

CA Inter FM **SUPER** **80**



For
May 26



AIR 30
CA Amit Sharma



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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

$$\frac{\text{Current Assets}}{\text{Current Liabilities}} = 4$$

$$\frac{\text{Current Assets}}{3,10,000} = 4$$

$$3,10,000$$

$$\text{Current Assets} = ₹ 12,40,000$$

(ii) Acid Test Ratio = 2.5

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

$$\frac{12,40,000 - \text{Inventory}}{3,10,000} = 2.5$$

$$12,40,000 - \text{Inventory} = ₹ 7,75,000$$

$$\text{Inventory} = ₹ 4,65,000$$

$$12,40,000 - \text{Inventory} = ₹ 7,75,000$$

$$\text{Inventory} = ₹ 4,65,000$$

(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
 (Debtors / sales) × 360 = 70
 (Debtors / 27,90,000) × 360 = 70
 Debtors = ₹ 5,42,500

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

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

$$\frac{27,90,000}{\text{Total Assets}} = 0.96$$
 Total Assets = ₹ 29,06,250

- (vi) Fixed Assets (FA) = Total Assets - Current Assets
 = 29,06,250 - 12,40,000
 Fixed Assets = ₹ 16,66,250

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

$$\frac{\text{Cash}}{3,10,000} = 0.43$$
 Cash = ₹ 1,33,300

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

$$\frac{\text{Proprietary Fund}}{29,06,250} = 0.48$$
 Proprietary Fund = ₹ 13,95,000

- (ix) Equity Dividend Coverage Ratio = 1.6 or

$$\frac{\text{EPS}}{\text{DPS}} = \frac{3.5}{\text{DPS}}$$
 DPS = ₹ 2.1875

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

$$2.1875 = \frac{1,75,000}{\text{Number of Equity Shares}}$$
 Number of Equity Shares = 80,000
 Equity Share Capital = 80,000 × 10 = ₹ 8,00,000
 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

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:

- (a) Calculate the operating expenses for the year ended 31st March, 2021.
 (b) 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

Current Ratio = 2.5

$$\text{Payables} = ₹ 2,50,000$$

$$\text{Bank overdraft} = ₹ 1,50,000$$

$$\text{Total Current Liabilities} = ₹ 2,50,000 + ₹ 1,50,000 = ₹ 4,00,000$$

$$\text{Current Assets} = 2.5 \times \text{Current Liabilities} = 2.5 \times 4,00,000 = ₹ 10,00,000$$

(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

$$\frac{\text{Cost of goods sold}}{\text{Closing stock}} = 12$$

$$\text{Closing stock} = \frac{22,50,000}{12} = \text{Closing stock} = ₹ 1,87,500$$



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

Q.3

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**

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

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

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

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

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

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

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

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

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

Substitute (3) in (4)

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

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

$$\text{Payables} = ₹ 4,00,000$$

$$\text{So, Cash} = 2 \times ₹ 4,00,000 - ₹ 3,72,500$$

$$\text{Cash} = ₹ 4,27,500$$

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

$$(vi) \text{ Equity Share Capital (ESC) + Reserves} = ₹ 15,00,000$$



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

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

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

$$(vii) \text{ Reserves} = 0.2 \times ₹ 12,50,000$$

$$\text{Reserves} = ₹ 2,50,000$$

$$(viii) \text{ Total of Liabilities} = \text{Total of Assets}$$

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

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

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

$$\text{FA (WDV)} = ₹ 17,15,000$$

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

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

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

$$\text{So, FA(Cost)} = ₹ 20,58,000$$

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

Q.4

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	2 Months
(All sales are on credit)	
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	19,89,000
Cash balance	8,53,500

(x) Calculation of Net worth

Fixed Assets	1,30,00,000
Current Assets	1,10,00,000
Total Assets	2,40,00,000
Less: Long term Loan	1,10,00,000
Current Liabilities	55,00,000
Net worth	75,00,000

$$\text{Net worth} = \text{Share capital} + \text{Reserves} = ₹ 75,00,000$$

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

$$\text{Reserves and Surplus} = ₹ 75,00,000 \times 5 = ₹ 60,00,000$$

**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		
	3,90,00,000		3,90,00,000
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		
	58,50,000		58,50,000

**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
	2,40,00,000		2,40,00,000

Q.5

All Ratios

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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

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:

- 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.
- 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.)
- Working capital ratio was 8 : 5.
- Quick assets ratio was 1 : 1.
- The receivables (four-fifth of the quick assets) to sales ratio revealed a credit period of 2 months. There were no cash sales.
- Return on net worth was 10%.
- Gross profit was at the rate of 15% of selling price.
- 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 depreciation of ₹ 5,000) i.e. 50,000 - 20,000	30,000
Addition to the Plant & Machinery	10,000

Calculation of stock

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

$$\begin{aligned}
 ₹ 50,000 &= ₹ 80,000 - \text{Stock} \\
 \text{Stock} &= ₹ 80,000 - ₹ 50,000 \\
 &= ₹ 30,000
 \end{aligned}$$

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

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

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

Gross profit = 15% of sales = ₹ 2,40,000 × 15/100 = ₹ 36,000

Return on net worth (net profit)

Net worth = ₹ 1,00,000 + ₹ 30,000

= ₹ 1,30,000

Net profit = ₹ 1,30,000 × 10/100 = ₹ 13,000

Debenture interest = ₹ 20,000 × 5/100 = ₹ 1,000

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	₹
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
		Current assets	
		Stock	30,000
		Receivables	40,000
		Bank	10,000
			80,000
	2,00,000		2,00,000

Q.6

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:

Debt = ₹ 45,00,000

Interest = ₹ 45,00,000 × 12.5% = 5,62,500

Debt to Equity = 1.5:1 = $\frac{\text{Total Debt}}{\text{Shareholders' Equity}}$

Equity = ₹ 30,00,000

Return of Shareholder's funds = 54% = $\frac{\text{Net Profit after taxes}}{\text{Equity shareholders' fund}} \times 100$

Profit after tax (PAT) = 54% × Equity = ₹16,20,000

Profit before tax (PBT)(1-25%) = Profit after tax
= ₹16,20,000/75% = ₹21,60,000

Earning before interest and tax (EBIT) = PBT + Interest
= ₹21,60,000 + ₹ 5,62,500
= ₹27,22,500

(i) Interest Coverage Ratio = EBIT/Interest
= ₹27,22,500/₹5,62,500
= 4.84 Times

(ii) Operating Profit Ratio = 1 - Operating Ratio
= 1 - 0.85 = 0.15 or 15%

0.15 = $\frac{\text{Operating Profit}}{\text{Sales}} \times 100$

Sales = EBIT or Operating Profit / 0.15
= ₹ 27,22,500 / 0.15
= ₹ 1,81,50,000

Operating ratio = $\frac{\text{Operating expenses}}{\text{Cost of goods sold (COGS)}} = 2 : 6 = 1 : 3$

Operating expenses = 1/3 COGS

Operating cost = Sales - Operating profit
= ₹ 1,81,50,000 - ₹ 27,22,500
= ₹ 1,54,27,500

₹ 1,54,27,500 = COGS + Operating expenses

₹ 1,54,27,500 = COGS + 1/3 COGS

COGS = ₹ 1,15,70,625

Gross profit = Sales - COGS
= 1,81,50,000 - 1,15,70,625
= ₹ 65,79,375

Gross Profit ratio = $\frac{\text{Gross Profit}}{\text{Sales}} \times 100$
= 65,79,375/1,81,50,000
= 0.3625 or 36.25%

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

$$\begin{aligned}
 \text{(iii) Current Ratio} &= \frac{\text{Current Assets}}{\text{Current Liabilities}} \\
 &= 1.8 \\
 \text{Current Assets} &= 1.8 \text{ Current Liabilities} \\
 \text{Total of Balance sheet liability} &= \text{Equity + Debt + Current Liabilities} \\
 &= 30,00,000 + 45,00,000 + \text{CL} \dots \dots \dots (2) \\
 \text{Total Balance sheet asset} &= \text{Fixed Assets + Current Assets} \\
 &= 39 \text{ lakhs} + \text{CA} = 39 + 1.8\text{CL} \quad (3) \\
 \text{Equating 2 and 3,} \\
 75,00,000 + \text{CL} &= 39,00,000 + 1.8\text{CL} \\
 0.8\text{CL} &= 36,00,000 \\
 \text{CL} &= ₹ 45,00,000 \\
 \text{Current Assets} &= 1.8 \text{ CL} = 1.8 \times 45 \text{ lakhs} = ₹ 81,00,000
 \end{aligned}$$

Q.7

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.8

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 except 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 = $\frac{2}{12} \times \text{Sales}$

2 / 12 x 18,00,000 = ₹ 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	15,39,000
Total	18,00,000		18,00,000

- (ix) Net profit for the year 2011, $16\% \times 21,60,000 = ₹ 3,45,600$
 Total Profit = $2,70,000 + 3,45,600 = ₹ 6,15,600$

Q.9

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 $(23,00,000 \times 75\%) + 20\%$	20,70,000	-
Debtor $(17,00,000 \times 50\%)$	-	8,50,000
Cash & Bank	5,70,000	5,50,000
Liquid Assets	26,40,000	14,00,000
Add: Stock $(23,00,000 \times 25\%)$	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
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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.10

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., **Fixed cost** = Contribution - Profit
 = 60,000 - 30,000 = ₹ 30,000
- 4., **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.
Variable cost = 2,00,000 × 70% = ₹ 1,40,000

Profit - Loss Statement

Particulars	₹
Sales	2,00,000
Less: Variable cost	1,40,000
Contribution	60,000
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.11

% 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

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) is

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

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

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

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** = $\frac{EBIT}{EBT} = \frac{1,50,000}{1,20,000} = 1.25 \text{ times}$
- Combined Leverage = Operating Leverage × Financial Leverage
 = $4 \times 1.25 = 5 \text{ times}$
- Or,
- Combined Leverage = $\frac{\text{Contribution}}{EBIT} \times \frac{EBIT}{EBT}$
- Combined Leverage = $\frac{\text{Contribution}}{EBIT} = \frac{6,00,000}{1,20,000} = 5 \text{ times}$
- (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.12

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:

- Operating Leverage
- Combined Leverage
- Earning per share
- Earning Yield

Ans.

Workings:

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

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

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

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

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

$$\text{EBT} = ₹ 9,71,223$$

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

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

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

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

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

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

$$(iii) \text{ Earnings per Share (EPS)}$$

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

No. of shares = 50,000

$$(iv) \text{ Earning Yield}$$

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

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. 13

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

$$\text{VC} = \text{Sales} - \text{Contribution}$$

$$\text{Sales} \times \text{VC Ratio} = \text{Sales} - \text{Contribution}$$

$$\text{Contribution} = \text{Sales} - \text{Sales} \times \text{VC Ratio}$$

$$\text{Contribution} = \text{Sales}(1 - \text{VCR})$$

$$\text{Sales} = \frac{\text{Contribution}}{1 - \text{VCR}}$$

$$\text{Sales}_A = ₹6,00,000 / (1 - 0.6) = ₹15,00,000$$

$$\text{Sales}_B = ₹15,00,000 / (1 - 0.5) = ₹30,00,000$$

$$\text{Sales}_C = ₹25,00,000 / (1 - 0.4) = ₹41,66,667$$

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. 14

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

4

4EBIT - ₹ 6,00,000

3EBIT

EBIT

For Company B

Financial Leverage

3

3EBIT - ₹ 3,00,000

2EBIT EBIT

Contribution

$$= \text{EBIT} / (\text{EBIT} - \text{Interest})$$

$$= \text{EBIT} / (\text{EBIT} - ₹ 1,50,000)$$

$$= \text{EBIT}$$

$$= ₹ 6,00,000$$

$$= ₹ 2,00,000$$

$$= \text{EBIT} / (\text{EBIT} - \text{Interest})$$

$$= \text{EBIT} / (\text{EBIT} - ₹ 1,00,000)$$

$$= \text{EBIT}$$

$$= ₹ 3,00,000$$

$$= ₹ 1,50,000$$

(v) For Company A

Operating Leverage

Operating Leverage

5

Contribution

For Company B

Operating Leverage

Operating Leverage

4

Contribution

Sales

$$= 1 / \text{Margin of Safety}$$

$$= 1 / 0.20 = 5$$

$$= \text{Contribution} / \text{EBIT}$$

$$= \text{Contribution} / ₹ 2,00,000$$

$$= ₹ 10,00,000$$

$$= 1 / \text{Margin of Safety}$$

$$= 1 / 0.25 = 4$$

$$= \text{Contribution} / \text{EBIT}$$

$$= \text{Contribution} / ₹ 1,50,000$$

$$= ₹ 6,00,000$$

(vi) For Company A

Profit Volume Ratio

Profit Volume Ratio

25%

Sales

Sales

For Company B

Profit Volume Ratio

$$= 25\%$$

$$= \text{Contribution} / \text{Sales} \times 100$$

$$= ₹ 10,00,000 / \text{Sales}$$

$$= ₹ 10,00,000 / 25\%$$

$$= ₹ 40,00,000$$

$$= 33.33\%$$

Therefore, Sales
Sales

= ₹ 6,00,000/33.33%
= ₹ 18,00,000

Q.15

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.

- 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.16

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

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

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

(ROI is calculated on Capital Employed)

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

$$(iii) \quad \text{Capital Turnover} = \frac{\text{NetSales}}{\text{Capital}}$$

$$\text{Or} = \frac{\text{NetSales}}{\text{Capital}} = \frac{75,00,000}{1,00,00,000} = 0.75$$

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

(iv) Calculation of Operating, Financial and Combined leverages

$$(a) \quad \text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{33,00,000}{27,00,000} = 1.22 \text{ (approx)}$$

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

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

$$\text{Or} = \text{Operating Leverage} \times \text{Financial Leverage} = 1.22 \times 1.18 = 1.44 \text{ (approx)}$$

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

(vi) Since the combined Leverage is 1.44, sales have to drop by $100/1.44$ i.e. 69.44% to bring EBT to Zero
 Accordingly, New Sales
 $= ₹ 75,00,000 \times (1 - 0.6944)$
 $= ₹ 75,00,000 \times 0.3056$
 $= ₹ 22,92,000 \text{ (approx)}$

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 $1.18 \times 20 = 23.6\%$ (approx)

Q.17

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:

- (i) Calculate Financial leverage
- (ii) Calculate P/V ratio and Earning per Share (EPS)
- (iii) If the company belongs to an industry, whose assets turnover is 1.6, does it have a high or low assets turnover?
- (iv) 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**

$$\begin{aligned}\text{Combined Leverage} &= \text{Operating Leverage} \times \text{Financial Leverage} \\ \text{So, financial leverage} &= \text{Combined Leverage} / \text{Operating Leverage} \\ &= 2.8 / 1.4 = 2\end{aligned}$$

(ii) **P/V Ratio and EPS**

$$\begin{aligned}\text{Operating Leverage} &= \frac{\text{Contribution}}{\text{Contribution} - \text{Fixed Cost}} \\ 1.4 &= \frac{\text{Contribution}}{\text{Contribution} - 2,10,000}\end{aligned}$$

$$1.4 \text{ Contribution} - 2,94,000 = \text{Contribution}$$

$$0.4 \text{ Contribution} = 2,94,000$$

$$\text{Contribution} = 7,35,000$$

$$\text{Now, P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{7,35,000}{40,00,000} \times 100 = 18.375\%$$

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

$$\begin{aligned}\text{Earning before tax (EBT)} &= \text{Contribution} - \text{Fixed Cost} - \text{Interest} \\ &= 7,35,000 - 2,10,000 - 2,50,000 \\ &= 2,75,000\end{aligned}$$

$$\begin{aligned}\text{Profit after tax} &= \text{EBT} - \text{Tax @ 30\%} \\ &= 2,75,000 - 82,500 \\ &= 1,92,500\end{aligned}$$

$$\text{EPS} = \frac{1,92,500}{2,00,000} = 0.9625$$

(iii) **Asset Turnover**

$$\text{Total Assets} = \text{Equity Share Capital} + \text{Debentures} = ₹ 20 \text{ lakhs} + ₹ 25 \text{ lakhs} = ₹ 45 \text{ lakhs}$$

$$\text{Asset Turnover} = \frac{\text{Sales}}{\text{Total Assets}} = \frac{40,00,000}{45,00,000} = 0.89$$

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 $40,00,000 \times (100\% - 35.71\%) = 25,71,600$

- (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.



3 CHAPTER

CAPITAL STRUCTURE

Q.18

Additional capital & MPS max

PY May 23



The following information pertains to CIZA Ltd.:

	₹
Capital Structure:	
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.19

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:

	(Amount in ₹)	
Alternative	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	
	(₹ 5,00,000 × 15%)	75,000	1,25,000
3	(₹ 5,00,000 × 10%)	50,000	
	(₹ 5,00,000 × 15%)	75,000	
	(₹ 4,00,000 × 20%)	80,000	2,05,000

(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. 20

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

$$\frac{(EBIT)(1 - 0.5)}{20,000 \text{ shares}} = \frac{(EBIT - ₹ 20,000)(1 - 0.5)}{10,000 \text{ shares}}$$

$$0.5 \text{ EBIT} = \text{EBIT} - ₹ 20,000$$

$$\text{EBIT} = ₹ 40,000$$

(b) Indifference point where EBIT of proposal 'X' and proposal 'Z' is equal:

$$\frac{(EBIT)(1 - 0.5)}{20,000 \text{ shares}} = \frac{\text{EBIT}(1 - 0.5) - ₹ 20,000}{10,000 \text{ shares}}$$

$$0.5 \text{ EBIT} = \text{EBIT} - ₹ 40,000$$

$$0.5 \text{ EBIT} = ₹ 40,000$$

$$\text{EBIT} = \frac{40,000}{0.5} = ₹ 80,000$$

(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. 21

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)	(60,000)	--
Earnings Before Tax (EBT)	2,90,000	3,50,000
Less: Tax @ 50%	(1,45,000)	(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.22

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	-
	50000000 × 50%	-	₹ 2,50,00,000
Debt @ 10%	50000000 × 75%	₹ 3,75,00,000	-
Preference Shares @ 12%	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

$$\begin{aligned}
 \text{Interest for Proposal I} &= ₹ 3,00,00,000 \times 9\% + ₹ 3,75,00,000 \times 10\% \\
 &= ₹ 27,00,000 + ₹ 37,50,000 \\
 &= ₹ 64,50,000
 \end{aligned}$$

$$\text{Preference Dividend for Proposal I} = ₹ 1,50,00,000 \times 11\% = ₹ 16,50,000$$



$$\begin{aligned}
 \text{Interest for Proposal II} &= ₹ 3,00,00,000 \times 9\% = ₹ 27,00,000 \\
 \text{Preference Dividend for Proposal II} &= ₹ 1,50,00,000 \times 11\% + ₹ 2,50,00,000 \times 12\% \\
 &= ₹ 16,50,000 + ₹ 30,00,000 = ₹ 46,50,000
 \end{aligned}$$

Let the indifference point be ₹ X

For Proposal I,

$$\text{EPS} = \frac{(X - ₹ 64,50,000) \times 0.66 - ₹ 16,50,000}{13,25,000} \dots\dots\dots(1)$$

For Proposal II,

$$\text{EPS} = \frac{(X - ₹ 27,00,000) \times 0.66 - ₹ 46,50,000}{13,25,000} \dots\dots\dots(2)$$

Equating (1) and (2),

$$\begin{aligned}
 \text{EPS} &= \frac{(X - ₹ 64,50,000) \times 0.66 - ₹ 16,50,000}{13,25,000} = \frac{(X - ₹ 27,00,000) \times 0.66 - ₹ 46,50,000}{13,25,000} \\
 &= \frac{0.66X - ₹ 42,57,000 - ₹ 16,50,000}{13,25,000} = \frac{0.66X - ₹ 59,07,000}{13,25,000}
 \end{aligned}$$

$$\frac{0.66X - ₹ 59,07,000}{13,25,000} = \frac{0.66X - ₹ 64,32,000}{13,25,000}$$

$$\begin{aligned}
 ₹ 51.48X - ₹ 46,07,46,000 &= ₹ 37.98X - ₹ 34,08,96,000 \\
 ₹ 16.5X &= ₹ 11,98,50,000
 \end{aligned}$$

$$\text{Indifference Point} = X = ₹ 72,63,636.36$$

Q. 23

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.

$$\text{Break Even Sales} = ₹ 68,00,000 \times 0.75 = ₹ 51,00,000$$

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

4

CHAPTER

CAPITAL STRUCTURE THEORY

Q.24

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, (K_o) 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.25

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:

- (i) The market value of the company
- (ii) It's cost of capital, and
- (iii) It's cost of equity

Ans.

Working Note

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

$$\frac{\text{Net income (NI) for equity holders}}{0.20} = ₹ 1,140 \text{ lakhs}$$

Therefore, Net Income to equity-holders = ₹ 228 lakhs

$$\text{EBIT} = ₹ 228 \text{ lakhs} / 0.7 = ₹ 325.70 \text{ lakhs}$$

	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

$$\begin{aligned} K_e &= (\text{Net Income to equity holders} / \text{Equity Value}) \times 100 \\ &= (207 \text{ lakhs} / 1200 \text{ lakhs} - 200 \text{ lakhs}) \times 100 \\ &= (207 / 1000) \times 100 \\ &= 20.7 \% \end{aligned}$$



(ii) Cost of Capital

Components	Amount (₹ In lakhs)	Cost of Capital %	Weight	WACC %
Equity	1000	20.7	83.33	17.25
Debt	200	(15% X 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%

$$\text{Cost of Equity } (K_e) = K_{eu} + (K_{eu} - K_d) \frac{\text{Debt} (1-t)}{\text{Equity}}$$

Where,

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

K_d = Cost of debt

t = Tax rate

$$K_e = 0.20 + \left(0.20 - 0.15 \times \frac{200 \text{ lakh} \times 0.7}{1,000 \text{ lakh}} \right)$$

$K_e = 0.20 + 0.007 = 0.207$ or 20.7%

So, Cost of Equity = 20.70%

Q.26

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:

- (a) 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.

- (b) 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)]

Total Value of Unlevered Firm (V_u) = $[NOI/k_e] = 9,00,000/0.18 = ₹ 50,00,000$

K_e of Unlevered Firm (given) = 0.18

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

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

Total Value of Levered Firm (V_L) = $V_u + (Debt \times Nil)$

= ₹ 50,00,000 + (27,00,000 × nil)

= ₹ 50,00,000

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_o)	0.18
Total Value of Firm ($V = NOI/k_o$)	50,00,000
Less: Market Value of Debt	27,00,000
Market Value of Equity (S)	23,00,000
Equity Capitalization Rate [$k_e = NI/S$]	0.2504
Weighted Average Cost of Capital (k_o)*	0.18
$k_o = (k_e \times S/V) + (k_d \times D/V)$	

*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)]

Total Value of unlevered Firm (V_u) = $[NOI (1 - t)/k_e] = 9,00,000 (1 - 0.40) / 0.18$
= ₹ 30,00,000

K_e of unlevered Firm (given) = 0.18

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

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

Total Value of Levered Firm (V_L) = $V_u + (Debt \times Tax)$

= ₹ 30,00,000 + (27,00,000 × 0.4)

= ₹ 40,80,000


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

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

**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 [$k_e = NI/S$]	0.2504
Weighted Average Cost of Capital (k_o)* $k_o = (k_e \times S/V) + (k_d \times D/V)$	13.23

*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

 * $K_d = 12\% (1 - 0.4) = 12\% \times 0.6 = 7.2\%$ WACC = 13.23%

first attempt success tutorials

Q.27

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_o) remains constant and cost of equity increases linearly with debt.

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

$$₹ 50,00,000 = \frac{5,00,000}{K_o}$$

$$K_o = \frac{5,00,000}{50,00,000} = 10\%$$

 Statement of Equity Capitalization rate (k_e) under MM approach

Debt (₹)	Equity (₹)	Debt/Equity	K_o	K_d	$K_o - K_d$	K_e = $K_o + (K_o - K_d) \times \frac{\text{Debt}}{\text{Equity}}$
(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.28

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

- Net Income Approach and
- 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.29

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
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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 ($12\% \times ₹ 4,00,000$)	48,000	Nil
Earnings available to Equity shareholders	1,92,000	2,40,000
K_e	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 ($12,80,000 \times 20\%$)	2,56,000
Borrow money ($4,00,000 \times 20\%$)	<u>80,000</u>
Buy shares in Unlevered company	<u>3,36,000</u>

(III) Change in Return

	₹
Income from shares in Unlevered company ($2,40,000 \times 3,36,000 / 16,00,000$)	50,400
Less: Interest on loan ($80,000 \times 12\%$)	<u>9,600</u>
Net Income from unlevered firm	40,800
Less: Income from Levered firm ($1,92,000 \times 20\%$)	<u>38,400</u>
Incremental Income due to arbitrage	2,400
Arbitrage process if $K_e = 20\%$	

(I). Valuation of firms

Particulars	Dumbo Ltd (₹)	Jumbo Ltd (₹)
EBIT	2,40,000	2,40,000
Less: Interest on debt ($12\% \times ₹ 4,00,000$)	48,000	Nil
Earnings available to Equity shareholders	1,92,000	2,40,000
K_e	20%	15%
Value of Equity (S)	9,60,000	16,00,000
(Earnings available to Equity shareholders/ K_e)		
Debt (D)	4,00,000	Nil



Value of Firm (V) = S + D	13,80,000	16,00,000
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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.30

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%) Equity	75,000 1,25,000	Nil 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
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.

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.



5

CHAPTER

COST OF CAPITAL

Q.31

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:

- To DETERMINE the pattern for raising the additional finance.
- To CALCULATE the post-tax average cost of additional debt.
- To CALCULATE the cost of retained earnings and cost of equity, and
- To DETERMINE the overall weighted average cost of capital (after tax).

Ans.

- Pattern of Raising Additional Finance**

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

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

Capital structure after Raising Additional Finance

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

- 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**

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

$$\text{Then, } K_e = \frac{2(1.1)}{4} + 0.10 = \frac{2.2}{4} + 0.10 = 0.15 \text{ or } 15\%$$

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

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

Q.32

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:**

- (i) Cost of new debt
- (ii) Cost of new preference shares
- (iii) 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

$$D1 = 50\% \text{ of } 2020 \text{ EPS} = 50\% \text{ of } ₹ 4.72 = ₹ 2.36$$

(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

$$\text{So, } ₹ 23,600 = 80\% \text{ of Total Capital}$$

(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.33

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	0.71	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%
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,

 $R_f = 10\%$
 $R_m - R_f = 18\%$
 $B = 1.25\%$
 $D_0 = 12.76$
 $D_5 = 10$

Flotation Cost = 5%

Using CAPM,

 $K_e = R_f + \beta(R_m - R_f) = 10\% + 1.25(18\%)$
 $= 32.50\%$

Calculation of growth rate in dividend

 $12.76 = 10(1+g)^5$
 $1.276 = (1+g)^5$
 $(1+5\%) = 1.276 \dots \dots \dots$ from FV Table

 $g = 5\%$



$$\text{Price of share after 6 years} = \frac{D_7}{k_{e-g}} = \frac{12.76(1.05)^7}{0.325 - 0.5}$$

$$P_6 = \frac{12.75 \times 1.407}{0.275} = 65.28$$

Redemption Value of Debenture (RV) = 65.28 × 2 = 130.56 (RV)

NP = 95 n = 6

$$K_d = \frac{\frac{INT(1-t) + \frac{(RV - NP)}{n}}{\frac{RV - NP}{2}}} \times 100 = \frac{9 + 5.93}{112.78} \times 100$$

$K_d = 13.24\%$

(ii) **Calculation of Cost of Preference Shares:**

$$\begin{aligned} \text{Net Proceeds} &= 100(1.1) - 6\% \text{ of } 100 (1.1) \\ &= 110 - 6.60 \\ &= \mathbf{103.40} \end{aligned}$$

Redemption Value = 100

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.34

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.

- (c) To determine the cost of retained earnings and cost of equity.
- (d) 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

On ₹ 75,00,000 = 10% (1 - 0.25) = 7.5% or 0.075

On ₹ 50,00,000 = 12% (1 - 0.25) = 9% or 0.09

Average Cost of Debt

$$= \frac{(75,00,000 \times 0.075) + (50,00,000 \times 0.09)}{1,25,00,000} \times 100$$

$$= \frac{5,62,500 + 4,50,000}{1,25,00,000} \times 100 = 8.10\%$$

- (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

$$\text{Then, } K_e = \frac{2(1.05)}{25} + 0.05 = \frac{2.1}{25} + 0.05 = 0.084 + 0.05 = 0.134 = 13.4\%$$

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.35

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:

- Cost of capital of two projects X and Y whose fund requirements are ₹ 6.5 lakhs and ₹ 14 lakhs respectively.
- If a project is expected to give after tax return of 10%, DETERMINE under what conditions it would be acceptable?

Ans.

- 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.36

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)	20,00,000		
TOTAL	50,00,000	TOTAL	50,00,000

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

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

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

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

- Earnings per share (EPS) & Market Price per share (MPS)
- Financial Leverage
- 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 (15,00,000 × 10%) (₹)	1,50,000
EBIT (IV + V) (₹)	7,10,000

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

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

Particulars	Amount in ₹	
	Alternative I	Alternative II
EBIT	9,10,000	9,10,000
Less: Interest: 10% on long term loan	(1,50,000)	(1,50,000)
14% on Debentures	(1,12,000)	Nil
8% on Irredeemable Debentures	Nil	(8,000)
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 × 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)

	Alternative 1			Alternative 2		
Capital	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)

	Alternative 1			Alternative 2		
Capital	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.37

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

- 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%
 - Cost of Equity**

$$K_e = \frac{D_1}{P_0} + g = \frac{16}{80} + 0.05$$
 - Cost of Preference Shares**

$$K_p = \frac{PD + \frac{(RV - NP)}{n}}{\frac{(RV + NP)}{2}} = \frac{8 + \frac{(106 - 104)}{5}}{\frac{(106 + 104)}{2}}$$

$$K_p = 8.4/105 = 8\%$$

(d) **Cost of Debt**

$$K_d = \frac{I(1-t) + \frac{(RV - NP)}{n}}{\frac{(RV + NP)}{2}} = \frac{12(1 - 0.4) + \frac{(120 - 95)}{5}}{\frac{(120 + 95)}{2}}$$

$$K_d = (7.2 + 2.5)/107.5 = 9.02\% = 9.02\%$$

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) × (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

$$WACC = (\text{Product} / \text{Total book value}) \times 100 = (9,20,200 / 50,00,000) \times 100 = 18.4\%$$

(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) × (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

$$WACC = (\text{Product} / \text{Total book value}) \times 100 = (13,40,200 / 80,00,000) \times 100 = 16.76\%$$

Q. 38

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% flotation cost & 10 years of maturity. The market price per debenture is ₹ 110.
- ₹ 100 per preference share redeemable at par has 3% flotation cost & 10 years of maturity. The market price per preference share is ₹ 108.
- Equity share has ₹ 4 flotation 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:

$$1. \quad \text{Cost of Equity } (K_e) = \frac{D_1}{P_0 - F} + g = \frac{2}{25 - 4} + 0.05 = 0.145 \text{ (approx.)}$$

$$2. \quad \text{Cost of Debt } (K_d) = \frac{I(1-t) + \frac{(RV-NP)}{n}}{(RV-NP)} = \frac{10(1-0.3) + \frac{(100-98)}{10}}{(100-98)} = \frac{7 + 0.2}{99} = 0.073 \text{ (approx.)}$$

$$3. \quad \text{Cost of Preference Shares } (K_p) = \frac{PD + \frac{(RV-NP)}{n}}{(RV-NP)} = \frac{12 + \frac{(100-97)}{10}}{(100-97)} = \frac{12 + 0.3}{98.5} = 0.125 \text{ (approx.)}$$

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. 39

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% flotation cost, 10-year maturity.
- (2) Rs.100 per preference share redeemable at par, 5% coupon rate, 2% flotation cost and 10 - year maturity.
- (3) Equity shares have a flotation 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%

$$\frac{9.32}{9.32 - (-17.59)} (5\% - 2\%) = 2\% + \frac{9.32}{26.91} (5\% - 2\%) = 3.04\%$$

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.40



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:

$$\begin{aligned}
 K_e &= \frac{D_1}{P_0} + g = \frac{4}{40} + 0.08 = 18\% \\
 K_r &= K_e (1 - PT) = 18\% (1 - 0.20) = 14.40\% \\
 K_d &= I (1 - t) = 14\% (1 - 0.40) = 8.40\% \\
 K_p &= \text{Rate of PD} = 11\%
 \end{aligned}$$

(ii) Calculation of WACC (Ko) using book value proportions

Name of Source	Amount	Proportion	K	Ko
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 (Ko) 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.



6

CHAPTER

DIVIDEND DECISIONS

Q.41

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

$K_e = 8\%$, $r = 12\%$, $D_0 = 9.2$, $b = 0.08$

$g = b \cdot r$

$g = 0.08 \times 0.12 = 0.96\%$

$D_1 = D_0(1+g) = 9.2(1+0.0096) = ₹ 9.2883$

$$P = \frac{D_1}{(K_e - g)} = 9.2883 / (0.08 - 0.0096) = 9.2883 / 0.0704 = ₹ 131.936$$

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.42

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

$K_e = 15\%$, $P_0 = ₹100$, $D_1 = 0$

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$₹100 = \frac{P_1 + 0}{1 + 0.15}$$

$P_1 = ₹115$

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



No. of shares = Funds required/ P_1

$$\Delta n = ₹10,00,000/₹115$$

Step 4: Calculation of value of firm $nP_0 = [(n+\Delta n)P_1 - I + E]/(1+K_e)$

$$nP_0 = [(100000 + 1000000/₹115) ₹115 - ₹5000000 + ₹4000000]/(1.15) = ₹1,00,00,000$$

CASE 2: Value of the firm when dividends are paid.

Step 1: Calculate price at the end of the period

$$K_e = 15\%, P_0 = ₹100, D_1 = ₹10$$

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$₹100 = \frac{P_1 + 10}{1 + 0.15}$$

$$P_1 = ₹105$$

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

No. of shares = Funds Required/ P_1

$$\Delta n = ₹20,00,000/₹105$$

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.43

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,

$$47619 (11.5 - D_1) = 2,00,000 D_1 + 3,00,024$$

$$5,47,618.5 - 47,619D_1 = 2,00,000D_1 + 3,00,024$$

$$2,47,594.5 = 2,00,000D_1 + 47,619 D_1$$

$$2,47,594.5 = 2,47,619 D_1$$





$$\begin{aligned}
 D_1 &= \frac{2,47,594.5}{2,47,619} = 0.99 = ₹ 1 \\
 P_1 &= 11.5 - D_1 \\
 P_1 &= 11.5 - 1 \\
 P_1 &= 10.5 \\
 n.P_0 &= \frac{(n + Dn)P_1 - I + E}{1 + K_e} \\
 &= \frac{(2,00,000 + 47,619)(10.5) - 8,00,024 + 5,00,000}{1.15} \\
 n.P_0 &= ₹19,99,979 = ₹20,00,000 \\
 \text{Using direct calculation,} \\
 n.P_0 &= 2,00,000 \times 10 = ₹ 20,00,000
 \end{aligned}$$

Q.44

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:

- The company generally gives a quarterly interim dividend. ₹ 2.5 per share is the last dividend declared.
- 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%

- 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

$$D_0 (1 + g)$$

$$P_0 = \frac{D_0 (1 + g)}{K_e - g}$$

$$D_0 = 2.5 \times 4 = 10 \text{ per share (annual)}$$

$$g = \text{br or retention ratio} \times \text{rate of return}$$

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

$$g = 0.54 \times 0.10 = 0.054 \text{ or } 5.4\%$$

$$P_0 = \frac{D_0 (1 + g)}{K_e - g}$$

$$P_0 = \frac{10(1 + 0.054)}{0.0885 - 0.054} = \frac{10.54}{0.0345} = 305.51$$

$$K_e = \text{Risk free rate} + (\text{Beta} \times \text{Risk Premium})$$

$$= 3.75\% + (1.2 \times 4.25\%) = 8.85\%$$

Q.45

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.

- Find out intrinsic value per share.
- 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.46

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.

- No of Eq. Shares (before buyback) = Total Earnings (before buy back)/EPS
 $= 18,00,000 / (270/18)$
 $= 1,20,000$ shares
- Buyback price = 270 + 10% premium = 297
- No of Eq. shares (after buyback) = 1,20,000 (-) 20,000 = 1,00,000 shares
- Total Book Value of Equity (after buyback) = 1,00,000 X 193.20
 $= 1,93,20,000$
 Now,
 Total BV of Eq. (after buyback) = Total BV of Eq.(before buyback) (-)
 Amt of buyback



$$\begin{aligned}
 1,93,20,000 &= x (-) (20,000 \times 297) \\
 \text{Therefore } x &= \text{Total BV (before buyback)} \\
 &= 2,52,60,000 \\
 \text{BV per share (before buyback)} &= 2,52,60,000 / 1,20,000 \\
 &= 210.50 \text{ per share}
 \end{aligned}$$

Q.47

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.

$$\begin{aligned}
 P &= M (D + E/3) \\
 58.33 &= 7 (5 + E/3) \\
 E &= ₹9.99 \text{ or } ₹10 \text{ approx.}
 \end{aligned}$$

Q.48

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

Ans.

Since the dividend payout ratio is 40%

$$\begin{aligned}
 D &= 40\% \text{ of } E \text{ i.e. } 0.4E \\
 P &= M (D + E/3) = 9 (D + E/3) = 9 (0.4E + E/3) \\
 P &= 9 (0.4E + E/3) = 9 \left(\frac{1.2E + E}{3} \right) = 3 (2.2E) = 6.6E \\
 \text{P/E ratio} &= \frac{\text{MPS}}{\text{EPS}} = \frac{P}{E} = \frac{6.6E}{E} = 6.6 \text{ times}
 \end{aligned}$$

Q.49

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.

$$(a) \quad K_e = \frac{D_1}{P_0} + g = \frac{20}{1,460} + 7.5\% = 8.87\%$$

- 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:

$$\begin{aligned}
 0.075 &= b_1 \times 0.10 \\
 b_1 &= 0.75 \quad \text{and} \quad \text{payout ratio} &= 0.25 \\
 \text{EPS} &= ₹20 \div 0.25 \text{ (.75 retention)} &= ₹80
 \end{aligned}$$



$$\begin{aligned}\text{Revised } D_1 &= ₹80 \times 0.40 &= ₹32 \\ \text{Revised } K_e &= \frac{D_1}{P_0} + g &= \frac{32}{1,460} + 6\% &= 8.19\%\end{aligned}$$

7

CHAPTER

CASH MANAGEMENT

Q.50

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.

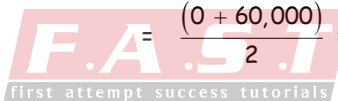
You are required to calculate

- Company's average cash balance,
- Number of conversions each year and
- Time interval between two conversions.

Ans.

- (i) **Computation of Average Cash balance:**

$$\begin{aligned} \text{Annual cash outflow (U)} &= 9,00,000 \times 4 = ₹ 36,00,000 \\ \text{Fixed cost per transaction (P)} &= ₹ 60 \\ \text{Opportunity cost of one rupee p.a. (S)} &= \frac{12}{100} = 0.12 \\ \text{Optimum cash balance (C)} &= \sqrt{\frac{2UP}{S}} = \sqrt{\frac{2 \times 36,00,000 \times 60}{0.12}} = ₹ 60,000 \\ \therefore \text{Average Cash balance} &= \frac{(0 + 60,000)}{2} = ₹ 30,000 \end{aligned}$$



- (ii) **Number of conversions p.a.**

$$\begin{aligned} \text{Annual cash outflow} &= ₹ 36,00,000 \\ \text{Optimum cash balance} &= ₹ 60,000 \\ \therefore \text{No. of conversions p.a.} &= \frac{36,00,000}{60,000} = 60 \end{aligned}$$

- (iii) **Time interval between two conversions**

$$\begin{aligned} \text{No. of days in a year} &= 360 \\ \text{No. of conversions p.a.} &= 60 \\ \therefore \text{Time interval} &= \frac{360}{60} = 6 \text{ days} \end{aligned}$$

Q.51

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

- (i) 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

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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.52

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	-	-	15,00,000	17,50,000	17,50,000	20,00,000
Total (A)	56,50,000	11,75,000	15,00,000	18,87,500	22,75,000	27,25,000
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		Land and Building	20,00,000
10,00,000 equity	1,00,00,000	Less: Depreciation	<u>1,00,000</u>
			19,00,000
		Plant and	10,00,000
shares of ₹10 each		Machinery	
Issued,		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 Long-term loans Current liabilities and provisions: Sundry creditors Accrued interest Outstanding expenses		22,17,250 7,75,000 15,87,500 45,250 <u>1,00,000</u> 17,32,750 97,75,000	Current Assets: Stock Sundry debtors Cash		 5,00,000 42,50,000 <u>11,75,000</u>	 59,25,000 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

1. There is shortage of cash in May of ₹ 1,25,000 which will be met by borrowings in May.
2. 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
3. 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

8

CHAPTER

DEBTORS MANAGEMENT

Q.53

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 $45 \text{ lakh} \times 50/365$	6,16,438
In case of factor, receivables would reduce to $45 \text{ lakhs} \times 30/365$	3,69,863
The costs of the existing policy are as follows:	
Cost of financing existing receivables: $6,16,438 \times 10\%$	61,644
Cost of bad debts: $45 \text{ lakhs} \times 0.4\%$	18,000
Cost of current policy	79,644
The cost under the factor are as follows:	
Cost of financing new receivable through factor: $(\text{Rs. } 3,69,863 \times 0.8 \times 0.11) + (\text{Rs. } 3,69,863 \times 0.2 \times 0.10)$ $= (32,548 + 7,397)$	39,945
Factor's annual fee: $45 \text{ Lakhs} \times 0.01$	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.54

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 Manager has determined the following three feasible sources of working capital funds:

- 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.
- 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.
- 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.55

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

$$\text{Variable Cost} \times \frac{\text{Collection period}}{\text{Return}} \times \text{Rate of}$$

Present Policy = ₹ 24,00,000 × $\frac{45}{360}$ × 15% = ₹ 54,000

Proposed Policy = $\frac{15}{360}$ × 15% = ₹ 18,000

Q.56

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 [Sales × 2/3]	6,00,000	6,40,000	6,60,000	7,00,000	7,40,000
(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.

Particulars		(Amount in ₹)				
		Present Policy 45 days	Proposed Policy W 60 days	Proposed Policy X 75 days	Proposed Policy Y 90 days	Proposed 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. 57

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. 58

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	$\frac{₹ 1,15,171.875 \times 360}{45}$	₹ 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	$\frac{₹ 4,85,187.5}{₹ 64,66,078.125} \times 100$	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 $\frac{₹ 4,35,187.5}{₹ 64,66,078.125} \times 100 = 6.730\%$

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	₹ 1,79,156.25
Net Amount of Advance available.	₹ 1,00,58,343.75

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. 59

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:

$$\begin{aligned}\text{Interest Cost} &= \text{Credit Sales} \times \text{Avg Collection Period} / 360 \times \text{Interest (\%)} \text{ p.a} \\ &= 75,00,000 \times 60/360 \times 10\% \\ &= 1,25,000\end{aligned}$$

(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 -

$$\text{Debtors} = 75 \text{ lakhs} \times 30/360 = 6,25,000$$

$$(-) \text{ Factor Reserve} = 10\% \text{ of above} = (62,500)$$

$$(-) \text{ Factor Commission} = 1.5\% \text{ of Debtors} = (9,375)$$

$$\text{Net Advance} = 5,53,125$$

$$\text{Advance from Factor} = 5,53,125 \times 80\% = 4,42,500$$

$$\text{Int cost on Advance from Factor} = 4,42,500 \times 12\% = 53,100$$

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)

$$= 1,82,500 \times 10\% = 18,250$$

$$\text{Net Savings in Interest Cost of Carrying Debtors} = 1,25,000 (-) 18,250 = 1,06,750$$

Q.60

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.

3. 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.
4. 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%.
5. 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	$1 \text{ Lakh} \div 30 \times 360 = 12,00,000$	$12 \text{ Lakhs} + 1/3\text{rd} = 16,00,000$
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 $(₹ 1,98,800 - 1,59,810) = ₹ 38,990$.

Q. 61

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 ($₹9,800 \times 35/365 \times 25\%$)	(235)	-
Net Cost	9,765	9,800



Advise: Thus it is better for the company to refuse the discount, as return on cash retained is more than the saving on account of discount.

Q.62



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.



9

CHAPTER

WORKING CAPITAL

Q.63

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 informations are available about the projections for the current year:

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

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

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
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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.64

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 33⅓%.
- 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.65

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-inprogress	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 Profitb/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
	<u>1,31,20,000</u>
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>

1,20,00,000

(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>



1,40,00,000

(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.66

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.67

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	
$Y \left(\frac{1,50,000 \text{ units} \times 7}{12 \text{ months}} \times 1 \text{ month} \right)$	87,500	
$Z \left(\frac{1,50,000 \text{ units} \times 6}{12 \text{ months}} \times 1 \text{ month} \right)$	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	

$Y \left(\frac{1,50,000 \text{ units} \times 7}{12 \text{ months}} \times 1 \text{ months} \right)$	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 $\left(\frac{1,50,000 \text{ units} \times 25}{12 \text{ months}} \times 1 \text{ months} \right)$		1,56,250
(iii) Outstanding Manufacturing and administration overheads $\left(\frac{1,50,000 \text{ units} \times 20}{12 \text{ months}} \times 1 \text{ months} \right)$		2,50,000
(iv) Outstanding Selling overheads $\left(\frac{1,50,000 \text{ units} \times 15}{12 \text{ months}} \times 1 \text{ months} \right)$		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.68

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.69

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:

- (a) Stock of materials 2 months' average consumption
- (b) Debtors 1.5 month's average sales.
- (c) Cash balance ₹ 50,000
- (d) Creditors for supply of materials 1 month's average purchase during the year.
- (e) 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	12,00,000	18,00,000
(Units produced × ₹ 100)		
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)	4,59,833	2,13,444
(Cost of Production × Closing stock/ units produced)		
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

10

CHAPTER

INVESTING DECISION

Q.70

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 providedTotal Trip = No. of Locations × No. of Persons × No. of Trips per Person = $7 \times 2 \times 2 = 28$ TripsTotal Travel Cost (including air fare, hotel accommodation and meals) $(28 \text{ trips} \times ₹ 27,000 \text{ per trip}) = ₹ 7,56,000$ **Option II : Video Conf.Facility is provided by Installation of Own Equipment at Different Locations**Cost of Equipment at each location $(₹ 8,25,000 \times 8 \text{ locations}) = ₹ 66,00,000$ Economic life of Machines (5 years). Annual depreciation $(66,00,000/5) = ₹ 13,20,000$ Annual transmission cost $(48 \text{ hrs. transmission} \times 8 \text{ locations} \times ₹ 300 \text{ per hour}) = ₹ 1,15,200$ Annual cost of operation $(13,20,000 + 1,15,200) = ₹ 14,35,200$ **Option III : Engaging Video Conferencing Facility on Rental Basis**Rental cost $(48 \text{ hrs.} \times 8 \text{ location} \times ₹ 1,500 \text{ per hr}) = ₹ 5,76,000$ Telephone cost $(48 \text{ hrs.} \times 8 \text{ locations} \times ₹ 400 \text{ per hr.}) = ₹ 1,53,600$ 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.71

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:

$$(-) ₹ 270 \text{ lakhs} + (₹ 42 \text{ lakhs} / 0.14) = (-) ₹ 270 \text{ lakhs} + ₹ 300 \text{ lakhs} = ₹ 30$$

$$\text{Issue costs} = ₹ 10 \text{ lakhs}$$

$$\text{Thus, the amount to be raised} = ₹ 270 \text{ lakhs} + ₹ 10 \text{ lakhs}$$

$$= ₹ 280 \text{ lakhs}$$

$$\text{Annual tax relief on interest payment} = ₹ 280 \times 0.1 \times 0.3$$

$$= ₹ 8.4 \text{ lakhs in perpetuity}$$

$$\text{The value of tax relief in perpetuity} = ₹ 8.4 \text{ lakhs} / 0.1$$

$$= ₹ 84 \text{ lakhs}$$

$$\text{Therefore, APV} = \text{Base case PV} - \text{Issue Costs} + \text{PV of Tax Relief on debt interest}$$

$$= ₹ 30 \text{ lakhs} - ₹ 10 \text{ lakhs} + 84 \text{ lakhs} = ₹ 104 \text{ lakhs}$$

(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. 72

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:

(₹ In lakh)

Year	1	2	3	4
------	---	---	---	---

Sales	966	966	1,254	1,254
Material consumption	90	120	255	255
Wages	225	225	255	300
Other expenses	120	135	162	210
Factory overheads	165	180	330	435
Depreciation (as per income tax rules)	150	114	84	63

Initial stock of materials required before commencement of the processing operations is ₹60 lakh at the start of year 1. The stock levels of materials to be maintained at the end of year 1, 2 and 3 will be ₹165 lakh and the stocks at the end of year 4 will be nil. The storage of materials will utilise space which would otherwise have been rented out for ₹30 lakh per annum. Labour costs include wages of 40 workers, whose transfer to this process will reduce idle time payments of ₹45 lakh in the year - 1 and ₹30 lakh in the year - 2. Factory overheads include apportionment of general factory overheads except to the extent of insurance charges of ₹90 lakh per annum payable on this venture. The company's tax rate is 30%.

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)



Profit on sale of machinery (net)	-	-	-	-	15
Total incremental cash flows	(150)	155.4	222.3	274.2	397.5
Present value factor	1.00	0.877	0.769	0.674	0.592
Present value of cash flows	(150)	136.28	170.95	184.81	235.32
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. 73

NPV Method (Buy M/c or not)

RTP May 19



BT Pathology Lab Ltd. is using an 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

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

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 × 0.04 × 4 = ₹ 3,04,000

(b) Scrap Value of Machine of Brand ABC

= ₹ 4,50,000 - ₹ 1,50,000 - ₹ 4,50,000 × 0.06 × 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.74

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.75

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.76

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.77

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:

$$4 \text{ years} + \frac{15200}{24800} = 4.613 \text{ years or 4 years, 2 months, and 11 days}$$

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:

$$1 \text{ year} + \frac{10620}{16600} = 1.640 \text{ years or 1 Year, 7 months and 23 days.}$$

(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. 78

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
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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

(i) 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 (PBTD)	5,05,688	6,21,688	1,16,000

Calculation of Incremental NPV

Year	PVF @ 10%	PBTD (₹)	Dep. @ 9% (₹)	PBT (₹)	Tax @ 25% (₹)	Cash Inflows (₹)	PV of Cash Inflows (₹)
	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. 79

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 anticipate that due to ready availability of tea and coffee through vending machines its employees would end up consuming more tea and coffee. It estimates that the consumption will increase by on an average 20% for all class of employees. Also, the paper cups consumption will be 10% more than the actual cups served due to leakages in them.

The company is in the 25% tax bracket and has a current cost of capital at 12% per annum. Straight line method of depreciation is allowed for the purpose of taxation. You as a financial consultant is required to ADVISE on the feasibility of acquiring the vending machine.

PV factors @ 12% :

Year	1	2	3	4	5
PVF	0.8929	0.7972	0.7118	0.6355	0.5674

Ans.

A. Computation of CFAT (Year 1 to 5)

Particulars			Amount (₹)
(a)	Savings in existing	$(120 \times 10 \times 3) + (40 \times 15 \times 3) + (40 \times 10 \times 1)$	11,60,000
	Tea & Coffee charges	$\times 200 \text{ days}$	
(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. 80

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.

