (Depreciation × Tax rate)	-	460	460	460	460	460
4 Net cash flows from operations (1 + 3)*	-	2284	2284	2284	2284	2284
5 Initial cost	(5850)					
6 Net Salvage Value	-	-	-	-	-	215
7 Net Cash Flows (4+5+6)	(5850)	2284	2284	2284	2284	2499
8 PVF at 15%	1.00	0.8696	0.7561	0.6575	0.5718	0.4972
9 PV	(5850)	1986.166	1726.932	1501.73	1305.99	1242.50
10 NPV	₹ 1913.32					

* Alternately Net Cash flows from operation can be calculated as follows:

$$\text{Profit before depreciation and tax} = ₹ 1,00,000 (200 - 148) - 80,000 (200 - 173)$$

$$= ₹ 52,00,000 - 21,60,000$$

$$= ₹ 30,40,000$$

$$\text{So profit after depreciation and tax is } ₹ (30,40,000 - 11,50,000) \times (1 - .40)$$

$$= ₹ 11,34,000$$

So profit before depreciation and after tax is :

$$₹ 11,34,000 + ₹ 11,50,000 (\text{Depreciation added back}) = ₹ 22,84,000$$

(ii)

₹ ('000)						
	0	1	2	3	4	5
NCF	(5850)	2284	2284	2284	2284	2499
PVF at 20%	1.00	0.8333	0.6944	0.5787	0.4823	0.4019
PV	(5850)	1903.257	1586.01	1321.751	1101.57	1004.35
PV of benefits	6916.94					
PVF at 30%	1.00	0.7692	0.5917	0.4550	0.3501	0.2693
PV	(5850)	1756.85	1351.44	1039.22	799.63	672.98
PV of benefits	5620.12					



$$\text{IRR} = 20\% + 10\% \times \frac{1066.94}{1296.82} = 28.23\%$$

(iii) Advise: The Company should go ahead with replacement project, since it is positive NPV decision.

Q. 24

NPV, Payback & Disc Payback

PY Nov 19



A company has ₹ 1,00,000 available for investment and has identified the following four investments in which to invest.

Project	Investment (₹)	NPV (₹)
C	40,000	20,000
D	1,00,000	35,000
E	50,000	24,000
F	60,000	18,000

You are required to optimize the returns from a package of projects within the capital spending limit if-

- The projects are independent of each other and are divisible.
- The projects are not divisible.

Ans.

(i) Optimizing returns when projects are independent and divisible.

Computation of NPVs per Re. 1 of Investment and Ranking of the Projects

Project	Investment (₹)	NPV (₹)	NPV per Re. 1 invested (₹)	Ranking
C	40,000	20,000	0.50	1
D	1,00,000	35,000	0.35	3
E	50,000	24,000	0.48	2
F	60,000	18,000	0.30	4

Building up of a Package of Projects based on their Rankings

Project	Investment (₹)	NPV (₹)
C	40,000	20,000
E	50,000	24,000
D (1/10 th of Project)	10,000	3,500
Total	1,00,000	47,500

The company would be well advised to invest in Projects C, E and D (1/10 th) and reject Project F to optimise return within the amount of ₹ 1,00,000 available for investment.

(ii) Optimizing returns when projects are indivisible.

Package of Project	Investment (₹)	Total NPV (₹)
C and E	90,000 (40,000 + 50,000)	44,000 (20,000 + 24,000)
C and F	1,00,000 (40,000 + 60,000)	38,000 (20,000 + 18,000)
Only D	1,00,000	35,000

The company would be well advised to invest in Projects C and E to optimise return within the amount of ₹ 1,00,000 available for investment.

Q. 25

NPV, Payback & Disc Payback

MTP Nov 23(1)



A firm can make investment in either of the following two projects. The firm anticipates its cost of capital to be 10%. The pre-tax cash flows of the projects for five years are as follows:

Year	0	1	2	3	4	5
Project A (₹)	(3,00,000)	55,000	1,20,000	1,30,000	1,05,000	40,000
Project B (₹)	(3,00,000)	3,18,000	20,000	20,000	8,000	6,000

Ignore Taxation.

An amount of ₹ 45,000 will be spent on account of sales promotion in year 3 in case of Project A. This has not been considered in calculation of pre-tax cash flows.

The discount factors are as under:

Year	0	1	2	3	4	5
PVF (10%)	1	0.91	0.83	0.75	0.68	0.62

You are required to calculate for each project:

- The payback period
- The discounted payback period
- Desirability factor
- Net Present Value

Ans.

Calculation of Present Value of cash flows

Year	PV factor @ 10%	Project A		Project B	
		Cash flows (₹)	Discounted Cash flows	Cash flows (₹)	Discounted Cash flows
0	1.00	(3,00,000)	(3,00,000)	(3,00,000)	(3,00,000)
1	0.91	55,000	50,050	3,18,000	2,89,380
2	0.83	1,20,000	99,600	20,000	16,600
3	0.75	85,000 (1,30,000 - 45,000)	63,750	20,000	15,000
4	0.68	1,05,000	71,400	8,000	5,440
5	0.62	40,000	24,800	6,000	3,720
Net Present Value			9,600		30,140

(i) The Payback period of the projects:

Project-A: The cumulative cash inflows up-to year 3 is ₹ 2,60,000 and remaining amount required to equate the cash outflow is ₹ 40,000 i.e. (₹ 3,00,000 - ₹ 2,60,000) which will be recovered from year-4 cash inflow. Hence, Payback period will be calculated as below:

$$3 \text{ years} + \frac{40000}{105000} = 3.381 \text{ years or 3 years, 4 months, 9 days (approx.)}$$

Project-B: The cash inflow in year-1 is ₹ 3,18,000 and the amount required to equate the cash outflow is ₹ 3,00,000, which can be recovered in a period less than a year. Hence, Payback period will be calculated as below:

$$\frac{300000}{318000} = 0.943 \text{ years or 11 months}$$

(ii) Discounted Payback period for the projects:

Project-A: The cumulative discounted cash inflows up-to year 4 is ₹ 2,84,800 and remaining amount required to equate the cash outflow is ₹ 15,200 i.e. (₹ 3,00,000 - ₹ 2,84,800) which will be recovered from year-5 cash inflow. Hence, Payback period will be calculated as below:



$$4 \text{ years} + \frac{15200}{24800} = 4.613 \text{ years or } 4 \text{ years, } 2 \text{ months, and } 11 \text{ days}$$

Project-B: The cash inflow in year-1 is ₹2,89,380 and remaining amount required to equate the cash outflow is ₹ 10,620 i.e. (₹ 3,00,000 - ₹ 2,89,380) which will be recovered from year-2 cash inflow. Hence, Payback period will be calculated as below:

$$1 \text{ year} + \frac{10620}{16600} = 1.640 \text{ years or } 1 \text{ Year, } 7 \text{ months and } 23 \text{ days.}$$

(iii) **Desirability factor of the projects**

$$\text{Desirability Factor (Profitability Index)} = \frac{\text{Discounted value Cash Inflows}}{\text{Discounted value of Cash}}$$

$$\text{Project A} = \frac{309600}{300000} = 1.032$$

$$\text{Project B} = \frac{330140}{300000} = 1.100$$

(iv) **Net Present Value (NPV) of the projects:**

Please refer the above table.

Project A- ₹ 9,600

Project B- ₹ 30,140

Q. 26

Purchase Machine or Not

MTP May 23(2)



- (a) Rambow Ltd. is contemplating purchasing machinery that would cost ₹ 10,00,000 plus GST @ 18% at the beginning of year 1. Cash inflows after tax from operations have been estimated at ₹ 2,56,000 per annum for 5 years. The company has two options for the smooth functioning of the machinery - one is service, and another is replacement of parts. The company has the option to service a part of the machinery at the end of each of the years 2 and 4 at ₹ 1,00,000 plus GST @ 18% for each year. In such a case, the scrap value at the end of year 5 will be ₹ 76,000. However, if the company decides not to service the part, then it will have to be replaced at the end of year 3 at ₹ 3,00,000 plus GST @ 18% and in this case, the machinery will work for the 6th year also and get operational cash inflow of ₹ 1,86,000 for the 6th year. It will have to be scrapped at the end of year 6 at ₹ 1,36,000.

Assume cost of capital at 12% and GST paid on all inputs including capital goods are eligible for input tax credit in the same month as and when incurred.

- (i) DECIDE whether the machinery should be purchased under option 1 or under option 2 or it shouldn't be purchased at all.
- (ii) If the supplier gives a discount of ₹ 90,000 for purchase, WHAT would be your decision? Note: The PV factors at 12% are:

Year	0	1	2	3	4	5	6
PV Factor	1	0.8928	0.7972	0.7118	0.6355	0.5674	0.5066

Ans.

Option I: Purchase Machinery and Service Part at the end of Year 2 and 4.

Net Present value of cash flow @ 12% per annum discount rate.

$$\text{NPV (in ₹)} = -10,00,000 + 2,56,000 \times (0.8928 + 0.7972 + 0.7118 + 0.6355 + 0.5674) - (1,00,000 \times 0.7972 + 1,00,000 \times 0.6355) + (76,000 \times 0.5674)$$

$$= -10,00,000 + (2,56,000 \times 3.6047) - 1,43,270 + 43,122.4$$

$$= -10,00,000 + 9,22,803.2 - 1,43,270 + 43,122.4$$

$$\text{NPV} = -1,77,344.4$$

Since Net Present Value is negative; therefore, this option is not to be considered.

If Supplier gives a discount of ₹ 90,000, then:

$$\text{NPV (in ₹)} = +90,000 - 1,77,344.4 = -87,344.4$$

In this case, Net Present Value is still negative; therefore, this option may not be advisable

Option II: Purchase Machinery and Replace Part at the end of Year 2.

$$\begin{aligned} \text{NPV (in ₹)} &= - 10,00,000 + 2,56,000 \times (0.8928+0.7972+0.7118+0.6355+0.5674) - (3,00,000 \times 0.7118) + (1,86,000 \\ &\times 0.5066+1,36,000 \times 0.5066) \\ &= - 10,00,000 + (2,56,000 \times 3.6047) - 2,13,540+1,63,125.2 \\ &= - 10,00,000 + 9,22,803.2 - 2,13,540+1,63,125.2 \\ \text{NPV} &= - 1,27,611.6 \end{aligned}$$

Net Present Value is negative, the machinery should not be purchased.

If the Supplier gives a discount of ₹ 90,000, then:

$$\text{NPV (in ₹)} = 90,000 - 1,27,611.6 = - 37,611.6$$

In this case, Net Present Value is still negative; therefore, this option may not be advisable.

Decision: The Machinery should not be purchased as it will earn a negative NPV in both options of repair and replacement.

Q. 27

Purchase Machine or Not

MTP May 23(1)



Yellow bells Ltd. wants to replace its old machine with new automatic machine. The old machine had been fully depreciated for tax purpose but has a book value of ₹3,50,000 on 31st March 2022. The machine cannot fetch more than ₹45,000 if sold in the market at present. It will have no realizable value after 10 years. The company has been offered ₹1,60,000 for the old machine as a trade in on the new machine which has a price (before allowance for trade in) of ₹6,50,000. The expected life of new machine is 10 years with salvage value of ₹63,000. Further, the company follows straight line depreciation method but for tax purpose, written down value method depreciation @ 9% is allowed taking that this is the only machine in the block of assets.

Given below are the expected sales and costs from both old and new machine:

	Old machine (₹)	New machine (₹)
Sales	11,74,500	11,74,500
Material cost	2,61,000	1,83,063
Labour cost	1,95,750	1,59,500
Variable overhead	81,563	68,875
Fixed overhead	1,30,500	1,41,375
Depreciation	34,800	60,175
Profit Before Tax (PBT)	4,70,888	5,61,513
Tax @ 25%	1,17,722	1,40,378
Profit After Tax (PAT)	3,53,166	4,21,134

From the above information, ANALYSE whether the old machine should be replaced or not if required rate of return is 10%? Ignore capital gain tax.

PV factors @ 10%:

Year	1	2	3	4	5	6	7	8	9	10
PVF	0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467	0.424	0.386

Ans.

(i) Calculation of Base for depreciation or Cost of New Machine

Particulars	(₹)
Purchase price of new machine	6,50,000
Less: Sale price of old machine	1,60,000
	4,90,000

(iii) Calculation of Profit before tax as per books



Particulars	Old machine (₹)	New machine (₹)	Difference (₹)
PBT as per books	4,70,888	5,61,513	90,625
Add: Depreciation as per books	34,800	60,175	25,375
Profit before tax and depreciation (PBT D)	5,05,688	6,21,688	1,16,000

Calculation of Incremental NPV

Year	PVF	PBT D	Dep. @ 9%	PBT	Tax @ 25%	Cash Inflows	PV of Cash Inflows
	@ 10%	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)
	1	2	3	4(2-3)	(5) = (4) × 0.25	(6) = (4) - (5) + (3)	(7) = (6) × (1)
1	0.909	1,16,000.00	44,100.00	71,900.00	17,975.00	98,025.00	89,104.73
2	0.826	1,16,000.00	40,131.00	75,869.00	18,967.25	97,032.75	80,149.05
3	0.751	1,16,000.00	36,519.21	79,480.79	19,870.20	96,129.80	72,193.48
4	0.683	1,16,000.00	33,232.48	82,767.52	20,691.88	95,308.12	65,095.45
5	0.621	1,16,000.00	30,241.56	85,758.44	21,439.61	94,560.39	58,722.00
6	0.564	1,16,000.00	27,519.82	88,480.18	22,120.05	93,879.95	52,948.29
7	0.513	1,16,000.00	25,043.03	90,956.97	22,739.24	93,260.76	47,842.77
8	0.467	1,16,000.00	22,789.16	93,210.84	23,302.71	92,697.29	43,289.63
9	0.424	1,16,000.00	20,738.14	95,261.86	23,815.47	92,184.53	39,086.24
10	0.386	1,16,000.00	18,871.70	97,128.30	24,282.07	91,717.93	35,403.12
							5,83,834.77
Add: PV of Salvage value of new machine (₹ 63,000 × 0.386)							24,318.00
Total PV of incremental cash inflows							6,08,152.77
Less: Cost of new machine [as calculated in point(i)]							4,90,000.00
Incremental Net Present Value							1,18,152.77

Analysis: Since the Incremental NPV is positive, the old machine should be replaced.

Q 28

Purchase Machine or Not

MTP Nov 22(1)



Emb ros Ltd. is planning to invest in a new product with a project life of 8 years. Initial equipment cost will be ₹ 35 crores. Additional equipment costing ₹ 2.50 crores will be purchased at the end of the third year from the cash inflow of this year. At the end of 8th year, the original equipment will have no resale value, but additional equipment can be sold at 10% of its original cost. A working capital of ₹ 4 crores will be needed, and it will be released at the end of 8th 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	14,40,000	21,60,000	52,00,000	54,00,000	36,00,000

Sales price of ₹ 120 per unit is expected and variable expenses will amount to 60% of sales revenue. Fixed cash operating costs will amount ₹ 3.60 crores per year. The loss of any year will be set off from the profits of subsequent year. The company follows straight line method of depreciation and is subject to 30% tax rate.

Considering 12% after tax cost of capital for this project, you are required to CALCULATE the net present value (NPV) of the project and advise the management to take appropriate decision.

PV factors @ 12% are:

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

Ans.

Calculation of year-wise Cash Inflow

(₹ in crores)

Year	Sales	VC (60% of Sales Value)	FC	Dep.	Profit	Tax (@30%)	PAT	Dep.	Cash inflow
1	17.28	10.368	3.6	4.375	(1.063)	-	(1.0630)	4.375	3.312
2	25.92	15.552	3.6	4.375	2.393	0.3990*	1.9940	4.375	6.369
3	62.4	37.44	3.6	4.375	16.985	5.0955	11.8895	4.375	16.2645
4-5	64.8	38.88	3.6	4.825#	17.495	5.2485	12.2465	4.825	17.0715
6-8	43.2	25.92	3.6	4.825	8.855	2.6565	6.1985	4.825	11.0235

*(30% of 2.393 - 30% of 1.063) = 0.7179 - 0.3189 = 0.3990

#4.375 + (2.50 - .25)/5 = 4.825

Calculation of Cash Outflow at the beginning

Particulars	₹
Cost of New Equipment	35,00,00,000
Add: Working Capital	4,00,00,000
Outflow	39,00,00,000

Calculation of NPV

Year	Cash inflows (₹)	PV factor	NPV (₹)
1	3,31,20,000	.893	2,95,76,160
2	6,36,90,000	.797	5,07,60,930
3	16,26,45,000 - 2,50,00,000 = 13,76,45,000	.712	9,80,03,240
4	17,07,15,000	.636	10,85,74,740
5	17,07,15,000	.567	9,67,95,405
6	11,02,35,000	.507	5,58,89,145
7	11,02,35,000	.452	4,98,26,220
8	11,02,35,000 + 4,00,00,000 + 25,00,000 = 15,27,35,000	.404	6,17,04,940
	Present Value of Inflow		55,11,30,780
	Less: Out flow		39,00,00,000
	Net Present Value		16,11,30,780

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



Q. 29

Purchase Machine or Not

MTP May 22(2)



Manoranjan Ltd is a News broadcasting channel having its broadcasting Centre in Mumbai. There are total 200 employees in the organisation including top management. As a part of employee benefit expenses, the company serves tea or coffee to its employees, which is outsourced from a third-party. The company offers tea or coffee three times a day to each of its employees. 120 employees prefer tea all three times, 40 employees prefer coffee all three times and remaining prefer tea only once in a day. The third-party charges ₹ 10 for each cup of tea and ₹ 15 for each cup of coffee. The company works for 200 days in a year.

Looking at the substantial amount of expenditure on tea and coffee, the finance department has proposed to the management an installation of a master tea and coffee vending machine which will cost ₹ 10,00,000 with a useful life of five years. Upon purchasing the machine, the company will have to enter into an annual maintenance contract with the vendor, which will require a payment of ₹ 75,000 every year. The machine would require electricity consumption of 500 units p.m. and current incremental cost of electricity for the company is ₹ 12 per unit. Apart from these running costs, the company will have to incur the following consumables expenditure also:

- (1) Packets of Coffee beans at a cost of ₹ 90 per packet.
- (2) Packet of tea powder at a cost of ₹ 70 per packet.
- (3) Sugar at a cost of ₹ 50 per Kg.
- (4) Milk at a cost of ₹ 50 per litre.
- (5) Paper cup at a cost of 20 paise per cup.

Each packet of coffee beans would produce 200 cups of coffee and same goes for tea powder packet.

Each cup of tea or coffee would consist of 10g of sugar on an average and 100 ml of milk.

The company anticipates that due to ready availability of tea and coffee through vending machines its employees would end up consuming more tea and coffee. It estimates that the consumption will increase by an average 20% for all class of employees. Also, the paper cups consumption will be 10% more than the actual cups served due to leakages in them.

The company is in the 25% tax bracket and has a current cost of capital at 12% per annum. Straight line method of depreciation is allowed for the purpose of taxation. You as a financial consultant are required to ADVISE on the feasibility of acquiring the vending machine.

PV factors @ 12% :

Year	1	2	3	4	5
PVF	0.8929	0.7972	0.7118	0.6355	0.5674

Ans.

A. Computation of CFAT (Year 1 to 5)

Particulars		Amount (₹)
(a)	Savings in existing Tea & Coffee charges	$(120 \times 10 \times 3) + (40 \times 15 \times 3) + (40 \times 10 \times 1)$ x 200 days
		11,60,000
(b)	AMC of machine	(75,000)
(c)	Electricity charges	$500 \times 12 \times 12$
		(72,000)
(d)	Coffee Beans	(W.N.) 144×90
		(12,960)
(e)	Tea Powder	(W.N.) 480×70
		(33,600)
(f)	Sugar	(W.N.) 1248×50
		(62,400)
(g)	Milk	(W.N.) 12480×50
		(6,24,000)
(h)	Paper Cup	(W.N.) $1,37,280 \times 0.2$
		(27,456)
(i)	Depreciation	$10,00,000/5$
		(2,00,000)
Profit before Tax		52,584
(-) Tax @ 25%		(13,146)
Profit after Tax		39,438

Depreciation	2,00,000
CFAT	2,39,438

B. Computation of NPV

Year	Particulars	CF	PVF @ 12%	PV
0	Cost of machine	(10,00,00)	1	(10,00,000)
1-5	CFAT	2,39,438	3.6048	8,63,126
Net Present Value				(1,36,874)

Since NPV of the machine is negative, it should not be purchased.

Working Note:

Computation of Qty of consumable

No. of Tea Cups = $[(120 \times 3 \times 200 \text{ days}) + (40 \times 1 \times 200 \text{ days}) \times 1.2 = 96,000$

No. of Coffee cups = $40 \times 3 \times 200 \text{ days} \times 1.2 = 28,800$

No. of coffee beans packet = $\frac{28800}{200} = 144$

No. of Tea Powder Packets = $\frac{96000}{200} = 480$

Qty of Sugar = $\frac{(96000 + 28800) \times 10g}{1000g} = 1248 \text{ kgs}$

Qty of Milk = $\frac{(96000 + 28800) \times 100ml}{1000ml} = 12,480 \text{ litres}$

No. of paper cups = $(96,000 + 28,800) \times 1.1 = 1,37,280$

Q. 30

Purchase Machine or Not

MTP May 21(2)

City Clap Ltd. is in the business of providing housekeeping services. There is a proposal before the company to purchase a mechanized cleaning system for a sum of Rs. 40 lakhs. The present system of the company is to use manual labour for the cleaning job. You are provided with the following information:

Proposed Mechanized System:

Cost of the machine	Rs. 40 lakhs
Life of the machine	7 years
Depreciation (on straight line basis)	15%
Operating cost of mechanized system	Rs. 20 lakhs per annum

Present system (Manual):

Manual labour	350 persons
Cost of manual labour	Rs. 15,000 per person per annum

The company has an after-tax cost of fund at 10% per annum.

The applicable tax rate is 50%.

Ans.

Calculation of NPV

	(Rs.)	(Rs.)
Cost of Manual System (Rs. 15,000 x 350)		52,50,000
Less: Cost of Mechanised System:		
Operating Cost	20,00,000	
Depreciation (Rs. 40,00,000 x 0.15)	6,00,000	26,00,000



Saving per annum		26,50,000
Less: Tax (50%)		13,25,000
Saving after tax		13,25,000
Add: Depreciation		6,00,000
Cash flow per annum		19,25,000
Cumulative PV Factor for 7 years @ 10%		4.867
Present value of cash flow for 7 years		93,68,975
Less: Cost of the Machine		40,00,000
NPV		53,68,975

The mechanized cleaning system should be purchased since NPV is positive by Rs. 53,68,975.

Q. 31

Replace Machine using NPV

RTP May 22



ABC & Co. is considering whether to replace an existing machine or to spend money on revamping it. ABC & Co. currently pays no taxes. The replacement machine costs ₹ 18,00,000 now and requires maintenance of ₹ 2,00,000 at the end of every year for eight years. At the end of eight years, it would have a salvage value of ₹ 4,00,000 and would be sold. The existing machine requires increasing amounts of maintenance each year and its salvage value fall each year as follows:

Year	Maintenance (₹)	Salvage (₹)
Present	0	8,00,000
1	2,00,000	5,00,000
2	4,00,000	3,00,000
3	6,00,000	2,00,000
4	8,00,000	0

The opportunity cost of capital for ABC & Co. is 15%.

REQUIRED:

When should the company replace the machine?

The following present value table is given for you:

Year	Present value of ₹ 1 at 15% discount rate
1	0.8696
2	0.7561
3	0.6575
4	0.5718
5	0.4972
6	0.4323
7	0.3759
8	0.3269

Ans.

ABC & Co.
Equivalent Annual Cost (EAC) of new machine

	(₹)
(i) Cost of new machine now	18,00,000
Add: PV of annual repairs @ ₹ 2,00,000 per annum for 8 years (₹ 2,00,000 × 4.4873)	8,97,460

	26,97,460
Less: PV of salvage value at the end of 8 years (₹ 4,00,000×0.3269)	1,30,760
	25,66,700
Equivalent annual cost (EAC) (₹ 25,66,700/4.4873)	5,71,992

PV of cost of replacing the old machine in each of 4 years with new machine

Scenario	Year	Cash Flow (₹)	PV @ 15%	PV (₹)
Replace Immediately	0	(5,71,992)	1.00	(5,71,992)
	0	8,00,000	1.00	8,00,000
				2,28,008
Replace in one year	1	(5,71,992)	0.8696	(4,97,404)
	1	(2,00,000)	0.8696	(1,73,920)
	1	5,00,000	0.8696	4,34,800
				(2,36,524)
Replace in two years	1	(2,00,000)	0.8696	(1,73,920)
	2	(5,71,992)	0.7561	(4,32,483)
	2	(4,00,000)	0.7561	(3,02,440)
	2	3,00,000	0.7561	2,26,830
				(6,82,013)
Replace in three years	1	(2,00,000)	0.8696	(1,73,920)
	2	(4,00,000)	0.7561	(3,02,440)
	3	(5,71,992)	0.6575	(3,76,085)
	3	(6,00,000)	0.6575	(3,94,500)
	3	2,00,000	0.6575	1,31,500
				(11,15,445)
Replace in four years	1	(2,00,000)	0.8696	(1,73,920)
	2	(4,00,000)	0.7561	(3,02,440)
	3	(6,00,000)	0.6575	(3,94,500)
	4	(5,71,992)	0.5718	(3,27,065)
	4	(8,00,000)	0.5718	(4,57,440)
				(16,55,365)

Advice: The company should replace the old machine immediately because the PV of cost of replacing the old machine with new machine is least.

Q.32

Replace Machine using NPV

PY May 23



Four years ago, Z Ltd. had purchased a machine of ₹ 4,80,000 having estimated useful life of 8 years with zero salvage value. Depreciation is charged using SLM method over the useful life. The company want to replace this machine with a new machine. Details of new machine are as below:



- Cost of new machine is ₹ 12,00,000, Vendor of this machine is agreed to take old machine at a value of ₹ 2,40,000. Cost of dismantling and removal of old machine will be ₹ 40,000. 80% of net purchase price will be paid on spot and remaining will be paid at the end of one year.
 - Depreciation will be charged @ 20% p.a. under WDV method.
 - Estimated useful life of new machine is four years and it has salvage value of ₹ 1,00,000 at the end of year four.
 - Incremental annual sales revenue is ₹ 12,25,000.
 - Contribution margin is 50%.
 - Incremental indirect cost (excluding depreciation) is ₹ 1,18,750 per year.
 - Additional working capital of ₹ 2,50,000 is required at the beginning of year and ₹ 3,00,000 at the beginning of year three. Working capital at the end of year four will be nil.
 - Tax rate is 30%.
 - Ignore tax on capital gain.
- Z Ltd. will not make any additional investment, if it yields less than 12% Advice, whether existing machine should be replaced or not.

Year	1	2	3	4	5
PVIF _{0.12, t}	0.893	0.797	0.712	0.636	0.567

Ans. Working Notes:**(i) Calculation of Net Initial Cash Outflow**

Particulars	₹
Cost of New Machine	12,00,000
Less: Sale proceeds of existing machine	2,00,000
Net Purchase Price	10,00,000
Paid in year 0	8,00,000
Paid in year 1	2,00,000

(ii) Calculation of Additional Depreciation

Year	1	2	3	4
	₹	₹	₹	₹
Opening WDV of machine	10,00,000	8,00,000	6,40,000	5,12,000
Depreciation on new machine @ 20%	2,00,000	1,60,000	1,28,000	1,02,400
Closing WDV	8,00,000	6,40,000	5,12,000	4,09,600
Depreciation on old machine (4,80,000/8)	60,000	60,000	60,000	60,000
Incremental depreciation	1,40,000	1,00,000	68,000	42,400

(iii) Calculation of Annual Profit before Depreciation and Tax (PBDT)

Particulars	Incremental Values (₹)
Sales	12,25,000
Contribution	6,12,500
Less: Indirect Cost	<u>1,18,750</u>
Profit before Depreciation and Tax (PBDT)	4,93,750

Calculation of Incremental NPV

Year	PVF @ 12%	PBTD (₹)	Incremental Depreciation (₹)	PBT (₹)	Tax @ 30% (₹)	Cash Inflows (₹)	PV of Cash Inflows (₹)
	(1)	(2)	(3)	(4)	(5) = (4) × 0.30	(6) = (4) - (5) + (3)	(7) = (6) × (1)
1	0.893	4,93,750	1,40,000	3,53,750	106,125	3,87,625	3,46,149.125
2	0.797	4,93,750	1,00,000	3,93,750	1,18,125	3,75,625	2,99,373.125
3	0.712	4,93,750	68,000	4,25,750	1,27,725	3,66,025	2,60,609.800
4	0.636	4,93,750	42,400	4,51,350	1,35,405	3,58,345	2,27,907.420
*						*	11,34,039.470
Add: PV of Salvage (₹ 1,00,000 × 0.636)							63,600
Less: Initial Cash Outflow - Year 0							8,00,000
Year 1 (₹ 2,00,000 × 0.893)							1,78,600
Less: Working Capital - Year 0							2,50,000
Year 2 (₹ 3,00,000 × 0.797)							2,39,100
Add: Working Capital released - Year 4 (₹ 5,50,000 × 0.636)							3,49,800
Incremental Net Present Value							79,739.470

Since the incremental NPV is positive, existing machine should be replaced.

Alternative Presentation

Computation of Outflow for new Machine:

	₹
Cost of new machine	<u>12,00,000</u>
Replaced cost of old machine	2,40,000
Cost of removal	<u>40,000</u>
Net Purchase price	10,00,000
Outflow at year 0	8,00,000
Outflow at year 1	2,00,000

Computation of additional depreciation

Year	1	2	3	4
	₹	₹	₹	₹
Opening WDV of machine	10,00,000	8,00,000	6,40,000	5,12,000
Depreciation on new machine @ 20%	2,00,000	1,60,000	1,28,000	1,02,400
Closing WDV	8,00,000	6,40,000	5,12,000	4,09,600
Depreciation on old machine (4,80,000/8)	60,000	60,000	60,000	60,000
Incremental depreciation	1,40,000	1,00,000	68,000	42,400

Computation of NPV

Year	0	1	2	3	4
	₹	₹	₹	₹	₹
1. Increase in sales revenue		12,25,000	12,25,000	12,25,000	12,25,000
2. Contribution		6,12,500	6,12,500	6,12,500	6,12,500
3. Increase in fixed cost		1,18,750	1,18,750	1,18,750	1,18,750



4.	Incremental Depreciation		1,40,000	1,00,000	68,000	42,400
5.	Net profit before tax [1-(2+3+4)]		3,53,750	3,93,750	4,25,750	4,51,350
6.	Net Profit after tax (5 × 70%)		2,47,625	2,75,625	2,98,025	3,15,945
7.	Add: Incremental depreciation		1,40,000	1,00,000	68,000	42,400
8.	Net Annual cash inflows (6 + 7)		3,87,625	3,75,625	3,66,025	3,58,345
9.	Release of salvage value					1,00,000
10.	(investment)/disinvestment in working capital	(2,50,000)		(3,00,000)		5,50,000
11.	Initial cost	(8,00,000)	(2,00,000)			
12.	Total net cash flows	(10,50,000)	1,87,625.0	75,625	3,66,025	10,08,345
13.	Discounting Factor	1	0.893	0.797	0.712	0.636
14.	Discounted cash flows (12 × 13)	(10,50,000)	1,67,549.125	60,273.125	2,60,609.800	641307.420

$$NPV = (1,67,549 + 60,273 + 2,60,610 + 6,41,307) - 10,50,000 = ₹ 79,739$$

Since the NPV is positive, existing machine should be replaced.

Q.33

Replace Machine using NPV

PY July 21

An existing company has a machine which has been in operation for two years, its estimated remaining useful life is 4 years with no residual value in the end. Its current market value is ₹ 3 lakhs. The management is considering a proposal to purchase an improved model of a machine gives increase output. The details are as under:

Particulars	Existing Machine	New Machine
Purchase Price	₹ 6,00,000	₹ 10,00,000
Estimated Life	6 years	4 years
Residual Value	0	0
Annual Operating days	300	300
Operating hours per day	6	6
Selling price per unit	₹ 10	₹ 10
Material cost per unit	₹ 2	₹ 2
Output per hour in units	20	40
Labour cost per hour	₹ 20	₹ 30
Fixed overhead per annum excluding depreciation	₹ 1,00,000	₹ 60,000
Working Capital	₹ 1,00,000	₹ 2,00,000
Income-tax rate	30%	30%

Assuming that - cost of capital is 10% and the company uses written down value of depreciation @ 20% and it has several machines in 20% block.

Advise the management on the Replacement of Machine as per the NPV method. The discounting factors table given below:

Discounting Factors	Year 1	Year 2	Year 3	Year 4
10%	0.909	0.826	0.751	0.683

Ans.

(i) Calculation of Net Initial Cash Outflows:

Particulars	₹
Purchase Price of new machine	10,00,000
Add: Net Working Capital	1,00,000
Less: Sale proceeds of existing machine	3,00,000
Net initial cash outflows	8,00,000

(ii) Calculation of annual Profit Before Tax and depreciation

Particulars	Existing machine	New Machine	Differential
(1)	(2)	(3)	(4) = (3) - (2)
Annual output	36,000 units	72,000 units	36,000 units
	₹	₹	₹
(A) Sales revenue @ ₹ 10 per unit	3,60,000	7,20,000	3,60,000
(B) Cost of Operation			
Material @ ₹ 2 per unit	72,000	1,44,000	72,000
Labour			
Old = 1,800 × ₹ 20	36,000		
New = 1,800 × ₹ 30		54,000	18,000
Fixed overhead excluding depreciation	1,00,000	60,000	(40,000)
Total Cost (B)	2,08,000	2,58,000	50,000
Profit Before Tax and depreciation (PBT) (A - B)	1,52,000	4,62,000	3,10,000

(iv) Calculation of Net Present value on replacement of machine

Year	PBT	Depreciation @ 20% WDV	PBT	Tax @ 30%	PAT	Net cash flow	PVF @ 10%	PV
(1)	(2)	(3)	(4 = 2-3)	(5)	(6 = 4-5)	(7 = 6 + 3)	(8)	(9 = 7 × 8)
1	3,10,000	1,40,000	1,70,000	51,000	1,19,000	2,59,000	0.909	2,35,431.000
2	3,10,000	1,12,000	1,98,000	59,400	1,38,600	2,50,600	0.826	2,06,995.600
3	3,10,000	89,600	2,20,400	66,120	1,54,280	2,43,880	0.751	1,83,153.880
4	3,10,000	71,680	2,38,320	71,496	1,66,824	2,38,504	0.683	1,62,898.232
								7,88,478.712
								Add: Release of net working capital at year end 4 (1,00,000 × 0.683)
								68,300.000
								Less: Initial Cash Outflow
								8,00,000.000
								NPV
								56,778.712



Advice: Since the incremental NPV is positive, existing machine should be replaced.

Working Notes:

1. Calculation of Annual Output

Annual output = (Annual operating days × Operating hours per day) × output per hour

Existing machine = (300 × 6) × 20 = 1,800 × 20 = 36,000 units

New machine = (300 × 6) × 40 = 1,800 × 40 = 72,000 units

2. Base for incremental depreciation

Particulars	₹
WDV of Existing Machine	
Purchase price of existing machine	6,00,000
Less: Depreciation for year 1	1,20,000
Depreciation for Year 2	<u>96,000</u>
WDV of Existing Machine (i)	3,84,000
Depreciation base of New Machine	
Purchase price of new machine	10,00,000
Add: WDV of existing machine	3,84,000
Less: Sales value of existing machine	3,00,000
Depreciation base of New Machine (ii)	10,84,000
Base for incremental depreciation [(ii) - (i)]	7,00,000

(Note: The above solution have been done based on incremental approach) Alternatively, solution can be done based on Total Approach as below:

(i) Calculation of depreciation:

Existing Machine						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Opening balance	6,00,000	4,80,000	3,84,000	3,07,200	2,45,760	1,96,608.00
Less: Depreciation @ 20%	1,20,000	96,000	76,800	61,440	49,152	39,321.60
WDV	4,80,000	3,84,000	3,07,200	2,45,760	1,96,608	1,57,286.40

New Machine				
	Year 1	Year 2	Year 3	Year 4
Opening balance	10,84,000*	8,67,200	6,93,760	5,55,008.00
Less: Depreciation @ 20%	2,16,800	1,73,440	1,38,752	1,11,001.60
WDV	8,67,200	6,93,760	5,55,008	4,44,006.40

* As the company has several machines in 20% block, the value of Existing Machine from the block calculated as below shall be added to the new machine of ₹ 10,00,000:
 WDV of existing machine at the beginning of the year ₹ 3,84,000
 Less: Sale Value of Machine ₹ 3,00,000
 WDV of existing machine in the block ₹ 84,000
 Therefore, opening balance for depreciation of block = ₹ 10,00,000 + ₹ 84,000 = ₹ 10,84,000

(ii) Calculation of annual cash inflows from operation:

Particulars	EXISTING MACHINE			
	Year 3	Year 4	Year 5	Year 6
Annual output (300 operating Days x 6 operating hours x 20 output per hour)	36,000 units	36,000 units	36,000 units	36,000 units
	₹	₹	₹	₹
(A) Sales revenue @ ₹10 per unit	3,60,000.00	3,60,000.00	3,60,000.00	3,60,000.00
(B) Less: Cost of Operation				
Material @ ₹ 2 per unit	72,000.00	72,000.00	72,000.00	72,000.00
Labour @ ₹ 20 per hour for (300 x 6) hours	36,000.00	36,000.00	36,000.00	36,000.00
Fixed overhead	1,00,000.00	1,00,000.00	1,00,000.00	1,00,000.00
Depreciation	76,800.00	61,440.00	49,152.00	39,321.60
Total Cost (B)	2,84,800.00	2,69,440.00	2,57,152.00	2,47,321.60
Profit Before Tax (A - B)	75,200.00	90,560.00	1,02,848.00	1,12,678.40
Less: Tax @ 30%	22,560.00	27,168.00	30,854.40	33,803.52
Profit After Tax	52,640.00	63,392.00	71,993.60	78,874.88
Add: Depreciation	76,800.00	61,440.00	49,152.00	39,321.60
Capital				1,00,000.00
Annual Cash Inflows	1,29,440.00	1,24,832.00	1,21,145.60	2,18,196.48

Particulars	NEW MACHINE			
	Year 1	Year 2	Year 3	Year 4
Annual output (300 operating days x 6 operating hours x 40 output per hour)	72,000 units	72,000 units	72,000 units	72,000 units
	₹	₹	₹	₹
(A) Sales revenue @ ₹10 per unit	7,20,000.00	7,20,000.00	7,20,000.00	7,20,000.00
(B) Less: Cost of Operation				
Material @ ₹ 2 per unit	1,44,000.00	1,44,000.00	1,44,000.00	1,44,000.00
Labour @ ₹ 30 per hour for (300 x 6) hours	54,000.00	54,000.00	54,000.00	54,000.00
Fixed overhead	60,000.00	60,000.00	60,000.00	60,000.00
Depreciation	2,16,800.00	1,73,440.00	1,38,752.00	1,11,001.60
Total Cost (B)	4,74,800.00	4,31,440.00	3,96,752.00	3,69,001.60
Profit Before Tax (A - B)	2,45,200.00	2,88,560.00	3,23,248.00	3,50,998.40
Less: Tax @ 30%	73,560.00	86,568.00	96,974.40	1,05,299.52
Profit After Tax	1,71,640.00	2,01,992.00	2,26,273.60	2,45,698.88
Add: Depreciation	2,16,800.00	1,73,440.00	1,38,752.00	1,11,001.60
Add: Release of Working Capital				2,00,000.00
Annual Cash Inflows	3,88,440.00	3,75,432.00	3,65,025.60	5,56,700.48



(iii) Calculation of Incremental Annual Cash Flow:

Particulars	Year 1 (₹)	Year 2 (₹)	Year 3 (₹)	Year 4 (₹)
Existing Machine (A)	1,29,440.00	1,24,832.00	1,21,145.60	2,18,196.48
New Machine (B)	3,88,440.00	3,75,432.00	3,65,025.60	5,56,700.48
Incremental Annual Cash Flow (B - A)	2,59,000.00	2,50,600.00	2,43,880.00	3,38,504.00

(iv) Calculation of Net Present Value on replacement of machine:

Year	Incremental Annual Cash Flow (₹) (A)	Discounting factor @ 10% (B)	Present Value of Incremental Annual Cash Flow (₹) (A × B)
1	2,59,000.00	0.909	2,35,431.000
2	2,50,600.00	0.826	2,06,995.600
3	2,43,880.00	0.751	1,83,153.880
4	3,38,504.00	0.683	2,31,198.232
Total Incremental Inflows			8,56,778.712
Less: Net Initial Cash Outflows (Working note)			8,00,000.000
Incremental NPV			56,778.712

Advice: Since the incremental NPV is positive, existing machine should be replaced.

Working Note:

Calculation of Net Initial Cash Outflows:

Particulars	₹
Cost of new machine	10,00,000
Less: Sale proceeds of existing machine	3,00,000
Add: incremental working capital required (₹ 2,00,000 - ₹ 1,00,000)	1,00,000
Net initial cash outflows	8,00,000

Q.34

Replace Machine using NPV

RTP Dec 21



HMR Ltd. is considering replacing a manually operated old machine with a fully automatic new machine. The old machine had been fully depreciated for tax purpose but has a book value of ₹ 2,40,000 on 31st March 2021. The machine has begun causing problems with breakdowns and it cannot fetch more than ₹ 30,000 if sold in the market at present. It will have no realizable value after 10 years. The company has been offered ₹ 1,00,000 for the old machine as a trade in on the new machine which has a price (before allowance for trade in) of ₹ 4,50,000. The expected life of new machine is 10 years with salvage value of ₹ 35,000.

Further, the company follows straight line depreciation method but for tax purpose, written down value method depreciation @ 7.5% is allowed taking that this is the only machine in the block of assets.

Given below are the expected sales and costs from both old and new machine:

	Old machine (₹)	New machine (₹)
Sales	8,10,000	8,10,000
Material cost	1,80,000	1,26,250
Labour cost	1,35,000	1,10,000
Variable overhead	56,250	47,500

Fixed overhead	90,000	97,500
Depreciation	24,000	41,500
PBT	3,24,750	3,87,250
Tax @ 30%	97,425	1,16,175
PAT	2,27,325	2,71,075

From the above information, ANALYSE whether the old machine should be replaced or not if required rate of return is 10%? Ignore capital gain tax.

PV factors @ 10%:

Year	1	2	3	4	5	6	7	8	9	10
PVF	0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467	0.424	0.386

Ans.

Workings:

1. Calculation of Base for depreciation or Cost of New Machine

Particulars	(₹)
Purchase price of new machine	4,50,000
Less: Sale price of old machine	1,00,000
	3,50,000

2. Calculation of Profit before tax as per books

Particulars	Old machine (₹)	New machine (₹)	Difference (₹)
PBT as per books	3,24,750	3,87,250	62,500
Add: Depreciation as per books	24,000	41,500	17,500
Profit before tax and depreciation (PBTd)	3,48,750	4,28,750	80,000

Calculation of Incremental NPV

Year	PVF @ 10%	PBTd (₹)	Dep. @ 7.5% (₹)	PBT (₹)	Tax @ 30% (₹)	Cash Inflows (₹)	PV of Cash Inflows (₹)
	(1)	(2)	(3)	(4)	(5) = (4) × 0.30	(6) = (4) - (5) + (3)	(7) = (6) × (1)
1	0.909	80,000.00	26,250.00	53,750.00	16,125.00	63,875.00	58,062.38
2	0.826	80,000.00	24,281.25	55,718.75	16,715.63	63,284.38	52,272.89
3	0.751	80,000.00	22,460.16	57,539.84	17,261.95	62,738.05	47,116.27
4	0.683	80,000.00	20,775.64	59,224.36	17,767.31	62,232.69	42,504.93
5	0.621	80,000.00	19,217.47	60,782.53	18,234.76	61,765.24	38,356.21
6	0.564	80,000.00	17,776.16	62,223.84	18,667.15	61,332.85	34,591.73
7	0.513	80,000.00	16,442.95	63,557.05	19,067.12	60,932.88	31,258.57
8	0.467	80,000.00	15,209.73	64,790.27	19,437.08	60,562.92	28,282.88
9	0.424	80,000.00	14,069.00	65,931.00	19,779.30	60,220.70	25,533.58
10	0.386	80,000.00	13,013.82	66,986.18	20,095.85	59,904.15	23,123.00
							3,81,102.44
						Add: PV of Salvage value of new machine (₹ 35,000 × 0.386)	13,510.00
						Total PV of incremental cash inflows	3,94,612.44



Less: Cost of new machine	3,50,000.00
Incremental Net Present Value	44,612.44

Analysis: Since the Incremental NPV is positive, the old machine should be replaced.

Q.35

MTP Sept 24



Mr. Anand is thinking of buying a Share at ₹ 500 whose Face Value per share is ₹ 100. He is expecting a bonus at the ratio 1 : 5 at the end of the fourth year. Annual expected dividend is 20% and the same rate is expected to be maintained on the expanded capital base. He intends to sell the Shares at the end of seventh year at an expected price of ₹ 900 each. Incidental Expenses for purchase and sale of Shares are estimated to be 5% of the Market Price. Assuming a Discount rate of 12% per annum, COMPUTE the Net Present Value from the acquisition of the shares.

Ans.

Computation of PV of Future Cash Flows

Year	Nature	Cash Flow	DF @ 12%	DCF
1	Dividends (₹ 100 × 20%)	20	0.893	17.86
2	Dividends (₹ 100 × 20%)	20	0.797	15.94
3	Dividends (₹ 100 × 20%)	20	0.712	14.24
4	Dividends (₹ 100 × 20%)	20	0.636	12.72
5	Dividends (₹ 100 × 1.2 × 20%)	24	0.567	13.61
6	Dividends (₹ 100 × 1.2 × 20%)	24	0.507	12.17
7	Dividends (₹ 100 × 1.2 × 20%)	24	0.452	10.85
8	Net Sale Proceeds (₹ 900 × 1.2 - 5%)	1,026	0.452	463.75
	Present Value of Cash Inflows			561.14
0	Less: Initial Investment (₹ 500 + 5%)	525	1	525.00
	Net Present Value			36.14

Note: At the end of Year 4, Anand will have 1.2 Share i.e. 1 Bought Share + 1/5th Bonus Share.

Q.36

MTP Jan 25(1)



Vyom Limited, an IT conglomerate, is planning to take over Aryayash Limited, a startup company incorporated 2 years ago but holding a lot of prospects. To determine the buyout consideration, Vyom Limited has approached you as a Finance controller to estimate the fair value of the startup company today based on future earnings estimates. Following details of the startup company are as below -

Expected Sales in the coming year are ₹ 25 lakhs with P/V ratio of 40%. The sales are expected to grow at a rate of 20% for the next 2 years, to 40% for another 2 years, 25% in the 6th year and thereafter cash flows will grow at a steady rate of 10%. Fixed cost for the upcoming year is expected to be 12 lakhs for the first two years, ₹ 10 lakhs thereafter. Loss in any year can be set-off only against the profits of the immediate next year.

Corporate taxes applicable are 25% & 20% to Vyom Limited & Aryayash Limited respectively. Vyom Limited's desired rate of return is 15% & Cost of Capital of Aryayash Limited is 17%.

As a finance controller, CALCULATE the Fair value of Aryayash Limited

Ans.

Fair Value of Company = Present Value all future cash flows discounted at the expected Rate of return of acquiring company.

WN 1 - Calculation of Cash flows

₹ in Lakhs

YEAR	1	2	3	4	5	6
Contribution (40% on sales)	10	12	14.4	20.16	28.22	35.28

(-) Fixed Cost	-12	-12	-10	-10	-10	-10
NPBT (A)	-2	0	4.4	10.16	18.22	25.28
(-) Losses Set Off	0	0	-2(Setoff)	0	0	0
Taxable Income	0	0	2.4	10.16	18.22	25.28
(-) Tax @ 25% (B)	0	0	0.6	2.54	4.55	6.32
Cash Flow (A - B)	-2	0	3.8	7.62	13.66	18.96
PV OF CASH FLOWS @ 15%	-1.740	0	2.50	4.35	6.79	8.19

Total PV of cash flows (yr 1 to 6) = 20.08 lakhs

(+) PV of cash flow at terminal value (end of Year 6) = 18.96 + 10%

0.15 - 0.10

= 417.12 Lakhs

= 180.20 lakhs

Therefore, PV of above = 417.12 X PV factor (15%, 6th Year)

Total fair value of Aryayash limited = 20.08 + 180.20 = 200.28 Lakhs

Note - 1. Discounting rate should be the desired rate of acquiring company i.e. of Vyom Limited

Terminal value of cash flows means the cash flows at that point from where it would grow at constant rate. Here it assumed that from 7th year, Cash flows/NPAT will grow at a constant rate and not sales

Q. 37

MTP Jan 25(2)



Hemparsh Private Limited is globally recognized consultancy firm having its presence in various countries across the globe and is currently headquartered at Ahmedabad, India.

It plans to commence a new branch in the Australia owing to the untapped opportunities available there in the outsourcing business. The company hired a professional for the preparation of the Project report and the fee paid was Rs 2,00,000. The company also incurred Rs 5,00,000 in the form R&D costs. As per the project report, the Company will require an initial fund outlay of Rs 25 crores for buying property & setting up the other infrastructure. It will also require working capital amounting to Rs 5 crore. The company is planning to operate for a very long period of time, however for the sake of simplicity, calculations shall end at the end of the 10th year. The Earnings before tax but after deducting Interest Exp (EBT) estimated would be as follows -

YEAR	EBT (Amount in Rs)
1	2,00,00,000
2	2,50,00,000
3	4,00,00,000
4	4,75,00,000
5	6,00,00,000
6	6,40,00,000
7	6,15,00,000
8	5,25,00,000
9	3,80,00,000
10	2,90,00,000

The above amounts also include an allocated common cost of Rs 12,50,000. Company will distribute 10% dividends every year on post-tax earnings. Company intends to borrow funds of 3 crores at a post-tax Interest rate of 6.5% in India. As per the tax treaty between India & Australia (Tax Agreement between two nations), first 3 years are tax free and from 4th year 75% of corporate taxes are to be paid in the country where it is headquartered and balance in the other nation. Total Corporate tax rate applicable to the company is 30%. However, tax on capital gains is to be paid at 15%, only in the headquarters. Salvage value for depreciation purpose is estimated at Rs. 90,00,000. The assets would be disposed of in the market at Rs. 3,50,00,000 at the end. Hemparsh Private



Limited desires a premium of 3% to the current MCLR of 12% (Marginal Cost of Funds based Lending Rate). Assume no other assets in the block.

CALCULATE NPV for the project and advise only from Indian law perspective.

If the company wishes to recoup its investment within 3.5 years, STATE any two measures that the company shall take.

Ans.

Calculation of NPV (Amount in crores)

Year	1	2	3	4	5	6	7	8	9	10
EBT	2.000	2.500	4.000	4.750	6.000	6.400	6.150	5.250	3.800	2.900
Add: Interest	0.195	0.195	0.195	0.252	0.252	0.252	0.252	0.252	0.252	0.252
Add: Allocated Common Cost	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
Project Profit Before Tax	2.320	2.820	4.320	5.127	6.377	6.777	6.527	5.627	4.177	3.277
Less: Tax	-	-	-	1.154	1.435	1.525	1.469	1.266	0.940	0.737
Profit After Tax	2.320	2.820	4.320	3.973	4.942	5.252	5.058	4.361	3.237	2.539
Add: Depreciation	2.410	2.410	2.410	2.410	2.410	2.410	2.410	2.410	2.410	-
Cash Inflows	4.730	5.230	6.730	6.383	7.352	7.662	7.468	6.771	5.647	2.539
Add: Release Of Working Capital	-	-	-	-	-	-	-	-	-	5.000
Add: Net Cash Inflow from sale of asset (Net Of Tax) (WN-3)	-	-	-	-	-	-	-	-	-	3.471
Total Cash Inflows	4.730	5.230	6.730	6.383	7.352	7.662	7.468	6.771	5.647	11.010
DF @ 15%	0.870	0.756	0.658	0.572	0.497	0.432	0.376	0.327	0.284	0.247
PV Cash Inflow	4.113	3.955	4.425	3.650	3.655	3.312	2.808	2.213	1.605	2.722

TOTAL PV CI = 32.458 Crores

(-) TOTAL PVCO = 30.000 Crores (Initial Outlay + Working Capital)

NPV = 2.458 Crores

ADVISE - Since NPV is positive, company should go for the project.

- Notes** -
1. Allocated common costs are to be excluded from cash inflows
 2. Dividend distribution are deemed irrelevant for cash flow analysis
 3. Discounting rate = MCLR + premium = 12 + 3 = 15%
 4. Interest exp is to be excluded from the cash inflows as it is already getting covered in the discounting rate above
 5. Professional fees paid for project report and R&D costs being sunk costs are irrelevant for decision making

WN 1 - Calculation of applicable taxes each year

For the first 3 years, tax will be zero and for the next 7 years tax rate applicable would 22.5% (30 x 0.75) as balance tax will be paid in Australia, so it will have no relevance under India perspective calculations.

WN - 2 Calculation of interest expense each year

Since post tax interest rate is given in the question, firstly it needs to be converted to pre-tax rate. However, for the first 3 years of the project, post- tax and pre-tax rate would be same owing to zero taxes

Interest Expense (first 3 years) = 3,00,00,000 X 6.5% = 19,50,000 or 0.195 crores

Interest Expense (next 7 years) = 3,00,00,000 x 8.39% = 25,17,000 or 0.2517 crores

$$\begin{aligned}\text{Pre-tax Interest Rate} &= \frac{\text{Post tax Rate}}{1 - \text{India Tax Rate}} \\ &= 6.5 / (1 - 0.225) \\ &= \mathbf{8.39\%}\end{aligned}$$

WN 3 - CALCULATION OF CAPITAL GAINS INCOME IN YEAR 10

Cost of Asset remaining in the block at the beginning of Year 10

= 3,31,00,000 (2,41,00,000 + 90,00,000)

(+) New Asset purchased during the year = 0

(-) Sale Value of the Asset = 3,50,00,000

Capital Gains Income before tax = 19,00,000

(-) Capital Gains tax = 19,00,000 × 15% = 2,85,000

Net Cash Inflow after tax = 3,50,00,000 - 2,85,000

= 3,47,15,000

$$\begin{aligned}\text{B) Current Payback Period} &= 4 + 1.927 / 7.352 \\ &= 4.262 \text{ years}\end{aligned}$$

$$\text{Target Payback Period} = 3.5 \text{ years}$$

Some key measures to reduce your Payback period are as follows

(Only illustrative):

- i. Emphasizing on reduction of operational costs
- ii. Improving marketing thereby resulting into higher sales
- iii. Incorporate product-led growth strategies
- iv. Judicious efforts in bringing down the overall cost of capital thereby reducing the discounting rate and in turn better Payback period.
- v. Leveraging out the presence of the fixed cost

NOTES



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