SUPER 150 QUESTIONS

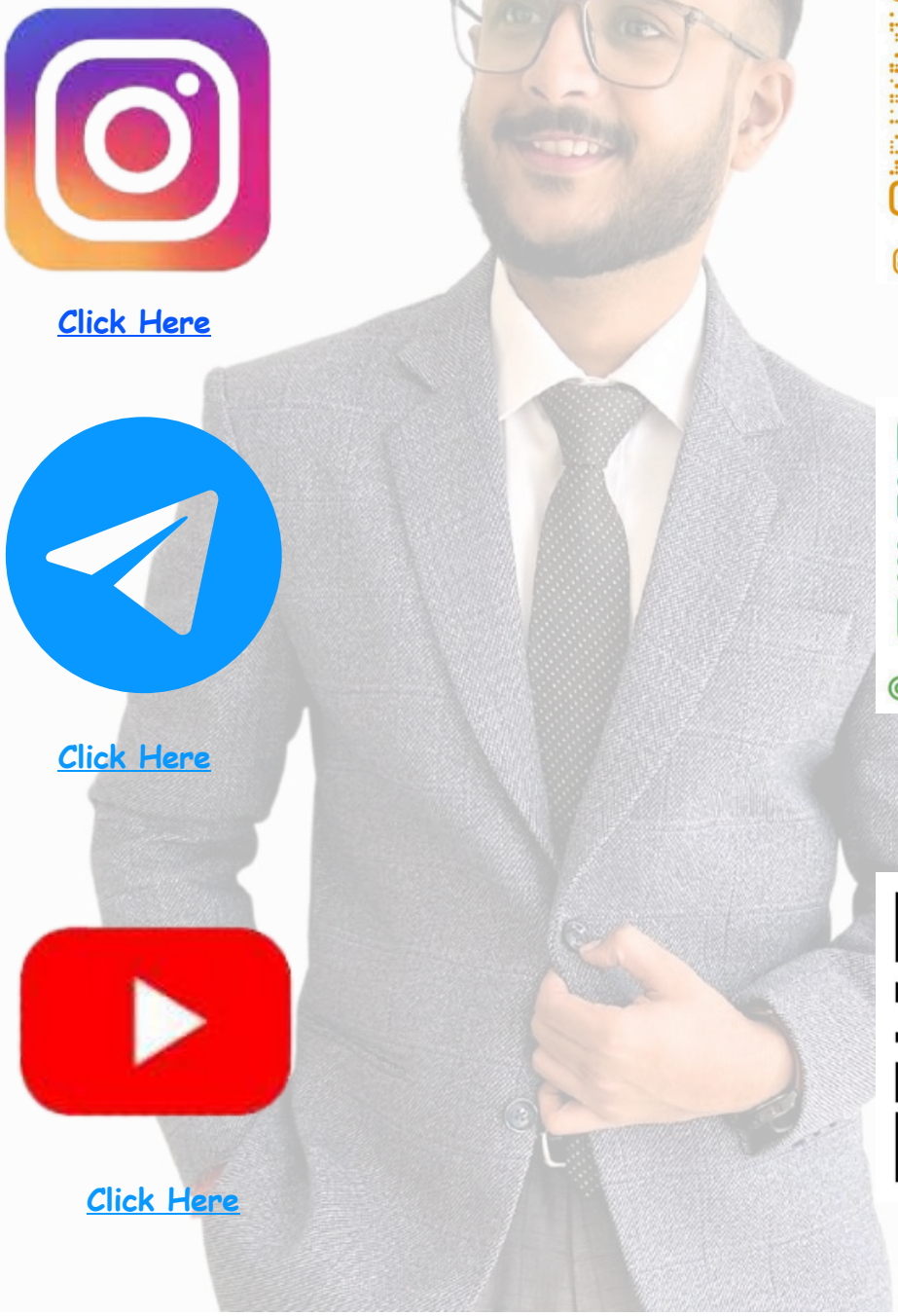
Hey Buddies.

We have compiled the best 150 Questions of FM for your attempt. Along with the Free-Power Batch available on our youtube chanel, this will become your best tool to obtain your dream marks.

ALL THE VERY BEST

❤ Yours - AmitBhai

Know Your Amit Bhai (AIR 30)



Click Here

@YOURS_AMITBHAI

Scan Here

Click Here

@FASTCOSTFMBYAB

Scan Here

Click Here

Scan Here

Our Courses Lists

Click On Below Links

- Cost Live Batch
- Cost-FM-SM Regular Batch
- Cost-FM-SM Exam Oriented Batch
- Only SM Power Batch
- All Question Bank
- All Handwritten Notes

RATIO ANALYSIS

Q.1 | All Ratios | PY May 22

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

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

You are required to calculate:

(i) Shareholders' Fund
(ii) Stock
(iii) Debtors
(iv) Current liabilities
(v) Cash Balance.

Ans.

(i) Calculation of Shareholders' Fund:

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

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

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

Reserve & Surplus = 5,00,000 + 0.5 Reserve & Surplus
0.5 Reserve & Surplus = 5,00,000
Reserve & Surplus = 10,00,000
Shareholders' funds = 10,00,000 +10,00,000
Shareholders' funds = ₹ 20,00,000

(ii) Calculation of Value of Stock:

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

Sales = 1.5 × 20,00,000
Sales = 30,00,000
Gross Profit = 30,00,000 × 20% = 6,00,000
Cost of Goods Sold = 30,00,000 – 6,00,000
= ₹ 24,00,000

Stock velocity = 2 months

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

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

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

Average stock = ₹ 4,00,000

(iii) Calculation of Debtors:

Debtors Turnover Ratio = 6

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

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

Average Debtors = ₹ 5,00,000

(iv) Calculation of Current Liabilities:

Net Working Capital Turnover ratio = 2.5

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

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

Current Assets – Current Liabilities = 12,00,000 ..... (1)

Current Ratio = 2.5

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

Current Assets = 2.5 Current Liabilities .....(2)

From (1) & (2),

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

1.5 Current Liabilities = 12,00,000

Current Liabilities = ₹ 8,00,000

(v) Calculation of Cash Balance:

Current Assets = 2.5 Current Liabilities

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

Q.2 COGS | PY Nov 18

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

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

Assume that:

(i) No change in Non-Current Assets during the year 2017-18

(ii) No depreciation charged on Non-Current Assets during the year 2017-18.

(iii) Ignoring Tax

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

Ans. **Workings**

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

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

So, Current Assets = ₹ 1,00,00,000

Now further,

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

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

So, Sales = ₹ 2,00,00,000

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

(i) Cost of Goods Sold (COGS):

Cost of Goods Sold = Sales- Gross Profit

= ₹ 2,00,00,000 – 20% of ₹ 2,00,00,000

= ₹ 1,60,00,000

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

= ₹ 20,00,000

(iii) Inventory:

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

Inventory Turnover Ratio = 12/ 3 = 4

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

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

Average or Closing Inventory =₹ 40,00,000

(iv) Receivables :

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

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

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

So, Average Accounts Receivable/Receivables =₹ 50,00,000/-

(v) Cash:

Cash* = Current Assets* – Inventory- Receivables

Cash = ₹ 1,00,00,000 - ₹ 40,00,000 - ₹ 50,00,000

= ₹ 10,00,000

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

Q.3 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 31stMarch, 2023.

Balance Sheet as on 31stMarch, 2023.

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

Ans. (i) Current Ratio = 4

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

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

Current Assets = ₹ 12,40,000

(ii) Acid Test Ratio = 2.5

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

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

12,40,000 – Inventory = ₹ 7,75,000

Inventory = ₹ 4,65,000

(iii) Inventory Turnover Ratio (on Sales) = 6

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

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

Sales = ₹ 27,90,000

(iv) Debtors Collection Period = 70 days

(Debtors / sales) x 360 = 70

(Debtors / 27,90,000) x 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

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

DPS = ₹ 2.1875

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

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

Number of Equity Shares = 80,000

Equity Share Capital = 80,000 x 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.4 Prepare B/s | PY Dec 21

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

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

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

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

Ans.

Working Notes:

(1) Total liability = Total Assets = ₹ 50,00,000
Debt to Total Asset Ratio = 0.40

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

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

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

(2) Total Liabilities = ₹ 50,00,000
Equity share Capital + Reserves + Debt = ₹ 50,00,000
So, Reserves =₹ 50,00,000 - ₹ 20,00,000 - ₹ 20,00,000
So, Reserves & Surplus = ₹ 10,00,000

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

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

Long Term Debt = ₹ 9,00,000

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

Accounts Payable = ₹ 11,00,000

(5) Gross Profit to sales = 20%

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

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

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

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

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

Closing inventory = 9,77,778

(7) Accounts Receivable period = 36 days

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

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

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

Accounts Receivable = ₹ 8,00,000

(8) Quick Ratio = 0.9

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

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

Cash + 8,00,000 = ₹ 9,90,000

Cash = ₹ 1,90,000

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

Balance Sheet of ABC Industries as on 31st March 2021

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

		Cash	**1,90,000**
Total	50,00,000	**Total**	**50,00,000**

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

Q.5 Prepare B/s | PY July 21

Masco Limited has furnished the following ratios and information relating to the year ended 3 1st 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.

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

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

The ratio of share capital to reserves is 6:4

Share Capital = 19,50,000 x 6/10 = ₹ 11,70,000

Reserves = 19,50,000 x 4/10 = ₹ 7,80,000

(ii) Calculation of Debentures

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

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

(iii) Calculation of Current Assets

Current Ratio = 2.5

Payables = ₹ 2,50,000

Bank overdraft = ₹ 1,50,000

Total Current Liabilities = ₹ 2,50,000 + ₹ 1,50,000 = ₹ 4,00,000

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

(iv) Calculation of Fixed Assets

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

(v) Calculation of Composition of Current Assets

Inventory Turnover = 12

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

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

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

Q.6 Find missing figures of B/S | RTP May

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

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

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

Average Receivables = ₹ 2,62,500

Closing Receivables = ₹ 2,62,500

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

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

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

Or Average Stock = ₹ 2,10,000

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

Opening Stock + Closing Stock = ₹ 4,20,000.....(1)

Also, Closing Stock-Opening Stock = ₹ 40,000.....(2)

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

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

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

Or ₹ 1,20,000 + 2 Payables = ₹ 4,92,500 + Cash

Or 2 Payables – Cash.= ₹ 3,72,500

Or Cash = 2 Payables – ₹ 3,72,500.....(3)

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

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

Or ₹ 1,80,000 + 3 Payables = ₹ 5,25,000 + 2 Cash

Or 3 Payables – 2 Cash = ₹ 3,45,000 ..... (4)

Substitute (3) in (4)

Or 3 Payables – 2(2 Payables – ₹ 3,72,500) = ₹ 3,45,000

Or 3 Payables – 4 Payables + ₹ 7,45,000= ₹ 3,45,000 (Payables) = ₹ 3,45,000 - ₹ 7,45,000

Payables = ₹ 4,00,000

So, Cash = 2 x ₹ 4,00,000 – ₹ 3,72,5000

Cash = ₹ 4,27,500

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

(vi) Equity Share Capital (ESC) + Reserves = ₹ 15,00,000
Or ESC + 0.2ESC = ₹ 15,00,000
Or 1.2 ESC = ₹ 15,00,000
Equity Share Capital (ESC) = ₹ 12,50,000

(vii) Reserves = 0.2 x ₹ 12,50,000

Reserves = ₹ 2,50,000

(viii) Total of Liabilities=Total of Assets
Or ₹ 12,50,000 + ₹ 2,50,000 + ₹ 6,75,000 +₹ 60,000 + ₹ 4,00,000 + Fixes Assets(FA) (WDV) + ₹ 2,30,000 + ₹ 2,62,000 +₹ 4,27,500
Or ₹ 26,35,000 = ₹ 9,20,000 + FA(WDV)
FA (WDV) =₹ 17,15,000
Now FA(Cost) – Depreciation = FA(WDV) Or FA(Cost) – FA(Cost)/6 = ₹ 17,15,000
Or 5 FA(Cost)/6 = ₹ 17,15,000
Or FA(Cost) = ₹ 17,15,000x 6/5
So, FA(Cost) = ₹ 20,58,000
Depreciation = ₹ 20,58,000/6 = ₹ 3,43,000

Q.7 Return Ratios | RTP July

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

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

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

(₹ in crores)

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

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

(i) Return on total assets
(ii) Return on owner's equity
(iii) Net Working capital
(iv) Current Ratio

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

Ans. **(i) Return on total assets**

$$\text{Return on total assets} = \frac{\text{EBIT}(1-T)}{\text{Total assets (FA + CA)}}$$

$$= \frac{2.30 \text{ crores}(1-0.3)}{5.20 \text{ crores} + ₹ 7.80 \text{ crores}}$$

$$= \frac{1.61 \text{crores}}{13 \text{ crores}} = 0.1238 \text{ or } 12.38\%$$

(ii) Return on owner's equity

(Amount in ₹)

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

(iii) Net Working capital

(₹ in crores)

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

(iv) Current ratio

(₹ in crores)

Financing policy		
Conservative	**Moderate**	**Aggressive**

Current Ratio = $\frac{\text{Current Assets}}{\text{Current Liabilities}}$	= $\frac{7.80}{5.76}$ = 1.35	= $\frac{7.80}{6.68}$ = 1.17	= $\frac{7.80}{7.68}$ = 1.02

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

Q.8 All Ratios | RTP Nov 19

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

Trading and Profit & Loss Account

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

Balance Sheet as on…….

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

You are required to COMPUTE:

(i) Gross profit ratio
(ii) Net profit ratio
(iii) Operating cost ratio
(iv) Operating profit ratio
(v) Inventory turnover ratio
(vi) Current ratio
(vii) Quick ratio
(viii) Interest coverage ratio
(ix) Return on capital employed

(x) Debt to assets ratio.

Ans.

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

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

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

Operating cost = Cost of goods sold + Operating expenses

Cost of goods sold = Sales – Gross profit

= 1,96,56,000 - 42,18,000 = 1,54,38,000

Operating expenses = Administrative expenses + Selling & distribution expenses

= 18,40,000 + 7,56,000 = 25,96,000

Therefore, Operating ratio = $\frac{1,54,38,000 + 25,96,000}{1,96,56,000} \times 100$

= $\frac{1,80,34,000}{1,96,56,000} \times 100 = 91.75\%$

(iv) Operating profit ratio = 100 – Operating cost ratio

= 100 – 91.75% = 8.25%

(v) Inventory turnover ratio = $\frac{\text{Cost of goods sold}}{\text{Average stock}}$

= $\frac{1,54,38,000}{\frac{(14,28,000 + 12,46,000)}{2}}$

= $\frac{1,54,38,000}{13,37,000} = 11.55$ times

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

Current assets = Sundry receivables + Inventory + Cash & Bank balance

= 13,50,000 + 14,28,000 + 4,22,000 = 32,00,000

Current liabilities = Sundry Payables + Other liabilities

= 7,20,000 + 2,80,000 = 10,00,000

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

(vii) Quick Ratio = $\frac{\text{Current assets - Inventories}}{\text{Current liablities}}$

= $\frac{32,00,000 - 14,28,000}{10,00,000} = 1.77$ times

(viii) Interest coverage ratio = $\frac{\text{EBIDT}}{\text{Interest}} = \frac{\text{Net profit + Interest}}{\text{Interest}}$

$= \frac{14,08,600 + 2,60,000}{2,60,000}$ = 6.42 times

(ix) Return on capital employed (ROCE) = $\frac{\text{EBIT}}{\text{Capital employed}} \times 100$

Capital employed = Capital + Retained earnings + General reserve + Term loan
= 20,00,000 + 42,00,000 + 12,00,000 + 26,00,000
= 1,00,00,000

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

(x) Debt to assets ratio = $\frac{\text{Debts}}{\text{Total assets}} \times 100$

$= \frac{26,00,000}{1,10,00,000} \times 100 = 23.64\%$

Q.9 Decision on basis of ratio | MTP Dec 21

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

Statement of Profit and Loss **(In ₹ '000)**

	2018-19	2019-20	2020-21
Sales			
Cash	400	960	1,600
Credit	3,600	8,640	14,400
Total sales	4,000	9,600	16,000
Cost of goods sold	2,480	5,664	9,600
Gross profit	1,520	3,936	6,400
Operating expenses:			
General, administration, and selling expenses	160	900	2,000
Depreciation	200	800	1,320
Interest expenses (on borrowings)	120	316	680
Profit before tax (PBT)	1,040	1,920	2,400
Tax @ 30%	312	576	720
Profit after tax (PAT)	728	1,344	1,680

BALANCE SHEET **(In ₹ '000)**

	2018-19	2019-20	2020-21
Assets			

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

INDUSTRY AVERAGE OF KEY RATIOS

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

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

Ans.

(In ₹ '000)

Ratio	Formula	2018-19	2019-20	2020-21	Industry Average
Current Ratio	$\frac{\text{Current assets}}{\text{Current liabilities}}$	$\frac{1,320}{520}$ = 2.54	$\frac{6,200}{3,456}$ = 1.80	$\frac{8,912}{5,560}$ = 1.60	2.30:1
Acid test ratio (quick ratio)	$\frac{\text{Quick Assets}}{\text{Current Liabilities}}$	$\frac{680}{520}$ = 1.31	$\frac{3,200}{3,456}$ = 0.93	$\frac{4,412}{5,560}$ = 0.79	1.20:1
Receivable turnover ratio	$\frac{\text{Credit Sales}}{\text{Average Accounts Receivable}}$	$\frac{3,600}{(600+600)/2}$ = 6	$\frac{8,640}{(600+3,000)/2}$ = 4.80	$\frac{14,400}{(3,000+4,200)/2}$ = 4	7 times
Inventory turnover ratio	$\frac{\text{COGS}}{\text{Average Inventory}}$	$\frac{2,480}{(640+640)/2}$ = 3.88	$\frac{5,664}{(640+3,000)/2}$ = 3.11	$\frac{9,600}{(3,000+4,500)/2}$ = 2.56	4.85 times

Long-term debt to total debt	Long term Debt × 100 Total Debt	1, 472 × 100 1,992 = 73.90%	2, 472 × 100 5,928 = 41.70%	5, 000 × 100 10,560 = 47.35%	24%
Debt-to-equity ratio	Long term Debt ×100 Shareholders' Equity	1, 472 × 100 3,128 = 47.06%	2, 472 × 100 5,272 = 46.89%	5, 000 × 100 7,752 = 64.50%	35%
Net profit ratio	Net Profit ×100 Sales	728 × 100 4,000 = 18.2%	1, 344 × 100 9,600 = 14%	1, 680 × 100 16,000 = 10.5%	18%
Return on total assets	Net Profit after taxes ×100 Total assets	728 × 100 5,120 = 14.22%	1, 344 × 100 11,200 = 12%	1, 680 × 100 18,312 = 9.17%	10%
Interest coverage ratio (times interest earned)	EBIT Interest	1,160 120 = 9.67	2, 236 316 = 7.08	3, 080 680 = 4.53	10

Conclusion:

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

On overall comparison of the industry average of key ratios than that of Jensen & Spencer, the company is in deterioration position. The company's profitability has declined steadily over the period. However, before jumping to the conclusion relying only on the key ratios, it is pertinent to keep in mind the industry, the company dealing in with i.e. manufacturing of pharmaceutical drugs. The pharmaceutical industry is one of the major contributors to the economy and is expected to grow further. After the covid situation, people are more cautious towards their health and are going to spend relatively more on health medicines. Thus, while analysing the loan proposal, both the factors, financial and non-financial, needs to be kept in mind.

Q.10 All Ratios | ICAI MAT

Following is the abridged Balance Sheet of Alpha Ltd.:

Liabilities	₹	Assets	₹	₹
Share Capital	1,00,000	Land and Buildings		80,000
Profit and Loss Account	17,000	Plant and Machineries	50,000	
Current Liabilities	40,000	Less: Depreciation	15,000	35,000
				1,15,000
		Stock	21,000	
		Receivables	20,000	
		Bank	1,000	42,000
Total	1,57,000	Total		1,57,000

With the help of the additional information furnished below, you are required to

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

(i) The company went in for re-organisation of capital structure, with share capital remaining the same as follows:

Share capital	50%
Other Shareholders' funds	15%
5% Debentures	10%
Current Liabilities	25%

Debentures were issued on 1st April, interest being paid annually on 31st March.

(ii) Land and Buildings remained unchanged. Additional plant and machinery has been bought and a further ₹ 5,000 depreciation was written off.
(The total fixed assets then constituted 60% of total fixed and current assets.)

(iii) Working capital ratio was 8 : 5.

(iv) Quick assets ratio was 1 : 1.

(v) The receivables (four-fifth of the quick assets) to sales ratio revealed a credit period of 2 months. There were no cash sales.

(vi) Return on net worth was 10%.

(vii) Gross profit was at the rate of 15% of selling price. (viii) Stock turnover was eight times for the year. Ignore Taxation.

Ans.

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

Calculation of Assets

Total liabilities = Total Assets

₹ 2,00,000	=	Total Assets
Fixed Assets	=	60% of total fixed assets and current assets
	=	₹ 2,00,000 □ 60/100 = ₹ 1,20,000
Current Assets	=	Total Assets – Fixed Assets
	=	₹ 2,00,000 – ₹ 1,20,000 = ₹ 80,000

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

Quick ratio: $= \frac{\text{Current assets} - \text{stock}}{\text{Current liabilities}} = 1$

$= \frac{`80,000 - \text{stock}}{50,000} = 1$

₹ 50,000 = ₹ 80,000 – Stock

Stock = ₹ 80,000 - ₹ 50,000

= ₹ 30,000

Receivables = 4/5th of quick assets

= (₹ 80,000 – ₹ 30,000) x 4/5

= ₹ 40,000

Receivables turnover $= \frac{\text{Receivables}}{\text{Credit Sales}} \times 12\text{Months} = 2 \text{ months}$

$= \frac{40,000 \times 12}{\text{Credit Sales}} = 2 \text{ months}$

2×credit sales = 4,80,000

Credit sales = 4,80,000/2

= ₹ 2,40,000 = Total Sales (As there were no cash sales)

Gross profit = 15% of sales = ₹ 2,40,000 x 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 x 10/100 = ₹ 13,000

Debenture interest = ₹ 20,000 x 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
		Plant & machinery	60,000	
5% Debentures	20,000	*Less*: Depreciation	20,000	40,000
Current liabilities	50,000	Current assets		
		Stock	30,000	
		Receivables	40,000	
		Bank	10,000	
				80,000
	2,00,000			2,00,000

Q.11 All Ratios | ICAI MAT

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

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

	₹	₹	₹
Accounts payable	*2,30,000*	*3,00,000*	*3,80,000*
Accruals	*2,00,000*	*2,10,000*	*2,25,000*
Bank loan (short-term)	*1,00,000*	*1,00,000*	*1,40,000*

	5,30,000	6,10,000	7,45,000
Long-term debt	3,00,000	3,00,000	3,00,000
Common stock	1,00,000	1,00,000	1,00,000
Retained earnings	5,00,000	5,50,000	5,50,000
	14,30,000	15,60,000	16,95,000
	₹	₹	₹
Sales	40,00,000	43,00,000	38,00,000
Cost of goods sold	32,00,000	36,00,000	33,00,000
Net profit	3,00,000	2,00,000	1,00,000

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

Ans.

Ratios	2020-21	2021-22	2022-23
Current ratio (Current Assets / Current Liabilities)	1.19 $\left(\frac{6,30,000}{5,30,000}\right)$	1.25 $\left(\frac{7,60,000}{6,10,000}\right)$	1.20 $\left(\frac{8,95,000}{7,45,000}\right)$
Acid-test ratio (Quick Assets / Current Liabilities)	0.43 $\left(\frac{2,30,000}{5,30,000}\right)$	0.46 $\left(\frac{2,80,000}{6,10,000}\right)$	0.40 $\left(\frac{2,95,000}{7,45,000}\right)$
Receivables turnover ratio (Sales/ Average Receivables) (Refer Working Notes)	20 $\left(\frac{40,00,000}{2,00,000}\right)$	18.70 $\left(\frac{43,00,000}{2,30,000}\right)$	13.82 $\left(\frac{38,00,000}{2,75,000}\right)$
Average collection period (365 / Receivables turnover ratio)	18.25 (365/20)	19.52 (365/18.70)	26.41 (365/13.82)
Inventory turnover ratio (COGS / Average Inventory) (Refer Working Notes)	8 $\left(\frac{32,00,000}{4,00,000}\right)$	8.18 $\left(\frac{36,00,000}{4,40,000}\right)$	6.11 $\left(\frac{33,00,000}{5,40,000}\right)$
Total debt to net worth (Short term + Long term Debt) / (Common stock + Retained earnings)	1.38 $\left(\frac{8,30,000}{6,00,000}\right)$	1.40 $\left(\frac{9,10,000}{6,50,000}\right)$	1.61 $\left(\frac{10,45,000}{6,50,000}\right)$
Long-term debt to total capitalization	0.33 $\left(\frac{3,00,000}{9,00,000}\right)$	0.32 $\left(\frac{3,00,000}{9,50,000}\right)$	0.32 $\left(\frac{3,00,000}{9,50,000}\right)$

Gross profit margin (Gross Profit / Sales) {Gross profit = Sales – Cost of Goods sold}	0.20 $\left(\frac{8,00,000}{40,00,000}\right)$	0.16 $\left(\frac{7,00,000}{43,00,000}\right)$	0.13 $\left(\frac{5,00,000}{38,00,000}\right)$
Net profit margin (Net Profit / Sales)	0.075 $\left(\frac{3,00,000}{40,00,000}\right)$	0.047 $\left(\frac{2,00,000}{43,00,000}\right)$	0.026 $\left(\frac{1,00,000}{38,00,000}\right)$
Total Asset turnover (Sales / Total Assets)	2.80 $\left(\frac{40,00,000}{14,30,000}\right)$	2.76 $\left(\frac{43,00,000}{15,60,000}\right)$	2.24 $\left(\frac{38,00,000}{16,95,000}\right)$
Return on assets (Net profit/ Total Assets)	0.21 $\left(\frac{3,00,000}{14,30,000}\right)$	0.13 $\left(\frac{2,00,000}{15,60,000}\right)$	0.06 $\left(\frac{1,00,000}{16,95,000}\right)$
Working Notes			
Average receivables {(Opening + closing)/2}	(₹2,00,000 + ₹ 2,00,000)/2 = ₹ 2,00,000	(₹2,00,000 + ₹ 2,60,000)/2 = ₹ 2,30,000	(₹2,60,000 + ₹ 2,90,000)/2 = ₹ 2,75,000
Average Inventory {(Opening + closing)/2}	(₹4,00,000 + ₹ 4,00,000)/2 = ₹ 4,00,000	(₹4,00,000 + ₹ 4,80,000)/2 = ₹ 4,40,000	(₹4,80,000 + ₹ 6,00,000)/2 = ₹ 5,40,000

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

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

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

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

Q.12 Prepare B/S | MTP May 18

Based on the following particulars, PREPARE a balance sheet showing various assets and liabilities of T Ltd.

Fixed assets turnover ratio	8 times
Capital turnover ratio	2 times
Inventory Turnover	8 times

Receivable turnover	4 times
Payable turnover	6 times
GP Ratio	25%

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

Ans.

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

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

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

(c) Receivable turnover = $\frac{\text{Sales}}{\text{Receivables}}$ = 4
= Receivables = $\frac{\text{Sales}}{4}$
= $\frac{32,00,000}{4}$ = ₹ 8,00,000

Q.13 Calculate Ratios | RTP Nov 19

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

Ratios	2021	2022	Average of Chemical Industry
Liquidity Ratios			
Current ratio	2.1	2.3	2.4
Quick ratio	1.4	1.8	1.4
Receivable turnover ratio	8	9	8
Inventory turnover	8	9	5
Receivables collection period	46 days	41 days	46 days
Operating profitability			
Operating income –ROI	24%	21%	18%
Operating profit margin	18%	18%	12%
Financing decisions			
Debt ratio	45%	44%	60%
Return			
Return on equity	26%	28%	18%

COMMENT on the following aspect of Prabhu Chemicals Limited

(i) Liquidity

(ii) Operating profits

(iii) Financing

(iv) Return to the shareholders

Ans.

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

Q.14 Change in current ratio | RTP Nov 18

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

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

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

S. No.	Situation	Improve/ Decline/ No Change	Reason
(i)	Payment of Current liability	Current Ratio will improve	Let us assume CA is ₹ 2 lakhs & CL is ₹ 1 lakh. If payment of Current Liability = ₹10,000 then, CA = 1, 90,000 CL = 90,000. Current Ratio = $\frac{1,90,000}{90,000}$ = 2.11 : 1. When Current Ratio is 2:1 Payment of Current liability will reduce the same amount in the numerator and denominator. Hence, the ratio will improve.
(ii)	Purchase of Fixed Assets by cash	Current Ratio will decline	Since the cash being a current asset converted into fixed asset, current assets reduced, thus current ratio will fall.
(iii)	Cash collected		

	from Customers	Current Ratio will not change	Cash will increase and Debtors will reduce. Hence No Change in Current Asset.
(iv)	Bills Receivable dishonoured	Current Ratio will not change	Bills Receivable will come down and debtors will increase. Hence no change in Current Assets.
(v)	Issue of New Shares	Current Ratio will improve	As Cash will increase, Current Assets will increase and current ratio will increase.

Q.15 Prepare B/S | MTP May 22

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

Debt Equity Ratio	1:1
Current Ratio	3:1
Acid Test Ratio	8:3
Fixed Asset Turnover (on the basis of sales)	4
Stock Turnover (on the basis of sales)	6
Cash in hand	5,00,000
Stock to Debtor	1:1
Sales to Net Worth	4
Capital to Reserve	1:2
Gross Profit	20% of Cost
COGS to Creditor	10:1

Interest for entire year is yet to be paid on Long Term loan @ 10% .

Ans.

Balance Sheet of Rudra Ltd.

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

Working Notes:

Let sales be ₹ x

Balance Sheet of Rudra Ltd.

Liabilities	Amount (₹)	Assets	Amount (₹)
Capital		Fixed Assets	x/4
Reserves		Current Assets:	
Net Worth	x/4	Stock in Trade	x/6
Long Term Loan @ 10%	x/4	Debtors	x/6

		Cash	5,00,000
Current liabilities:			
Creditors	x/12		
Other Short-term Current Liability			
Outstanding Interest			
Total Current Liabilities	x/9+5,00,000/3		
Total		**Total**	

1 Fixed Asset Turnover = 4 $= \frac{x}{\text{Fixed Assets}}$

Fixed Assets $= \frac{x}{4}$

2. Stock Turnover = 6 $= \frac{x}{\text{Stock}}$

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

3. Sales to net worth = 4 $= \frac{x}{\text{Net worth}}$

net worth $= \frac{x}{4}$

4. Debt: Equity $= 1 : 1$

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

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

5. Gross Profit to Cost $= 20\%$

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

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

$GP = 0.2x - 0.2\,GP$

$1.2\,GP = 0.2x$

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

$GP = x/6$

Cost of Goods Sold $= x - x/6 = 5/6\,x$

6. COGS to creditors $= 10:1$

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

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

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

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

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

8. Current Ratio = 3 : 1

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

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

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

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

9. $CA = 3CL$

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

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

10. Net worth + Long Term Loan + Current Liability = Fixed Asset + Current Assets

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

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

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

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

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

11. Now, from above calculations, we get,

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

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

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

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

Now, Capital to Reserve is 1 : 2

Capital = ₹ 10,00,000

and, Reserve = ₹ 20,00,000

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

-> Outstanding Interest = 30,00,000×10% = 3,00,000

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

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

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

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

15,00,000 = Other STCL + 13,00,000
Other STCL = 2,00,000

Q.16 All Ratios | ICAI MAT

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

Navya Ltd.

Balance Sheet as at 31.3.2023

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

Statement of Profitability

For the year ending 31.3.2023

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

Industry Norms

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

Ans.

Ratios	Navya Ltd.	Industry Norms
1. Current Ratio = Current Ass / Current Liabilities	₹52,80,000 / ₹19,80,000 = 2.67	2.50
2 Receivable Turnover Ratio = Sales / Debtors	₹1,10,00,000 / ₹11,00,000 =10.0	8.00
3. Inventory turnover ratio = Sales / Stock	₹1,10,00,000 / ₹33,00,000 = 3.33	9.00
4. Total Asset Turn over ratio = Sales / Total Assets	₹1,10,00,000 / ₹77,00,000 =1.43	2.00
5 Net Profit Ratio = Net Profit / Sales	₹2,31,000 / ₹1,10,00,000 = 2.10%	3.50%
6. Return on Total Asset = EBIT / Total Assets	₹5,54,000 / ₹77,00,000 = 7.19%	7%
7. Return on Net worth = Net Profit / Net Worth	₹2,31,000 / ₹48,00,000 = 4.81%	10.5%
8. Total Debt / Total Assets	₹29,00,000 / ₹77,00,000 = 37.66%	60%

Comments:

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

LEVERAGE

Q.17 EPS calculation | PY May 23

Following information is given for X Ltd.:

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

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

Ans.

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

Or EBIT = ₹ 1,36,000

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

(iii) Combined Leverage = OL × FL = 3.125 × FL

So, Financial Leverage = 2.5 /3.125 = 0.8

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

So, EBT = $\frac{1,36,000}{0.80}$ = ₹ 1,70,000

Calculation of EPS of X Ltd

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

Q.18 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) x 100	8%
Loan amount	₹ 1,25,000
Interest amount = 1,25,000 x 8%	₹ 10,000

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

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

1.5 EBIT -15000 = EBIT

1.5 EBIT – EBIT = 15,000

0.5 EBIT = 15,000

EBIT = ₹ 30,000

EBT = EBIT – Interest = 30,000 – 10,000 = ₹ 20,000

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

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

Contribution = ₹ 60,000

3., **Fixed cost** = Contribution – Profit

= 60,000 – 30,000 = ₹ 30,000

4., $\text{Sales} = \frac{\text{Contribution}}{\text{PV Ratio}}$

$$= \frac{60,000}{30\%} = ₹\ 2,00,000$$

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

Variable cost = 2,00,000 x 70% = ₹ **1,40,000**

Profit – Loss Statement

Particulars	₹
Sales	2,00,000
Less: Variable cost	1,40,000
Contribution	60000

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

(2) Calculation of no. of Equity shares

Market Price per Share (MPS) = ₹140

Price Earnings Ratio (PER) = 10

WKT,

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

Total earnings (EAT) = ₹ 14,000

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

Q.19 ROCE / EPS / OL / FL / CL | PY May 22

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

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

Required:

(i) Determine company's Return on Capital Employed (Pre-tax) and EPS.

(ii) Does the company have a favourable financial leverage?

(iii) Calculate operating and combined leverages of the company.

(iv) Calculate percentage change in EBIT, if sales increases by 10%.

(v) At what level of sales, the Earning before Tax (EBT) of the company will be equal to zero?

Ans.

Income Statement

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

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

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

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

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

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

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

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

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

Or, = Operating Leverage × Financial Leverage = 1.497 × 1.37 7 = **2.06 (approx.)**

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

(v) Since the combined Leverage is 2.062, sales have to drop by 100/2.062 i.e. 48.50% to bring EBT to Zero.
Accordingly, New Sales = ₹ 86,00,000 × (1 - 0.4850)
= ₹ 86,00,000 × 0.515
= ₹ 44,29,000 (approx.)
Hence, at ₹ 44,29,000 sales level, EBT of the firm will be equal to Zero.

Q.20 % change in EPS / PL / FL / 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)

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 $= \frac{EBIT}{EBT} = \frac{1,50,000}{1,20,000} = 1.25$ times

Combined Leverage = Operating Leverage × Financial Leverage

= 4 x 1.25 = 5 times

Or,

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

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

(iii) Percentage Change in Earnings per share

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

% Change in EPS = 25%

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

Q.21 EPS / OL / FL / CL | PY May 21

A company had the following balance sheet as on 31st March, 2021:

Liabilities	₹ in Crores	Assets	₹ in Crores
Equity Share Capital (75 lakhs Shares of ₹ 10 each)	7.50	Building	12.50
Reserves and Surplus	1.50	Machinery	6.25
15% Debentures	15.00	Current Assets	
Current Liabilities	6.00	Stock	3.00
		Debtors	3.25
		Bank Balance	5.00
	30.00		30.00

The additional information given is as under:

Fixed cost per annum (excluding interest)	₹ 6 crores
Variable operating cost ratio	60%
Total assets turnover ratio	2.5
Income-tax rate	40%

Calculate the following and comment:

(i) Earnings per share
(ii) Operating Leverage
(iii) Financial Leverage
(iv) Combined Leverage

Ans.

Total Assets = ₹ 30 crores
Total Asset Turnover Ratio = 2.5
Hence, Total Sales = 30 x 2.5 = ₹ 75 crores

Computation of Profit after Tax (PAT)

Particulars	**(₹ in crores)**
Sales	75.00

Less: Variable Operating Cost @ 60%	45.00
Contribution	30.00
Less: Fixed Cost (other than Interest)	6.00
EBIT/PBIT	24.00
Less: Interest on Debentures (15% □ 15)	2.25
EBT/PBT	21.75
Less: Tax @ 40%	8.70
EAT/ PAT	13.05

(i) Earnings per Share

$$EPS = \frac{PAT}{Numberof\ Equity\ Shares} = \frac{13.05}{0.75} = ₹\ 17.40$$

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

(ii) Operating Leverage

$$Operating\ Leverage = \frac{Contribution}{EBIT} = \frac{30}{24} = 1.25$$

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

(iii) Financial Leverage

$$Financial\ Leverage = \frac{EBIT}{PBT} = \frac{24}{21.75} = 1.103$$

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

(iv) Combined Leverage

$$Combined\ Leverage = \frac{Contribution}{PBT} = \frac{30}{21.75} = 1.379$$

Or,
= Operating Leverage × Financial Leverage
= 1.25 x 1.103 = 1.379
The combined leverage studies the choice of fixed cost in cost structure and choice of debt in capital structure. It studies how sensitive the change in EPS is vis-à-vis change in sales. The leverages operating, financial and combined are used as measurement of risk.

Q.22 EPS / OL / CL | PY Jan 21

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

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

Income Tax Rate Applicable 30%

You are required to compute the following:
(i) Operating Leverage
(ii) Combined Leverage
(iii) Earning per share
(iv) Earning Yield

Ans. **Workings:**

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

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

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

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

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

EBT = ₹ 9,71,223

3. Income Statement

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

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

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

(ii) Combined Leverage = Operating Leverage x Financial Leverage
= 1.556 x 1.39 = 2.163 (approx.)

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

(iii) Earnings per Share (EPS)

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

No. of shares = 50,000

(iv) Earning Yield

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

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.23 | % change in EBIT | PY Nov 20

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

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

Using the concept of leverage, find out
(i) The percentage change in taxable income if EBIT increases by 10%.
(ii) The percentage change in EBIT if sales increases by 10%.
(iii) The percentage change in taxable income if sales increases by 10%.
Also verify the results in each of the above case.

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

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

Verification

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

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

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

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

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

Verification

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

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

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

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

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

Verification

Particulars	Amount (₹)
New Sales after 10% increase (₹ 5,00,000 + 10%)	5,50,000
Less: Variable cost (40% of ₹ 5,50,000)	2,20,000
Contribution	3,30,000
Less: Fixed costs	2,00,000
Earnings before interest and tax (EBIT)	1,30,000
Less: Interest	25,000
Earnings before tax after change (EBT)	1,05,000

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

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

Q.24 PL / OL / FL / CL | PY Nov 18

Following is the Balance Sheet of Soni Ltd. as on 31st March, 2018 :

Liabilities	Amount in ₹
Shareholder's Fund	
Equity Share Capital (₹ 10 each)	25,00,000
Reserve and Surplus	5,00,000
Non-Current Liabilities (12 Debentures)	50,00,000
Current Liabilities	20,00,000
Total	**1,00,00,000**
Assets	**Amount in ₹**
Non-Current Assets	60,00,000
Current Assets	40,00,000
Total	**1,00,00,000**

Additional Information:

(i) Variable Cost is 60% of Sales.

(ii) Fixed Cost p.a. excluding interest ₹ 20,00,000.

(iii) Total Asset Turnover Ratio is 5 times.

(iv) Income Tax Rate 25%

You are required to:

(1) Prepare Income Statement
(2) Calculate the following and comment:
  (a) Operating Leverage
  (b) Financial Leverage
  (c) Combined Leverage

Ans. **Workings:-**

Total Assets = ₹ 1 crore

Total Asset Turnover Ratio i.e. $\frac{\text{Total Sales}}{\text{Total Assets}}$ = 5

Hence, Total Sales = ₹ 1 Crore x 5 = ₹ 5 crore

(1) Income Statement

	(₹ in crore)
Sales	5
Less: Variable cost @ 60%	3
Contribution	2
Less: Fixed cost (other than Interest)	0 .2
EBIT (Earnings before interest and tax)	1.8
Less: Interest on debentures (12% x 50 lakhs)	0 .06
EBT (Earning before tax)	1.74
Less: Tax 25%	0.435
EAT (Earning after tax)	1.305

(2) (a) Operating Leverage

$$\text{Operating leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{2}{1.8} = 1.11$$

It indicates fixed cost in cost structure. It indicates sensitivity of earnings before interest and tax (EBIT) to change in sales at a particular level.

(b) Financial Leverage

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{1.8}{1.74} = 1.03$$

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

(c) Combined Leverage

$$\text{Combined Leverage} = \frac{\text{Contribution}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{EBT}} = 1.11 \times 1.03 = 1.15$$

$$\text{Or } \frac{\text{Contribution}}{\text{EBIT}} = \frac{2}{1.74} = 1.15$$

The combined leverage studies the choice of fixed cost in cost structure and choice of debt in capital structure. It studies how sensitive the change in EPS is vis-à-vis change in sales.

The leverages operating, financial and combined are measures of risk.

Q.25 FL / PV Ratio | PY May 18

The following data have been extracted from the books of LM Ltd: Sales - ₹100 lakhs

Interest Payable per annum - ₹ 10 lakhs
Operating leverage - 1.2
Combined leverage - 2.16

You are required to calculate:

(i) The financial leverage,
(ii) Fixed cost and
(iii) P/V ratio

Ans.

(i) Calculation of Financial Leverage:

Combined Leverage (CL) = Operating Leverage (OL) x Financial Leverage (FL)

2.16 = 1.2 x FL

FL = 1.8

(ii) Calculation of Fixed cost:

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBTi.e EBIT} - \text{Interest}}$$

$$1.8 = \frac{\text{EBIT}}{\text{EBIT} - 10,00,000}$$

1.8 (EBIT – 10,00,000) = EBIT

1.8 EBIT - 18,00,000 = EBIT

$$\text{EBIT} = \frac{18,00,000}{0.8} = ₹\ 22,50,000$$

$$\text{Further, Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}}$$

$$1.2 = \frac{\text{Contribution}}{22,50,000}$$

Contribution = ₹ 27,00,000

Fixed Cost = Contribution – EBIT

= ₹ 27, 00,000 – ₹ 22,50,000

Fixed cost = ₹ 4,50,000

(iii) Calculation of P/V ratio:

$$\text{P/V ratio} = \frac{\text{Contribution}(C)}{\text{Sales}(S)} \times 100 = \frac{27,00,000}{100,00,000} \times 100 = 27\%$$

Q.26 EPS / OL / FL | RTP Nov 23

The capital structure of ABC Ltd. for the year ended 31st March 2022 consisted as follows:

Particulars	Amount in ₹
Equity share capital (face value ₹ 100 each)	20,00,000
10% debentures (₹ 100 each)	20,00,000

During the year 2021-22, sales decreased to 1,00,000 units as compared to 1,20,000 units in the previous year. However, the selling price stood at ₹ 15 per unit and variable cost at ₹ 10 per unit for both the years. The fixed expenses were at ₹ 2,00,000 p.a. and the income tax rate is 30%.

You are required to CALCULATE the following:

(a) The degree of financial leverage at 1,20,000 units and 1,00,000 units.
(b) The degree of operating leverage at 1,20,000 units and 1,00,000 units.
(c) The percentage change in EPS.

Ans.

Sales in units	**1,20,000 (₹)**	**1,00,000 (₹)**
Sales Value	18,00,000	15,00,000
Variable Cost	(12,00,000)	(10,00,000)
Contribution	6,00,000	5,00,000
Fixed expenses	(2,00,000)	(2,00,000)
EBIT	4,00,000	3,00,000
Debenture Interest	(2,00,000)	(2,00,000)
EBT	2,00,000	1,00,000
Tax @ 30%	(60,000)	(30,000)
Profit after tax (PAT)	1,40,000	70,000
(i) Financial Leverage= $\frac{EBIT}{EBT}$	$= \frac{4,00,000}{2,00,000} = 2$	$= \frac{3,00,000}{1,00,000} = 3$
(ii) Operating leverage = $\frac{Contribution}{EBIT}$	$\frac{6,00,000}{4,00,000} = 1.50$	$= \frac{5,00,000}{3,00,000} = 1.67$
(iii) Earnings per share (EPS)	$\frac{1,40,000}{20,000} = 7$	$\frac{70,000}{20,000} = ₹ 3.5$
Decrease in EPS		= ₹ 7 - ₹ 3.5 = ₹ 3.5
% decrease in EPS		$\frac{3.5}{7} \times 100 = 50\%$

Q.27 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 = $\frac{EBIT}{EBIT - Interest}$

DFL x (EBIT – Int) = EBIT
DFL x EBIT – Int x DFL= EBIT
DFL x EBIT – EBIT =Int x DFL
EBIT (DFL – 1) = Int x DFL

$EBIT = \frac{intx\ DFL}{DFL - 1}$

For A,

$EBIT_A = \frac{1,00,000 \times 3}{3 - 1}$

$EBIT_A$ = ₹150000

For B

$EBIT_B = \frac{4,00,000 \times 5}{5 - 1}$

EBITB = ₹500000

For C

$EBIT_c = \frac{6,00,000 \times 2.5}{2.5 - 1}$ ₹

$EBIT_c$ =10,00,000

(ii) DOL= $\frac{Contribution}{EBIT}$

Contribution = DOL x EBIT
$Contribution_A$ = 4 x ₹1,50,000
$Contribution_A$ = ₹6,00,000
$Contribution_B$ = 3 x ₹5,00,000
$Contribution_B$ = ₹15,00,000
$Contribution_C$ = 2.5 x ₹10,00,000
$Contribution_C$ = ₹25,00,000

(iii) Fixed Cost = Contribution – EBIT
Fixed $Cost_A$= ₹6,00,000 – ₹1,50,000 = ₹4,50,000
Fixed $Cost_B$ =₹15,00,000 – ₹5,00,000 = ₹10,00,000
Fixed $Cost_C$ = ₹25,00,000 – ₹10,00,000 = ₹15,00,000

(iv) Contribution = Sales – VC
VC= Sales – Contribution
Sales x VC Ratio= Sales – Contribution
Contribution= Sales – Sales x VC Ratio
Contribution=Sales(1-VCR)

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

Sales_A = ₹6,00,000/(1-0.6) = ₹15,00,000
Sales_B = ₹15,00,000/(1-0.5) = ₹30,00,000
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.28 PL Statement | RTP May 22

Company P and Q are having same earnings before tax. However, t he 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 x 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 x 75% = 3

(iv) EBIT

For Company A	
Financial Leverage	= EBIT/(EBIT- Interest)
4	= EBIT/(EBIT- ₹ 1,50,000)
4EBIT – ₹ 6,00,000	= EBIT
3EBIT	= ₹ 6,00,000
EBIT	= ₹ 2,00,000
For Company B	
Financial Leverage	= EBIT/(EBIT - Interest)
3	= EBIT/(EBIT – ₹ 1,00,000)
3EBIT – ₹ 3,00,000	= EBIT
2EBIT EBIT	= ₹ 3,00,000
Contribution	= **₹ 1,50,000**

(v) For Company A

Operating Leverage	
	= 1/Margin of Safety
Operating Leverage	= 1/0.20 = 5
5	= Contribution/EBIT
Contribution	= Contribution/₹ 2,00,000
For Company B	= ₹ 10,00,000
Operating Leverage	
	= 1/Margin of Safety
Operating Leverage	= 1/0.25 = 4
4	= Contribution/EBIT
Contribution	= Contribution/₹ 1,50,000
Sales	= ₹ 6,00,000

(vi) For Company A

Profit Volume Ratio	= 25%
Profit Volume Ratio	= Contribution/Sales 100
25%	= ₹ 10,00,000/Sales
Sales	= ₹ 10,00,000/25%
Sales	= ₹ 40,00,000
For Company B	
Profit Volume Ratio	= 33.33%
Therefore, Sales	= ₹ 6,00,000/33.33%
Sales	= ₹ 18,00,000

Q.29 Raise money by Equity or Debt | RTP Dec 21

The following particulars relating to Navya Ltd. for the year ended 31st March 2021 is given:

Output	1,00,000 units at normal
Selling price per unit	₹ 40
Variable cost per unit	₹ 20
Fixed cost	₹ 10,00,000

The capital structure of the company as on 31st March, 2021 is as follows:

Particulars	₹
Equity share capital (1,00,000 shares of ₹ 10 each)	10,00,000
Reserves and surplus	5,00,000

7% debentures	10,00,000
Current liabilities	5,00,000
Total	**30,00,000**

Navya Ltd. has decided to undertake an expansion project to use the market potential, that will involve ₹ 10 lakhs. The company expects an increase in output by 50%. Fixed cost will be increased by ₹ 5,00,000 and variable cost per unit will be decreased by 10%. The additional output can be sold at the existing selling price without any adverse impact on the market.

The following alternative schemes for financing the proposed expansion programme are planned:

(i) Entirely by equity shares of ₹ 10 each at par.

(ii) ₹ 5 lakh by issue of equity shares of ₹ 10 each and the balance by issue of 6% debentures of ₹ 100 each at par.

(iii) Entirely by 6% debentures of ₹ 100 each at par.

FIND out which of the above-mentioned alternatives would you recommend for Navya Ltd. with reference to the risk and return involved, assuming a corporate tax of 40%.

Ans. **Statement showing Profitability of Alternative Schemes for Financing**

(₹ in '00,000)

Particulars	**Existing**	**Alternative Schemes**		
		(i)	**(ii)**	**(iii)**
Equity Share capital (existing)	10	10	10	10
New issues	-	10	5	-
	10	**20**	**15**	**10**
7% debentures	10	10	10	10
6% debentures	-	-	5	10
	20	**30**	**30**	**30**
Debenture interest (7%)	0.7	0.7	0.7	0.7
Debenture interest (6%)	-	-	0.3	0.6
	0.7	**0.7**	**1.0**	**1.3**
Output (units in lakh)	1	1.5	1.5	1.5
Contribution per. unit (₹) (Selling price - Variable Cost)	**20**	**22**	**22**	**22**
Contribution (₹ lakh)	**20**	**33**	**33**	**33**
Less: Fixed cost	10	15	15	15
EBIT	**10**	**18**	**18**	**18**
Less: Interest (as calculated above)	0.7	0.7	1.0	1.3
EBT	**9.3**	**17.3**	**17**	**16.7**
Less: Tax (40%)	3.72	6.92	6.8	6.68
EAT	**5.58**	**10.38**	**10.20**	**10.02**
Operating Leverage (Contribution /EBIT)	**2.00**	**1.83**	**1.83**	**1.83**
Financial Leverage (EBIT/EBT)	**1.08**	**1.04**	**1.06**	**1.08**
Combined Leverage (Contribution/EBT)	**2.15**	**1.91**	**1.94**	**1.98**
EPS (EAT/No. of shares) (₹)	**5.58**	**5.19**	**6.80**	**10.02**

Risk	-	Lowest	Lower than option (3)	Highest
Return	-	Lowest	Lower than option (3)	Highest

From the above figures, we can see that the Operating Leverage is same in all alternatives though Financial Leverage differs. Alternative (iii) uses the maximum amount of debt and result into the highest degree of financial leverage, followed by alternative (ii). Accordingly, risk of the company will be maximum in these options. Corresponding to this scheme, however, maximum EPS (i.e., ₹ 10.02 per share) will be also in option (iii).
So, if Navya Ltd. is ready to take a high degree of risk, then alternative (iii) is strongly recommended. In case of opting for less risk, alternative (ii) is the next best option with a reduced EPS of ₹ 6.80 per share. In case of alternative (i), EPS is even lower than the existing option, hence not recommended.

Q.30 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:

(i) CALCULATE the degree of operating leverage for each of these firms. Comment also.

(ii) Use the operating leverage to EXPLAIN why these firms have different beta.

Ans. (i) Degree of operating leverage = $\frac{\%\text{Change in Operating income}}{\%\text{Change in Revenues}}$

A Ltd. = 0.22 / 0.35 = 0.63
B Ltd. = 0.35 / 0.24 = 1.46
C Ltd. = 0.26 / 0.29 = 0.90
D Ltd. = 0.30 / 0.32 = 0.94

It is level specific.

(ii) High operating leverage leads to high beta. So when operating leverage is lowest i.e. 0.63, Beta is minimum (1) and when operating leverage is maximum i.e. 1.46, beta is highest i.e. 1.65

Q.31 OL / FL / CL | RTP May 18

CALCULATE the operating leverage, financial leverage and combined leverage from the following data under Situation I and II and Financial Plan A and B:

Installed Capacity	4,000 units
Actual Production and Sales	75% of the Capacity
Selling Price	₹30 per unit
Variable Cost	₹15 per unit

Fixed Cost:

Under Situation I	₹ 15,000
Under Situation-II	₹ 20,000

Capital Structure:

	Financial Plan	
	A (₹)	B (₹)
Equity	10,000	15,000
Debt (Rate of Interest at 20%)	10,000	5,000
	20,000	20,000

Ans.

(i) Operating leverages:

Particulars	Situation-I (₹)	Situation-II (₹)
Sales (S) (3,000 units @ ₹ 30/- per unit)	90,000	90,000
Less: Variable Cost (VC) @ ₹15 per unit	(45,000)	(45,000)
Contribution (C)	45,000	45,000
Less: Fixed Cost (FC)	15,000	20,000
EBIT	30,000	25,000
Operating Leverage $\left(\frac{C}{EBIT}\right)$	45,000 / 30,000	45,000 / 25,000
	= 1.5	= 1.8

(ii) Financial Leverages:

	A (₹)	B (₹)
Situation I:		
EBIT	30,000	30,000
Less: Interest on debt	(2,000)	(1,000)
EBT	28,000	29,000
Financial Leverage $\left(\frac{EBIT}{EBT}\right)$	30,000 / 28,000	30,000 / 29,000
	= 1.07	= 1.03
Situation-II:		
EBIT	25,000	25,000
Less: Interest on debt	(2,000)	(1,000)
EBT	23,000	24,000
Financial Leverage $\left(\frac{EBIT}{EBT}\right)$	25,000 / 23,000	25,000 / 24,000
	= 1.09	= 1.04

(iii) Combined Leverages:

	A (₹)	B (₹)
(a) Situation I	1.5 × 1.07 = 1.61	1.5 × 1.03 = 1.55
(b) Situation II	1.8 × 1.09 = 1.96	1.8 × 1.04 = 1.87

Q.32 OL / Break Even | MTP Nov 22

Following information is provided relating to SVB Ltd.:

Sales price	₹ 21 per unit
Variable cost	₹ 13.50 per unit

Break-even point 30,000 units

You are required to CALCULATE operating leverage at sales volume 37,500 units and 45,000 units.

Ans.

Computation of Operating Leverage (OL)

Selling Price = ₹ 21 per unit

Variable Cost = ₹ 13.50 per unit

Fixed Cost = BEP × (Selling price – Variable cost) = 30,000 × (21 – 13.50) = 30,000 × 7.5 = 2,25,000

Particulars	For 37,500 units (₹)	For 45,000 units (₹)
Sales (@ ₹ 21 /unit)	7,87,500	9,45,000
Less: Variable Cost (@ 13.50 /unit)	5,06,250	6,07,500
Contribution	2,81,250	3,37,500
Less: Fixed Cost	2,25,000	2,25,000
Earnings before Interest and tax (EBIT)	56,250	1,12,500
Operating Leverage $\left(\frac{\text{Contribution}}{\text{EBIT}}\right)$	$\left(\frac{2,81,250}{56,250}\right)$	$\left(\frac{2,81,250}{1,12,500}\right)$
Operating Leverage	5 times	3 times

Q.33 PL Statement | MTP May 22 (2)

From the given details, PREPARE Income Statement for Alpha Ltd. and Beta Ltd.

Particulars	Alpha Ltd.	Beta Ltd.
Operating Leverage	1.875	1.800
Financial Leverage	1.600	1.250
PV Ratio	60%	50%
Profit after tax	₹ 3,00,000	₹ 2,40,000
Tax rate	40%	40%

Ans.

Particulars	Alpha Ltd. (₹)	Beta Ltd. (₹)	
Sales	25,00,000	18,00,000	
Less: Variable Cost	10,00,000	9,00,000	(Bal. fig.)
Contribution	15,00,000	9,00,000	
Less: Fixed Cost	7,00,000	4,00,000	(Bal. fig.)
EBIT	8,00,000	5,00,000	
Less: Interest	3,00,000	1,00,000	(Bal. fig.)
PBT	5,00,000	4,00,000	
Less: Tax (40%)	2,00,000	1,60,000	
PAT	3,00,000	2,40,000	

Working Note:

Particulars	Alpha Ltd.	Beta Ltd.
PAT	₹ 3,00,000	₹ 2,40,000

Tax Rate (t)	40%	40%
PBT = PAT/(I-t)	$\frac{3,00,000}{1-0.4}$ = 5,00,000	$\frac{2,40,000}{1-0.4}$ = 4,00,000
Finance Leverage	1.60	1.25
EBIT = PBT × FL	5,00,000 × 1.6 = 8,00,000	4,00,000 × 1.25 = 5,00,000
Operating Leverage	1.875	1.800
Contribution = EBIT × OL	8,00,000 × 1.875 = 15,00,000	5,00,000 × 1.8 = 9,00,000
PV ratio	60%	50%
Sales = $\frac{\text{Contribution}}{\text{PV ratio}}$	$\frac{15,00,000}{.60}$ = 25,00,000	$\frac{9,00,000}{.50}$ = 18,00,000

Q.34 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**

Combined Leverage = Operating Leverage x Financial Leverage

So, financial leverage = Combined Leverage/Operating Leverage

= 2.8/1.4 = 2

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

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{Contribution} - \text{Fixed Cost}}$$

$$1.4 = \frac{\text{Contribution}}{\text{Contribution} - 2,10,000}$$

1.4 Contribution – 2,94,000 = Contribution

0.4 Contribution = 2,94,000

Contribution = 7,35,000

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

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

Earning before tax (EBT) = Contribution – Fixed Cost – Interest
= 7,35,000 – 2,10,000 – 2,50,000
= 2,75,000

Profit after tax = EBT – Tax @ 30%
= 2,75,000 – 82,500
= 1,92,500

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

(iii) Asset Turnover

Total Assets = Equity Share Capital + Debentures = ₹ 20 lakhs + ₹ 25 lakhs = ₹ 45 lakhs

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

0.89 < 1.6, means lower than industry turnover.

(iv) EBT zero means 100% reduction in EBT. Since combined leverage is 2.8, sales have to be dropped by 100/2.8 = 35.71%. Hence new sales will be
40,00,000 x (100% - 35.71%) = 25,71,600

(b) Electronic Fund Transfer: With the developments which took place in the information technology, the present banking system has switched over to the computerization of banks branches to offer efficient banking services and cash management services to their customers. The network wil l 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.

CAPITAL STRUCTURE

Q.35 Additional capital & MPS max | PY May 23

The following information pertains to CIZA Ltd.:

	₹
Capital Structure:	
Equity share capital (₹ 10	*8,00,000*
each) Retained earnings	*20,00,000*
9% Preference share capital (₹ 100 each)	*12,00,000*
12% Long-term loan	*10,00,000*
Interest coverage	*8*
ratio 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

$$\frac{EBIT}{Interest} = 8$$

$$\frac{EBIT}{1,20,000} = 8$$

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

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.36 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 x 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 x 10%)		50,000
2	(₹ 5,00,000 x 10%)	50,000	
	(₹ 5,00,000 x 15%)	75,000	1,25,000
3	(₹ 5,00,000 x 10%)	50,000	
	(₹ 5,00,000 x 15%)	75,000	
	(₹ 4,00,000 x 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.37 Calculate new EPS | PY Dec 21

Earnings before interest and tax of a company are ₹ 4,50,000. Currently the company has 80,000 Equity shares of ₹ 10 each, retained earnings of ₹ 12,00,000. It pays annual interest of ₹ 1,20,000 on 12% Debentures. The company proposes to take up an expansi on scheme for which it needs additional fund of ₹ 6,00,000. It is anticipated that after expansion, the company will be able to achieve the same return on investment as at present.
It can raise fund either through debts at rate of 12% p.a. or by issuing Eq uity shares at par. Tax rate is 40%.

Required:
Compute the earning per share if:
(i) The additional funds were raised through debts.
(ii) The additional funds were raised by issue of Equity shares.
Advise whether the company should go for expansion plan and which sources of finance should be preferred.

Ans

Working Notes:

(1) **Capital employed before expansion plan:**

	(₹)
Equity shares (₹ 10 × 80,000 shares)	8,00,000
Debentures {(₹ 1,20,000/12) x 100}	10,00,000
Retained earnings	12,00,000
Total capital employed	**30,00,000**

(2) **Earnings before interest and tax (EBIT)** = 4,50,000

(3) **Return on Capital Employed (ROCE):**

$$ROCE = \frac{EBIT}{Capital\ employed} \times 100 = \frac{4,50,000}{30,00,000} \times 100 = 15\%$$

(4) **Earnings before interest and tax (EBIT) after expansion scheme:**
After expansion, capital employed = ₹ 30,00,000 + ₹ 6,00,000 = ₹ 36,00,000
Desired EBIT = 15% x ₹ 36,00,000 = ₹ **5,40,000**

(i) & (ii) Computation of Earnings Per Share (EPS) under the following options:

	Present situation	Expansion scheme Additional funds raised as	
		Debt (i)	Equity (ii)
	(₹)	(₹)	(₹)
Earnings before Interest and Tax (EBIT)	4,50,000	5,40,000	5,40,000
Less: Interest - Old Debt	1,20,000	1,20,000	1,20,000
- New Debt	--	**72,000** (₹ 6,00,000 x 12%)	--

Earnings before Tax (EBT)	3,30,000	3,48,000	4,20,000
Less: Tax (40% of EBT)	1,32,000	1,39,200	1,68,000
PAT/EAT	1,98,000	**2,08,800**	**2,52,000**
No. of shares outstanding	80,000	80,000	1,40,000
Earnings per Share (EPS)	2.475 $\left(\frac{1,98,000}{80,000}\right)$	**2.610** $\left(\frac{2,08,800}{80,000}\right)$	**1.800** $\left(\frac{2,52,000}{1,40,000}\right)$

Advise to the Company: When the expansion scheme is financed by additional debt, the EPS is higher. Hence, the company **should finance the expansion scheme by raising debt.**

Q.38 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 Plan Y = ₹ 2,00,000 / ₹ 20 Plan Z = ₹ 2,00,000 / ₹ 20	20,000	10,000	10,000
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

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

0.5 EBIT = EBIT - ₹ 20,000

EBIT = ₹ 40,000

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

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

0.5 EBIT = EBIT- ₹ 40,000

0.5 EBIT = ₹ 40,000

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

(c) Indifference point where EBIT of proposal 'Y' and proposal 'Z' are equal

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

0.5 EBIT - ₹ 10,000 = 0.5 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.39 Form of Financing to choose | PY Nov 18

Y Limited requires ₹ 50,00,000 for a new project. This project is expected to yield earnings before interest and taxes of ₹ 10,00,000. While deciding about the financial plan, the company considers the objective of maximizing earnings per' share. It has two alternatives to finance the project - by raising debt ₹ 5,00,000 or ₹ 20,00,000 and the balance, in each case, by issuing Equity Shares. The company's share is currently selling at ₹ 300, but is expected to decline to ₹ 250 in case the funds are borrowed in excess of ₹ 20,00,000. The funds can be borrowed at the rate of 12 percent upto ₹ 5,00,000 and at 10 percent over ₹ 5,00,000. The tax rate applicable to the company is 25 percent. Which form of financing should the company choose?

Ans.

Plan I = Raising Debt of Rs 5 lakh + Equity of Rs 45 lakh.

Plan II = Raising Debt of ₹ 20 lakh + Equity of ₹ 30 lakh.

Calculation of Earnings per share (EPS)

Particulars	Financial Plans	
	Plan I	Plan II

	₹	₹
Expected EBIT	10,00,000	10,00,000
Less: Interest (Working Note 1)	(60,000)	(2,10,000)
Earnings before taxes	9,40,000	7,90,000
Less: Taxes @ 25%	(2,35,000)	(1,97,500)
Earnings after taxes (EAT)	7,05,000	5,92,500
Number of shares (Working Note 2)	15,000	10,000
Earnings per share (EPS)	47	59.25

Financing Plan II (i.e. Raising debt of ₹ 20 lakh and issue of equity share capital of ₹ 30 lakh) is the option which maximises the earnings per share.

Working Notes:

1. **Calculation of interest on Debt.**

Plan I	(₹ 5,00,000 x 12%)		₹ 60,000
Plan II	(₹ 5,00,000 x 12%)	₹ 60,000	₹ 2,10,000
	(₹ 15,00,000 x 10%)	₹ 1,50,000	

2. **Number of equity shares to be issued**

$$\text{Plan I: } \frac{\text{Rs. } 45,\ 00,\ 000}{\text{Rs. } 300\ (\text{MarketPrice of share})} = 15{,}000 \text{ shares}$$

$$\text{Plan II: } \frac{\text{Rs. } 30,\ 00,\ 000}{\text{Rs. } 300\ (\text{Market Price ofshare})} = 10{,}000 \text{ shares}$$

(*Alternatively, interest on Debt for Plan II can be 20,00,000 X 10% i.e. ₹ 2,00,000. accordingly, the EPS for the Plan II will be ₹60)

Q.40 EPS / Fin. BEP / Indifference | PY May 18

Sun Ltd. is considering two financing plans.
Details of which are as under:

(i) Fund's requirement – ₹ 100 Lakhs
(ii) Financial Plan

Plan	Equity	Debt
I	100%	-
II	25%	75%

(iii) Cost of debt – 12% p.a.
(iv) Tax Rate – 30%
(v) Equity Share ₹ 10 each, issued at a premium of ₹ 15 per share
(vi) Expected Earnings before Interest and Taxes (EBIT) ₹ 40 Lakhs

You are required to compute:
(i) EPS in each of the plan
(ii) The Financial Break Even Point
(iii) Indifference point between Plan I and II

Ans. **Computation of Earnings Per Share (EPS)**

Plans	I (₹)	II (₹)
Earnings before interest & tax (EBIT)	40,00,000	40,00,000
Less: Interest charges (12% of ₹ 75 lakh)	--	(9,00,000)
Earnings before tax (EBT)	40,00,000	31,00,000
Less: Tax @ 30%	(12,00,000)	(9,30,000)
Earnings after tax (EAT)	28,00,000	21,70,000
No. of equity shares (@₹ 10+₹ 15)	4,00,000	1,00,000
E.P.S (`)	7.00	21.70

(ii) Computation of Financial Break-even Points

Plan 'I' = 0 – Under this plan there is no interest payment, hence the financial break - even point will be zero.
Plan 'II' = ₹ 9,00,000 - Under this plan there is an interest payment of ₹9,00,000, hence the financial break -even point will be ₹9 lakhs

(iii) Computation of Indifference Point between Plan I and Plan II:

Indifference point is a point where EBIT of Plan-I and Plan-II are equal. This can be calculated by applying the following formula:

{(EBIT -I1) (1- T)} / E1 = {(EBIT -I2) (1- T)} / E2

So $\frac{EBIT(1-0.3)}{4,00,000 shares} = \frac{(EBIT - `9,00,000)(1-0.3)}{1,00,000 shares}$

Or, 2.8 EBIT – 25,20,000 = 0.7EBIT
Or, 2.1EBIT = 25,20,000
EBIT =12,00,000

Q.41 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 If ₹ 5,00,000 is raised as debt (₹)	Plan-II 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 $\left(50,000 x \frac{100}{10}\right)$	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 = $\frac{3,\ 00,\ 000}{15,00,000} x100$	20%

2. **Number of Equity Shares to be issued in Plan-II:**

$= \frac{`\ 5,00,000}{50}$ = 10,000 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:**

$= \frac{10,00,000}{20,00,000}$ x 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.42 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 x 7 lakhs	₹ 1,40,00,000
Reserves		₹ 10,00,000
9% Bonds		₹ 3,00,00,000
11% Preference Share Capital	₹ 50 x 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 x 25%	₹ 1,25,00,000	-
	50000000 x 50%	-	₹ 2,50,00,000
Debt @ 10%	50000000 x 75%	₹ 3,75,00,000	-
Preference Shares @ 12%	50000000 x 50%	-	₹ 2,50,00,000
Combined Capital		**Amount (proposal 1)**	**Amount (proposal 2)**
Equity		₹ 2,65,00,000	₹ 3,90,00,000
Reserves		₹ 10,00,000	₹ 10,00,000
9% Bond		₹ 3,00,00,000	₹ 3,00,00,000
10% Debt		₹ 3,75,00,000	-
11% Preference Shares		₹ 1,50,00,000	₹ 1,50,00,000
12% Preference Shares		-	₹ 2,50,00,000
		₹ 11,00,00,000	**₹ 11,00,00,000**

Interest for Proposal I = ₹ 3,00,00,000 x 9% + ₹ 3,75,00,000 x 10%
= ₹ 27,00,000 + ₹ 37,50,000
= ₹ 64,50,000

Preference Dividend for Proposal I = ₹ 1,50,00,000 x 11% = ₹ 16,50,000

Interest for Proposal II = ₹ 3,00,00,000 x 9% = ₹ 27,00,000
Preference Dividend for Proposal II = ₹ 1,50,00,000 x 11% + ₹ 2,50,00,000 x 12%
= ₹ 16,50,000 + ₹ 30,00,000 = ₹ 46,50,000

Let the indifference point be ₹ X

For Proposal I,

$$EPS = \frac{(X - ` 64,50,000) \times 0.66 - ` 16,50,000}{13,25,000} \quad \ldots\ldots\ldots\ldots\ldots\ldots(1)$$

For Proposal II,

$$EPS = \frac{(X - ` 27,00,000) \times 0.66 - ` 46,50,000}{13,25,000} \quad \ldots\ldots\ldots\ldots\ldots(2)$$

Equating (1) and (2),

$$EPS = \frac{(X - 64,50,000) \times 0.66 - 16,50,000}{13,25,000} = \frac{(X - ` 27,00,000) \times 0.66 - 46,50,000}{19,50,000}$$

$$= \frac{0.66\,X\;42,57,000 - 16,50,000}{1,325} = \frac{0.66X - 17,82,000 - 46,50,000}{1,950}$$

$$\frac{0.66X - ` 59,07,000}{53} = \frac{0.66X - 64,32,000}{78}$$

₹ 51.48X – ₹ 46,07,46,000 = ₹ 37.98X - ₹34,08,96,000
₹ 16.5X = ₹ 11,98,50,000
Indifference Point = X = ₹ 72,63,636.36

Q.43 Calculate new MPS | RTP Nov 22

ABC Limited provides you the following information:

	(₹)
Profit (EBIT)	2,80,000
Less: Intt. on Debt @10%	40,000
EBT	2,40,000
Less: Income Tax @ 50%	1,20,000
	1,20,000
No. of Equity Shares (₹ 10 each)	30,000
Earnings per share (EPS)	4
Price / EPS (P/E) Ratio	10
Ruling Market price per share	40

The company has undistributed reserves of ₹ 7,00,000 and needs ₹ 4,00,000 further for expansion. This investment is expected to earn the same rate as funds already invested. You are informed that a debt equity (debt/ debt +equity) ratio higher than 32% will push the P/E ratio down to 8 and raise the interest rate on additional borrowings (debentures) to 12%. You are required to ASCERTAIN the probable price of the share.

(i) If the additional funds are raised as debt; and

(ii) If the amount is raised by issuing equity shares at ruling market price of ₹ 40 per share.

Ans. Ascertainment of probable price of shares

Particulars	Plan (i) (If ₹ 4,00,000 is raised as debt) (₹)	Plan (ii) (If ₹ 4,00,000 is raised by issuing equity shares) (₹)
Earnings Before Interest (EBIT)	3,60,000	3,60,000
20% on (14,00,000 + 4,00,000)		
Less: Interest on old debentures @ 10% on 4,00,000	40,000	40,000
	3,20,000	3,20,000
Less: Interest on New debt @ 12% on ₹ 4,00,000	48,000	-
Earnings Before Tax (After interest)	2,72,000	3,20,000
Less: Tax @ 50%	1,36,000	1,60,000
Earnings for equity shareholders (EAIT)	1,36,000	1,60,000
Number of Equity Shares (in numbers)	30,000	40,000
Earnings per Share (EPS)	4.53	4.00
Price/ Earnings Ratio	8	10
Probable Price Per Share	36.24 (8 x 4.53)	40 (10 x 4)

Working Notes:

		(₹)
1.	Calculation of Present Rate of Earnings	
	Equity Share capital (30,000 x ₹ 10)	3,00,000
	10% Debentures $\left(40{,}000x\frac{100}{10}\right)$	4,00,000
	Reserves (given)	7,00,000
		14,00,000
	Earnings before interest and tax (EBIT) given	2,80,000
	Rate of Present Earnings = $\left(\frac{2{,}80{,}000}{14{,}00{,}000}x100\right)$	20%
2.	Number of Equity Shares to be issued in Plan $\left(\frac{4{,}00{,}000}{40}\right)$	10,000
	Thus, after the issue total number of shares	30,000 + 10,000 = 40,000
3.	Debt/Equity Ratio if ₹ 4,00,000 is raised as debt:	$\left(\frac{8{,}00{,}000}{18{,}00{,}000}x100\right)$

As the debt equity ratio is more than 32% the P/E ratio shall be 8 in plan (i) = 44.44%

Q.44 Indifference Point | RTP May 20

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

(i) Equity share capital of ₹60,00,000 and 12% debentures of ₹40,00,000.

Or

(ii) Equity share capital of ₹40,00,000, 14% preference share capital of ₹20,00,000 and 12% debentures of ₹40,00,000.

Assume the corporate tax rate is 35% and par value of equity share is ₹100 in each case.

Ans. **Computation of level of earnings before interest and tax (EBIT)**

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

$$EPS_{\text{Alternative (i)}} = \frac{(EBIT - Interest)\ (1 - tax\ rate)}{No.of\ equityshares}$$

$$= \frac{(EBIT - 0.12 \times 40,\ 00,\ 000)\ (1 - 0.35)}{60,000\ shares}$$

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

$$EPS_{\text{Alternative (ii)}} = \frac{(EBIT - 0.12 \times 40,00,000)\ (1 - 0.35) - (0.14 \times 20,00,000)}{40,000 shares}$$

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

$$\frac{(EBIT - 0.12 \times 40,\ 00,\ 000)(1 - 0.35)}{60,000 shares} = \frac{(EBIT - 0.12 \times 40,\ 00,\ 000)(1 - 0.35) - (0.14 \times 20,00,\ 000)}{40,000 shares}$$

$$\text{Or } \frac{0.65\ EBIT - 3,12,000}{3} = \frac{0.65\ EBIT\ -\ `5,92,000}{2}$$

Or 1.30 EBIT □ ₹6,24,000 = 1.95 EBIT - ₹17,76,000

Or (1.95 □ 1.30) EBIT = ₹17,76,000 - ₹6,24,000 = ₹11,52,000

Or $EBIT = \frac{11,52,000}{0.65}$

Or EBIT = ₹17,72,308

Q.45 Calculate New MPS | RTP May 19

Akash Limited provides you the following information:

	(₹)
Profit (EBIT)	2,80,000
Less: Interest on Debenture @ 10%	(40,000)
EBT	2,40,000
Less Income Tax @ 50%	(1,20,000)
	1,20,000
No. of Equity Shares (₹ 10 each)	30,000
Earnings per share (EPS)	4
Price /EPS (PE) Ratio	10

The company has reserves and surplus of ₹ 7,00,000 and required ₹ 4,00,000 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 are 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 Akash limited

Particulars	Plan-I If ₹ 4,00,000 is raised as debt (₹)	Plan-II If ₹4,00,000 is raised by issuing equity shares (₹)
Earnings Before Interest and Tax (EBIT) {20% of new capital i.e. 20% of (₹14,00,000 + ₹4,00,000)} (Refer working note1)	3,60,000	3,60,000
Less: Interest on old debentures (10% of ₹4,00,000)	(40,000)	(40,000)
Less: Interest on new debt (12% of ₹4,00,000)	(48,000)	--
Earnings Before Tax (EBT)	2,72,000	3,20,000
Less: Tax @ 50%	(1,36,000)	(1,60,000)
Earnings for equity shareholders (EAT)	1,36,000	1,60,000
No. of Equity Shares (refer working note 2)	30,000	40,000
Earnings per Share (EPS)	₹ 4.53	₹ 4.00
Price/ Earnings (P/E) Ratio (refer working note 3)	8	10
Probable Price Per Share (PE Ratio × EPS)	₹ 36.24	₹ 40

Working Notes:

1. **Calculation of existing Return of Capital Employed (ROCE):**

	(₹)
Equity Share capital (30,000 shares × ₹10)	3,00,000
10% Debentures $\left(40,000 x \frac{100}{10}\right)$	4,00,000
Reserves and Surplus	7,00,000
Total Capital Employed	14,00,000
Earnings before interest and tax (EBIT) (given)	2,80,000
ROCE = $\frac{2,80,000}{14,00,000} x 100$	20%

2. **Number of Equity Shares to be issued in Plan-II:**

= $\frac{4,00,000}{40}$ x 10,000 shares

Thus, after the issue total number of shares = 30,000+ 10,000 = 40,000 shares

3. Debt/Equity Ratio if ₹ 4,00,000 is raised as debt:

$= \frac{8,00,000}{18,00,000} \times 100 = 44.44\%$

As the debt equity ratio is more than 40% the P/E ratio will be brought down to 8 in Plan-I

Q.46 Compute New EPS | MTP Nov 23(2)

A Company earns a profit of ₹7,00,000 per annum after meeting its interest liability of ₹1,00,000 on 10% debentures. The Tax rate is 40%. The number of Equity Shares of ₹10 each are 1,00,000 and the retained earnings amount to ₹20,00,000. The company proposes to take up an expansion scheme for which a sum of ₹10,00,000 is required. It is anticipated that after expansion, the company will be able to achieve the same return on investment as at present. The funds required for expansion can be raised either through debt at the rate of 12% or by issuing equity shares at par.

Required:

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

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

Ans. **Working Notes:**

1. Capital employed before expansion plan:

	(₹)
Equity shares (₹10 × 1,00,000 shares)	10,00,000
Debentures {(₹1,00,000/10) x 100}	10,00,000
Retained earnings	20,00,000
Total capital employed	40,00,000

2. Earnings before the payment of interest and tax (EBIT) :

	(₹)
Profit (EBT)	7,00,000
Add: Interest	1,00,000
EBIT	8,00,000

3. Return on Capital Employed (ROCE):

$ROCE = \frac{EBIT}{Capital\ employed} \times 100 = \frac{Rs.8,\ 00,\ 000}{Rs.40,00,000} \times 100 = 20\%$

4. Earnings before interest and tax (EBIT) after expansion scheme:

After expansion, capital employed	= ₹40,00,000 + ₹10,00,000
	= ₹ 50,00,000
Desired EBIT	= 20% x ₹50,00,000 = ₹10,00,000

(i) Computation of Earnings Per Share (EPS) under the following options:

	Present situation	Expansion scheme Additional funds raised as	
		Debt	Equity
	(₹)	(₹)	(₹)

Earnings before Interest and Tax (EBIT)	8,00,000	10,00,000	10,00,000
Less: Interest - Old capital	1,00,000	1,00,000	1,00,000
- New capital	--	1,00,000 (₹10,00,000 x 10%)	--
Earnings before Tax (EBT)	7,00,000	8,00,000	9,00,000
Less: Tax (40% of EBT)	2,80,000	3,20,000	3,60,000
PAT	4,20,000	4,80,000	5,40,000
No. of shares outstanding	1,00,000	1,00,000	2,00,000
Earnings per Share (EPS)	4.20 $\left(\frac{4,20,000}{1,00,000}\right)$	4.80 $\left(\frac{4,80,000}{1,00,000}\right)$	2.70 $\left(\frac{5,40,000}{2,00,000}\right)$

(ii) Advise to the Company: When the expansion scheme is financed by additional debt, the EPS is higher. Hence, the company should finance the expansion scheme by raising debt.

Q.47 Compute EPS & Choose best EPS | MTP Nov 23(1)

Bhaskar Manufactures Ltd. have Equity Share Capital of ₹ 5,00,000 (face value ₹100) to meet the expenditure of an expansion programme, the company wishes to raise ₹ 3,00,000 and is having following four alternative sources to raise the funds:

Plan A: To have full money from equity shares.

Plan B: To have ₹ 1 lakhs from equity and ₹ 2 lakhs from borrowing from the financial institution @ 10% p.a.

Plan C: Full money from borrowing @ 10% p.a.

Plan D: ₹1 lakh in equity and ₹ 2 lakhs from preference shares at 8% p.a.

The company is expected to have an earning of ₹ 1,50,000. The corporate tax is 50%. Suggest a suitable plan of the above four plans to raise the required funds.

Ans. **Statement showing the EPS under the four plans**

	Plan A	Plan B	Plan C	Plan D
Equity share capital	₹ 8,00,000	₹ 6,00,000	₹ 5,00,000	₹ 6,00,000
8% Pref. Share capital	-	-	-	₹ 2,00,000
Borrowing @ 10%	-	₹ 2,00,000	₹ 3,00,000	-
	₹ 8,00,000	₹ 8,00,000	₹ 8,00,000	₹ 8,00,000
E.B.I.T	₹ 1,50,000	₹ 1,50,000	₹ 1,50,000	₹ 1,50,000
Less: Interest @ 10%		₹ 20,000	₹ 30,000	
E.B.T	₹ 1,50,000	₹ 1,30,000	₹1,20,000	₹ 1,50,000
Less: Tax	₹ 75,000	₹65,000	₹60,000	₹ 75,000
Less: Pref Divided				₹ 16,000
Earnings available to equity share holders	₹ 75,000	₹ 65,000	₹ 60,000	₹ 59,000
No.of equity shares (₹100)	8,000	6,000	5,000	6,000
Earning per share	**₹ 9.38**	**₹ 10.83**	**₹ 12.00**	**₹ 9.83**

Plan C given the highest EPS and therefore to be accepted.

Q.48 Calculate New EPS | MTP May 23(1)

RML Limited needs ₹6,50,00,000 for the Expansion purposes. The following three plans are feasible:

(I) The Company may issue 6,50,000 equity shares at ₹100 per share.

(II) The Company may issue 4,00,000 equity shares at ₹100 per share and 2,50,000 debentures of ₹100 denomination bearing a 9% rate of interest.

(III) The Company may issue 4,00,000 equity shares at ₹100 per share and 2,50,000 cumulative preference shares at ₹100 per share bearing a 9% rate of dividend.

(i) If the Company's earnings before interest and taxes are ₹15,62,500, ₹22,50,000, ₹62,50,000, ₹93,75,000 and ₹1,56,25,000, CALCULATE the earnings per share under each of three financial plans? Assume a Corporate Income tax rate of 25%.

(ii) WHICH alternative would you recommend and why?

Ans.

Computation of EPS under three-financial plans.

Plan I: Equity Financing

	(₹)	(₹)	(₹)	(₹)	(₹)
EBIT	15,62,500	22,50,000	62,50,000	93,75,000	1,56,25,000
Interest	0	0	0	0	0
EBT	15,62,500	22,50,000	62,50,000	93,75,000	1,56,25,000
Less: Tax @ 25%	3,90,625	5,62,500	15,62,500	23,43,750	39,06,250
PAT	11,71,875	16,87,500	46,87,500	70,31,250	1,17,18,750
No. of equity shares	6,50,000	6,50,000	6,50,000	6,50,000	6,50,000
EPS	1.80	2.60	7.21	10.82	18.03

Plan II: Debt – Equity Mix

	(₹)	(₹)	(₹)	(₹)	(₹)
EBIT	15,62,500	22,50,000	62,50,000	93,75,000	1,56,25,000
Less: Interest	22,50,000	22,50,000	22,50,000	22,50,000	22,50,000
EBT	(6,87,500)	0	40,00,000	71,25,000	1,33,75,000
Less: Tax @ 25%	1,71,875*	0	10,00,000	17,81,250	33,43,750
PAT	(5,15,625)	0	30,00,000	53,43,750	1,00,31,250
No. of equity shares	4,00,000	4,00,000	4,00,000	4,00,000	4,00,000
EPS (₹)	(1.29)	0.00	7.50	13.36	25.08

* The Company can set off losses against the overall business profit or may carry forward it to next financial years.

Plan III: Preference Shares – Equity Mix

	(₹)	(₹)	(₹)	(₹)	(₹)
EBIT	15,62,500	22,50,000	62,50,000	93,75,000	1,56,25,000
Less: Interest	0	0	0	0	0
EBT	15,62,500	22,50,000	62,50,000	93,75,000	1,56,25,000
Less: Tax @ 25%	3,90,625	5,62,500	15,62,500	23,43,750	39,06,250
PAT	11,71,875	16,87,500	46,87,500	70,31,250	1,17,18,750
Less: Pref. dividend *	22,50,000	22,50,000	22,50,000	22,50,000	22,50,000
PAT after Pref. dividend.	(10,78,125)	(5,62,500)	24,37,500	47,81,250	94,68,750

No. of Equity shares	4,00,000	4,00,000	4,00,000	4,00,000	4,00,000
EPS	(2.70)	(1.41)	6.09	11.95	23.67

* In case of cumulative preference shares, the company has to pay cumulative dividend to preference shareholders.

(ii) In case of lower EBIT Plan I i.e Equity Financing is better however in case of higher EBIT Plan II i.e Debt=Equity Mix is best.

Q.49 Interest / EPS | MTP Nov 22(2)

Axar Ltd. has a Sales of ₹ 68,00,000 with a Variable cost Ratio of 60%.

The company has fixed cost of ₹16,32,000. The capital of the company comprises of 12% long term debt, ₹1,00,000 Preference Shares of ₹ 10 each carrying dividend rate of 10% and 1,50,000 equity shares.

The tax rate applicable for the company is 30%.

At current sales level, DETERMINE the Interest, EPS and amount of debt for the firm if a 25% decline in Sales will wipe out all the EPS.

Ans. Break Even Sales = ₹ 6800000×0.75 = ₹ 51,00,000

Income Statement (Amount in ₹)

	Original	Calculation of Interest at BEP (backward calculation)	Now at present level
Sales	68,00,000	51,00,000	68,00,000
Less: Variable Cost	40,80,000	30,60,000	40,80,000
Contribution	27,20,000	20,40,000	27,20,000
Less: Fixed Cost	16,32,000	16,32,000	16,32,000
EBIT	10,88,000	4,08,000	10,88,000
Less: Interest (EBIT-PBT)	?	**3,93,714**	**3,93,714**
PBT	?	14,286(10,000/70%)	6,94,286
Less: Tax @ 30%(or PBT-PAT)	?	4,286	2,08,286
PAT	?	10,000(Nil+10,000)	4,86,000
Less: Preference Dividend	10,000	10,000	10,000
Earnings for Equity share holders	?	**Nil (at BEP)**	4,76,000
Number of Equity Shares	1,50,000	1,50,000	1,50,000
EPS	?	-	3.1733

So Interest=₹3,93,714, EPS=₹3.1733, Amount of debt=3,93,714/12%=₹ 32,80,950

Q.50 Calculate New EPS | MTP May 22(2)

(a) The Modern Chemicals Ltd. requires ₹ 25,00,000 for a new plant. This plant is expected to yield earnings before interest and taxes of ₹ 5,00,000. While deciding about the financial plan, the company considers the objective of maximising earnings per share. It has three alternatives to finance the project- by raising debt of ₹ 2,50,000 or ₹ 10,00,000 or ₹ 15,00,000 and the balance, in each case, by issuing equity shares. The company's share is currently selling at ₹ 150, but is expected to decline to ₹ 125 in case the funds are

borrowed in excess of ₹ 10,00,000. The funds can be borrowed at the rate of 10% upto ₹ 2,50,000, at 15% over ₹ 2,50,000 and upto ₹ 10,00,000 and at 20% over ₹ 10,00,000. The tax rate applicable to the company is 50%. ANALYSE, which form of financing should the company choose?

Ans. (a) Calculation of Earnings per share for three alternatives to finance the project

Particulars	Alternatives		
	I To raise debt of ₹2,50,000 and equity of ₹22,50,000 (₹)	**II** To raise debt of ₹ 10,00,000 and equity of ₹ 15,00,000 (₹)	**III** To raise debt of ₹ 15,00,000 and equity of ₹ 10,00,000 (₹)
Earnings before interest and tax	5,00,000	5,00,000	5,00,000
Less: Interest on debt at the rate of	25,000 (10% on ₹ 2,50,000)	1,37,500 (10% on ₹ 2,50,000) (15% on ₹ 7,50,000)	2,37,500 (10% on ₹ 2,50,000) (15% on ₹ 7,50,000) (20% on ₹ 5,00,000)
Earnings before tax	4,75,000	3,62,500	2,62,500
Less: Tax (@ 50%)	2,37,500	1,81,250	1,31,250
Earnings after tax: (A)	2,37,500	1,81,250	1,31,250
Number of shares :(B) (Refer to working note)	15,000	10,000	8,000
Earnings per share: (A)/(B)	15.833	18.125	16.406

So, the earning per share (EPS) is higher in alternative II i.e. if the company finance the project by raising debt of ₹ 10,00,000 and issue equity shares of ₹ 15,00,000. Therefore, the company should choose this alternative to finance the project.

Working Note:

	Alternatives		
	I	**II**	**III**
Equity financing : (A)	₹ 22,50,000	₹ 15,00,000	₹ 10,00,000
Market price per share : (B)	₹ 150	₹ 150	₹ 125
Number of equity share: (A)/(B)	15,000	10,000	8,000

(b) "Operating risk is associated with cost structure whereas financial risk is associated with capital structure of a business concern".

Operating risk refers to the risk associated with the firm's operations. It is represented by the variability of earnings before interest and tax (EBIT). The variability in turn is influenced by revenues and expenses, which are affected by demand of firm's products, variations in prices and proportion of fixed cost in total cost. If there is no fixed cost, there would be no operating risk. Whereas financial risk refers to the additional risk placed on firm's shareholders as a result of debt and preference shares used in the capital

structure of the concern. Companies that issue more debt instruments would have higher financial risk than companies financed mostly by equity.

Q.51 Indifference Point | MTP May 21(1)

HN Limited is considering total investment of Rs. 20 lakhs. You are required to CALCULATE the level of earnings before interest and tax (EBIT) at which the EPS indifference point between the following financing alternatives will occur:

(i) Equity share capital of Rs. 12,00,000 and 14% debentures of Rs. 8,00,000.
Or
(ii) Equity share capital of Rs. 8,00,000, 16% preference share capital of Rs. 4,00,000 and 14% debentures of Rs. 8,00,000.

Assume the corporate tax rate is 30% and par value of equity share is Rs.10 in each case.

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

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

$$EPS_{\text{Alternative (i)}} = \frac{(EBIT - \text{Interest})(1 - \text{tax rate})}{\text{No.of equity shares}} = \frac{(EBIT - 0.14 \times 8,00,000)(1 - 0.3)}{1,20,000 \text{shares}}$$

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

$$EPS_{\text{Alternative (ii)}} = \frac{(EBIT - \text{Interest})(1 - \text{tax rate}) - PD}{\text{No.of equity shares}}$$

$$= \frac{(EBIT - 0.14 \times 8,00,000)(1 - 0.3) - 0.16 \times 4,00,000}{80,000 \text{shares}}$$

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

$$\frac{(EBIT - 0.14 \times 8,00,000)(1 - 0.3)}{1,20,000 \text{shares}} = \frac{(EBIT - 0.14 \times 8,00,000)(1 - 0.3) - 0.16 \times 4,00,000}{80,000 \text{shares}}$$

$$\text{Or,} \quad \frac{0.7EBIT - 78,400}{1,20,000} = \frac{0.7EBIT - 1,42,400}{80,000}$$

Or 1.40 EBIT – Rs. 1,56,800 = 2.10 EBIT – Rs. 4,27,200

Or 0.70 EBIT = Rs. 2,70,400

Or $EBIT = \frac{2,70,400}{0.7}$

Or EBIT = Rs. 3,86,285.71 (approx.)

Q.52 Indifference Point | MTP Nov 19

RPS Company presently has Rs. 36,00,000 in debt outstanding bearing an interest rate of 10 percent. It wishes to finance a Rs. 40,00,000 expansion programme and is considering three alternatives: additional debt at 12 per cent interest, preferred stock with an 11 per cent dividend, and the sale of common stock at Rs. 16 per share. The company presently has 8,00,000 shares of common stock outstanding and is in a 40 per cent tax bracket.

(i) If earnings before interest and taxes are presently Rs. 15,00,000, CALCULATE earnings per share for the three alternatives, assuming no immediate increase in profitability?
(ii) CALCULATE indifference point between debt and common stock.

Ans. (i)

(Rs. in thousands)

	Debt	Preferred Stock	Common Stock
	Rs.	Rs.	Rs.
EBIT	1,500	1,500	1,500
Interest on existing debt	360	360	360
Interest on new debt	480		
Profit before taxes	660	1,140	1,140
Taxes	264	456	456
Profit after taxes	396	684	684
Preferred stock dividend		440	
Earnings available to common shareholders	396	244	684
Number of shares	800	800	1,050
Earnings per share	.495	.305	.651

(ii) Mathematically, the indifference point between debt and common stock is (Rs in thousands):

$$\frac{EBIT^* - Rs.\ 840}{800} = \frac{EBIT^* - Rs.\ 360}{1{,}050}$$

EBIT* (1,050) – Rs. 840(1,050) = EBIT* (800) – Rs. 360 (800)

250EBIT* = Rs. 5,94,000

EBIT* = Rs. 2,376

CAPITAL STRUCTURAE THEORY

Q.53 MM Hypothesis | PY July 21

The details about two companies R Ltd. and S Ltd. having same operating risk are given below:

Particulars	R Ltd.	S Ltd.
Profit before interest and tax	₹ 10 lakhs	₹ 10 lakhs
Equity share capital ₹ 10 each	₹ 17 lakhs	₹ 50 lakhs
Long term borrowings @ 10%	₹ 33 lakhs	-
Cost of Equity (Ke)	18%	15%

You are required to:

(1) Calculate the value of equity of both the companies on the basis of M.M. Approach without tax.

(2) Calculate the Total Value of both the companies on the basis of M.M. Approach without tax.

Ans.

(1) Computation of value of equity on the basis of MM approach without tax

Particulars	R Ltd. (₹ in lakhs)	S Ltd. (₹ in lakhs)
Profit before interest and taxes	10	10
Less: Interest on debt (10% × ₹ 33,00,000)	3.3	-
Earnings available to Equity shareholders	6.7	10
Ke	18%	15%
Value of Equity (Earnings available to Equity shareholders/Ke)	**37.222**	**66.667**

(2) Computation of total value on the basis of MM approach without tax

Particulars	R Ltd. (₹ in lakhs)	S Ltd. (₹ in lakhs)
Value of Equity (S) (as calculated above)	37.222	66.667
Debt (D)	33	-
Value of Firm (V) = S + D	**70.222**	**66.667**

Q.54 Implied equity rate of return | 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 i f the Company has net operating income of ₹ 4,50,000 and the overall capitalization rate of the company, (Ko) 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. = $\frac{NOI}{Ko} = \frac{4,50,000}{18\%} = 25,00,000$

(i) Return on Shares of X on A Ltd.

Particulars	Amount (₹)
Value of the company	25,00,000
Market value of debt (60% x ₹ 25,00,000)	15,00,000
Market value of shares (40% x ₹ 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.55 MM Hypothesis | PY Nov 18

The following data relate to two companies belonging to the same risk class :

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

Required:

(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 'A Ltd.' and 'B Ltd' according to MM Hypothesis

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

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

Ke of Unlevered Firm (given) = 0.18

Ko of Unlevered Firm (Same as above = ke as there is no debt) = 0.18

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

Total Value of Levered Firm (VL) = Vu + (Debt× Nil) = ₹ 1,00,00,000 + (54,00,000 × nil)
= ₹1,00,00,000

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

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

*Computation of WACC A Ltd

Component of Capital	Amount	Weight	Cost of Capital	WACC
Equity	46,00,000	0.46	0.2504	0.1152
Debt	54,00,000	0.54	0.12*	0.0648
Total	81,60,000			0.18

*Kd = 12% (since there is no tax) WACC = 18%

(b) Assuming 40% taxes as per MM Approach

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

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

Total Value of unlevered Firm (Vu) = [NOI (1 - t)/ke] = 18,00,000 (1 – 0.40)] / 0.18
= ₹60,00,000

Ke of unlevered Firm (given) = 0.18

Ko of unlevered Firm (Same as above = ke as there is no debt) = 0.18

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

Total Value of Levered Firm (VL) = Vu + (Debt× Tax)

= ₹ 60,00,000 + (54,00,000 × 0.4)

= ₹ 81,60,000

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

= 18% (i.e. Ke = Ko)

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

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

*Computation of WACC A Ltd

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

*Kd= 12% (1- 0.4) = 12% × 0.6 = 7.2% WACC = 13.23%

Q.56 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**

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

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

Therefore, Net Income to equity-holders = ₹ 228 lakhs
EBIT = ₹ 228 lakhs / 0.7 = ₹ 325.70 lakhs

	All Equity (₹ In lakhs)	Debt of Equity (₹ In lakhs)
EBIT	325.70	325.70
Interest on ₹200 lakhs @ 15%	--	30.00
EBT	325.70	295.70
Tax @ 30 %	97.70	88.70
Income available to equity holders	228	207

(i) **Market value of levered firm** = **Value of unlevered firm + Tax Advantage**
= ₹ 1,140 lakhs + (₹200 lakhs x 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

Ke = (Net Income to equity holders / Equity Value) X 100
= (207 lakhs / 1200 lakhs – 200 lakhs) X 100
= (207/ 1000) X 100
= 20.7 %

(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 (Ko) = Keu(1-tL) Where,
Keu = Cost of equity in an unlevered company
t = Tax rate

$$L = \frac{\text{Debt}}{\text{Debt} + \text{Equity}}$$

$$Ko = 0.2 \times \left(1 - \frac{200\text{lakh}}{1,200\text{lakh}} x 0.3\right)$$

So, Cost of capital = 0.19 or 19%

$$\text{Cost of Equity (Ke)} = Keu + (Keu - Kd)\ \frac{\text{Debt}\ (1-t)}{\text{Equity}}$$

Where,

Keu = Cost of equity in an unlevered company

Kd = Cost of debt

t = Tax rate

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

Ke = 0.20 + 0.007 = 0.207 or 20.7%

So, Cost of Equity = 20.70%

Q.57 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 (Vu) = [NOI/ke] = 9,00,000/0.18 = ₹ 50,00,000

Ke of Unlevered Firm (given) = 0.18

Ko of Unlevered Firm (Same as above = ke as there is no debt) = 0.18

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

Total Value of Levered Firm (VL) = Vu + (Debt× 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)* $k_o = (k_e \times S/V) + (k_d \times D/V)$	0.18

*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

*Kd = 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 (Vu) = [NOI (1 - t)/ke] = 9,00,000 (1 – 0.40)] / 0.18
= ₹ 30,00,000

Ke of unlevered Firm (given) = 0.18
Ko of unlevered Firm (Same as above = ke as there is no debt) = 0.18
Market Value of 'Bee Ltd' [Levered Firm (I)]
Total Value of Levered Firm (VL) = Vu + (Debt× 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. Ke = Ko)

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

*Kd= 12% (1- 0.4) = 12% × 0.6 = 7.2% WACC = 13.23%

Q.58 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:

(i) Amount of debt to be employed by firm as per traditional approach.

(ii) 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, Wd and We

Total Capital (₹)	Debt (₹)	Wd	Equity value (₹)	We
(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)

Ke	We	Kd	Wd	Ke We	KdWd	Ko
(1)	(2)	(3)	(4)	(5) = (1) x (2)	(6) = (3) x (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 (Ko) remains constant and cost of equity increases linearly with debt.

$$\text{Value of a firm} = \frac{\text{Net Operating Income (NOI)}}{K0}$$

$$₹\ 50,00,000 = \frac{5,00,000}{K0}$$

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

Statement of Equity Capitalization rate (ke) under MM approach

Debt (₹)	Equity (₹)	Debt/Equity	Ko	Kd	Ko - Kd	Ke = Ko + (Ko - Kd) Debt Equity
(1)	(2)	(3) = (1)/(2)	(4)	(5)	(6)=(4) -(5)	(7) = (4) + (6) x (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.59 Net Income & Net operating | RTP May 18

Company P and Q are identical in all respects including risk factors except for debt/equity, company P having issued 10% debentures of ₹ 18 lakhs while company Q is unlevered. Both the companies earn 20% before interest

and taxes on their total assets of ₹ 30 lakhs.

Assuming a tax rate of 50% and capitalization rate of 15% from an all-equity company.

Required:

CALCULATE the value of companies' P and Q using

(i) Net Income Approach and

(ii) Net Operating Income Approach.

Ans.

(i) Valuation under Net Income Approach

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

(ii) Valuation of Companies under Net Operating Income Approach

Particulars	P Amount (₹)	Q Amount (₹)
Capitalisation of earnings at 15% $\left(\frac{(1-0.5)}{5}\right)$	20,00,000	20,00,000
Less: Value of debt {18,00,000 (1 – 0.5)}	9,00,000	Nil
Value of equity	11,00,000	20,00,000
Add: Total Value of debt	18,00,000	Nil
Total Value of Company	29,00,000	20,00,000

Q.60 Arbitrage Process | MTP May 23(2)

Following data is available in respect of two companies having same business risk: Capital employed = ₹ 12,00,000, EBIT = ₹ 2,40,000 and Ke = 15%

Sources	Dumbo Ltd (₹)	Jumbo Ltd (₹)
Debt (@12%)	4,00,000	Nil
Equity	8,00,000	12,00,000

An investor is holding 20% shares in the levered company. CALCULATE the increase in annual earnings of investor if arbitrage process is undertaken.

Also EXPLAIN the arbitrage process if Ke = 20% for Dumbo Ltd instead of 15%.

Ans. **(I). Valuation of firms**

Particulars	Dumbo Ltd (₹)	Jumbo Ltd (₹)
EBIT	2,40,000	2,40,000
Less: Interest on debt (12% × ₹ 4,00,000)	48,000	Nil
Earnings available to Equity shareholders	1,92,000	2,40,000
Ke	15%	15%
Value of Equity (S)	12,80,000	16,00,000
Debt (D)	4,00,000	Nil
Value of Firm (V) = S + D	16,80,000	16,00,000

Value of Levered company is more than that of unlevered company. Therefore, investor will sell his shares in levered company and buy shares in unlevered company. To maintain the level of risk he will borrow proportionate amount and invest that amount also in shares of unlevered company

(II) Investment & Borrowings

	₹
Sell shares in Levered company (12,80,000 x 20%)	2,56,000
Borrow money (4,00,000 x 20%)	80,000
Buy shares in Unlevered company	3,36,000

(III) Change in Return

	₹
Income from shares in Unlevered company (2,40,000 x 3,36,000/16,00,000)	50,400
Less: Interest on loan (80,000 x 12%)	9,600
Net Income from unlevered firm	40,800
Less: Income from Levered firm (1,92,000 x 20%)	38,400
Incremental Income due to arbitrage	2,400

Arbitrage process if Ke = 20%

(I). Valuation of firms

Particulars	Dumbo Ltd (₹)	Jumbo Ltd (₹)
EBIT	2,40,000	2,40,000
Less: Interest on debt (12% × ₹ 4,00,000)	48,000	Nil
Earnings available to Equity shareholders	1,92,000	2,40,000
Ke	20%	15%
Value of Equity (S) (Earnings available to Equity shareholders/Ke)	9,60,000	16,00,000
Debt (D)	4,00,000	Nil
Value of Firm (V) = S + D	13,80,000	16,00,000

Value of unlevered company is more than that of levered company. Therefore, investor will sell his shares in unlevered company and buy proportionate shares and debt in levered company i.e. 20% share.

(II). Investment & Borrowings

₹

Sell shares in unlevered company (16,00,000 x 20%)	3,20,000
Buy shares in levered company (9,60,000 x 20%)	1,92,000
Buy Debt of levered company	1,28,000

(III). Change in Return

	₹
Income from shares in levered company (1,92,000 x 20%)	38,400
Add: Interest on debt of levered (1,28,000 x 12%)	15,360
Net Income from levered firm	53,760
Less: Income from unlevered firm (2,40,000 x 20%)	48,000
Incremental Income due to arbitrage	5,760

Q.61 Traditional Theory | MTP May 19(2)

The proportion and required return of debt and equity was recorded for a company with its increased financial leverage as below:

Debt (%)	Required return (Kd) (%)	Equity (%)	Required Return (Ke) (%)	Weighted Average Cost of Capital (WACC) (Ko)(%)
0	5	100	15	15
20	6	80	16	?
40	7	60	18	?
60	10	40	23	?
80	15	20	35	?

You are required to complete the table and IDENTIFY which capital structure is most beneficial for this company. (Based on traditional theory, i.e., capital structure is relevant).

Ans. Computation of Weighted Average Cost of Capital (WACC) for each level of Debt-equity mix.

Debt (%)	Required return (Kd)(%)	Equity (%)	Required return (Ke) (%)	Kd× Proportion of debt + Ke Proportion and equity	Weighted Average Cost of Capital (WACC)(Ko)(%)
0	5	100	15	0%(5%) +100%(15%)	15
2	6	80	16	20%(6%) +80%(16%)	14
4	7	60	18	40%(7%) +60%(18%)	13.6
6	10	40	23	60%(10%) +40%(23%)	15.2
8	15	20	35	80%(15%) +20%(35%)	19

The optimum mix is 40% debt and 60% equity, as this will lead to lowest WACC value i.e., 1 3.6%.

COST OF CAPITAL

Q.62 Effective Cost of Capital | MTP May 19(2)

Annova Ltd is considering raising funds of about Rs.250 lakhs by any of two alternative methods, viz., 14% institutional term loan and 13% non-convertible debentures. The term loan option would attract no major incidental cost and can be ignored. The debentures would have to be issued at a discount of 2.5% and would involve cost of issue of 2% on face value.

ADVISE the company as to the better option based on the effective cost of capital in each case. Assume a tax rate of 50%.

Ans. Calculation of Effective Cost of Capital:

Particulars	Option 1 14% institutional Term loan (Rs. in Lakhs)	Option 2 13% Non-convertible Debentures (Rs. in lakhs)
(A) Effective capital to be raised Face value	250.00	250.00
Less: Discount	Nil	(6.25)
	250.00	243.75
Less: Cost of issue	Nil	5.00
Effective amount of capital	250.00	238.75
(B) Annual interest charges on face value of Rs. 250 lakhs	35.0	32.50
Less: Tax benefit on interest @ 50%	17.5	16.25
	17.5	16.25
(C) Effective cost of capital after tax	$\frac{B}{A} \times 100$ = 7.0%	$\frac{16.25}{238.75} \times 100$ = 6.81% (approx)

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

Q.63 Implied Rate of Return | MTP May 22(1)

PRI Ltd. and SHA Ltd. are identical, however, their capital structure (in market-value terms) differs as follows:

Company	Debt	Equity
PRI Ltd.	60%	40%
SHA Ltd.	20%	80%

The borrowing rate for both companies is 8% in a no-tax world and capital markets are assumed to be perfect.

(a) (i) If Mr. Rhi, owns 6% of the equity shares of PRI Ltd., DETERMINE his return if the Company has net operating income of ₹ 9,00,000 and the overall capitalization rate of the company (Ko) is 18%.

(ii) CALCULATE the implied required rate of return on equity of PRI Ltd.

(b) SHA Ltd. has the same net operating income as PRI Ltd.

(i) CALCULATE the implied required equity return of SHA Ltd.

(ii) ANALYSE why does it differ from that of PRI Ltd.

Ans. Value of PRI Ltd. = NOI 9,00,000= 50,00,000

Ko 18%

(a) (i) Return on Shares of Mr. Rhi on PRI Ltd.

Particulars	Amount (₹)
Value of the company	50,00,000
Market value of debt (60% x ₹ 50,00,000)	30,00,000
Market value of shares (40% x ₹ 50,00,000)	**20,00,000**
Particulars	**Amount (₹)**
Net operating income	9,00,000
Interest on debt (8% × ₹ 30,00,000)	2,40,000
Earnings available to shareholders	**6,60,000**
Return on 6% shares (6% × ₹ 6,60,000)	**39,600**

(ii) Implied required rate of return on equity of PRI Ltd. = $\frac{660000}{2000000}$ =33%

(b) (i) Calculation of Implied rate of return of SHA Ltd.

Particulars	Amount (₹)
Total value of company	50,00,000
Market value of debt (20% × ₹ 50,00,000)	10,00,000
Market value of equity (80% × ₹ 50,00,000)	40,00,000
Particulars	**Amount (₹)**
Net operating income	9,00,000
Interest on debt (8% × ₹ 10,00,000)	80,000
Earnings available to shareholders	8,20,000

Implied required rate of return on equity = $\frac{820000}{4000000}$ = 20.5%

(ii) Implied required rate of return on equity of SHA Ltd. is lower than that of PRI Ltd. because SHA 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.64 Cost of Debt (Kd) | RTP Nov 22

Bounce Ltd. evaluates all its capital projects using discounting rate of 15%. Its capital structure consists of equity share capital, retained earnings, bank term loan and debentures redeemable at par. Rate of interest on bank term loan is 1.5 times that of debenture. Remaining tenure of debenture and bank loan is 3 years and 5 years respectively. Book value of equity share capital, retained earnings and bank loan is ₹ 10,00,000, ₹ 15,00,000 and ₹ 10,00,000 respectively. Debentures which are having book value of ₹ 15,00,000 are currently trading at ₹ 97 per debenture. The ongoing P/E multiple for the shares of the company stands at 5. You are required to CALCULATE the rate of interest on bank loan and debentures if tax rate applicable is 25%.

Ans. Let the rate of Interest on debenture be x

$\therefore$ Rate of Interest on loan = 1.5x

$\therefore$ Kd on debentures = $\dfrac{\text{Int}(1-t)+\dfrac{RV-NP}{n}}{\dfrac{RV+NP}{2}} = \dfrac{100x(1-25)+\dfrac{100-97}{3}}{\dfrac{100+97}{2}} = \dfrac{75x+1}{98.5}$

$\therefore$ Kd on bank loan= 1.5x (1-0.25) =1.125x

$Ke = \dfrac{FPS}{MPS} = \dfrac{1}{MPS/EPS} = \dfrac{1}{P/E} = \dfrac{1}{5} = 0.2$

KY = Ke = 0.2

Computation of WACC

Capital	Amount (₹)	Weights	Cost	Product
Equity	10,00,000	0.2	0.2	0.04
Reserves	15,00,000	0.3	0.2	0.06
Debentures	15,00,000	0.3	(75x+1)/98.5	(22.5x + 0.3)/98.5
Bank Loan	10,00,000	0.2	1.125x	0.225x
	50,00,000	1		0.1 + 0.225x + 22.5x +0.3
				98.5

WACC = 15%

$\therefore 0.1+0.225x+\dfrac{22.5x}{98.5}+\dfrac{0.3}{98.5}=0.15$

$\therefore$ 9.85+22.1625x+22.5x+0.3=(0.15)(98.5)

$\therefore$ 44.6625x=14.775-9.85-0.3

$\therefore$ 44.625x-4.625

$\therefore x = \dfrac{4.625}{44.6625}$

$\therefore$ x=10.36%

$\therefore$ Rate of interest on debenture=x =10.36%

Rate of interest on Bank loan=1.5x = (1.5) (10.36%) = 15.54%

Q.65 Cost of Debt (Kd) | PY Nov 20

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

Year	1	2	3	4	5
PV Factor @ 15%	0.870	0.756	0.658	0.572	0.497

Ans. **Determination of Redemption value:**

Higher of-

(i) The cash value of debentures = ₹100

(ii) Value of equity shares = 5 shares × ₹ 20 $(1+0.04)^5$

= 5 shares × ₹ 24.333

= **₹121.665 rounded to ₹121.67**

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

Calculation of Cost of 10% Convertible debenture

(i) Using Approximation Method:

$$K_{d=}\frac{I(1-t)+\frac{(RV-NP)}{n}}{\frac{(RV+NP)}{2}}=\frac{10(1-0.25)+(121.67-100)}{\frac{5}{(121.67+100)}}=\frac{7.5+4.334}{110.835}=10.676\%$$

(ii) Using Internal Rate of Return Method

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

$$IRR=L+\frac{NPV_L}{NPV_L-NPV_L}(H-L)=10\%+\frac{3.982}{3.982-(-14.382)}(15\%-10\%)$$

=0.11084 or 11.084% (approx.)

Q.66 Cost of Debt / Equity / WACC | RTP May 18

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

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

Required:

(i) To DETERMINE the pattern for raising the additional finance.

(ii) To CALCULATE the post-tax average cost of additional debt.

(iii) To CALCULATE the cost of retained earnings and cost of equity, and

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

Ans.

(i) **Pattern of Raising Additional Finance**

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

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

Capital structure after Raising Additional Finance

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

(ii) **Post-tax Average Cost of Additional Debt**

Kd=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.

$$Kd= \frac{(1,80,000x0.05)+(2,20,000x0.08)}{4,00,000} x100 = 6.65\%$$

(iii) **Cost of Retained Earnings and Cost of Equity applying Dividend Growth Model**

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

$$\text{Then, } Ke= \frac{2(1.1)}{4} + 0.10 = \frac{2.2}{44} + 0.10 = 0.15 \text{ or } 15\%$$

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

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

Q.67 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
	4,00,00

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**

$$K_d = \frac{I(1-t)}{P_0} \qquad = \frac{16(1-0.3)}{96} = 0.11667$$

(ii) **Cost of new preference shares**

$$K_p = \frac{2.22}{18.5} = 0.12$$

(iii) **Cost of new equity shares**

$$K_e = \frac{D_1}{P_0} + g \qquad = \frac{2.36}{47.20} + 0.10$$

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% of 2020 EPS = 50% 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:**

Retained earnings = 50% of EPS of 2020 × outstanding equity shares
= 50% of ₹ 4.72 × 10,000 shares = ₹ 23,600

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

So, ₹ 23,600 = 80% of Total Capital

(D) If the company spends in excess of ₹ 29,500, it will have to issue new equity shares at ₹ 40 per share.

∴ The cost of new issue of equity shares will be:

$$K_e = \frac{D_1}{P_0} + g = \frac{`2.36}{`40} + 0.10 = 0.159$$

The marginal cost of capital will be:

Type of Capital	Proportion	Specific Cost	Product
(1)	(2)	(3)	(2) × (3) =
Debentures	0.15	0.11667	0.0175
Preference Shares	0.05	0.1200	0.0060
Equity Shares (New)	0.80	0.1590	0.1272
Marginal cost of capital			0.1507

Q.68 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%.

(i) Calculate the cost of convertible debentures using the approximation method.

(ii) Use YTM method to calculate cost of preference shares.

Year	1	2	3	4	5	6	7	8	9	10
PVIF 0.03,	0.97	0.94	0.91	0.88	0.86	0.83	0.81	0.78	0.76	0.74

PVIF 0.05,	0.95	0.90	0.86	0.82	0.78	0.74	0.711	0.67	0.64	0.61
PVIFA	0.97	1.913	2.82	3.71	4.58	5.41	6.23	7.02	7.78	8.53
PVIFA	0.95	1.85	2.72	3.54	4.32	5.07	5.78	6.46	7.10	7.72

Interest rate	1%	2%	3%	4%	5%	6%	7%	8%	9%
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% $R_m - R_t$ = 18%

B = 1.25% D_0 = 12.76

D_{-5} = 10 Flotation Cost = 5%

Using CAPM,

K_e = $R_t + \beta(R_m - R_f)$ = 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..... from FV Table

g = 5%

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

$P6 = \frac{12.75x1.407}{0.275}$ = 65.28

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

NP = 95 n = 6

$K_d = \frac{INT(1-t)+\frac{(RV-NP)}{n}}{\frac{[RV-NP]}{2}} X100 = \frac{9+5.93}{112.78} X100$

K_d = 13.24%

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

Net Proceeds = 100(1.1)-6% of 100 (1.1)

= 110-6.60

= **103.40**

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**

$$K_p = 3\% + \frac{5\% - 3\%}{[3.39 - (-13.65)]} x 13.65 = 4.6\%$$

Q.69 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 ₹ 1crore earning next year. Further details are as follows:

(i) The amount will be raised by equity and debt in the ratio of 3: 1.

(ii) The additional issue of equity shares will result in price per share being fixed at ₹ 25.

(iii) The debt capital raised by way of term loan will cost 10% for the first ₹ 75 lakh and 12% for the next ₹50 lakh.

(iv) The net expected dividend on equity shares is ₹ 2.00 per share. The dividend is expected to grow at the rate of 5%.

(v) Income tax rate is 25%.

You are required:

(a) To determine the amount of equity and debt for raising additional finance.

(b) To determine the post-tax average cost of additional debt.

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

(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

$$= \frac{(75,00,000 x 0.75) + (50,00,000 x 0.09)}{1,25,00,000} x100$$

$$= \frac{5,62,500 + 4,50,000}{1,25,00,000} x100 = 8.10\%$$

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

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

Where,

K_e= Cost of equity

$D_1 = D_0(1+g)$

D_0= Dividend paid (ie= Rs2)

g = Growth rate

P_0= Current market price per share

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

Cost of retained earnings equals to cost of Equity i.e. 13.4%

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

Particular	(₹)	Weights	Cost of funds	Weighted Cost (%)
Equity (including retained earnings)	3,75,00,000	3/4	13.4%	10.05
Debt	1,25,00,000	1/4	8.1%	2.025
WACC	5,00,00,000			**12.075**

Q.70 Cost of Debt / Equity | MTP Nov 23(1)

ABC Company's equity share is quoted in the market at ₹ 30 per share currently. The company pays a dividend of ₹ 3 per share and the investor's market expects a growth rate of 7% per year.

You are required to:

(i) CALCULATE the company's cost of equity capital.

(ii) If the company issues 10% debentures of face value of ₹ 100 each and realises ₹ 95 per debenture while the debentures are redeemable after 10 years at a premium of 10%, CALCULATE cost of debenture using YTM?
Assume Tax Rate to be 50%.

Ans. (i) **Cost of Equity Capital (Ke):**

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

$$= \frac{3 \times 1.07}{30} + 0.07 = 0.177 \text{ or } 17.7\%$$

(ii) **Cost of Debenture (Kd):**
Using Present Value method (YTM)
Identification of relevant cash flows

Year	Cash flows
0	Current market price (P0) = ₹ 95
1 to 10	Interest net of tax [I(1-t)] = 10% of ₹ 100 (1 – 0.5) = ₹ 5
10	Redemption value (RV) = ₹ 100 (1.10) = ₹ 110

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

Year	Cash flows (₹)	Discount factor @ 5% (L)	Present Value (₹)	Discount factor @ 10% (H)	Present Value (₹)
0	(95)	1.000	(95.00)	1.000	(95.00)
1 to 10	5	7.722	38.61	6.145	30.725
10	110	0.614	67.54	0.386	42.46
NPV			+11.15		-21.815

Calculation of IRR

$$IRR = L + \frac{NPV_L}{NPV_L - NPV_H}(H-L)$$

$$5\% + \frac{`11.15}{`11.15 - (`-21.815)}(10\% - 5\%) = 5\% + \frac{`55.75}{`32.965} = 6.69\%$$

Therefore, K_d= 6.69%

Q.71 Cost of Equity | MTP May 22(1)

Following information is given for WN Ltd.:

Earnings Rs 30 per share

Dividend	Rs 9 per share
Cost of capital	15%
Internal Rate of Return on investment	20%

You are required to CALCULATE the market price per share using-

(i) Gordon's formula

(ii) Walter's formula

Ans.

(i) **As per Gordon's Model, Price per share is computed using the formula:**

$$P_0 = \frac{E_{1(1-b)}}{K_{e-br}}$$

Where,

P_0= Price per share

E1 = Earnings per share

b = Retention ratio; (1-b= Pay-out ratio)

K_e= Cost of capital

r = IRR

br = Growth rate (g)

Applying the above formula, price per share

$$P_0 = \frac{30x0.3^*}{0.15-0.70x0.2} = \frac{9}{0.01} = ₹900$$

*Dividend pay-out ratio $= \frac{9}{30} = 0.3$ or 0.3

(ii) **As per Walter's Model, Price per share is computed using the formula:**

$$\text{Price (P)} = \frac{D+\frac{r}{Ke}(E-D)}{\frac{k}{e}}$$

Where,

P = Market Price of the share
E = Earnings per share
D = Dividend per share
K_e= Cost of equity/ rate of capitalization/ discount rate
r = Internal rate of return/ return on investment
Applying the above formula, price per share

$$P = \frac{9+\frac{0.20}{0.15}(30-9)}{0.15} = \frac{37}{0.15} = 246.67$$

Q.72 | Cost of Equity/ Marginal | PY Nov 22

MR Ltd. is having the following capital structure, which is considered to be optimum as on 31.03.2022.

Equity share capital (50,000 shares)	₹ 8,00,000
12% Pref. share capital	₹ 50,000
15% Debentures	₹ 1,50,000
	₹ 10,00,000

The earnings per share (EPS) of the company were ₹ 2.50 in 2021 and the expected growth in equity dividend is 10% per year. The next year's dividend per share (DPS) is 50% of EPS of the year 202I. The current market price per share (MPS) is ₹ 25.00. The 15% new debentures can be issued by the company. The company's debentures are currently selling at ₹ 96 per debenture. The new 12% Pref. share can be sold at a net price of ₹ 91.50 (face value ₹ 100 each). The applicable tax rate is 30%.

You are required to calculate

(a) After tax cost of

(i) New debt,

(ii) New pref. share capital and

(iii) Equity shares assuming that new equity shares come from retained earnings. (b) Marginal cost of capital, How much can be spent for capital investment before sale of new equity shares assuming that retained earnings for next year investment is 50% of 2021?

Ans

(a) (i) **After tax cost of new Debt:**

$$K_d = \frac{I(1-t)}{P_1} = \frac{15(1-0.3)}{96}$$

= 0.1094 (or) 10.94%

(ii) **After tax cost of New Preference share capital:**

$$K_p = \frac{P_D}{P_0} = \left(\frac{12}{91.5}\right) = 0.1311 \text{ (or) } 13.11\%$$

(iii) **After tax cost of Equity shares:**

$$K_e = \left(\frac{D_1}{P_0}\right) + g = \left[\frac{(2.50 x 50\%)}{25}\right] + 0.10$$

=0.15 (or) 15%

(b) **Marginal Cost of Capital**

Type of capital	Proportions	Specific cost	Product
Equity Shares	0.80	0.15	0.12
Preference Shares	0.05	0.1311	0.0066
Debentures	0.15	0.1094	0.0164
Marginal cost of capital			**0.1430**

(c) **Amount that can be spend for capital investment**

Retained earnings = 50% of EPS x No. of outstanding Equity shares

= 1.25 x 50,000

Proportion of equity (Retained earnings here) capital is 80% of total capital. Therefore, ₹ 62,500 is 80% of total capital.

$\therefore$ Amount of Capital Investment= $\frac{62,500}{0.80}$ =`78,125

Q.73 | WACC | PY May 19

Alpha Ltd. has furnished the following information :

- Earning Per Share (EPS) ₹ 4
- Dividend payout ratio 25%
- Market price per share ₹ 50
- Rate of tax 30%
- Growth rate of dividend 10%

The company wants to raise additional capital of ₹ 10 lakhs including debt of ₹ 4 lakhs. The cost of debt (before tax) is 10% up to ₹ 2 lakhs and 15% beyond that. Compute the after tax cost of equity and debt and also weighted average cost of capital

Ans. **(i) Cost of Equity Share Capital (Ke)**

$$K_e = \frac{D_{0(1+g)}}{P_0} + g = \frac{25\% \text{ of } 4\ (1+0.10)}{50} + 0.10 = \frac{1.10}{50} + 0.10 = 0.122 \text{ or } 12.2\%$$

(ii) **Cost of Debt (Kd)**

$$K_d = \frac{Interest}{Net\ Proceeds} x100x(1-t)$$

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

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

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

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

Source of capital	Amount (₹)	Weights	Cost of Capital (%)	WACC (%)
Equity shares	6,00,000	0.60	12.20	7.32
Debt	4,00,000	0.40	8.75	3.50
Total	10,00,000	1.00		**10.82**

Alternatively Cost of Equity Share Capital (Ke) can be calculated as

$$K_e = \frac{D}{P_0} + g = \frac{25\% \text{ of } 4}{50} + 0.10 = \frac{1.00}{50} + 0.10 = 0.120 \text{ or } 12.00\%$$

Accordingly

Weighted Average Cost of Capital (WACC)

Source of capital	Amount (₹)	Weights	Cost of Capital (%)	WACC (%)
Equity shares	6,00,000	0.60	12.00	7.20
Debt	4,00,000	0.40	8.75	3.50
Total	10,00,000	1.00		**10.70**

Q.74 WACC | RTP Nov 18

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

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

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

Assuming the tax rate at 50%, CALCULATE:

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

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

Ans.

(i) Statement of Weighted Average Cost of Capital

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

& upto ₹ 20 lakhs	Equity	0.6	= 6.5% 14.5%	0.6 × 14.5 = 8.7
				11.3%

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

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

Q.75 WACC MTP Nov 23(2)

Q Ltd. has the following capital structure at book-value as on 31st March 2022:

Particulars	(₹)
Equity share capital (10,00,000 shares)	4,00,00,000
12% Preference shares	80,00,000
11% Debentures	6,80,00,000

The equity shares of the company are sold for ₹ 400. It is expected that the company will pay next year a dividend of ₹ 20 per equity share, which is expected to grow by 5% p.a. forever. Assume a 30% corporate tax rate.

Required:

(i) COMPUTE weighted average cost of capital (WACC) of the company based on the existing capital structure.

(ii) COMPUTE the new WACC, if the company raises an additional ₹ 50 lakhs debt by issuing 12% debentures. This would result in increasing the expected equity dividend to ₹ 25 and leave the growth rate unchanged, but the price of equity share will fall to ₹ 300 per share.

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

Source of Capital	Existing Capital structure (₹)	Weights (a)	After tax cost of capital (%) (b)	WACC (%) (a) × (b)
Equity share capital (W.N.1)	4,00,00,000	0.588	10.00	5.88
12% Preference share capital	80,00,000	0.118	12.00	1.42
11% Debentures (W.N.2)	2,00,00,000	0.294	7.70	2.26
Total	6,80,00,000	1.000		9.56

Working Notes:

1. Cost of Equity Capital:

$$K_e = \frac{Expected\ dividend(D_1)}{Current\ Market\ Price(P_0)} + Growth(g)$$

$$= \frac{20}{400} + 0.05$$

$$= 10\%$$

2. Cost of 10% Debentures

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

$$= \frac{22,00,000(1-0.30)}{2,00,00,000}$$

$$= 0.077 \text{ or } 7.7\%$$

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

Source of Capital	New Capital structure (₹)	Weights (a)	After tax cost of capital (%) (b)	WACC (%) (a) x (b)
Equity share capital (W.N.3)	4,00,00,000	0.548	13.33	7.30
12% Preference share capital	80,00,000	0.110	12.00	1.32
11% Debentures (W.N.2)	2,00,00,000	0.274	7.70	2.11
12% Debentures (W.N.4)	50,00,000	0.068	8.40	0.57
Total	7,30,00,000	1.000		11.30

Working Notes:

3. Cost of Equity Capital:

$$K_e = \frac{25}{300} + 0.05$$

$$= 13.33\%$$

4. Cost of 12% Debentures

$$K_d = \frac{6,00,000(1-0.30)}{50,00,000}$$

$$= 0.084 \text{ or } 8.4\%$$

Q.76 WACC | MTP May 20

ABC Limited has the following book value capital structure:

Equity Share Capital (1 crore shares @ Rs.10 each)	Rs.1,000 lakh
Reserves and Surplus	Rs.2,250 lakh
9% Preference Share Capital (5 lakh shares @ Rs.100 each)	Rs.500 lakh
8.5% Debentures (1.5 lakh debentures @ Rs.1,000 each)	Rs.1,500 lakh
12% Term Loans from Financial Institutions	Rs.500 lakh

The debentures of ABC Limited are redeemable at par after five years and are quoting at Rs.985 per debenture. The current market price per equity share is Rs.60. The prevailing default-risk free interest rate on 10-year GOI. Treasury Bonds is 5.5%. The average market risk premium is 7%. The beta of the company is 1.85

The preference shares of the company are redeemable at 10% premium after 5 years is currently selling at Rs.102 per share.The applicable income tax rate for the company is 35%.

Required: CALCULATE weighted average cost of capital of the company using market value weights.

Ans. Working Notes:

(1) **Computation of cost of debentures** (Kd) :

$$K_d = \frac{85(1-0.35)+\frac{(1,000-985)}{5}}{\frac{(1,000+985)}{2}} = \frac{55.25+3}{992.5} = 0.0586 \text{ or } 5.86\%$$

(2) **Computation of cost of term loans (KT)** :

=r(1-t)

0.12(1-0.35) = 0.078 or 7.8%

(3) **Computation of cost of preference capital (KP) :**

$$K_p = \frac{\text{Preference Dividend}+(RV-NP)/n}{(RV+NP)/2}$$

$$\frac{9+\frac{(110-102)}{5}}{\frac{(110+102)}{2}} = \frac{9+1.6}{106} = 0.1 \text{ or } 10\%$$

(4) **Computation of cost of equity (Ke) :**

= Rf + ß(Rm – Rf)

Or, = Risk free rate + (Beta × Risk premium)

= 0.055 + (1.85 □ 0.07) = 0.1845 or 18.45%

Calculation of Weighted Average cost of capital Using market value weights

Source of Capital	Market value of capital structure (Rs. in lakh)	Weights	After tax cost of capital (%)	WACC (%)
Equity share capital (1 crore shares × Rs.60)	6,000	0.71	18.45	13.09
9% Preference share capital (5 lakh shares □ Rs.102)	510	0.06	10.00	0.60
8.5 % Debentures (1.5 lakh □ Rs.985)	1,477.5	0.17	5.86	0.99
12% Term loans	500	0.06	7.80	0.47
	8,487.50	1.000		15.15

Q.77 WACC | MTP Nov 18(2)

PQR Ltd. has the following capital structure on October 31, 20X8:

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

	80,00,000

The market price of equity share is Rs. 30. It is expected that the company will pay next year a dividend of Rs. 3 per share, which will grow at 7% forever. Assume 40% income tax rate.
You are required to COMPUTE weighted average cost of capital using market value weights.

Ans.

(i) Cost of Equity (Ke) =

(ii) Cost of Debentures (Kd) = 9 % (1-0.4) = 5.6%

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

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

Q.78 WACC | MTP May 18

G Limited has the following capital structure, which it considers to be optimal

Capital Structure	Weightage (in %)
Debt	25
Preference Shares	15
Equity Shares	60
	100

G Limited's expected net income this year is ₹ 34,285.72, its established dividend payout ratio is 30 per cent, its tax rate is 40 per cent, and investors expect earnings and dividends to grow at a constant rate of 9 per cent in the future. It paid a dividend of ₹ 3.60 per share last year, and its shares currently sells at a price of ₹ 54 per share.G Limited requires additional funds which it can obtain in the following ways:

- Preference Shares: New preference shares with a dividend of ₹ 11 can be sold to the public at a price of ₹95 per share.
- Debt: Debt can be sold at an interest rate of 12 per cent. You are required to:

(i) DETERMINE the cost of each capital structure component; and
(ii) COMPUTE the weighted average cost of capital (WACC) of G Limited.

Ans.

(i) **Computation of Costs of Different Components of Capital:**

(a) Equity Shares:

$$K_e = \frac{D_1}{P0} + g = \frac{D_0(1+g)}{P_0} + g$$

$$= \frac{3.60(1.09)}{54} + 0.09 = 0.0727 + 0.09 = 16.27\%$$

(b) Preference Shares:

$$K_p = \frac{\text{Preference Share Dividend}}{P_0} = \frac{11}{95} = 11.58\%$$

(c) Debt at 12%

$K_d (1 - t) = 12\% (1 - 0.4) = 12\% \times 0.6 = 7.20\%.$

(ii) **Weighted Average Cost of Capital (WACC)**

WACC = WdKd + WpKp + WeKe

WACC = 0.25 (7.2%) + 0.15 (11.58%) + 0.60 (16.27%)

= 1.8 + 1.737 + 9.762 = 13.30%.

Q.79 WACC | PY Nov 22

The following is the extract of the Balance Sheet of M/s KD Ltd.:

Particulars	*Amount (₹)*
Ordinary shares (Face Value ₹ 10/- per share)	*5,00,000*
Share Premium	*1,00,000*
Retained Profits	*6,00,000*
8% Preference Shares (Face Value ₹25/- per share)	*4,00,000*
12% Debentures (Face value ₹100/- each)	*6,00,000*
	22,00,000

The ordinary shares are currently priced at ₹ 39 ex-dividend and preference share is priced at ₹ 18 cum-dividend. The debentures are selling at 120 percent ex-interest. The applicable tax rate to KD Ltd. is 30 percent. KD Ltd.'s cost of equity has been estimated at 19 percent. Calculate the WACC (weighted average cost of capital) of KD Ltd. on the basis of market value.

Ans.

W.N. 1

Cum-dividend price of Preference shares = ₹ 18

Less: Dividend (8/100) x 25 = ₹ 2

∴ Market Price of Preference shares = ₹ 16

$$K_p = \frac{2}{16} = 0.125 \text{ (or) } 12.5\%$$

$$\text{No. of Preference shares} = \left(\frac{4,00,000}{25}\right) = 16,000$$

W.N. 2

$$\text{Market price of Debentures} = \left(\frac{120}{100}\right) x100 = Rs\ 120$$

$$K_d = \left[\frac{12(1-0.3)}{120}\right] = 0.07 \text{ (or) } 7\%$$

$$\text{No. of Debentures} = \left(\frac{6,00,000}{100}\right) = 6,000$$

W.N.3

Market Price of Equity shares = Rs 39

Ke (given) = 19% or 0.19

No. of Equity shares = 5, 00, 000 = 50,000

Sources	Market Value	Nos.	Total Market value (₹)	Weight	Cost of Capital	Product
Equity Shares	39	50,000	19,50,000	0.6664	0.19	0.1266
Preference Shares	16	16,000	2,56,000	0.0875	0.125	0.0109
Debentures	120	6,000	7,20,000	0.2461	0.07	0.0172
					WACC =	0.1547

WACC = 0.1547 or 15.47%

Q.80 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:

I. Earnings per share (EPS) & Market Price per share (MPS)

II. Financial Leverage

III. Weighted Average Cost of Capital & Marginal Cost of Capital (using Book Value weights)

Ans. **Calculation of Equity Share capital and Reserves and surplus: Alternative 1:**

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

Reserves= ₹10,00,000 + $\frac{2,00,000 \times 33.3333}{133.3333}$ =₹10,50,000

Alternative 2:

Equity Share capital = ₹ 20,00,000 + $\frac{9,00,000 \times 100}{125}$ =₹27,20,000

Reserves= ₹10,00,000 + $\frac{9,00,000 \times 100}{125}$ =₹11,80,000

Capital Structure Plans

Amount in ₹

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

Computation of Present Earnings before interest and tax (EBIT)

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

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

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

Amount in ₹

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

Working Note 1

	Alternative I	Alternative II
Debt:		
₹15,00,000 +₹8,00,000	23,00,000	-
₹15,00,000 +₹1,00,000	-	16,00,000
Total capital Employed (₹)	55,00,000	55,00,000
Debt Ratio (Debt/Capital employed)	=0.4182	=0.2909
	=41.82%	=29.09%

Change in Equity: ₹21,50,000-₹20,00,000	1,50,000	
₹27,20,000-₹20,00,000		7,20,000
Percentage change in equity	7.5%	**36%**
Applicable P/E ratio	**7**	**8.5**

Calculation of Cost of equity and various type of debt

	Alternative I	Alternative II
A) Cost of equity		
EPS	22.60	20.74
DPS (EPS X 60%)	13.56	12.44
Growth (g)	10%	10%
Po (MPS)	158.2	176.29
Ke= Do (1 + g)/ Po	$\frac{13.56\ (1.1)}{158.2}$	$\frac{12.44(1.1)}{176.29}$
	=9.43%	=7.76%
B) Cost of Debt:		
10% long term debt	10% + (1-0.25)	10% +(1-0.25)
	= 7.5%	= 7.5%
14% redeemable debentures	$\frac{14(1-0.25)+(110-100/10)}{110+100/2}$	nil
	= 10.5 + 1 / 10.5	
	= 10.95%	
8% irredeemable debenture	NA	8000(1-0.25)/1,00,00 = 6%

Calculation of Weighted Average cost of capital (WACC)

	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.81 WACC | RTP Dec 21

Kalyanam Ltd. has an operating profit of ₹ 34,50,000 and has employed Debt which gives total Interest Charge of ₹ 7,50,000. The firm has an existing Cost of Equity and Cost of Debt as 16% and 8% respectively. The firm has a new proposal before it, which requires funds of ₹ 75 Lakhs and is expected to bring an additional profit of ₹ 14,25,000. To finance the proposal, the firm is expecting to issue an additional debt at 8% and will not be issuing any new equity shares in the market. Assume no tax culture.

You are required to CALCULATE the Weighted Average Cost of Capital (WACC) of Kalyanam Ltd.:

(i) Before the new Proposal

(ii) After the new Proposal

Ans. Workings:

(a) Value of Debt $= \frac{\text{Interest}}{\text{cost of debt } (k_d)}$

$= \frac{7,50,000}{0.08} = ₹\ 93,75,000$

(b) Value of equity capital $= \frac{\text{Operating profit - Interest}}{\text{Cost of equity } (K_e)}$

$= \frac{34,50,000 - 7,50,000}{0.16} = ₹\ 1,68,75,000$

(c) New Cost of equity (K_e) after proposal

$= \frac{\text{Increased Operating profit - Interest on Increased debt}}{\text{Equity capital}}$

$= \frac{(34,50,000 + 14,25,000) - (7,50,000 + 6,00,000)}{1,68,75,000}$

$= \frac{48,75,000 - 13,50,000}{1,68,7500} = \frac{35,25,000}{1,68,75000} = 0.209 \text{ or } 20.9\%$

(i) Calculation of Weighted Average Cost of Capital (WACC) before the new proposal

Sources	Amount (₹)	Weight	Cost of Capital	WACC
Equity	1,68,75,000	0.6429	0.160	0.1029
Debt	93,75,000	0.3571	0.080	0.0286

Total	**2,62,50,000**	**1**		**0.1315 or 13.15 %**

(ii) Calculation of Weighted Average Cost of Capital (WACC) after the new proposal

Sources	Amount (₹)	Weight	Cost of Capital	WACC
Equity	1,68,75,000	0.5000	0.209	0.1045
Debt	1,68,75,000	0.5000	0.080	0.0400
Total	**3,37,50,000**	**1**		**0.1445 or 14.45 %**

Q.82 WACC before & after proposal | MTP May 22(2)

Genzy Ltd. is planning to introduce a new product with a project life of 10 years. The initial equipment cost will be ₹ 2.5 crores. At the end of 10 years, the equipment will have a resale value of 50 lakhs. A working capital of ₹ 30,00,000 will be needed and it will be released at the end of the tenth year. The project will be financed with the following capital sources.

Particulars	Amount (₹)	Issue Price (Market price)
Equity Share Capital of Face value ₹10 each	1,50,00,000	₹30
Debentures of face value ₹100 each with a maturity of 10 years	90,00,000	₹90
Preference shares of ₹100 each with a maturity of 10 years	60,00,000	₹96

The existing yield on T-bills is averaging 8% p.a. The systematic risk measure for the proposed project is 1.6. NSE NIFTY is expected to yield 14% p.a. on average for the foreseeable future. Debenture holders have been promised a coupon of 12% and preference shareholders have been committed a dividend of 15%.

The sales volumes over 10 years have been estimated as follows:

Year	1	2	3-5	6-8	9-10
Units per year	70,000	98,000	2,10,000	2,50,000	1,20,000

A sales price of ₹ 300 per unit is expected and variable expenses will amount to 60% of sales revenue. Fixed cash operating costs will amount to ₹ 40,00,000 per year. The loss of any year will be set off from the profits of subsequent years.

The company is subject to a 30 per cent tax rate. The company follows straight line method of depreciation which is to be assumed to be admissible for tax purpose also.

CALCULATE the net present value of the project for the company and advise the management to take appropriate decision.

The PV factors are to be taken as rounded figures upto 2 decimals. Use market value weights to COMPUTE overall cost of capital.

Ans

Cost of Equity

K_e = Rf + Beta * (Rm – Rf) K_e = 8% + 1.6 * (14% - 8%)

K_e = 8% + (1.6 * 6%)

K_e = 17.6%

1. **Cost of Redeemable Debentures (Post-Tax)** $K_d = \dfrac{\text{Int}\,(1-t) + \dfrac{(RV - NP)}{n}}{\dfrac{(RV+NP)}{2}}$

$$K_d = \frac{12,00,000 * (1 - 30\%) + ((1,00,00,000 - 90,00,000) / 10)}{(1,00,00,000 + 90,00,000)/ 2}$$

K_d = 8,40,000 + 1,00,000

95,00,000

K_d = 9.89%

2. **Cost of Redeemable Preference Shares** $K_p = \dfrac{PD + \dfrac{(RV - NP)}{n}}{\dfrac{(RV+NP)}{2}}$

K_p = 9,37,500 + 25,000
61,25,000

K_p = 15.71%

3. **Weighted Average Cost of Capital (WACC) – Book Value Method**

Source of Capital	Market Value	Weights	After Tax Cost of Capital	WACC
Equity Share Capital	1,50,00,000	0.5	17.6%	0.088
Debentures	90,00,000	0.3	9.89%	0.030
Preference Share Capital	60,00,000	0.2	15.71%	0.031
	3,00,00,000	**1.000**		**0.149**

WACC = 14.9%

4. **Computation of CFAT**

	(year 1 to year 4)					
Sr. No.	Particulars / Year	1	2	3-5	6-8	9-10
A	Sale Price p.u.	300	300	300	300	300
	Sale units	70,000	98,000	2,10,000	2,50,000	1,20,000
C	Sales (A x B)	2,10,00,000	2,94,00,000	6,30,00,000	7,50,00,000	3,60,00,000
D	Variable Cost p.u.	180	180	180	180	180
E	Variable Cost (B x D)	1,26,00,000	1,76,40,000	3,78,00,000	4,50,00,000	2,16,00,000
F	Contribution (C - E)	84,00,000	1,17,60,000	2,52,00,000	3,00,00,000	1,44,00,000
G	Less: Fixed Cost	40,00,000	40,00,000	40,00,000	40,00,000	40,00,000
H	PBDT (F-G)	44,00,000	77,60,000	2,12,00,000	2,60,00,000	1,04,00,000
I	Less: Depreciation (2,50,00,000-50,00,000) / 10	20,00,000	20,00,000	20,00,000	20,00,000	20,00,000
J	PBT	24,00,000	57,60,000	1,92,00,000	2,40,00,000	84,00,000
K	Less: Taxes @ 30%	7,20,000	17,28,000	57,60,000	72,00,000	25,20,000
L	PAT	16,80,000	40,32,000	1,34,40,000	1,68,00,000	58,80,000
M	Add: Depreciation	20,00,000	20,00,000	20,00,000	20,00,000	20,00,000
N	CFAT	36,80,000	60,32,000	1,54,40,000	1,88,00,000	78,80,000

5. **Computation of NPV**

Sr. No.	Particulars / Year	1	2	3-5	6-8	9-10
I	CFAT	36,80,000	60,32,000	1,54,40,000	1,88,00,000	78,80,000
II	PVAF @ 14.9%	0.87	0.76	(0.66+0.57+0.50) = 1.73	(0.43+0.38+0.33) = 1.14	(0.29+0.25) = 0.54

III	PV of CFATs (I x II)	32,01,600	45,84,320	2,67,11,200	2,14,32,000	42,55,200
IV	Salvage + Release of WC					80,00,000
V	PVF @ 14.9%					0.25
VI	PV of Salvage (IV x V)					20,00,000

PV of Inflows = 32,01,600 + 45,84,320 + 2,67,11,200 + 2,14,32,000 + 42,55,200 + 20,00,000
PV of Inflows = 6,21,84,320
PV of Outflows = Investment + Introduction of Working Capital PV of Outflows = 2,50,00,000 + 30,00,000
PV of Outflows = 2,80,00,000
NPV = PV of Inflows – PV of Outflows
NPV = 6,21,84,320 - 2,80,00,000
NPV = 3,41,84,320
The management should consider taking up the project as the Net Present Value of the Project is Positive.

Q.83 Cost of Debt / Preference | ICAI MAT

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 years 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%.

(i) CALCULATE the cost of convertible debentures using the approximation method.

(ii) Use YTM method to CALCULATE cost of preference shares.

Year	1	2	3	4	5	6	7	8	9	10
PVIF 0.03, t	0.971	0.943	0.915	0.888	0.863	0.837	0.813	0.789	0.766	0.744
PVIF 0.05, t	0.952	0.907	0.864	0.823	0.784	0.746	0.711	0.677	0.645	0.614
PVIFA 0.03, t	0.971	1.913	2.829	3.717	4.580	5.417	6.230	7.020	7.786	8.530
PVIFA 0.05, t	0.952	1.859	2.723	3.546	4.329	5.076	5.786	6.463	7.108	7.722

Interest rate	1%	2%	3%	4%	5%	6%	7%	8%	9%
FVIF i, 5	1.051	1.104	1.159	1.217	1.276	1.338	1.403	1.469	1.539
FVIF i, 6	1.062	1.126	1.194	1.265	1.340	1.419	1.501	1.587	1.677
FVIF i, 7	1.072	1.149	1.230	1.316	1.407	1.504	1.606	1.714	1.828

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

Price of share after 6 years = $\frac{D_7}{k-g} = \frac{12.76(1.05)^7}{0.325 - 0.05}$

$P_6 = \frac{12.76 \times 1.407}{0.275}$

$P_6 = 65.28$
Redemption Value of Debenture (RV) = 65.28 × 2 = 130.56 (RV)
NP = 95
n = 6

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

$$= \frac{15(1 - 0.4) + \frac{(130.56-95)}{6}}{\frac{(130.56-95)}{2}} \times 100$$

$$= \frac{9 + 5.93}{112.78} \times 100$$

$K_d = 13.24\%$

(ii) Calculation of Cost of Preference Shares:
Net Proceeds = 100 (1.1) - 6% of 100 (1.1)
= 110 - 6.60
= 103.40
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
			-13.65		**3.39**

$K_p = 3\% + \frac{5\% - 3\%}{[3.39 - (-13.65)]}$

$= 3\% + \frac{2\%}{17.04} \times 13.65$ So, $K_p = 4.6021\%$

DIVIDEND DECISIONS

Q.84 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: (i) Dividend payout ratio.

(ii) Market price of share at optimum dividend payout ratio.

(iii) P/E ratio, at which the dividend policy will have no effect on the price of share.

(iv) Market price of share at this P/E ratio.

(v) 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 (Ke) may be taken as the inverse of P/E ratio. Therefore, Ke is 8% (i.e., 1/12.5). The value of the share is ₹ 130 which may be equated with Walter Model as follows:

$$P=\frac{D+\frac{r}{k_e}(E-D)}{K_e} \text{ or } p=\frac{D+\frac{12\%}{8\%}(10\%-D)}{8\%}$$

or [D+1.5(10-D)]/0.08=130 or
D+15-1.5D=10.4
or -0.5D=-4.6
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 Ke 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 Ke would be equal to the rate of return (r) of the firm. The Ke 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.

(iii) If the P/E is 8.33 instead of 12.5, then the Ke which is the inverse of P/E ratio, would be 12% and in such a situation ke= r and the market price, as per Walter's model would be:

Q.85 Growth Model | MTP May 18

A company had paid dividend of ₹ 2 per share last year. The estimated growth of the dividends from the company is estimated to be 5% p.a. DETERMINE the estimated market price of the equity share if the estimated growth rate of dividends (i) rises to 8%, and (ii) falls to 3%. Also COMPUTE the present market price of the share, given that the required rate of return of the equity investors is 15.5%.

Ans

In this case the company has paid dividend of ₹2 per share during the last year. The growth rate (g) is 5%. Then, the current year dividend (D1) with the expected growth rate of 5% will be ₹ 2.10

The share price is = $P_o = \frac{D_1}{Ke - g}$

$= \frac{2.10}{0.155 - 0.05}$

= ₹ 20

(i) In case the growth rate rises to 8% then the dividend for the current year (D1) would be ₹ 2.16 and market price would be-

$= \frac{2.16}{0.155 - 0.08}$

= ₹ 28.80

(ii) In case growth rate falls to 3% then the dividend for the current year (D1) would be ₹2.06 and market price would be-

$= \frac{2.16}{0.155 - 0.03}$

= ₹16.48

So, the market price of the share is expected to vary in response to change in expected growth rate is dividends.

Q.86 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

Ke = 15%, P_0 = ₹100, D_1 = 0

$P_o = \frac{P_1 + D_1}{1 + Ke}$

$₹100 = \frac{P_1 + 0}{1 + 0.15}$

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/P1

Δn = ₹10,00,000/₹115

Step 4: Calculation of value of firm nP_o = [(n+Δn)P1-I+E]/(1+Ke)

nP_o = [(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

Ke= 15%, P_o= ₹100, D_1= ₹10

$$P_o = \frac{P1 + D1}{1 + Ke}$$

$$₹100 = \frac{P1 + 10}{1 + 0.15}$$

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/P1

Δn = ₹2000000/₹105

Step 4: Calculation of value of firm nP_o

= [(n+Δn)P1 – I+E]/(1+Ke)

nP_o = [(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.87 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

P0 = ₹ 10 n = 2,00,000, E = ₹ 5,00,000
Ke = 15%, Δn = 26,089, I = ?

$$P_0 = \frac{P_1}{1+Ke}$$

$$10 = \frac{P_1}{1.5}$$

P1 = 11.5

$$\Delta n = \frac{I - E + nD1}{P1}$$

$$26,089 = \frac{I - 5,00,000}{11.5}$$

I = 8,00,024

Now,

P0 = ₹ 10, n = ₹ 2,00,000,

E = ₹ 5,00,000, I = 8,00,024, Ke = 15%, Δn 47,619, D1 = ?

$$P = \frac{P_1 + D_1}{1+Ke}$$

$$10 = \frac{P_1 + D_1}{1.15}$$

P1 = 11.5

$$\Delta n = \frac{I - E + nD1}{P_1}$$

$$26,089 = \frac{I - 5,00,000}{11.5}$$

I = 8,00,024

Now,

P0 = ₹ 10, n = ₹ 2,00,000,

E = ₹ 5,00,000, I = 8,00,024, Ke = 15%, Δn 47,619, D1 = ?

$$P = \frac{P_1 + D_1}{1+ke}$$

$$10 = \frac{P_1 + D_1}{1.5}$$

P1 + D1 = 11.5

P1 = 11.5 - D1 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 P1 = 2,00,000 D1 + 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

$$D1 = \frac{2,47,594.5}{2,47,619} = 0.99 = ₹ 1$$

P1 = 11.5 – D_1

P1 = 11.5 – 1

P1 = 10.5

$$n.P_0 = \frac{(n + Dn)P_1 - I + E}{1 + Ke}$$

$$\frac{(2,00,000 + 47,619)(10.5) - 8,00,024 + 5,00,000}{1.15}$$

$n.P_0$ = ₹19,99,979 = ₹20,00,000

Using direct calculation,

$n.P_0$ = 2,00,000 ×10 = ₹ 20,00,000

Q.88 MM Approach | MTP Nov 23(1)

ZX Ltd. has a paid-up share capital of ₹ 2,00,00,000, face value of ₹ 100 each. The current market price of the shares is ₹ 100 each. The Board of Directors of the company has an agenda of meeting to pay a dividend of 50% to its shareholders. The company expects a net income of ₹ 1,50,00,000 at the end of the current financial year. Company also plans for a capital expenditure for the next financial year for a cost of ₹ 1,90,00,000, which can be financed through retained earnings and issue of new equity shares.

Company's desired rate of investment is 15%.

Required:

Following the Modigliani- Miller (MM) Hypothesis, DETERMINE value of the company when:

(i) It does not pay dividend and (ii) It does pay dividend

Ans

V_1 or $nP_o = \frac{(n + \Delta n)P_1 - I + E}{(1 + Ke)}$

Where,

Vf = Value of firm in the beginning of the period
n = number of shares in the beginning of the period
Δn = number of shares issued to raise the funds required
I = Amount required for investment
E = total earnings during the period

(i) Value of the ZX Ltd. when dividends are not paid.

$$nP_o = \frac{(n + \Delta n)P_1 - I + E}{(1 + Ke)}$$

$$nP_o = \frac{2,00,000\left(\frac{40,00,000}{115}\right) \times 115 - Rs.1,90,00,000 + 1,50,00,000}{(1 + 0.15)}$$

$$= \frac{2,70,00,000 - 1,90,00,000 + 1,50,00,000}{1 + 0.5} = ₹\ 2,00,00,000$$

Working notes:

1. Price of share at the end of the period (P1)

$$P_o = \frac{P_1 + D_1}{1 + Ke}$$

$$100 = \frac{P_1 + 0}{1 + 0.15} \text{ or, } P_1 = 115$$

2. Calculation of funds required for investment

Earnings	₹1,50,00,000
Dividend distributed	Nil
Fund available for investment	₹ 1,50,00,000
Total Investment	₹ 1,90,00,000
Balance Funds required	₹ 40,00,000

3. Calculation of no. of shares required to be issued for balance fund

$$\text{No. of shares } (\Delta n) = \frac{\text{Funds required}}{\text{Price at end } (P_1)} = \frac{40,00,000}{115} \text{ shares}$$

(ii) Value of the ZX Ltd. when dividends are paid.

$$nP_o = \frac{(n + \Delta n)P - I + E}{1 + K_e}$$

$$nP_o = \frac{2,00,000\left(\frac{140,00,000}{65}\right) \times 65 - 1,90,00,000 + 1,50,00,000}{(1 + 0.15)}$$

$$= \frac{2,70,00,000 - 1,90,00,000 + 1,50,00,000}{(1 + 0.15)} = ₹\ 2,00,00,000$$

Working notes:

4. Price of share at the end of the period (P1)

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

$$100 = \frac{P_2 + 50}{1 + 0.15} \text{ or, } \quad P_1 = ₹65$$

5. Calculation of funds required for investment

Earnings	₹ 1,50,00,000
Dividend distributed	₹ 1,00,00,000
Fund available for investment	₹ 50,00,000
Total Investment	₹ 1,90,00,000
Balance Funds required	₹ 1,40,00,000

6. Calculation of no. of shares required to be issued for balance fund

$$\text{No. of shares } (\Delta n) = \frac{\text{Funds required}}{\text{Priceat end } (P_1)} = \frac{1,40,00,000}{65} = 2,15,385 \text{ shares(approx.)}$$

Note- As per MM-hypothesis of dividend irrelevance, value of firm remains same irrespective of dividend paid. In the solution, there may be variation in value, which is due to rounding off error.

Q.89 MMP Approach & Gordan | MTP May 23(2)

Rex Ltd has 20 lakh equity shares outstanding at the start of the accounting year 202 3. The existing market price per share is ₹ 300. Expected dividend is ₹ 20 per share. The rate of capitalization appropriate to the risk class to which the company belongs is 20%.

CALCULATE the market price per share when expected dividends are: (a) declared, and (b) not declared, based on the Miller – Modigliani approach.

CALCULATE number of shares to be issued by the company at the end of the accounting year on the assumption that the net income for the year is ₹ 5 crore; investment budget is ₹ 8 crores, when (a) Dividends are declared, and (b) Dividends are not declared.

PROVE that the market value of the shares at the end of the accounting year will remain unchanged irrespective of whether (a) Dividends are declared, or (ii) Dividends are not declared.

WHAT is the implied growth rate in dividends as per Gordon's model, if expected dividend payment is considered imminent?

Ans

(i) Calculation of market price per share

According to Miller – Modigliani (MM) Approach:

$$Po = \frac{P_1 + D1}{1+ke}$$

Where,

Existing market price (Po) = ₹ 300
Expected dividend per share (D_1) = ₹ 20
Capitalization rate (ke) = 0.20 Market price at year end (P1) = ?

a. If expected dividends are declared, then

$$300=(P1+20)/(1+0.2)$$
$$300 \times 1.2 = P1+20$$

P1= 340

b. If expected dividends are not declared, then

300=(P1+0)/(1+0.2)

300 x 1.2 = P1

P1= 360

(ii) Calculation of number of shares to be issued

	(a)	(b)
	Dividends are declared.(₹ lakh)	Dividends are not Declared (₹ lakh)
Net income	500	500
Total dividends	(400)	-
Retained earnings	100	500
Investment budget	800	800
Amount to be raised by new issues	700	300
Relevant market price (₹ per share)	340	360
No. of new shares to be issued (in lakh) (₹ 700 ÷ 340; ₹ 300 ÷ 360)	2.0588	0.8333

(i) Calculation of market value of the shares

	(a)	(b)
Particulars	Dividends are declared	Dividends are not Declared
Existing shares (in lakhs)	20.00	20.00
New shares (in lakhs)	2.0588	0.8333
Total shares (in lakhs)	22.0588	20.8333
Market price per share (₹)	340	360
Total market value of shares at the end of the year (₹ in lakh)	22.0588 × 340 = 7,500 (approx.)	20.8333 × 360 = 7,500 (approx.)

Hence, it is proved that the total market value of shares remains unchanged irrespective of whether dividends are declared, or not declared.

(iv) P0=D1/(Ke-g)

300 = 20/(0.2-g)

0.2-g = 20/300

0.2-g = 0.0667

G = 0.133333

g = 13.3333%

Q.90 Gordan's Model | RTP Nov 23

HM Ltd. is listed on Bombay Stock Exchange which is currently been evaluated by Mr. A on certain parameters.Mr. A collated following information:

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

(b) The company's sales are growing by 20% on a 5-year Compounded Annual Growth Rate (CAGR) basis, however the company expects following retention amounts against probabilities mentioned as contention is dependent upon cash requirements for the company. Rate of return is 10% generated by the company.

Situation	Prob.	Retention Ratio
A	30%	50%
B	40%	60%
C	30%	50%

(c) The current risk-free rate is 3.75% and with a beta of 1.2 company is having a risk premium of 4.25%. You are required to help Mr. A in calculating the current market price using Gordon's formula.

Ans

Market price using Gordon's formula

D0 (1 + g)

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

D0 = 2.5×4 = 10 per share (annual)

g = br or retention ratio x 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 × 0.10= 0.054 or 5.4% P_0

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

Ke - g

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

Ke = Risk free rate + (Beta x Risk Premium)

= 3.75% + (1.2 x 4.25%) = 8.85%

Q.91 MPS Using Gordon's Model | PY Dec 21

X Ltd. is a multinational company. Current market price per share is ₹ 2,185. During the F.Y. 2020-21, the company paid ₹ 140 as dividend per share. The company is expected to grow @ 12% p.a. for next four years, then 5% p.a. for an indefinite period. Expected rate of return of shareholders is 18% p.a.

(i) Find out intrinsic value per share.

(ii) State whether shares are overpriced or under priced.

Year	1	2	3	4	5
Discounting Factor @ 18%	0.847	0.718	0.608	0.515	0.436

Ans

As per Dividend discount model, the price of share is calculated as follows:

$$P = \frac{D_1}{(1+Ke)^1} + \frac{D_2}{(1+Ke)^2} + \frac{D_3}{(1+Ke)^3} + \frac{D_4}{(1+Ke)^4} + \frac{D_4(1+g)}{(Ke-g)} \times \frac{1}{(1+Ke)^4}$$

Where,

P = Price per share

K_e = Required rate of return on equity

g = Growth rate

$$P = \frac{140x1.12}{(1+0.18)^1} + \frac{156.80 \times 1.12}{(1+0.18)^2} + \frac{175.62 \times 1.12}{(1+0.18)^3} + \frac{196x1.12}{(1+0.18)^4} + \frac{220.29(1+0.05)}{(0.18-0.05)} x \frac{1}{(1+0.18)^4}$$

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.92 Walter & Gordon Model | MTP May 19(1)

With the help of following figures CALCULATE the market price of a share of a company by using:

(i) Walter's formula

(ii) Dividend growth model (Gordon's formula)

Earnings per share (EPS)	Rs. 10
Dividend per share (DPS)	Rs. 6
Cost of capital (k)	20%
Internal rate of return on investment	25%
Retention Ratio	60%

Ans **Market price per share by**

(i) Walter's formula:

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

$$P = \frac{6 + \frac{0.25}{0.20}(10 - 6)}{0.20}$$

P = Rs.55

(ii) Gordon's formula (Dividend Growth model): When the growth is incorporated in earnings and dividend, the present value of market price per share (Po) is determined as follows:

Gordon's theory:

$$Po = \frac{E_1(1-b)}{Ke-br}$$

Where,

Po = Price per share

E_1 = Earnings per share

b = Retention ratio; (1 - b = Payout ratio)

Ke = Cost of capital

r = IRR

br = Growth rate (g)

$$Po = \frac{10\ (1-0.60)}{0.20 - (0.60 \times 0.25)} = \frac{4}{0.05} = Rs.80$$

Q.93 Optimum Payout using Walter Model | RTP July 21

The following information is supplied to you:

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

Applying Walter's Model:

(i) ANALYSE whether the company is following an optimal dividend policy.

(ii) COMPUTE P/E ratio at which the dividend policy will have no effect on the value of the share.

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

Ans

(i) The EPS of the firm is ₹ 10 (i.e., ₹ 2,00,000/ 20,000) and r = 2,00,000/ (20,000 shares× ₹100) = 10%. The P/E Ratio is given at 12.5 and the cost of capital, K e, may betaken at the inverse of P/E ratio. Therefore, Ke is 8 (i.e., 1/12.5). The firm is distributing total dividends of ₹ 1,50,000 among 20,000 shares, giving a dividend per share of₹ 7.50. the value of the share as per Walter's model may be found as follows:

$$P=\frac{D+\frac{r}{K_e}(E-D)}{K_e}=\frac{7.5+\frac{0.1}{0.08}(10-7.5)}{0.08}=₹\ 132.81$$

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

$$=\frac{0+\frac{0.1}{0.08}(10-0)}{0.08}=₹\ 156.25$$

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

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

(iii) If the P/E is 8 instead of 12.5, then the Ke which is the inverse of P/E ratio, would be12.5 and in such a situation ke> r and the market price, as per Walter's model would be:

$$P=\frac{D+\frac{r}{K_e}(E-D)}{K_e}=\frac{7.5+\frac{0.1}{0.125}(10-7.5)}{0.125}=₹\ 76$$

Q.94 Optimum Payout using Walter Model | MTP Dec 21(2)

The following information is supplied to you:

Particulars	₹
Total Earnings	5,00,000
Equity shares (of ₹ 100 each)	50,00,000
Dividend paid	3,75,000
Price/ Earnings ratio	12.5

Applying Walter's Model:

(i) ANALYSE whether the company is following an optimal dividend policy.

(ii) COMPUTE P/E ratio at which the dividend policy will have no effect on the value of the share.

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

Ans

(i) The EPS of the firm is ₹ 10 (i.e. ₹ 5,00,000/ 50,000). r = 5,00,000/ 50,00,000 = 10%The P/E Ratio is given at 12.5 and the cost of capital, Ke, may be taken at the inverseof P/E ratio. Therefore, Ke is 8 (i.e., 1/12.5). The firm is distributing total dividends of₹ 3,75,000 among 50,000 shares, giving a dividend per share of ₹ 7.50. The value ofthe share as per Walter's model may be found as follows:

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e} = \frac{7.5 + \frac{0.1}{0.08}(10 - 7.5)}{0.08} = ₹\ 132.81$$

The firm has a dividend payout of 75% (i.e., ₹ 3,75,000) out of total earnings of₹ 5,00,000. Since, the rate of return of the firm, r, is 10% and it is more than the Ke of8%, therefore, by distributing 75% of earnings, the firm is not following an optimal dividend policy. The optimal dividend policy for the firm would be to pay zero dividend and in such a situation, the market price would be,

$$= \frac{0 + \frac{0.1}{0.08}(10 - 0)}{0.08} = ₹\ 156.25$$

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

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

(iii) If the P/E is 8 instead of 12.5, then the Ke which is the inverse of P/E ratio, would be12.5 and in such a situation ke> r and the market price, as per Walter's model would be:

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e} = \frac{7.5 + \frac{0.1}{0.125}(10 - 7.5)}{0.125} = ₹\ 76$$

CASH MANAGEMENT

Q.95 REORDER INVENTORY LEVEL | PY May 22

A company requires 36,000 units of a product per year at cost of ₹ 100 per unit. Ordering cost per order is ₹ 250 and the carrying cost is 4.5% per year of the inventory cost. Normal lead time is 25 days and safety stock is NIL. Assume 360 working days in a year.

(i) Calculate the Reorder Inventory Level.

(ii) Calculate the Economic Order Quantity (EOQ).

(iii) If the supplier offers 1% quantity discount for purchase in lots of 9,000 units or more, should the company accept the proposal?

Ans.

Annual Consumption = 36,000 (A)

Ordering Cost = ₹ 250 per order (O)

Carrying Cost $= \frac{4.5}{100} \times 100$

= ₹ 4.5 (C) Lead Time

= 25 days

(i) Reorder Level = Lead Time × Daily Consumption

$= 25 \times \frac{36,000}{360}$

= **2,500 units**

(ii) Economic Order Quantity (EOQ)

$= \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 36,000 \times 250}{4.5}}$

= 2,000 units

(iii) Evaluation of Profitability of Quantity Discount Offer:

(a) When EOQ is ordered

		(₹)
Purchase Cost	(36,000 units x ₹ 100)	36,00,000
Ordering Cost	[(36,000 units/2,000 units) x ₹ 250]	4,500
Carrying Cost	(2,000 units x ½ x ₹ 4.5)	4,500
Total Cost		**36,09,000**

(b) When Quantity Discount is accepted

		(₹)
Purchase Cost	(36,000 units x ₹ 99*)	35,64,000
Ordering Cost	[(36,000 units/9,000 units) x ₹ 250]	1,000
Carrying Cost	(9,000 units x ½ x ₹ 99 x 4.5%)	20,048
Total Cost		**35,85,048**

*Unit Cost = ₹100

Less: Quantity Discount @ 1% = ₹ 1

Purchase Cost = ₹ 99Advise -

The total cost of inventory is lower if Quantity Discount is accepted. Hence, the company is advised to accept the proposal.

Q.96 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
(i) Company's average cash balance,
(ii) Number of conversions each year and
(iii) Time interval between two conversions.

Ans.

(i) Computation of Average Cash balance:

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

(ii) Number of conversions p.a.

Annual cash outflow = ₹ 36,00,000
Optimum cash balance = ₹ 60,000
∴ No. of conversions p.a. = $\frac{36,00,000}{60,000} = 60$

(iii) Time interval between two conversions

No. of days in a year = 360
No. of conversions p.a. = 60
∴ Time interval = $\frac{360}{60}$ = 6 days

Q.97 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 (1/5th of total	128	176	120	120	160
Credit Sales (4/5th of total	512	704	480	480	640

(2) Calculation of Credit Sales Receipts

Month	Nov.	Dec.	Jan.	Feb.	Mar.
Forecast Credit sales (Working note 1)	512.00	704.00	480.00	480.00	640.00
Receipts:					
15% in the month of sales			**72.00**	**72.00**	**96.00**
25% in next month			**176.00**	**120.00**	**120.00**
58% in next to next month			**296.96**	**408.32**	**278.40**
Total			544.96	600.32	494.40

Cash Budget **(₹ithousands)**

	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.98 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 10,00,000 equity shares of ₹10 each Issued, Subscribed and Paid up capital		1,00,00,000	Land and Building	20,00,000		
			Less: Depreciation	1,00,000	19,00,000	
			Plant and Machinery	10,00,000		
			Less: Depreciation	50,000	9,50,000	
			Furniture	5,00,000		
			Less: Depreciation	25,000	4,75,000	

5,00,000 equity Shares of ₹10 each		50,00,000	Motor Vehicles *Less:* Depreciation	5,00,000 25,000	4,75,000	38,00,000
Reserve and Surplus: Profit and Loss Long-term loans Current liabilities and provisions: Sundry creditors Accrued interest Outstanding expenses	15,87,500 45,250 1,00,000	22,17,250 7,75,000 17,32,750 97,75,000	Current Assets: Stock Sundry debtors Cash		5,00,000 42,50,000 11,75,000	59,25,000

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	-	-	15,00,000	17,50,000	17,50,000	20,00,000
Total (A)	56,50,000	-	15,00,000	17,50,000	17,50,000	20,00,000
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	50,000	50,000	50,000	50,000	50,000	50,000
Total	46,00,000	11,75,000	13,62,500	13,62,500	15,50,000	15,50,000
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

Q.99 Monthly Cash Budget | MTP May 21(1)

PREPARE monthly cash budget for the first six months of 2021 on the basis of the following information:

(i) Actual and estimated monthly sales are as follows:

Actual	(Rs.)	Estimated	(Rs.)
October 2020	2,00,000	January 2021	60,000
November 2020	2,20,000	February 2021	80,000
December 2020	2,40,000	March 2021	1,00,000
		April 2021	1,20,000
		May 2021	80,000
		June 2021	60,000
		July 2021	1,20,000

(ii) Operating Expenses (including salary & wages) are estimated to be payable as follows:

Month	(Rs.)	Month	(Rs.)
January 2021	22,000	April 2021	30,000
February 2021	25,000	May 2021	25,000
March 2021	30,000	June 2021	24,000

(iii) Of the sales, 75% is on credit and 25% for cash. 60% of the credit sales are collected after one month, 30% after two months and 10% after three months.

(iv) Purchases amount to 80% of sales and are made on credit and paid for in the month preceding the sales.

(v) The firm has 12% debentures of Rs.1,00,000. Interest on these has to be paid quarterly in January, April and so on.

(vi) The firm is to make an advance payment of tax of Rs. 5,000 in April.

(vii) The firm had a cash balance of Rs. 40,000 at 31st Dec. 2020, which is the minimum desired level of cash balance. Any cash surplus/deficit above/below this level is made up by temporary investments/liquidation

of temporary investments or temporary borrowings at the end of each month (interest on these to be ignored).

Ans. **Monthly Cash Budget for first six months of 2021**

(Amount in Rs.)

Particulars	Jan.	Feb.	Mar.	April	May	June
Opening balance	40,000	40,000	40,000	40,000	40,000	40,000
Receipts:						
Cash sales	15,000	20,000	25,000	30,000	20,000	15,000
Collection from debtors	1,72,500	97,500	67,500	67,500	82,500	70,500
Total cash available (A)	2,27,500	1,57,500	1,32,500	1,37,500	1,42,500	1,25,500
Payments:						
Purchases	64,000	80,000	96,000	64,000	48,000	96,000
Operating Expenses	22,000	25,000	30,000	30,000	25,000	24,000
Interest on debentures	3,000	-	-	3,000	-	-
Tax payment	-	-	-	5,000	-	-
Total payments (B)	89,000	1,05,000	1,26,000	1,02,000	73,000	1,20,000
Minimum cash balance desired	40,000	40,000	40,000	40,000	40,000	40,000
Total cash needed (C)	1,29,000	1,45,000	1,66,000	1,42,000	1,13,000	1,60,000
Surplus/(deficit) (A - C)	98,500	12,500	(33,500)	(4,500)	29,500	(34,500)
Investment/financing						
Temporary Investments	(98,500)	(12,500)	-	-	(29,500)	-
Liquidation of temporary investments or temporary borrowings			33,500	4,500	-	34,500
Total effect of investment/financing(D)	(98,500)	(12,500)	33,500	4,500	(29,500)	34,500
Closing cash balance (A + D - B)	40,000	40,000	40,000	40,000	40,000	40,000

Workings:

1. Collection from debtors: **(Amount in Rs.)**

	Year 2020			Year 2021					
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June
Total sales	2,00,000	2,20,00	2,40,00	60,00	80,000	1,00,00	1,20,000	80,000	60,000
Credit sales (75% of total sales)	1,50,000	1,65,00	1,80,00	45,00	60,000	75,00	90,000	60,000	45,000
Collections:									
One month		90,000	99,00	1,08,00	27,000	36,00	45,000	54,000	36,000
Two months			45,00	49,50	54,000	13,500	18,000	22,500	27,000
Three months				15,000	16,500	18,000	4,500	6,000	7,500
Total collections				**1,72,5**	**97,500**	**67,50**	**67,500**	**82,500**	**70,500**

2. Payment to Creditors: **(Amount in Rs.)**

	Year 2021						
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**
Total sales	60,000	80,000	1,00,000	1,20,000	80,000	60,000	1,20,000
Purchases (80% of total sales)	48,000	64,000	80,000	96,000	64,000	48,000	96,000
Payment: **One month prior**	**64,000**	**80,000**	**96,000**	**64,000**	**48,000**	**96,000**	

DEBTORS MANAGEMENT

Q.100 Accept Factoring or Not | MTP May 19(2)

Navya Ltd has annual credit sales of Rs. 45 lakhs. Credit terms are 30 days, but its management of receivables has been poor and the average collection period is 50 days, Bad debt is 0.4 per cent of sales. A factor has offered to take over the task of debt administration and credit checking, at an annual fee of 1 per cent of credit sales. Navya Ltd. estimates that it would save Rs. 35,000 per year in administration costs as a result. Due to the efficiency of the factor, the average collection period would reduce to 30 days and bad debts would be zero. The factor would advance 80 per cent of invoiced debts at an annual interest rate of 11 per cent. Navya Ltd. is currently financing receivables from an overdraft costing 10 per cent per year.

If occurrence of credit sales is throughout the year, COMPUTE whether the factor's services should be accepted or rejected. Assume 365 days in a year.

Ans

	Rs.
Present level of receivables is 45 lakh× 50/365	6,16,438
In case of factor, receivables would reduce to 45 lakhs× 30/365	3,69,863
The costs of the existing policyare as follows:	
Cost of financing existing receivables: 6,16,438×10%	61,644
Cost of bad debts: 45 lakhs × 0.4%	18,000
Cost of current policy	79,644
The cost under the factor are as follows:	
Cost of financing new receivable through factor:	
(Rs. 3,69,863 × 0.8 × 0.11) + (Rs. 3,69,863 × 0.2 × 0.10) = (32,548 + 7,397)	39,945
Factor's annual fee: 45 Lakhs × 0.01	45,000
Administration costs saved:	(35,000)
Net cost under factor:	49,945

From the above analysis it is clear that the factor's services are cheaper than Existing policy by Rs. 29,699 (Rs. 79,644 - Rs.49,945) per year. Hence, the services of the factor should be accepted.

Q.101 Bank Loan, Factoring, Credit | RTP Dec 21

The Alliance Ltd., a Petrochemical sector company had just invested huge amount in its new expansion project. Due to huge capital investment, the company is in need of an additional ₹ 1,50,000 in working capital immediately. The Finance Manger has determined the following three feasible sources of working capital funds:

(i) Bank loan: The Company's bank will lend ₹ 2,00,000 at 15%. A 10% compensating balance will be required, which otherwise would not be maintained by the company.

(ii) Trade credit: The company has been offered credit terms from its major supplier of 3/30, net 90 for purchasing raw materials worth ₹ 1,00,000 per month.

(iii) Factoring: A factoring firm will buy the company's receivables of ₹ 2,00,000 per month, which have a collection period of 60 days. The factor will advance up to 75 % of the face value of the receivables at 12% on an annual basis. The factor will also charge commission of 2% on all receivables purchased. It has been estimated that the factor's services will save the company a credit department expense and bad debt expense of ₹ 1,250 and ₹ 1,750 per month respectively.

On the basis of annual percentage cost, ADVISE which alternative should the company select? Assume 360 days year.

Ans. **(i) Bank loan:** Since the compensating balance would not otherwise be maintained, the real annual cost of taking bank loan would be:

$= \frac{15}{90} \times 100 = 16.67\%$ 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:

$= \frac{3}{97} \times \frac{360}{60} \times 100 = 18.56\%$ p.a.

(iii) Factoring:

Commission charges per year = 2% x(₹ 2,00,000 x12) = ₹ 48,000
Total Savings per year = (₹ 1,250 + ₹ 1,750) x 12 = ₹ 36,000
Net factoring cost per year = ₹ 48,000 - ₹ 36,000 = ₹ 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% 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.102 Bank Loan, Factoring, Credit | MTP May 23(2)

Sundaram limited a plastic manufacturing company had invested enormous amount of money in a new expansion project. Due to such a great amount of capital investment, Company needs an additional ₹ 2,00,00,000 in working capital immediately. The CFO has determined the following three feasible sources of working capital funds:
Bank Loan: The company's bank will lend ₹2,30,00,000 at 12% per annum. However, the bank will require 15% of the loan granted to be kept in a current account as the minimum average bal ance which otherwise would have been just ₹ 50,000.
Trade Credit: A major supplier with 2/20 net 80 credit terms has approached for supply of raw material worth ₹1,90,00,000 p.m.
Factoring: factoring firm will buy the companies receivables of ₹ 2,50,00,000 per month, which have a collection period of 60 days. factor will advance up to 75% of the face value of the receivables at 14 percent per annum. Factor Commission will amount to 2% on all receivables purchased. Factoring will save credit department expense and bad debts of ₹ 1,75,000 p.m. and ₹ 2,25,000 p.m.
Based on annual percentage cost, ADVISE which alternative should the company select. Assume 360 days a year

Ans **(i) Bank Loan:** As the minimum average balance more than ₹ 50,000 need not be kept if loan is not undertaken, the incremental money made available by bank through bank loan is₹ 2,30,00,000- (15% x 2,30,00,000- ₹ 50,000) = ₹ 1,96,00,000. Real annual cost of bank loan = (₹ 2.3 crores x 12%) / ₹ 1.96 crores = 14.08%.

(ii) Trade Credit: The real annual cost of trade credit will be 2/98 x 360/60 x 100 = 12.24% .

(iii) Factoring:

Commission charges per year = 2% x 2.5 crores x 12 = ₹ 60,00,000
Savings per year = (1,75,000+2,25,000) x 12 = ₹ 48,00,000
Net Factoring cost per year = ₹ 60,00,000 – ₹ 48,00,000 = ₹12,00,000
Annual cost of borrowing ₹ 2.5 crores x 75% i.e. ₹ 1,87,50,000 will be
(1,87,50,000 x 14% + ₹ 12,00,000) / 1,87,50,000 = 20.4%
Conclusion: The company should select trade credit as a preferred mode of financing the working capital requirement as it results in lowest cost on an annual basis.

Q.103 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	16,80,000	20,16,000
	(c) Contribution	13,20,000	15,84,000
	(d) *Less:* Bad Debts	60,000	1,08,000
	(e) Contribution after Bad debt [(c)-(d)]	12,60,000	14,76,000
B.	Opportunity Cost of investment in Receivables	15,000	54,000
C.	Net Benefits [A-B]	12,45,000	14,22,000
D.	Increase in Benefit		1,77,000

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

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

Q.104 Credit Policy | RTP May 23

River limited currently uses the credit terms of 1.5/15 net 45 days and average collection period was 30 days. The company presently having sales of ₹ 50,00,000 and 30% customers availing the discount. The chances of default are currently 5%. Variable cost constitutes 65% and total cost constitute 85% of sales. The company is planning liberalization of credit terms to 2/20 net 50 days. It is expected that sales are likely to increase

by ₹ 5,00, 000, the default chances are 10% and average collection period will decline to 25 days. There won't be any change in the fixed cost and 50% customers are expected to avail the discount. Tax rate is 35%. EVALUATE this policy in comparison with the current policy and recommend whether the new policy should be implemented. Assume cost of capital to be 10% (post tax) and 360 days in a year.

Ans

Evaluation of Credit Policies

	Particulars	1.5/15 net 45	2/20 net 50
A	Sales	₹50,00,000	₹55,00,000
B	Variable Cost (65%)	₹32,50,000	₹35,75,000
C	Fixed Cost (20% in 1st Case)	₹10,00,000	₹10,00,000
D	Bad Debts (5% and 10%)	₹2,50,000	₹5,50,000
E	Discounts		
	(₹5000000x30%x1.5%)	₹22,500	-
	(₹5500000x50%x2%)	-	₹55,000
F	PBT (A-B-C-D-E)	₹4,77,500	₹3,20,000
G	Tax @ 35%	₹1,67,125	₹1,12,000
H	PAT	₹3,10,375	₹2,08,000
I	Opportunity Cost (₹3250000 + ₹1000000) x 30/360x10% (₹3575000 + ₹1000000) x 25/360 x 10%	₹35,417 -	- ₹31,771
J	Net Benefit	₹2,74,958	₹1,76,229

The new policy leads to lower net benefit for the company. Hence it should not be implemented.

Q.105 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 [(a) – (b) – (c)]	2,16,000	2,30,600	2,35,200	2,43,500	2,50,600
II.	Opportunity Cost of Investments in Receivables	16,875	23,833	30,625	38,750	52,069
III.	Net Benefits (I – II)	1,99,125	2,06,767	2,04,575	2,04,750	1,98,531

Recommendation: The Proposed Policy W (i.e. increase in collection period by 15 days or total 60 days) should be adopted since the net benefits under this policy are higher as compared to other policies.

Working Notes:

(i) Calculation of Fixed Cost = [Average Cost per unit – Variable Cost per unit] × No. of Units sold

= [₹ 2.25 - ₹ 2.00] × (₹ 9,00,000/3)

= ₹ 0.25 × 3,00,000 = ₹ 75,000

(ii) Calculation of Opportunity Cost of Average Investments

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection period}}{360} \times \frac{\text{Rate of Return}}{100}$$

$$\text{Present Policy} = 6,75,000 \times \frac{45}{360} \times \frac{20}{100} = 16,875$$

$$\text{Policy W} = 7,15,000 \times \frac{60}{360} \times \frac{20}{100} = 23,833$$

$$\text{Policy X} = 7,35,000 \times \frac{75}{360} \times \frac{20}{100} = 30,625$$

$$\text{Policy Y} = 7,75,000 \times \frac{90}{360} \times \frac{20}{100} = 38,750$$

$$\text{Policy Z} = 8,15,000 \times \frac{115}{360} \times \frac{20}{100} = 52,069$$

B. Another method of solving the problem is Incremental Approach. Here we assume that sales are all credit sales. **(Amount in ₹)**

Particulars		Present 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**

$$\text{Expected Rate of Return} = \frac{\text{Incremental Expected Profit}}{\text{Incremental Investmentin Receivables}} \times 100$$

$$\text{For Policy W} = \frac{14,500}{34,792} \times 100 = 41.96\%$$

$$\text{For Policy X} = \frac{19,200}{68,750} \times 100 = 27.93\%$$

$$\text{For Policy Y} = \frac{27,500}{109,375} \times 100 = 25.14\%$$

$$\text{For Policy Z} = \frac{34,600}{1,75,972} \times 100 = 19.66\%$$

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.106 Credit Policy | RTP May 20

TM Limited, a manufacturer of colour TV sets is considering the liberalization of existing credit terms to three of their large customers A, B and C. The credit period and likely quantity of TV sets that will be sold to the customers in addition to other sales are as follows:

Quantity sold (No. of TV Sets)

Credit Period (Days)	A	B	C
0	10,000	10,000	-
30	10,000	15,000	-
60	10,000	20,000	10,000
90	10,000	25,000	15,000

The selling price per TV set is ₹15,000. The expected contribution is 50% of the selling price. The cost of carrying receivable averages 20% per annum.

You are required to COMPUTE the credit period to be allowed to each customer. (Assume 360 days in a year for calculation purposes).

Ans

In case of customer A, there is no increase in sales even if the credit is given. Hence comparative statement for B & C is given below:

Particulars	Customer B				Customer C			
1. Credit period (days)	0	30	60	90	0	30	60	90
2. Sales Units	10,000	15,000	20,000	25,000	-	-	10,000	15,000
	₹ in lakh				₹in lakh			
3. Sales Value	1,500	2,250	3,000	3,750	-	-	1,500	2,250
4. Contribution at 50% (A)	750	1,125	1,500	1,875	-	-	750	1,125
5. Receivables:- Credit Period × Sale 360	-	187.5	500	937.5	-	-	250	562.5
6. Debtors at cost	-	93.75	250	468.75	-	-	125	281.25
7. Cost of carrying debtors at 20% (B)	-	18.75	50	93.75	-	-	25	56.25
8. Excess of contributions over cost of carrying debtors (A – B)	750	1,106.25	1,406.25	1,781.25	-	-	725	1,068.75

The excess of contribution over cost of carrying Debtors is highest in case of credit period of 90 days in respect of both the customers B and C. Hence, credit period of 90 days should be allowed to B and C.

Q.107 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 companyRECOMMEND 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) Ba d 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 policyare 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.108 Credit Policy | MTP Nov 22(2)

Avesh Pvt. Ltd. is considering relaxing its present credit policy for accounts receivable and is in the process of evaluating two proposed policies. Currently, the company has annual credit sales of ₹ 55 lakhs and accounts receivable turnover ratio of 5 times a year. The current level of loss due to bad debts is ₹ 2,00,000. The company is required to give a return of 15% on the investment in new accounts receivable. The company's variable costs are 75% of the selling price. Given the following information, IDENTIFY which is the better policy?

(Amount in ₹)

Particulars	Present Policy	Proposed Policy 1	Proposed Policy 2
Annual credit sales	55,00,000	65,00,000	70,00,000
Accounts receivable turnover ratio	5 times	4 times	3 times
Bad debt losses	2,00,000	3,50,000	5,00,000

Ans **Statement showing the Evaluation of Accounts Receivable Policies**

(Amount in ₹)

A	Particulars Expected Profit:	Present Policy	Proposed Policy 1	Proposed Policy 2
	(a) Credit Sales	55,00,000	65,00,000	70,00,000
	(b) Total Cost other than Bad Debts:			

	(i) Variable Costs (75%)	41,25,000	48,75,000	52,50,000
	(c) Bad Debts	2,00,000	3,50,000	5,00,000
	(d) Expected Profit [(a) – (b) – (c)]	11,75,000	12,75,000	12,50,000
B	Opportunity Cost of Investments in Accounts Receivable (Working Note)	1,23,750	1,82,813	2,62,500
C	Net Benefits (A – B)	10,51,250	10,92,187	9,87,500

Recommendation: The Proposed Policy 1 should be adopted since the net benefits under this policy are higher as compared to other policies.

Working Note:

Calculation of Opportunity Cost of Average Investments

Opportunity Cost = Total Cost × Collection period/12 × Rate of Return/100

Present Policy = ₹ 41,25,000 × 2.4/12 × 15% = ₹1,23,750

Proposed Policy 1 = ₹ 48,75,000× 3/12 × 15% = ₹ 1,82,813

Proposed Policy 2 = ₹ 52,50,000× 4/12 × 15% = ₹ 2,62,500

Q.109 Credit Policy | MTP Nov 22(1)

GT Ltd. is taking into account the revision of its credit policy with a view to increasing its sales and profit. Currently, all its sales are on one month credit. Other information is as follows:

Contribution 2/5th of Sales Revenue

Additional funds raising cost 20% per annum

The marketing manager of the company has given the following options along with estimates for considerations:

Particulars	Current Position	Option I	Option II	Option III
Sales Revenue (₹)	40,00,000	42,00,000	44,00,000	50,00,000
Credit period (in months)	1	1½	2	3
Bad debts (% of sales)	2	2½	3	5
Cost of Credit administration (₹)	24,000	26,000	30,000	60,000

You are required to ADVISE the company for the best option.

Ans

Statement Showing Evaluation of Credit Policies

(₹ in lakhs)

Particulars	Current position (1 month)	Option I (1.5 months)	Option II (2 months)	Option III (3 months)
Sales Revenue	40,00,000	42,00,000	44,00,000	50,00,000
Contribution @ 40%	16,00,000	16,80,000	17,60,000	20,00,000
Increase in contribution over Current level price (A)	-	80,000	1,60,000	4,00,000
Debtors = $\frac{\text{Average Collection period} \times \text{Credit Sale}}{12}$	-	$\frac{1 \times 40,00,000}{12}$ = 3,33,333.33	$\frac{1.5 \times 42,00,000}{12}$ = 5,25,000	$\frac{3 \times 50,00,000}{12}$ = 12,50,000
Increase in debtors over current level		1,91,666.67	4,00,000.00	9,16,666.67
Cost of funds for additional amount of debtos @ 20% (B)	-	38,333.33	80,000.00	1,83,333.33
Credit administrative cost	24,000	26,000	30,000	60,000

Increase in credit administration cost over present level (c)	-	2,000	6,000	36,000
Bad debts	80,000	1,05,000	1,32,000	2,50,000
Increase in bad debts over current levels (D)	-	25,000	52,000	1,70,000
Net gain/loss A - (B + C + D)	-	14,666.67	22,000.00	10,666.67

Advise: It is suggested that the company GT Ltd. should implement Option II with a net gain of₹ 22,000 which has a credit period of 2 months

Q.110 Grant of Credit of Not | RTP Nov 23

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 ₹ 40 lakhs in 2022, 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 ₹ 400 on which a profit of ₹ 20 per unit is expected to be made. It is anticipated that taking up of this contract would mean an extra recurring expenditure of ₹ 20,000 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	40,00,000
(b) Total Cost	
(i) Variable Costs (₹ 380 x 10000 units)	38,00,000
(ii) Recurring Costs	20,000
	38,20,000
(c) Bad Debts	80,000
(d) Expected Profit [(a) - (b) - (c)]	1,00,000
B. Opportunity Cost of Investments in Receivables	1,31,790
C. Net Benefits (A - B)	(31,790)

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	7,64,000	11,46,000	11,46,000	6,87,600	37,43,600
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)	11,460	34,380	51,570	34,380	1,31,790

Q.111 Factoring | MTP May 24

NV Industries Ltd. is a manufacturing industry which manages its accounts receivables internally by its sales and credit department. It supplies small articles to different industries. The total sales ledger of the company stands at ₹ 200 lakhs of which 80% is credit sales. The company has a credit policy of 2/40, net 120. Past experience of the company has been that on average out of the total, 50% of customers avail of discount and the balance of the receivables are collected on average in 120 days. The finance controller estimated, bad debt losses are around 1% of credit sales.

With escalating cost associated with the in-house management of the debtors coupled with the need to unburden the management with the task so as to focus on sales promotion, the CFO is examining the possibility of outsourcing its factoring service for managing its receivables. Currently, the firm spends about ₹ 2,40,000 per annum to administer its credit sales. These are avoidable as a factoring firm is prepared to buy the firm's receivables. The main elements of the proposal are : (i) It will charge 2% commission (ii) It will pay advance against receivables to the firm at an interest rate of 18% after withholding 10% as reserve.

Also, company has option to take long term loan at 15% interest or may take bank finance for working capital at 14% interest. Consider year as 360 days.

You were also present at the meeting; being a financial consultant, the CFO has asked you to be ready with the following questions:

I. What is average level of receivables of the company?

a. ₹ 53,33,333 b. ₹ 35,55,556 c. ₹ 44,44,444 d. ₹ 71,11,111

Ans. (b)

II. How much advance factor will pay against receivables?

a. ₹ 31,28,889 b. ₹ 39,11,111 c. ₹ 30,03,733 d. ₹ 46,93,333

Ans. (c)

III. What is the annual cost of factoring to the company?

a. ₹ 8,83,200 b. ₹ 4,26,667 c. ₹ 5,51,823 d. ₹ 4,00,000

Ans. (a)

IV. What is the net cost to the company on taking factoring service?

a. ₹ 4,00,000 b. ₹ 4,26,667 c. ₹ 3,50,000 d. ₹ 4,83,200

Ans. (d)

V. What is the effective cost of factoring on advance received?

a. 16.09% b. 13.31% c. 12.78% d. 15.89%

Ans. (a)

WORKING CAPITAL

Q.112 Balance Sheet & W.Cap required | RTP Nov 23

Consider the following figures and ratios:

(i)	Sales for the year (all credit)	₹ 1,05,00,000
(ii)	Gross Profit ratio	35 percent
(iii)	Fixed assets turnover (based on cost of goods sold)	1.5
(iv)	Stock turnover (based on cost of goods sold)	6
(v)	Liquid ratio	1.5:1
(vi)	Current ratio	2.5:1
(vii)	Receivables (Debtors) collection period	1 month
(viii)	Reserves and surplus to Share capital	1:1.5
(ix)	Capital gearing ratio	0.7875
(x)	Fixed assets to net worth	1.3 : 1

You are required to PREPARE:

(a) Balance Sheet as on 31/3/2022 based on above details.

(b) The statement showing working capital requirement if the company wants to make a provision for contingencies @ 14 percent of net working capital.

Ans Working Notes:

(i) Cost of Goods Sold = Sales – Gross Profit (35% of Sales)
= ₹ 1,05,00,000 – ₹ 36,75,000
= ₹ 68,25,000

(ii) Closing Stock = Cost of Goods Sold / Stock Turnover
$= \frac{68,25,000}{6}$ = ₹ 11,37,500

(iii) Fixed Assets = Cost of Goods Sold / Fixed Assets Turnover
$= \frac{68,25,000}{1.5}$
= ₹ 45,50,000

(iv) Current Assets:
Current Ratio = 2.5 and Liquid Ratio = 1.5
Inventories (Stock) = 2.5 – 1.5 = 1
Current Assets = Amount of Inventories (Stock) x $\frac{2.5}{1}$
= ₹11,37,500 x $\frac{2.5}{1}$ = ₹ 28,43,750

(v) Liquid Assets (Receivables and Cash)
= Current Assets – Inventories (Stock)
= ₹ 28,43,750 – ₹ 11,37,500
= ₹ 17,06,250

(vi) Receivables (Debtors) = Sales x $\frac{\text{Debtors Collection period}}{12}$
= ₹1,05,00,000x $\frac{1}{12}$
= ₹ 8,75,000

(vii) Cash = Liquid Assets – Receivables (Debtors)
= ₹ 17,06,250 – ₹ 8,75,000 = ₹ 8,31,250

(viii) Net worth $= \frac{\text{Fixed Assets}}{1.3}$

$= \frac{45,50,000}{1.3} =$ ₹ 35,00,000

(ix) Reserves and Surplus

Reserves and Share Capital = Net worth

Net worth = 1 + 1.5 = 2.5

Reserves and Surplus = ₹35,00,000 x $\frac{1}{2.5}$

= ₹ 14,00,000

(x) Share Capital = Net worth – Reserves and Surplus

= ₹ 35,00,000 – ₹ 14,00,000

= ₹ 21,00,000

(xi) Current Liabilities = Current Assets/ Current Ratio

$= \frac{28,43,750}{2.5} =$ ₹ 11,37,500

(xii) Long-term Debts

Capital Gearing Ratio = Long-term Debts / Equity Shareholders' Fund

Long-term Debts = ₹ 35,00,000 × 0.7875 = ₹ 27,56,250

(a) Balance Sheet

Particulars	Figures as at 31-03-2022 (₹)	Figures as at 31-03-2021 (₹)
I. EQUITY AND LIABILITIES		
Shareholders' funds		
(a) Share capital	21,00,000	-
(b) Reserves and surplus	14,00,000	-
Non-current liabilities		
(a) Long-term borrowings	27,56,250	-
Current liabilities	11,37,500	-
TOTAL	73,93,750	-
II. ASSETS		
Non-current assets		
Fixed assets	45,50,000	-
Current assets		
Inventories	11,37,500	-
Trade receivables	8,75,000	-
Cash and cash equivalents	8,31,250	-
TOTAL	73,93,750	-

(b) Statement Showing Working Capital Requirement

Particulars	(₹)	(₹)
A. Current Assets		
(i) Inventories (Stocks)		11,37,500
(ii) Receivables (Debtors)		8,75,000
(iii) Cash in hand & at bank		8,31,250

Total Current Assets		28,43,750
B. Current Liabilities: Total Current Liabilities		
Net Working Capital (A – B)		17,06,250
Add: Provision for contingencies (14% of Net Working Capital)		2,38,875
Working capital requirement		19,45,125

Q.113 Max Bank Finance | PY May 22

Balance sheet of X Ltd for the year ended 31st March,2022 is given below:

(₹ in lakhs)

Liabilities	Amount	Assets	Amount
Equity Shares ₹ 10 each	200	Fixed Assets	500
Retained earnings	200	Raw materials	150
11% Debentures	300	W.I.P	100
Public deposits (Short-Term)	100	Finished goods	50
Trade Creditors	80	Debtors	125
Bills Payable	100	Cash/Bank	55
	980		980

Calculate the amount of maximum permissible bank finance under three methods as per Tandon Committee lending norms.

Ans

The total core current assets are assumed to be ₹ 30 lakhs.
Current Assets = 150 + 100 + 50 + 125 + 55 = ₹ 480 Lakhs
Current Liabilities = 100 + 80 + 100 = ₹ 280 Lakhs
Maximum Permissible Banks Finance under Tandon Committee Norms:

Method I
Maximum Permissible Bank Finance = 75% of (Current Assets – Current Liabilities)
= 75% of (480 - 280)
= ₹ 150 Lakhs

Method II
Maximum Permissible Bank Finance = 75% of Current Assets – Current Liabilities
= 75 % of 480 – 280
= ₹ 80 Lakhs

Method III
Maximum Permissible Bank Finance = 75% of (Current Assets – Core Current Assets) – Current Liabilities
= 75 % of (480 - 30) – 280
= ₹ 57.5 Lakhs

Q.114 Max. Bank Finance | RTP May 23

Kalyan limited has provided you the following information for the year 2021-22:
By working at 60% of its capacity the company was able to generate sales of ₹ 72,00,000. Direct labour cost per unit amounted to ₹ 20 per unit. Direct material cost per unit was 40% of the selling price per unit. Selling price was 3 times the direct labour cost per unit. Profit margin was 25% on the total cost.For the year 2022-23, the company makes the following estimates:
Production and sales will increase to 90% of its capacity. Raw material per unit price will remain unchanged. Direct expense per unit will increase by 50%. Direct labour per unit will increase by 10%. Despite the fluctuations in the cost structure, the company wants to maintain the same profit margin on sales.
Raw materials will be in stock for one month whereas finished goods will remain in stock for two months. Production cycle is for 2 months. Credit period allowed by suppliers is 2 months. Sales are made to three zones:

Zone	Percentage of sale	Mode of Credit
A	50%	Credit period of 2 months
B	30%	Credit period of 3 months
C	20%	Cash Sales

There are no cash purchases and cash balance will be ₹ 1,11,000
The company plans to apply for a working capital financing from bank for the year 2022-23. ESTIMATE Net Working Capital of the Company receivables to be taken on sales and also COMPUTE the maximum permissible bank finance for the company using 3 criteria of Tandon Committee Norms. (Assume stock of finished goods to be a core current asset)

Ans

Cost Structure

		2021-22			2022-23	
Particulars	**Calculations**	**P.U.**	**Amount (p.u. X units)**	**Calculations**	**P.U.**	**Amount (p.u. X units)**
Direct	40% of SP	₹24	₹28,80,000	Same as PY	₹24	₹43,20,000
Material						
Direct	Given	₹20	₹24,00,000	20*1.1	₹22	₹39,60,000
labour						
Direct	bal. fig.	₹4	₹4,80,000	4*1.5	₹6	₹10,80,000
Expenses						
Total Cost	SP - Profit	₹48	₹57,60,000		₹52	₹93,60,000
Profit	(SP/125x25)	₹12	₹14,40,000	52*25%	₹13	₹23,40,000
Sales	3 x Direct	₹60	₹72,00,000		₹65	₹1,17,00,000
	Labour p.u.					
*units=		₹72,00,000/ ₹60			1,20,000/60 x90	
		=1,20,000			=1,80,000	

Operating Cycle

Raw material holding period	1 months
Finished Goods holding period	2 months
WIP conversion period	2 months
Creditor Payment Period	2 months
Receiveable collection Period	2/3 months

Estimation of Working Capital

Particulars	Calculation	Amount
Current Assets		
Stock of Raw Material	43,20,000 x 1/12	₹3,60,000
RM cost	₹43,20,000	

Labour cost	₹19,80,000	
Direct Exp cost	₹5,40,000	
Total WIP Cost	₹68,40,000	
Stock of WIP	68,40,000 x 2/12	₹11,40,000
Stock of Finished Goods	93,60,000 x 2/12	₹15,60,000
Receivables (on sales)		
A	1,17,00,000 x 50% x 2/12	₹9,75,000
B	1,17,00,000 x 30% x 3/12	₹8,77,500
C	NIL	-
Cash Balance	Given	₹1,11,000
Total Current Assets		₹ **50,23,500**
Current Liabilities		
Payables	* ₹44,40,000 x 2/12	₹7,40,000
Net Working Capital		₹ **42,83,500**

Opening RM stock = 28,80,000 x 1/12= ₹2,40,000

* RM purchased = RM consumed – Opening Stock + Closing Stock

= ₹43,20,000 – ₹2,40,000 + ₹3,60,000 = ₹44,40,000

Computation of Maximum Permissible Bank Finance			
Method	**Formula**	**Calculation**	₹
I	75% x (Current Assets-Current Liabilities)	75% x (₹50,23,500 - ₹7,40,000)	₹32,12,625
I	75% x Current Assets-Current Liabilities	75% x ₹50,23,500 - ₹7,40,000	₹30,27,625
II	75% x (Current Assets-Core CA)- Current Liabilities	75% x (₹50,23,500-₹7,40,000	₹18,57,625

Q.115 Maximum Bank Finance | MTP Nov 18(2)

A newly formed company has applied to the commercial bank for the first time for financing its working capital requirements. The following information is available about the projections for the current year:

Estimated level of activity: 1,04,000 completed units of production plus 4,000 units of work-in progress. Based on the above activity, estimated cost per unit is:

Raw material	Rs. 80 per unit
Direct wages	Rs. 30 per unit
Overheads (exclusive of depreciation)	Rs. 60 per unit
Total cost	Rs. 170 per unit
Selling price	Rs. 200 per unit

Raw materials in stock: Average 4 weeks consumption, work-in-progress (assume 50% completion stage in respect of conversion cost) (materials issued at the start of the processing).

Finished goods in stock	8,000 units
Credit allowed by suppliers	Average 4 weeks
Credit allowed to debtors/receivables	Average 8 weeks
Lag in payment of wages	Average $1\frac{1}{2}$ weeks

Cash at banks (for smooth operation) is expected to be Rs.25,000

Assume that production is carried on evenly throughout the year (52 weeks) and wages and overheads accrue similarly. All sales are on credit basis only. CALCULATE

(i) Net Working Capital required;

(ii) Maximum Permissible Bank finance under first and second methods of financing as per Tandon Committee Norms.

Ans **(i) Estimate of the Requirement of Working Capital**

	(Rs.)	(Rs.)
A. Current Assets:		
Raw material stock (Refer to Working note 3)	6,64,615	
Work in progress stock (Refer to Working note 2)	5,00,000	
Finished goods stock (Refer to Working note 4) Debtors/ Receivables (Refer to Working note 5) Cash and Bank balance	13,60,000 29,53,846 25,000	55,03,461
B. Current Liabilities:		
Creditors for raw materials (Refer to Working note 6) Creditors for wages (Refer to Working note 7)	7,15,740 91,731	(8,07,471)
Net Working Capital (A-B)		46,95,990

(ii) The maximum permissible bank finance as per Tandon Committee Norms

First Method:

75% of the net working capital financed by bank i.e. 75% of Rs.46,95,990 (Refer to (i) above)

= Rs. 35,21,993

Second Method:

(75% of Current Assets) - Current liabilities

= 75% of Rs. 55,03,461 - Rs. 8,07,471 (Refer to (i) above)

= Rs. 41,27,596 – Rs. 8,07,471

= Rs. 33,20,125

Working Notes:

1. Annual cost of production

	Rs.
Raw material requirements (1,04,000 units x Rs. 80)	83,20,000
Direct wages (1,04,000 units x Rs. 30)	31,20,000
Overheads (exclusive of depreciation) (1,04,000 x Rs. 60)	62,40,000
	1,76,80,000

2. Work in progress stock

	Rs.
Raw material requirements (4,000 units x Rs. 80)	3,20,000
Direct wages (50% x 4,000 units x Rs. 30)	60,000
Overheads (50% x4,000 units x Rs.60)	1,20,000
	5,00,000

3. Raw material stock

It is given that raw material in stock is average 4 weeks consumption. Since, the company is newly formed, the raw material requirement for production and work in progress will be issued and consumed during the year.Hence, the raw material consumption for the year (52 weeks) is as follows:

		Rs.
For Finished goods		83,20,000
For Work in progress		3,20,000
		86,40,000
Raw material stock	$\frac{86,40,000}{52 \text{ weeks}}$ × 4 weeks i.e. Rs. 6,64,615	

4. Finished goods stock

8,000 units @ Rs. 170 per unit = Rs. 13,60,000

5. Debtors for sale

Credit allowed to debtors	Average 8 weeks
Credit sales for year (52 weeks) i.e. (1,04,000 units-8,000 units)	96,000 units
Selling price per unit	Rs.200
Credit sales for the year (96,000 units XRs. 200)	Rs. 1,92,00,000

Debtors $\frac{1,92,00,000}{52 \text{weeks}}$ × 8 weeks i.e. Rs. 29,53,846

(Debtor can also be calculated based on Cost of goods sold)

6. Creditors for raw material:

Credit allowed by suppliers	Average 4 weeks
Purchases during the year (52 weeks) i.e. (Rs. 83,20,000 + Rs. 3,20,000 + Rs. 6,64,615) (Refer to Working notes 1,2 and 3 above)	Rs. 93,04,615
Creditors	$\frac{93,04,615}{52 \text{ weeks}}$ × 4 weeks i.e. Rs. 7,15,740

7. Creditors for wages

Lag in payment of wages	Average $1\frac{1}{2}$ weeks
Direct wages for the year (52 weeks) i.e. (Rs. 31,20,000 + Rs. 60,000) (Refer to Working notes 1 and 2 above)	Rs. 31,80,000
Creditors	Rs. $\frac{31,80,000}{52 \text{weeks}}$ X$1\frac{1}{2}$ weeks i.e. Rs. 91,731

Q.116 Net Working Capital | MTP May 18

A newly formed company has applied to the commercial bank for the first time for financing its working capital requirements. The following information is available about the projections for the current year:

Estimated level of activity: 1,04,000 completed units of production plus 4,000 units of work -in-progress. Based on the above activity, estimated cost per unit is:

Raw material	₹80 per unit
Direct wages	₹30 per unit
Overheads (exclusive of depreciation)	₹60 per unit
Total cost	₹170 per unit
Selling price	₹200 per unit

Raw materials in stock: Average 4 weeks consumption, work-in-progress (assume 50% completion stage in respect of conversion cost) (materials issued at the start of the processing).

Finished goods in stock	8,000 units
Credit allowed by suppliers	Average 4 weeks
Credit allowed to debtors/receivables	Average 8 weeks
Lag in payment of wages	Average$1\frac{1}{2}$ weeks

Cash at banks (for smooth operation) is expected to be ₹25,000Assume that production is carried on evenly throughout the year (52 weeks) and wages and overheads accrue similarly. All sales are on credit basis only. CALCULATE Net Working Capital.

Ans

Estimate of the Requirement of Working Capital

A.	**Current Assets:**		
		(₹)	(₹)
	Raw material stock (Refer to Working note 3)	6,64,615	
	Work in progress stock (Refer to Working note 2)	5,00,000	
	Finished goods stock (Refer to Working note 4)	13,60,000	
	Receivables (Refer to Working note 5)	25,10,769	
	Cash and Bank balance	25,000	50,60,384
B.	**Current Liabilities:**		
	Payables for raw materials (Refer to Working note 6)	7,15,740	
	Payables for wages (Refer to Working note 7)	91,731	(8,07,471)
	Net Working Capital (A - B)		42,52,913

Working Notes:

1. Annual cost of production

	₹
Raw material requirements (1,04,000 units x ₹ 80)	83,20,000
Direct wages (1,04,000 units x ₹ 30)	31,20,000
Overheads (exclusive of depreciation)(1,04,000 x ₹ 60)	62,40,000
	1,76,80,000

2. Work in progress stock

	₹
Raw material requirements (4,000 units x ₹ 80)	3,20,000
Direct wages (50% x 4,000 units x ₹ 30)	60,000
Overheads (50% x 4,000 units x ₹ 60)	1,20,000
	5,00,000

3. Raw material stock

It is given that raw material in stock is average 4 weeks' consumption. Since, the company is newly formed, the raw material requirement for production and work in progress will be issued and consumed during the year.

Hence, the raw material consumption for the year (52 weeks) is as follows:

	₹
For Finished goods	83,20,000
For Work in progress	3,20,000
	86,40,000

Raw material stock $= \frac{86,40,000}{86,40,000} \times 4$ weeks i.e. ₹ 6,64,615

4. Finished goods stock

8,000 units @ ₹ 170 per unit = ₹13,60,000

5. Receivables for sale

Credit allowed to debtors	Average 8 weeks
Credit sales for year (52 weeks) i.e. (1,04,000 units - 8,000 units)	96,000 units
Cost per unit	₹ 170
Credit sales for the year (96,000 units x ₹170)	₹ 1,63,20,000

Receivables = $\frac{1,63,20,000}{52 \text{ weeks}}$ × 8 weeks i.e. ₹ 25,10,769

6. Payables for raw material:

Credit allowed by suppliers	Average 4 weeks
Purchases during the year (52 weeks) i.e. (₹ 83,20,000 + ₹ 3,20,000 + ₹ 6,64,615) (Refer to Working notes 1,2 and 3 above)	₹ 93,04,615

Payables for raw materials = $\frac{93,04,615}{52 \text{ weeks}}$ × 4 weeks i.e. ₹ 7,15,740

7. Payables for wages

Lag in payment of wages	Average $1\frac{1}{2}$ 52 weeks
Direct wages for the year (52 weeks) i.e. (₹31,20,000 + ₹60,000) (Refer to Working notes 1 and 2 above)	₹31,80,000

Payables for wages = $\frac{31,80,000}{52 \text{ weeks}} \times 1\frac{1}{2}$ weeks i.e. ₹ 91,731

Q.117 Operating Cycle | PY Jan 21

The following information is provided by MNP Ltd. for the year ending 31st March, 2020:

Raw Material Storage period	45 days
Work-in-Progress conversion period	20 days
Finished Goods storage period	25 days
Debt Collection period	30 days
Creditors payment period	60 days
Annual Operating Cost (Including Depreciation of ₹ 2,50,000)	₹ 25,00,000

Assume 360 days in a year. You are required to calculate:

(i) Operating Cycle period

(ii) Number of Operating Cycle in a year.

(iii) Amount of working capital required for the company on a cost basis.

(iv) The company is a market leader in its product and it has no competitor in the market.Based on a market survey it is planning to discontinue sales on credit and deliver products based on pre-payments in order to reduce its working capital requirement substantially. You are required to compute the reduction in working capital requirement in such a scenario.

Ans

(i) Calculation of Operating Cycle Period:

Operating Cycle Period = R + W + F + D – C

= 45 + 20 + 25 + 30 – 60 = 60 days

(ii) Number of Operating Cycle in a Year

$= \frac{360}{\text{Operating cycle period}} = \frac{360}{60} = 6$

(iii) Amount of Working Capital Required

$= \frac{\text{Annual operating cost}}{\text{Number of operating cycle}} = \frac{25,00,000 - 2,50,000}{6}$

$= \frac{22,50,000}{6} =$ ₹ 3,75,000

(iv) Reduction in Working Capital

Operating Cycle Period = R + W + F – C

= 45 + 20 + 25 – 60 = 30 days

Amount of Working Capital Required = $\frac{22,50,000}{360} \times 30 =$ ₹ 1,87,500

Reduction in Working Capital = ₹ 3,75,000 – ₹ 1,87,500 = ₹ 1,87,500

Note: If we use Total Cost basis, then amount of Working Capital required will be ₹ 4,16,666.67 (approx.) and Reduction in Working Capital will be ₹ 2,08,333.33 (approx.)

Q.118 Operating Cycle | RTP May 18

Following information is forecasted by the Puja Limited for the year ending 31 st March,20X8:

	Balance as at 1st April, 20X7(₹)	Balance as at 31st March, 20X8(₹)
Raw Material	45,000	65,356
Work-in-progress	35,000	51,300
Finished goods	60,181	70,175
Debtors	1,12,123	1,35,000
Creditors	50,079	70,469
Annual purchases of raw material (all credit)		4,00,000
Annual cost of production		7,50,000
Annual cost of goods sold		9,15,000
Annual operating cost		9,50,000
Annual sales (all credit)		11,00,000

You may take one year as equal to 365 days.

Required:

CALCULATE

(i) Net operating cycle period.

(ii) Number of operating cycles in the year.

(iii) Amount of working capital requirement using operating cycles.

Ans

Working Notes:

1. Raw Material Storage Period (R)

$= \frac{\text{Average Stock of RawMaterial}}{\text{Annual Consumption of RawMaterial}} \times 365$

$= \frac{\frac{45,000 + 65,356}{2}}{3,79,644} \times 365$

= 53 days.

Annual Consumption of Raw Material = Opening Stock + Purchases- Closing Stock

= ₹ 45,000 + ₹ 4,00,000 – ₹ 65,356

= ₹ 3,79,644

2. Work-in-Progress (WIP) Conversion Period (W)

WIP Conversion Period = $\frac{\text{Average Stock of WIP}}{\text{Annual Cost of Production}} \times 365$

$= \frac{\frac{35,000 + 51,300}{2}}{7,50,000} \times 365$

=21 days

3. Finished Stock Storage Period (F)

$= \frac{\text{Average Stock of Finished Goods}}{\text{Cost of Goods Sold}} \times 365$

$= \frac{65,178}{9,15,000} \times 365 = 26$ days.

Average Stock $= \frac{60,181 + 70,175}{2}$

= ₹ 65,178.

4. Debtors Collection Period (D)

$= \frac{\text{Average Debtors}}{\text{Annual Credit Sales}} \times 365$

$= \frac{123,56.50}{11,00,000} \times 365$

= 41 days

Average debtors $= \frac{\frac{1,12,123 + 1}{35,000}}{2} = 1,23,561.50$

5. Creditors Payment Period (C)

$= \frac{\text{Average Creditors}}{\text{Annual Net Credit Purchases}} \times 365$

$= \frac{70,469}{4,00,000} \times 365$

= 55 days

(i) Operating Cycle Period

= R + W + F+ D - C

= 53 + 21 + 26 + 41 - 55

= 86 days

(ii) Number of Operating Cycles in the Year

$= \frac{365}{\text{Operating}} = \frac{365}{86} = 4.244$

(iii) Amount of Working Capital Required

$= \frac{\text{Annual Operating Cost}}{\text{Number of Operating Cycles}} = \frac{9,50,000}{4.244} = ₹2,23,845.42$

Q.119 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:

(a) Receivables are allowed 3 months' credit.

(b) Raw Material Supplier extends 3 months' credit.

(c) Lag in payment of Labour is 1 month.

(d) Manufacturing Overhead are paid one month in arrear.

(e) Administrative & Selling Overhead is paid 1 month advance.

(f) Inventory holding period of Raw Material & Finished Goods are of 3 months.

(g) Work-in-Progress is Nil.

(h) PK Ltd. sells goods at Cost plus 33⅓%.

(i) Cash Balance ₹ 3,00,000.

(j) 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.120 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)

$$\text{Raw Material Storage Period (R)} = \frac{\text{Average Stock of Raw Material}}{\text{Daily Average Consumption of Raw material}}$$

$$= \frac{(14,40,000 + 16,00,000) / 2}{86,40,000 / 365} = 64.21 \text{ Days}$$

Raw Material Consumed = Opening Stock + Purchases – Closing Stock

= ₹ 14,40,000+ ₹ 88,00,000– ₹ 16,00,000 = ₹ 86,40,000

(2) Conversion/Work-in-Process Period (W)

$$\text{Conversion/Processing Period} = \frac{\text{AverageStock of WIP}}{\text{Daily Average Pr oduction}}$$

$$= \frac{(4,80,000 + 8,00,000) / 2}{1,23,20,000 / 365} = 18.96 \text{ days}$$

Production Cost:	₹
Opening Stock of WIP	4,80,000
Add: Raw Material Consumed	86,40,000
Add: Wages	24,00,000
Add: Production Expenses	16,00,000
	1,31,20,000
Less: Closing Stock of WIP	8,00,000
Production Cost	1,23,20,000

(3) Finished Goods Storage Period (F)

$$\text{Finished Goods Storage Period} = \frac{\text{Average Stock of Finished Goods}}{\text{Daily Average Cost of Good Sold}}$$

$$= \frac{(20,80,000 + 24,00,000) / 2}{1,20,00,000 / 365} = 68.13 \text{ Days}$$

Cost of Goods Sold	₹
Opening Stock of Finished Goods	20,80,000
Add: Production Cost	1,23,20,000
	1,44,00,000
Less: Closing Stock of Finished Goods	(24,00,000)
	1,20,00,000

(4) Receivables Collection Period (D)

$$\text{Receivables Collection Period} = \frac{\text{Average Receivables}}{\text{Daily averagecredit sales}}$$

$$= \frac{(12,00,000 + 16,00,000) / 2}{1,60,00,000 / 365} = 31.94 \text{ Days}$$

(5) Payables Payment Period (C)

$$\text{Payables Payment Period} = \frac{\text{Average Payable}}{\text{Daily averagecredit sales}}$$

$$= \frac{(16,00,000 + 19,20,000) / 2}{88,00,000 / 365} = 73 \text{ Days}$$

(6) Duration of Operating Cycle (O)

$O = R + W + F + D - C$

$= 64.21 + 18.96 + 68.13 + 31.94 - 73$

$= 110.24$ days

Computation of Working Capital

(i) Number of Operating Cycles per Year

= 365/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	6,00,000
	1,40,00,000

(iii) Working Capital Required

$$\text{Working Capital Required} = \frac{\text{Total Operating Expenses}}{\text{Number of Operating Cycles per year}}$$

$$= \frac{1,40,00,000}{3.311} = ₹\ 42,28,329.81$$

Q.121 Working Capital Requirement | MTP Nov23(2)

Cost sheet of X&Y Ltd. provides the following particulars:

	Amount per unit (₹)
Raw materials cost	260.00
Direct labour cost	125.00
Overheads cost	200.00
Total cost	585.00
Profit	75.00
Selling Price	660.00

The Company keeps raw material in stock, on an average for four weeks; work -in-progress, on an average for one week; and finished goods in stock, on an average for two weeks.
The credit allowed by suppliers is three weeks and company allow four weeks credit to its debtors. The lag in payment of wages is one week and lag in payment of overhead expenses is two weeks.
The Company sells one-fifth of the output against cash and maintains cash-in-hand and at bank put together at ₹ 2,70,000.
Required:
PREPARE a statement showing estimate of Working Capital needed to finance an activity level of 2,40,000 units of production. Assume that production is carried on evenly throughout the year, and wages and overheads accrue similarly. Work-in-progress stock is 75% complete in all respects.

Ans

Statement showing Estimate of Working Capital Needs

	(Amount in ₹)	(Amount in ₹)
A. Current Assets		
(i) Inventories:		
Raw material (4 weeks) $\left(\frac{2,40,000 \text{ units} \times 260}{52 \text{ weeks}} \times 4 \text{Weeks}\right)$	48,00,000	
WIP Inventory (1 week) $\left(\frac{2,40,000 \text{ units} \times 585}{52 \text{ weeks}} \times 1 \text{Weeks}\right) \times 0.75$	20,25,000	
Finished goods inventory (2 weeks) $\left(\frac{2,40,000 \text{ units} \times 585}{52 \text{ weeks}} \times 2 \text{Weeks}\right)$	54,00,000	1,22,25,000
(ii) Receivables (Debtors) (4 weeks) $\left(\frac{2,40,000 \text{ units} \times 585}{52 \text{ weeks}} \times 4 \text{Weeks}\right) \times \frac{4}{5}$		86,40,000
(iii) Cash and bank balance		2,70,000
Total Current Assets		2,11,35,000
B. Current Liabilities:		
(i) Payables (Creditors) for materials (3 weeks) $\left(\frac{2,40,000 \text{ units} \times 125}{52 \text{ weeks}} \times 3 \text{Weeks}\right)$		36,00,000
(ii) Outstanding wages (1 week) $\left(\frac{2,40,000 \text{ units} \times 125}{52 \text{ weeks}} \times 1 \text{Weeks}\right)$		5,76,923
(iii) Outstanding overheads (2 weeks) $\left(\frac{2,40,000 \text{ units} \times 125}{52 \text{ weeks}} \times 2 \text{Weeks}\right)$		18,46,154
Total Current Liabilities		60,23,077
Net Working Capital Needs (A – B)		1,51,11,923

Q.122 Working Capital Requirement | MTP May 22(2)

The following annual figures relate to manufacturing entity:

A.	Sales at one month credit	84,00,000
B.	Material consumption	60% of sales value
C.	Wages (paid in a lag of 15 days)	12,00,000
D.	Cash Manufacturing Expenses	3,00,000
E.	Administrative Expenses	2,40,000
F.	Creditors extend 3 months credit for payment.	
G.	Cash manufacturing and administrative expenses are paid 1 months in arrear.	

The company maintains stock of raw material equal to economic order quantity. The company incurs ₹ 100 as per ordering cost per order and opportunity cost of capital is 15% p.a. The optimum cash balance is determined using Baumol's model. The bank charges ₹ 10 for each cash withdrawal. Finished goods are held in stock for 1 month. The company maintains a bank balance of ₹12,00,000 on an average. Creditors are paid through net banking and all other expenses are incurred in cash which is withdrawn from bank.

Assuming a 20% safety margin, you are required to ESTIMATE the amount of working capital that needs to be invested by the Company.

Ans

Statement of working capital Requirement

Particular	**(₹)**	**(₹)**
A. Current Assets		
Stock of Raw Material (W.N. 2)	81,975	
Stock of finished Goods $\left(65,40,000x\ \frac{1}{12}\right)$	5,45,000	
Average Receivables (at Cost) $\left(67,80,000x\ \frac{1}{12}\right)$	5,65,000	
Bank Balance	12,00,000	
Cash Balance (W.N. 3)	15,232	
Gross Working Capital		24,07,207
B. Current Liabilities		
Average Creditor for materials $\left(50,40,000x\ \frac{3}{12}\right)$	12,60,000	
Outstanding Wages $\left(12,00,000x\ \frac{0.5}{12}\right)$	50,000	
Outstanding Cash Manufacturing Expenses $\left(3,00,000x\ \frac{1}{12}\right)$	25,000	
Outstanding administrative Expenses $\left(240,000x\ \frac{1}{12}\right)$	20,000	
		13,55,000
Net Working Capital (A-B)		10,52,207
dd: Safety Margin @ 20%		2,10,441
Total Working Capital Requirement		**12,62,648**

Working Notes:

1. Computation of annual cash Cost of Production & Sales

Material Consumed (84,00,000 × 60%)	50,40,000
Wages	12,00,000

Manufacturing expenses	3,00,000
Cash Cost of production	65,40,000
(+) Administrative Expenses	2,40,000
Cash Cost of Sales	67,80,000

2. Computation of stock of Raw Material

A = 50,40,000

B = 100

C = 0.15

$$EOQ = \sqrt{\frac{2AB}{C}} = \sqrt{\frac{2x50,40,000x100}{0.15}} = ₹\ 81,975$$

3. Calculation of Cash Balance

A = 12,00,000+3,00,000+2,40,000

A = 17,40,000

B = 10

C = 0.15

$$\text{Optimal Cash Balance} = \sqrt{\frac{2AB}{C}} = \sqrt{\frac{2x17,40,000x10}{0.15}} = ₹\ 15,232$$

Q.123 **Cash Cost Basis** **RTP July**

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:

(a) Raw Materials are purchased from different suppliers leading to different credit period allowed as follows:

X – 2 months; Y– 1 months; Z – ½ month

(b) Production cycle is of ½ 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.

(c) X is required to be stored for 2 months and other materials for 1 month. (d) Finished goods are held for 1 month.

(e) 25% of the total sales is on cash basis and remaining on credit basis. The credit allowed by debtors is 2 months.

(f) Average time lag in payment of all overheads is 1 months and ½ months for direct labour.

(g) 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		
$x\left(\frac{1,50,000units \times Rs.30}{12\ months} x2months\right)$	7,50,000	
$y\left(\frac{1,50,000units \times 7}{12\ months} x1months\right)$	87,500	
$z\left(\frac{1,50,000units \times 6}{12\ months} x1months\right)$	75,000	
$WIP\left(\frac{1,50,000units \times 64}{12\ months} x0.5months\right)$	4,00,000	
Finished goods $\left(\frac{1,50,000units \times 88}{12\ months} x1months\right)$	11,00,000	24,12,500
(ii) Receivables (Debtors) $\left(\frac{1,50,000units \times 103}{12\ months} x2months\right) \times 0.75$		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		
$X\left(\frac{1,50,000units \times 30}{12\ months} x2months\right)$	7,50,000	
$y\left(\frac{1,50,000units \times 7}{12\ months} x1months\right)$	87,500	
$Z\left(\frac{1,50,000units \times 6}{12\ months} x0.5months\right)$	37,500	8,75,000
(ii) Outstanding Direct Labour $\left(\frac{1,50,000units \times 25}{12\ months} x1months\right)$		1,56,250
(iii) Outstanding Manufacturing and administration overheads $\left(\frac{1,50,000units \times 20}{12\ months} x1months\right)$		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 x 50%)	3
Cost during the year:	
Z {(₹ 6 x 50%) x 50%}	1.5
Direct Labour (₹ 25 x 50%)	12.5
Manufacturing and administration overheads (₹ 20 x 50%)	10
	64

Q.124 Working Capital Estimate | RTP May 22

PQR Ltd., a company newly commencing business in the year 2021-22, provides the following projected Profit and Loss Account:

	(₹)	(₹)
Sales		5,04,000
Cost of goods sold		3,67,200
Gross Profit		1,36,800
Administrative Expenses	33,600	
Selling Expenses	31,200	64,800
Profit before tax		72,000
Provision for taxation		24,000
Profit after tax		48,000
The cost of goods sold has been arrived at as under:		
Materials used	2,01,600	
Wages and manufacturing Expenses	1,50,000	
Depreciation	56,400	
	4,08,000	

Less: Stock of Finished goods (10% of goods produced not yet sold)	40,800	
	3,67,200	

The figure given above relate only to finished goods and not to work-in-progress. Goods equal to 15% of the year's production (in terms of physical units) will be in process on the average requiring full materials but only 40% of the other expenses. The company believes in keeping materials equal to two months' consumption in stock.
All expenses will be paid one month in advance. Suppliers of materials will extend 1 -1/2 months credit. Sales will be 20% for cash and the rest at two months' credit. 70% of the Income tax will be paid in advance in quarterly instalments. The company wishes to keep ₹ 19,200 in cash. 10% must be added to the estimated figure for unforeseen contingencies. PREPARE an estimate of working capital.

Ans

Statement showing the requirements of Working Capital

Particulars	(₹)	(₹)
A. Current Assets:		
Inventory:		
Stock of Raw material (₹ 2,31,840 × 2/12)	38,640	
Stock of Work-in-progress (As per Working Note)	39,240	
Stock of Finished goods (₹ 3,51,600 × 10/100)	35,160	
Receivables (Debtors) (₹3,04,992 × 2/12)	50,832	
Cash in Hand	19,200	
Prepaid Expenses:		
Wages & Mfg. Expenses (₹ 1,59,000 × 1/12)	13,250	
Administrative expenses (₹ 33,600 × 1/12)	2,800	
Selling & Distribution Expenses (₹ 31,200 × 1/12)	2,600	
Advance taxes paid {(70% of ₹ 24,000) × 3/12}	4,200	
Gross Working Capital	2,05,922	2,05,922
B. Current Liabilities:		
Payables for Raw materials (₹ 2,70,480 × 1.5/12)	33,810	
Provision for Taxation (Net of Advance Tax) (₹ 24,000 × 30/100)	7,200	
Total Current Liabilities	41,010	41,010
C. Excess of CA over CL		1,64,912
Add: 10% for unforeseen contingencies		16,491
Net Working Capital requirements		1,81,403

Working Notes:

(i) Calculation of Stock of Work-in-progress

Particulars	(₹)
Raw Material (₹ 2,01,600 × 15%)	30,240
Wages & Mfg. Expenses (₹ 1,50,000 × 15% × 40%)	9,000
Total	39,240

(ii) Calculation of Stock of Finished Goods and Cost of Sales

Particulars	(₹)
Direct material Cost [₹ 2,01,600 + ₹ 30,240]	2,31,840
Wages & Mfg. Expenses [₹ 1,50,000 + ₹ 9,000]	1,59,000
Depreciation	0
Gross Factory Cost	3,90,840
Less: Closing W.I.P.	(39,240)
Cost of goods produced	3,51,600
Add: Administrative Expenses	33,600

	3,85,200
Less: Closing stock	(35,160)
Cost of Goods Sold	3,50,040
Add: Selling and Distribution Expenses	31,200
Total Cash Cost of Sales	3,81,240
Debtors (80% of cash cost of sales)	3,04,992

(iii) Calculation of Credit Purchase

Particulars	(₹)
Raw material consumed	2,31,840
Add: Closing Stock	38,640
Less: Opening Stock	-
Purchases	2,70,480

Q.125 Working Capital Estimate | RTP Dec 21

The management of Trux Company Ltd. is planning to expand its business and consults you to prepare an estimated working capital statement. The records of the company reveals the following annual information:

	(₹)
Sales – Domestic at one month's credit	18,00,000
Export at three month's credit (sales price 10% below domestic price)	8,10,000
Materials used (suppliers extend two months credit)	6,75,000
Lag in payment of wages – ½ month	5,40,000
Lag in payment of manufacturing expenses (cash) – 1 month	7,65,000
Lag in payment of Administration Expenses – 1 month	1,80,000
Selling expenses payable quarterly in advance	1,12,500
Income tax payable in four installments, of which one falls in the next financial year	1,68,000

Rate of gross profit is 20%. Ignore work-in-progress and depreciation.
The company keeps one month's stock of raw materials and finished goods (each) and believes in keeping ₹2,50,000 available to it including the overdraft limit of ₹ 75,000 not yet utilized by the company.
The management is also of the opinion to make 10% margin for contingencies on computed figure.
You are required to PREPARE the estimated working capital statement for the next year.

Ans **Preparation of Statement of Working Capital Requirement for Trux Company Ltd.**

	(₹)	(₹)
A. Current Assets		
(i) Inventories:		
Material (1 month) $\left(\frac{6,75,000}{12\text{months}} x 1\text{ month}\right)$	56,250	
Finished goods (1 month) $\left(\frac{21,60,000}{12\text{months}} x 1\text{ month}\right)$	1,80,000	2,36,250
(ii) Receivables (Debtors)		
For Domestic Sales $\left(\frac{15,17,586}{12\text{months}} x 1\text{ month}\right)$	1,26,466	

(iii) Prepayment of Selling expenses $\left(\frac{1,12,500}{12\text{months}} x 3 \text{ month}\right)$		28,125
(iii) Cash in hand & at bank		1,75,000
Total Current Assets		7,54,570
B. Current Liabilities:		
(i) Payables (Creditors) for materials (2 months) $\left(\frac{6,75,000}{12\text{months}} x 2 \text{ month}\right)$		1,12,500
(ii) Outstanding wages (0.5 months) $\left(\frac{5,40,000}{12\text{months}} x 0.5 \text{ month}\right)$		22,500
(iii) Outstanding manufacturing expenses $\left(\frac{7,65,000}{12\text{months}} x 1 \text{ month}\right)$		63,750
(iv) Outstanding administrative expenses $\left(\frac{1,80,000}{12\text{months}} x 1 \text{ month}\right)$		15,000
(v) Income tax payable		42,000
Total Current Liabilities		2,55,750
Net Working Capital (A – B)		4,98,820
Add: 10% contingency margin		49,882
Total Working Capital required		5,48,702

Working Notes:

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

	Domestic (₹)	Export (₹)	Total (₹)
Domestic Sales	18,00,000	8,10,000	26,10,000
Less: Gross profit @ 20% on domestic sales and 11.11% on export sales (Working note-2)	3,60,000	90,000	4,50,000
Cost of Goods Sold	14,40,000	7,20,000	21,60,000
Add: Selling expenses (Working note-3)	77,586	34,914	1,12,500
Cash Cost of Sales	15,17,586	7,54,914	22,72,500

2. Calculation of gross profit on Export Sales

Let domestic selling price is ₹ 100. Gross profit is ₹ 20, and then cost per unit is ₹ 80
Export price is 10% less than the domestic price i.e. ₹ 100 – (1- 0.1) = ₹ 90
Now, gross profit will be = ₹ 90 - ₹ 80 = ₹ 10
So, Gross profit ratio at export price will be = $\frac{10}{90} \times 100 = 11.11\%$

3. Apportionment of Selling expenses between Domestic and Exports sales:

Apportionment on the basis of sales value:
Domestic Sales = $\frac{1,12,500}{26,10,000} \times 18,00,000$ = ₹ 77,586

Exports Sales = $\frac{1,12,500}{26,10,000}$ x ₹ 8,10,000 = ₹ 34,914

4. Assumptions

(i) It is assumed that administrative expenses is related to production activities.

(ii) Value of opening and closing stocks are equal.

Q.126 Working Capital Estimate | MTP Dec 21(2)

On 01st April, 2020, the Board of Director of ABC Ltd. wish to know the amount of working capital that will be required to meet the programme they have planned for the year. From the following information, PREPARE a working capital requirement forecast and a forecast profit and loss account and balance sheet:

Issued share capital	₹ 6,00,000
10% Debentures	₹ 1,00,000
Fixed Assets	₹ 4,50,000

Production during the previous year was 1,20,000 units; it is planned that this level of activity should be maintained during the present year.

The expected ratios of cost to selling price are: raw materials 60%, direct wages 10% overheads 20% Raw materials are expected to remain in store for an average of two months before issue to production. Each unit of production is expected to be in process for one month. The time lag in wage payment is one month.

Finished goods will stay in the warehouse awaiting dispatch to customers for approximately three months.

Credit allowed by creditors is two months from the date of delivery of raw materials. Credit given to debtors is three months from the date of dispatch.

Selling price is ₹ 5 per unit.

There is a regular production and sales cycle and wages and overheads accrue evenly.

Ans

Forecast Profit and Loss Account for the period 01.04.2020 to 31.03.2021

Particulars	₹	Particulars	₹
Materials consumed	3,60,000	By Sales 1,20,000 @ ₹ 5	6,00,000
1,20,000 @ ₹ 3			
Direct wages :	60,000		
Overheads :	1,20,000		
1,20,000 @ ₹ 1			
Gross profit c/d	60,000		
	6,00,000		6,00,000
Debenture interest	10,000		60,000
(10% of 1,00,000)			
Net profit c/d	50,000	By gross profit b/d	
	60,000		60,000

Working Capital Requirement Forecast for the year 01.04.2020 to 31.03.2021

Particulars	Period (Months)	Total (₹)	Current Assets (₹)				Current Liabilities(₹)
			Raw materials	Work-in-progress	Finished goods	Debtors	Creditors
1.Material							
In store	2		60,000				
In work-in-progress	1			30,000			

In finished goods	3				90,000		
Credit to debtors	3					90,000	
	9						
Less : Credit from creditors	2						60,000
Net block period	**7**	**2,10,000**					
2. Wages:							
In work-in-progress	1/2			2,500			
In finished goods	3				15,000		
Credit to debtors	3					15,000	
	$6\frac{1}{2}$						
Less : Time lag in payment	1						5,000
Net block period	**$5\frac{1}{2}$**	**27,500**					
3.Overhead							
In work-in-progress	$\frac{1}{2}$			5,000			
In finished goods	3				30,000		
Credit to debtors	3					30,000	
Net block period	**$6\frac{1}{2}$**	**65,000**					
4.Profit							
Credit to debtors	3					15,000	
Net block period	**3**	**15,000**					
Total (₹)		**3,17,500**	**60,000**	**37,500**	**1,35,000**	**1,50,000**	**65,000**

Forecast Balance Sheet as on 31.03.2021

	(₹)			(₹)
Issued share capital	6,00,000	Fixed Assets		4,50,000
Profit and Loss A/c	50,000	Current Assets:		
10% Debentures	1,00,000	Stock:		
Sundry creditors	65,000	Raw materials	60,000	
Bank overdraft-		Work-in-progress	37,500	
Balancing figure	17,500	Finished goods	1,35,000	2,32,500
		Debtors		1,50,000

	8,32,500			8,32,500

The Total amount of working capital, thus, stands as follows:

	₹
Requirement as per working capital	3,17,500
Less: Bank overdraft as per balance sheet	17,500
Net requirement	**3,00,000**

Notes:

1. Average monthly production: 1,20,000 ÷ 12 = 10,000 units
2. Average cost per month:
   Raw Material 10,000 × (₹ 5 × 0.6) = ₹ 30,000
   Direct wages 10,000 × (₹ 5 × 0.1) = ₹ 5,000
   Overheads 10,000 × (₹ 5 × 0.2) = ₹ 10,000
3. Average profit per month: 10,000 × (₹ 5 × 0.1) = ₹ 5,000
4. Wages and overheads accrue evenly over the period and, hence, are assumed to be completely introduced for half the processing time.

Q.127 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

INVESTING DECISION

Q.128 Accept Mutually Excl. Project | PY May 19

Kanoria Enterprises wishes to evaluate two mutually exclusive projects X and Y.
The particulars are as under :

	Project X	Project Y
Initial Investment	1,20,000	1,20,000
Estimated cash inflows (per annum for 8 years)		
Pessimistic	26,000	12,000
Most Likely	28,000	28,000
Optimistic	36,000	52,000

The cut off rate is 14%. The discount factor at 14% are :

Year	1	2	3	4	5	6	7	8	9
Discount factor	0.877	0.769	0.675	0.592	0.519	0.456	0.400	0.351	0.308

Advise management about the acceptability of projects X and Y.

Ans. The possible outcomes of Project x and Project y are as follows

Estimates	Project X				Project Y			
	Estimated Annual Cash inflows (₹)	PVF @ 14% for 8 years	PV of Cash flow (₹)	NPV (₹)	Estimated Annual Cash inflows (₹)	PVF @ 14% for 8 years	PV of Cash flow (₹)	NPV (₹)
Pessimistic	26,000	4.639	1,20,614	**614**	12,000	4.639	55,668	**(-64,332)**
Most likely	28,000	4.639	1,29,892	**9,892**	28,000	4.639	1,29,892	**9,892**
Optimistic	36,000	4.639	2,41,228	**47,004**	52,000	4.639	2,41,228	**1,21,228**

In pessimistic situation project X will be better as it gives low but positive NPV whereas Project Y yield highly negative NPV under this situation. In most likely situation both the project will give same result. However, in optimistic situation Project Y will be better as it will gives very high NPV. So, project X is a risk less project as it gives positive NPV in all the situation whereas Y is a risky project as it will result into negative NPV in pessimistic situation and highly positive NPV in optimistic situation. So acceptability of project will largely depend on the risk taking capacity (Risk seeking/ Risk aversion) of the management.

Q.129 NPV Method (Accept/Not) | RTP May 23

Dharma Ltd, an existing profit-making company, is planning to introduce a new product with a projected life of 8 years. Initial equipment cost will be ₹ 240 lakhs and additional equipment costing ₹ 26 lakhs will be needed at the beginning of third year. At the end of 8 years, the original equipment will have resale value equivalent to the cost of removal, but the additional equipment would be sold for ₹ 2 lakhs. Working Capital of ₹ 25 lakhs will be needed at the beginning of the operations. The 100% capacity of the plant is of 4,00,000 units per annum, but the production and sales volume expected are as under:

Year	Capacity (%)
1	20
2	30
3-5	75
6-8	50

A sale price of ₹ 100 per unit with a profit volume ratio (contribution/sales) of 60% is likely to be obtained. Fixed operating cash cost are likely to be ₹ 16 lakhs per annum. In addition to this the advertisement expenditure will have to be incurred as under:

Year	1	2	3-5	6-8
Expenditure (₹ Lakhs each year)	30	15	10	4

The company is subjected to 50% tax rate and consider 12% to be an appropriate cost of capital. Straight line method of depreciation is followed by the company. ADVISE the management on the desirability of the project.

Ans.

Calculation of Cash Flow After tax

	Year	1	2	3 to 5	6 to 8
A	Capacity	20%	30%	75%	50%
B	Units	80000	120000	300000	200000
C	Contribution p.u.	₹60	₹60	₹60	₹60
D	Contribution	₹48,00,000	₹72,00,000	₹1,80,00,000	₹1,20,00,000
E	Fixed Cash Cost	₹16,00,000	₹16,00,000	₹16,00,000	₹16,00,000
	Depreciation				
F	Original Equipment (₹240Lakhs/8)	₹30,00,000	₹30,00,000	₹30,00,000	₹30,00,000
G	Additional Equipment (₹24Lakhs/6)	--	--	₹4,00,000	₹4,00,000
H	Advertisement Expenditure	₹30,00,000	₹15,00,000	₹10,00,000	₹4,00,000
I	Profit Before Tax (D- E-F-G-H)	₹ (28,00,000)	₹11,00,000	₹1,20,00,000	₹66,00,000
J	Tax savings/ (expenditure)	₹14,00,000	₹(5,50,000)	₹(60,00,000)	₹ (33,00,000)
K	Profit After Tax	₹ (14,00,000)	₹5,50,000	₹60,00,000	₹33,00,000
L	Add: Depreciation (F+G)	₹30,00,000	₹30,00,000	₹34,00,000	₹34,00,000
M	Cash Flow After Tax	₹16,00,000	₹35,50,000	₹94,00,000	₹67,00,000

Calculation of NPV

Year	Particula	Cash Flows	PV factor	PV
0	Initial Investment	₹ (2,40,00,000)	1.000	₹ (2,40,00,000)
0	Working Capital Introduced	₹ (25,00,000)	1.000	₹ (25,00,000)
1	CFAT	₹16,00,000	0.893	₹ 14,28,800
2	CFAT	₹ 35,50,000	0.797	₹ 28,29,350
2	Additional Equipment	₹ (26,00,000)	0.797	₹ (20,72,200)
3	CFAT	₹ 94,00,000	0.712	₹ 66,92,800
4	CFAT	₹ 94,00,000	0.636	₹ 59,78,400
5	CFAT	₹ 94,00,000	0.567	₹ 53,29,800
6	CFAT	₹ 67,00,000	0.507	₹ 33,96,900
7	CFAT	₹ 67,00,000	0.452	₹ 30,28,400
8	CFAT	₹ 67,00,000	0.404	₹ 27,06,800
8	WC Released	₹ 25,00,000	0.404	₹ 10,10,000

8	Salvage Value	₹ 2,00,000	0.404	₹ 80,800
	Net Present Value			**₹39,09,850**

Since the NPV is positive, the proposed project should be implemented.

Q.130 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 averge cost for telephone charges. You are Senior Officer of Finance Department. You have been asked by Ms. Kuthrapali to EVALUATE the proposal and SUGGEST if it would be worthwhile for the company to implement video conferencing.

Ans.

Option I : Cost of travel, in case Video Conferencing facility is not provided
Total Trip = No. of Locations × No. of Persons × No. of Trips per Person = 7×2×2 = 28 Trips
Total Travel Cost (including air fare, hotel accommodation and meals) (28 trips × ₹ 27,000 per trip) = **₹ 7,56,000**

Option II : Video Conf.Facility is provided by Installation of Own Equipment at Different Locations
Cost of Equipment at each location (₹ 8,25,000 × 8 locations) = ₹ 66,00,000
Economic life of Machines (5 years). Annual depreciation (66,00,000/5) = ₹ 13,20,000
Annual transmission cost (48 hrs. transmission × 8 locations × ₹ 300 per hour) = ₹ 1,15,200
Annual cost of operation (13,20,000 + 1,15,200) = ₹ 14,35,200
Option III : Engaging Video Conferencing Facility on Rental Basis
Rental cost (48 hrs. × 8 location × ₹ 1,500 per hr) = ₹ 5,76,000
Telephone cost (48 hrs.× 8 locations × ₹ 400 per hr.) = ₹ 1,53,600
Total rental cost of equipment (5,76,000 + 1,53,600) = ₹ 7,29,600
Analysis: The annual cash outflow is minimum, if video conferencing facility is engaged on rental basis Therefore, Option III is suggested.

Q.131 NPV Method (Accept/Not) | MTP May 19(2)

(a) Prem Ltd has a maximum of Rs. 8,00,000 available to invest in new projects. Three possibilities have emerged and the business finance manager has calculated Net present Value (NPVs) for each of the projects as follows:

Investment	Initial cash outlay Rs.	NPV Rs.
Alfa (α)	5,40,000	1,00,000
Beta(β)	6,00,000	1,50,000
Gama (γ)	2,60,000	58,000

DETERMINE which investment/combination of investments should the company invest in, if we assume that the projects can be divided?

(b) Invest Corporation Ltd. adjusts risk through discount rates by adding various risk premiums to the risk free rate. Depending on the resultant rate, the proposed project is judged to be a low, medium or high risk project.

Risk level	Risk free rate (%)	Risk Premium (%)

Low	8	4
Medium	8	7
High	8	10

DEMONSTRATE the acceptability of the project on the basis of Risk Adjusted rate

Ans. **(a)** Since funds available are restricted, the normal Net Present Value (NPV) rule of accepting investments decisions with the highest NPVs cannot be adopted straight way. Further, as the projects are divisible, a Profitability Index (PI) can be utilized to provide the most beneficial combination of investment for Rio Ltd.

Project	PV Per Rs.	Rank as per PI
Alfa (α)	Rs. 6,40,000 / Rs. 5,40,000 = 1.185	III
Beta (β)	Rs. 7,50,000 / Rs. 6,00,000 = 1.250	I
Gama (γ)	Rs. 3,18,000 / Rs. 2,60,000 = 1.223	II

Therefore Rio Ltd should invest Rs. 6,00,000 into project β (Rank I) earnings Rs. 1,50,000 and Rs.2,00,000 into project γ (Rank II) earning Rs.44,615 Rs. 2,00,000 / Rs. 2,60,000 × Rs. 58,000
So, total NPV will be Rs.1,94,615 Rs. 1,50,000 + Rs. 44,615 from Rs. 8,00,000 of investment.

(b) **Calculation of Risk Adjusted rate**

Risk level	Risk free rate (%)	Risk Premium (%)	Risk adjusted rate (%)
Low	8	4	12
Medium	8	7	15
High	8	10	18

The cash flows of the project considered are as following:

Point in time (yearly intervals)	0	1	2
Cash flow (Rs. in crore)	(100)	45	80

If the project is judged to be Low risk

Years	0	1	2
PV (Rs. in crore)	(100)	$\frac{45}{1+0.12} = 40.18$	$\frac{80}{(1+0.12)^2} = 63.78$

NPV = 40.18 + 63.78 – 100 = 3.96: Accept

If the project is judged to be Medium risk

Years	0	1	2
PV (Rs. in crore)	(100)	$\frac{45}{1+0.15} = 39.13$	$\frac{80}{(1+0.15)^2} = 60.49$

NPV = 39.13 + 60.49 – 100 = (0.38): Reject

Years	0	1	2
PV (Rs. in crore)	(100)	$\frac{45}{1+0.18} = 38.14$	$\frac{80}{(1+0.18)^2} = 57.45$

NPV = 38.14 + 57.45 – 100 = (4.41): Reject

Q.132 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.

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 lakhs + (₹ 42 lakhs / 0.14)	= (-) ₹ 270 lakhs + ₹ 300 lakhs
	= ₹ 30
Issue costs	= ₹ 10 lakhs
Thus, the amount to be raised	= ₹ 270 lakhs + ₹ 10 lakhs
	= ₹ 280 lakhs
Annual tax relief on interest payment	= ₹ 280 X 0.1 X 0.3
	= ₹ 8.4 lakhs in perpetuity
The value of tax relief in perpetuity	= ₹ 8.4 lakhs / 0.1
	= ₹ 84 lakhs

Therefore, APV = Base case PV – Issue Costs + PV of Tax Relief on debt interest

= ₹ 30 lakhs – ₹ 10 lakhs + 84 lakhs = ₹ 104 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 lakhs X (Annual Income / 0.14)	= (-) ₹104 lakhs
Annual Income / 0.14	= (-) ₹ 104 + ₹ 280 lakhs
Therefore, Annual income	= ₹ 176 X 0.14 = ₹ 24.64 lakhs
Adjusted discount rate	= (₹ 24.64 lakhs / ₹280 lakhs) X 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.

Q.133 Annualised Yeild | PY Dec 21

Stand Ltd. is contemplating replacement of one of its machines which has become outdated and inefficient. Its financial manager has prepared a report outlining two possible replacement machines. The details of each machine are as follows:

	Machine 1	Machine 2
Initial investment	₹ 12,00,000	₹ 16,00,000
Estimated useful life	3 years	5 years
Residual value	₹ 1,20,000	₹ 1,00,000
Contribution per annum	₹ 11,60,000	₹ 12,00,000
Fixed maintenance costs per annum	₹ 40,000	₹ 80,000
Other fixed operating costs per annum	₹ 7,20,000	₹ 6,10,000

The maintenance costs are payable annually in advance. All other cash flows apart from the initial investment assumed to occur at the end of each year. Depreciation has been calculated by straight line method and has been included in other fixed operating costs. The expected cost of capital for this project is assumed as 12% p.a

Required:

(i) Which machine is more beneficial, using Annualized Equivalent Approach? Ignore tax.

(ii) Calculate the sensitivity of your recommendation in part (i) to changes in the contribution generated by machine 1.

Year	*1*	*2*	*3*	*4*	*5*	*6*
PVIF0.12,t	*0.893*	*0.797*	*0.712*	*0.636*	*0.567*	*0.507*
PVIFA0.12,t	*0.893*	*1.690*	*2.402*	*3.038*	*3.605*	*4.112*

Ans.

Calculation of Net Cash flows

Machine 1

Other fixed operating costs (excluding depreciation) = 7,20,000-[(12,00,000-1,20,000)/3] = ₹ 3,60,000

Year	Initial Investment (₹)	Contribution (₹)	Fixed maintenance costs(₹)	Other fixed operating costs (excluding depreciation) (₹)	Residual Value(₹)	Net cash flow(₹)
0	(12,00,000)		(40,000)			(12,40,000)
1		11,60,000	(40,000)	(3,60,000)		7,60,000
2		11,60,000	(40,000)	(3,60,000)		7,60,000
3		11,60,000		(3,60,000)	1,20,000	9,20,000

Machine 2

Other fixed operating costs (excluding depreciation) = 6,10,000-[(16,00,000-1,00,000)/5] = ₹ 3,10,000

Year 0	Initial Investment (₹) (16,00,000)	Contribution (₹)	Fixed maintenanc costs (₹) (80,000)	Other fixed operating costs (excluding depreciation) (₹)	Residual Value (₹)	Net cash flow (₹) (16,80,000)
1		12,00,000	(80,000)	(3,10,000)		8,10,000
2		12,00,000	(80,000)	(3,10,000)		8,10,000
3		12,00,000	(80,000)	(3,10,000)		8,10,000
4		12,00,000	(80,000)	(3,10,000)		8,10,000
5		12,00,000		(3,10,000)	1,00,000	9,90,000

Calculation of Net Present Value

		Machine 1		Machine 2	
Year	12% discount factor	Net cash flow (₹)	Present value (₹)	Net cash flow (₹)	Present value (₹)

0	1.000	(12,40,000)	(12,40,000)	(16,80,000)	(16,80,000)
1	0.893	7,60,000	6,78,680	8,10,000	7,23,330
2	0.797	7,60,000	6,05,720	8,10,000	6,45,570
3	0.712	9,20,000	6,55,040	8,10,000	5,76,720
4	0.636			8,10,000	5,15,160
5	0.567			9,90,000	5,61,330
NPV @ 12%			**6,99,440**		**13,42,110**
PVAF @ 12%			2.402		3.605
Equivalent Annualized Criterion			**2,91,190.674**		**3,72,291.262**

Recommendation: Machine 2 is more beneficial using Equivalent Annualized Criterion.

(ii) Calculation of sensitivity of recommendation in part (i) to changes in the contribution generated by machine 1

Difference in Equivalent Annualized Criterion of Machines required for changing the recommendation in part (i) = 3,72,291.262- 2,91,190.674 = **₹ 81,100.588**

∴ Sensitivity relating to contribution $\frac{81.100.588}{11.60.000.00}$ = ×100 = 6.991 or **7% yearly**

Alternatively,

The annualized equivalent cash flow for machine 1 is lower by ₹ (3,72,291.262–2,91,190.674) = **₹81,100.588** than for machine 2. Therefore, it would need to increase contribution for **complete 3 years** before the decision would be to invest in this machine.

Sensitivity w.r.t contribution = 81,100.588 / (11,60,000 × 2.402) x100 = **2.911%**

Q.134 Buy New Machine | RTP July 21

The General Manager of Merry Ltd. is considering the replacement of five -year-old equipment. The company has to incur excessive maintenance cost of the equipment. The equipment has zero written down value. It can be modernized at a cost of ₹ 1,40,000 enhancing its economic life to 5 years. The equipment could be sold for ₹ 30,000 after 5 years. The modernization would help in material handling and in reducing labour , maintenance & repairs costs.

The company has another alternative to buy a new machine at a cost of ₹ 3,50,000 with an economic life of 5 years and salvage value of ₹ 60,000. The new machine is expected to be more efficient in reducing costs of material handling, labour , maintenance & repairs, etc.

The annual cost are as follows:

	Existing Equipment (₹)	Modernization (₹)	New Machine (₹)
Wages & Salaries	45,000	35,500	15,000
Supervision	20,000	10,000	7,000
Maintenance	25,000	5,000	2,500
Power	30,000	20,000	15,000
	1,20,000	70,500	39,500

Assuming tax rate of 50% and required rate of return of 10%, should the company modernize the equipment or buy a new machine? PV factor at 10% are as follows:

Year	1	2	3	4	5
PV factor	0.909	0.826	0.751	0.683	0.621

Ans. **Workings:**

Calculation of Depreciation:

On Modernized Equipment = $\frac{140000 - 30000}{5 \text{ years}}$ = ₹ 22,000 p.a.

On New machine = $\frac{350000 - 60000}{5 \text{ years}}$ = ₹ 58,000 p.a.

(i) Calculation of Incremental annual cash inflows/ savings:

Particulars	Existing Equipment (₹)	Modernization		New Machine	
		Amount (₹)	Savings (₹)	Amount (₹)	Savings (₹)
	(1)	(2)	(3)=(1)-(2)	(4)	(5)=(1)-(4)
Wages & Salaries	45,000	35,500	9,500	15,000	30,000
Supervision	20,000	10,000	10,000	7,000	13,000
Maintenance	25,000	5,000	20,000	2,500	22,500
Power	30,000	20,000	10,000	15,000	15,000
Total	**1,20,000**	**70,500**	**49,500**	**39,500**	**80,500**
Less: Depreciation (Refer Workings)			22,000		58,000
Total Savings			**27,500**		**22,500**
Less: Tax @ 50%			13,750		11,250
After Tax Savings			**13,750**		**11,250**
Add: Depreciation			22,000		58,000
Incremental Annual Cash Inflows			**35,750**		**69,250**

(ii) Calculation of Net Present Value (NPV)

Particulars	Year	Modernization (₹)	New Machine (₹)
Initial Cash outflow (A)	0	1,40,000.00	3,50,000.00
Incremental Cash Inflows	1-5	1,35,492.50 (₹ 35,750 x 3.790)	2,62,457.50 (₹ 69,250 x 3.790)
Salvage value	5	18,630.00 (₹ 30,000 x 0.621)	37,260.00 (₹ 60,000 x 0.621)
PV of Cash inflows (B)		1,54,122.50	2,99,717.50
Net Present Value (B - A)		14,122.50	(50,282.50)

Advise: The company should modernize its existing equipment and not buy a new machine because NPV is positive in modernization of equipment.

Q.135 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:

(i) Material stock increases are taken in cash flows.
(ii) Idle time wages have also been considered.
(iii) Apportioned factory overheads are not relevant only insurance charges of this project are relevant.
(iv) Interest calculated at 14% based on 4 equal instalments of loan repayment.
(v) Sale of machinery- Net income after deducting removal expenses taken. Tax on Capital gains ignored.
(vi) Saving in contract payment and income tax thereon considered in the cash flows.

Q.136 Buy or Rent | PY May 18

Maruti Ltd. requires a plant costing ₹ 200 Lakhs for a period of 5 years. The company can use the plant for the stipulated period through leasing arrangement or the requisite amount can be borrowed to buy the plant. In case of leasing, the company received a proposal to pay annual lease rent of ₹ 48 Lakhs at the end of each year for a period of 5 years.

In case of purchase, the company would have a 12%, 5 years loan to be paid in equated annual installment, each installment becoming due in the beginning of each year. It is estimated that plant can be sold for ₹ 40 Lakhs at the end of 5th year. The company uses straight line method of depreciation. Corporate tax rate is 30 %. Cost of Capital after tax for the company is 10%.

The PVIF @ 10% and 12% for the five years are given below:

Year	*1*	*2*	*3*	*4*	*5*
PVIF @ 10	*0.909*	*0.826*	*0.751*	*0.683*	*0.621*
PVIF @ 12	*0.893*	*0.797*	*0.712*	*0.636*	*0.567*

You are required to advise whether the plant should be purchased or taken on lease.

Ans. **Purchase Option**

Loan installment = ₹ 200 lakhs / (1 + PVIFA 12%, 4)
= ₹ 200 lakhs / (1 + 3.038) = ₹ 49.53 lakhs

Interest payable = (₹ 49.53 X 5) – ₹ 200 lakhs = ₹ 47.65 lakhs

Working note:

Amortisation of Loan Installment

Year	Loan amount (₹ In Lakhs)	Installment (₹In Lakhs)	Interet (₹ In Lakhs)	Principal (₹ In Lakhs)	O/S Amount (₹ In Lakhs)
0	200	49.53	0.00	49.53	150.47
1	150.47	49.53	18.06	31.47	119.00
2	119.00	49.53	14.28	35.25	83.75

3	83.75	49.53	10.05	39.48	44.27
4	44.27	49.53	*5.26	44.27	-
5	0	0	0	0	0

Calculation of PV of outflow under Purchase Option

(₹ In Lakhs)

(1) End	(2) Debt Payment	(3) Int. of the o/s Principal	(4) Dep.	(5) Tax Shield [(3) +(4)]x 0.3	(6) Net Cash out flows (2) – (5)	(7) PV factors @ 10%	(8) PV
0	49.53	0.00	0.00	0.00	49.53	1.000	49.53
1	49.53	18.06	32.00	15.02	34.51	0.909	31.37
2	49.53	14.28	32.00	13.88	35.65	0.826	29.44
3	49.53	10.05	32.00	12.61	36.92	0.751	27.72
4	49.53	*5.26	32.00	11.18	38.35	0.683	26.19
5	49.53	0	32.00	9.60	(9.60)	0.621	(5.96)
		47.65	160.00				158.29
						Less: PV of Salvage Value (₹40 lakhs x 0.621) =	24.84
						Total PV of Outflow	133.45

*Balancing Figure

Leasing Option

PV of Outflows under lease @ 10% = ₹ 48 lakhs x (1-0.30) x 3.790
= ₹ 127.34 lakhs

Decision: The plant should be taken on lease because the PV of outflows is less as compared to purchase option.

Q.137 Equivalent Method | MTP Nov 23(1)

A new project "Ambar" requires an initial outlay of ₹ 4,50,000. The company uses certainty equivalent method approach to evaluate the project. The risk-free rate is 7%. Following information is available:

Year	Cash Flow After Tax (₹)	Certainty Equivalent Coefficient
1	1,50,000	0.90
2	2,25,000	0.80
3	1,75,000	0.58
4	1,50,000	0.56
5	70,000	0.50

PV Factor at 7%

Year	1	2	3	4	5
PV Factor	0.935	0.873	0.816	0.763	0.713

Is investment in the project beneficial based on above information?

Ans. **Calculation of Net Present Value of the Project**

Year	Cash Inflows After Tax (in₹)	C.E.	Adjusted Cash Inflows (in ₹)	Present Value Factor	Present Value (in ₹)
1	1,50,000	0.90	1,35,000	0.935	1,26,225

2	2,25,000	0.80	1,80,000	0.873	1,57,140
3	1,75,000	0.58	1,01,500	0.816	82,824
4	1,50,000	0.56	84,000	0.763	64,092
5	70,000	0.50	35,000	0.713	24,955
Total Present Value of Cash Inflows					**4,55,236**
Less: Initial Investment or Cash Outflow required for "Ambar"					(4,50,000)
Net Present Value					**5,236**

Conclusion: As the Net Present Value of the project after considering the Certainty Equivalent factors is still positive, it may be advised to invest in project "Ambar".

Q.138 NPV Method (Invest Appraisal) RTP May 20

A company is considering the proposal of taking up a new project which requires an investment of ₹800 lakhs on machinery and other assets. The project is expected to yield the following earnings (before depreciation and taxes) over the next five years:

Year	Earnings (₹ in lakhs)
1	320
2	320
3	360
4	360
5	300

The cost of raising the additional capital is 12% and assets have to be depreciated at 20% on written down value basis. The scrap value at the end of the five year period may be taken as zero. Income-tax applicable to the company is 40%.

You are required to CALCULATE the net present value of the project and advise the management to take appropriate decision. Also CALCULATE the Internal Rate of Return of the Project.

Note: Present values of Re. 1 at different rates of interest are as follows

Year	10%	12%	14%	16%	20%
1	0.91	0.89	0.88	0.86	0.83
2	0.83	0.80	0.77	0.74	0.69
3	0.75	0.71	0.67	0.64	0.58
4	0.68	0.64	0.59	0.55	0.48
5	0.62	0.57	0.52	0.48	0.40

Ans. **(i) Calculation of Net Cash Flow**

(₹ in lakhs)

Year	Profit before dep. and tax	Depreciation (20% on WDV)	PBT	PAT	Net cash flow
(1)	(2)	(3)	(4)	(5)	(3) + (5)
1	320	800 × 20% = 160	160	96	256
2	320	(800 – 160)× 20% = 128	192	115.20	243.20
3	360	(640 – 128)× 20% = 102.4	257.6	154.56	256.96

4	360	(512 – 102.4)× 20% = 81.92	278.08	166.85	248.77
5	300	(409.6 – 81.92) = 327.68*	–27.68	–16.61	311.07

*this is treated as a short term capital loss.

(ii) Calculation of Net Present Value (NPV) **(₹ in lakhs)**

Year	Net Cash Flow	12%		16%		20%	
		D.F	P.V	D.F	P.V	D.F	P.V
1	256	0.89	227.84	0.86	220.16	0.83	212.48
2	243.20	0.80	194.56	0.74	179.97	0.69	167.81
3	256.96	0.71	182.44	0.64	164.45	0.58	149.03
4	248.77	0.64	159.21	0.55	136.82	0.48	119.41
5	311.07	0.57	177.31	0.48	149.31	0.40	124.43
			941.36		850.71		773.16
	Less: Initial Investment		800.00		800.00		800.00
		NPV	141.36		50.71		-26.84

(iii) Advise: Since Net Present Value of the project at 12% = 141.36 lakhs, therefore the project should be implemented.

(iv) Calculation of Internal Rate of Return (IRR)

$$IRR = 16\% + \frac{50.71 \times 4}{50.71 - (-26.84)}$$

$$= 16\% + \frac{2.03}{77.55} = 16\% + 2.62\% = 18.62\%.$$

Q.139 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 e xcept 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.140 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
Salaryto Computer Specialist		(10,00,000)	(10,00,000)	(10,00,000)	(10,00,000)	(10,00,000)
Maintenance and Operating Cost (payableinadvance)		(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.141 NPV, PI & Payback Method | MTP Dec 21(1)

Sadbhavna Limited is a manufacturer of computers. It wants to introduce artificial intelligence while making computers. It estimates that the annual savings from the artificial intelligence (AI) include a reduction of five employees with annual salaries of ₹ 3,00,000 each, ₹ 3,00,000 from reduction in production delays caused by inventory problem, reduction in lost sales ₹ 2,50,000 and ₹ 2,00,000 from billing issues.

The purchase price of the system for installation of artificial intelligence is ₹ 20,00,000 with installation cost of ₹ 1,00,000. The life of the system is 5 years and it will be depreciated on a straight -line basis. The salvage value is zero which will be its market value after the end of its life of five years.

However, the operation of the new system for AI requires two computer specialists with annual salaries of ₹ 5,00,000 per person. Also, the estimated maintenance and operating expenses of 1,50,000 is required.

The company's tax rate is 30% and its required rate of return is 12%.

From the above information:

(i) CALCULATE the initial cash outflow and annual operating cash flow over its life of 5 years.

(ii) Further, EVALUATE the project by using Payback Period, Net Present Value and Profitability Index.

(iii) You are also REQUIRED to obtain the cash flows and NPV on the assumption that book salvage value for depreciation purposes is ₹ 2,00,000 even though the machine is having no real worth in terms of its resale value. Also, the book salvage value of ₹ 2,00,000 is allowed for tax purposes.

Also COMMENT on the acceptability of the project in (ii) and (iii) above.

Ans. **(i) Project's Initial Cash Outlay**

Cost	20,00,000	
Installation Expenses	1,00,000	
Total Cash Outflow	21,00,000	
Depreciation per year = 21,00,000/5 =	4,20,000	
Project's Operating Cash Flows over its 5-year life		
Savings (A)		
Reduction in salaries (₹ 3,00,000 x 5)		15,00,000
Reduction in production delays		3,00,000
Reduction in lost sales		2,50,000
Gains due to timely billing		2,00,000
		22,50,000
Costs (B)		
- Depreciation		4,20,000
- Additional Specialist Cost (₹ 5,00,000 x 2)		10,00,000

- Maintenance Cost	1,50,000
	15,70,000
Increase in Profit before tax (A – B)	6,80,000
Less: Tax @ 30%	2,04,000
Profit after tax	**4,76,000**

Cash Inflows = Profit after tax + Depreciation
= 4,76,000 + 4,20,000 = 8,96,000

(ii) Evaluation of the project by using NPV Method

Year	Cash Inflows	PVAF (12%,5y)	Total PV
1-5	8,96,000	3.605	32,30,080
Less: Total Initial Cash Outflow			21,00,000
Net Present Value			**11,30,080**

Since NPV is positive, therefore, the project is acceptable.

Evaluation of the project by using Profitability Index Method

Profitability Index = Present Value of Cash Inflows/Present Value of Cash Outflows
= 32,30,080/21,00,000
= 1.538

Since, the profitability index is more than 1, the project is acceptable.

Calculation of the Project's Payback*

Year	Net Cash Flow	Cumulative Cash Flow
1	8,96,000	8,96,000
2	8,96,000	17,92,000
3	8,96,000	26,88,000
4	8,96,000	35,84,000
5	8,96,000	44,80,000

Here, the payback period is 2 years plus a fraction of the 3rd year
So, payback period = 2 years + 3,08,000/8,96,000
= 2.34 years

* Payback period may also be solved directly as follows: 21,00,000/8,96,000 = 2.34 years

(iii) **Project's cash flows and NPV assuming that the book salvage for depreciation purpose is ₹2,00,000**

Depreciation = (₹ 21,00,000 – 2,00,000)/5 = 3,80,000

Cash Inflows for the years 1 to 5 are:

Savings (calculated as earlier)		22,50,000
Less: Costs		
- Depreciation	3,80,000	
- Additional Specialists cost	10,00,000	
- Maintenance cost	1,50,000	15,30,000
Profit before tax		**7,20,000**
Less: Tax @ 30%		2,16,000
Profit after tax		5,04,000
Cash Inflow (5,04,000 + 3,80,000)		8,84,000

Calculation of NPV

It may be noted that at the end of year 5, the book value of the project would be ₹ 2,00,000 but its realizable value is nil. So, the capital loss of ₹ 2,00,000 will result in tax savings of ₹ 60,000 (i.e., ₹ 2,00,000

x 30%), as the capital loss is available for tax purposes in view of the information given. Therefore, at the end of year 5, there would be an additional inflow of ₹ 60,000. The NPV may now be calculated as follows:

Year	Cash Flow (₹)	PVAF (12%, n)	PV
1-5	8,84,000	3.605	31,86,820
5	60,000	0.567	34,020
PV of inflows			32,20,840
Outflows			21,00,000
NPV			11,20,840

As the NPV of the project is positive, the project is acceptable.

Q.142 NPV, PI & Payback Method | MTP Nov 18(1)

X Limited is considering to purchase of new plant worth Rs. 80,00,000. The expected net cash flows after taxes and before depreciation are as follows:

Year	Net Cash Flows (Rs.)
1	14,00,000
2	14,00,000
3	14,00,000
4	14,00,000
5	14,00,000
6	16,00,000
7	20,00,000
8	30,00,000
9	20,00,000
10	8,00,000

The rate of cost of capital is 10%. You are required to CALCULATE

(i) Pay-back period
(ii) Net present value at 10 discount factor
(iii) Profitability index at 10 discount factor
(iv) Internal rate of return with the help of 10% and 15% discount factor

The following present value table is given for you:

Year	Present value of Rs. 1 at 10% discount rate	Present value of Rs. 1 at 15% discount rate
1	.909	.870
2	.826	.756
3	.751	.658
4	.683	.572
5	.621	.497
6	.564	.432

7	.513	.376
8	.467	.327
9	.424	.284
10	.386	.247

Ans. **(i) Calculation of Pay-back Period**

Cash Outlay of the Project = Rs. 80,00,000
Total Cash Inflow for the first five years = Rs. 70,00,000
Balance of cash outlay left to be paid back in the 6th year Rs. 10,00,000
Cash inflow for 6th year = 16,00,000
So the payback period is between 5th and 6th years, i.e.,

$5 \text{ years} + \frac{1000000}{600000} = 5.625$ years or 5 years 7.5 months

(ii) Calculation of Net Present Value (NPV) @10% discount rate:

Year	Net Cash Inflow (Rs.)	Present Value at Discount Rate of 10%	Present Value (Rs.)
	(a)	(b)	(c) = (a) × (b)
1	14,00,000	0.909	12,72,600
2	14,00,000	0.826	11,56,400
3	14,00,000	0.751	10,51,400
4	14,00,000	0.683	9,56,200
5	14,00,000	0.621	8,69,400
6	16,00,000	0.564	9,02,400
7	20,00,000	0.513	10,26,000
8	30,00,000	0.467	14,01,000
9	20,00,000	0.424	8,48,000
10	8,00,000	0.386	3,08,800
			97,92,200

Net Present Value (NPV) = Cash Outflow – Present Value of Cash Inflows
= Rs. 80,00,000 – Rs. 97,92,200 = 17,92,200

(iii) Calculation of Profitability Index @ 10% discount rate:

$$\text{Profitability Index} = \frac{\text{Present Value of Cash inflows}}{\text{Cost of the investment}}$$

$$= \frac{9792200}{8000000} = 1.224$$

(iv) Calculation of Internal Rate of Return:

Net present value @ 10% interest rate factor has already been ca lculated in (ii) above, we will calculate Net present value @15% rate factor.

Year	Net Cash Inflow (Rs.)	Present Value at Discount Rate of 15%	Present Value (Rs.)
	(a)	(b)	(c) = (a)× (b)

1	14,00,000	0.870	12,18,000
2	14,00,000	0.756	10,58,400
3	14,00,000	0.658	9,21,200
4	14,00,000	0.572	8,00,800
5	14,00,000	0.497	6,95,800
6	16,00,000	0.432	6,91,200
7	20,00,000	0.376	7,52,000
8	30,00,000	0.327	9,81,000
9	20,00,000	0.284	5,68,000
10	8,00,000	0.247	1,97,600
			78,84,000

Net Present Value at 15% = Rs. 78,84,000 – Rs. 80,00,000 = Rs. -1,16,000

As the net present value @ 15% discount rate is negative, hence internal rate of return falls in between 10% and 15%. The correct internal rate of return can be calculated as follows:

$$IRR = L + \frac{NPV_L}{NPV_L - NPV_H}(H - L)$$

$$= 10\% + \frac{1792200}{1792200 - (-116000)}(15\% - 10\%)$$

$$= 10\% + \frac{1792200}{1908200} \times 5\% = 14.7\%$$

Q.143 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.144 Calculate NPV | MTP Nov 19

Probabilities for net cash flows for 3 years of a project of Ganesh Ltd are as follows:

Year 1		Year 2		Year 3	
Cash Flow (Rs.)	Probability	Cash Flow (Rs.)	Probability	Cash Flow (Rs.)	Probability
2,000	0.1	2,000	0.2	2,000	0.3
4,000	0.2	4,000	0.3	4,000	0.4
6,000	0.3	6,000	0.4	6,000	0.2
8,000	0.4	8,000	0.1	8,000	0.1

CALCULATE the expected net cash flows and the present value of the expected cash flow, using 10 per cent discount rate. Initial Investment is Rs. 10,000

Ans.

Year 1			Year 2			Year 3		
Cash Flow (Rs.)	Probability	Expecte Value (Rs.)	Cash Flow (Rs.)	Probability	Expected Value (Rs.)	Cash Flow (Rs.)	Probability	Expecte d Value (Rs.)
2,000	0.1	200	2,000	0.2	400	2,000	0.3	600
4,000	0.2	800	4,000	0.3	1200	4,000	0.4	1,600
6,000	0.3	1,800	6,000	0.4	2400	6,000	0.2	1,200
8,000	0.4	3,200	8,000	0.1	800	8,000	0.1	800
ENCF		6,000			4,800			4,200

The present value of the expected value of cash flow at 10 per cent discount rate has been determined as follows:

Present Value of cash flow $= \frac{ENCF_1}{(1+K)^1} + \frac{ENCF_2}{(1+K)^2} + \frac{ENCF_3}{(1+K)^3}$

$= \frac{6000}{(1.1)^1} + \frac{4800}{(1+1)^2} + \frac{4200}{(1.1)^3}$

= (6,000 × 0.909) + (4,800 × 0.826) + (4,200 + 0.751) = 12,573

Expected Net Present value = Present Value of cash flow - Initial Investment

= Rs. 12,573 – Rs.10,000 = Rs.2,573.

Q.145 MPV & Payback Method | PY Nov 18

PD Ltd. an existing company, is planning to introduce a new product with projected life of 8 years. Project cost will be ₹ 2,40,00,000. At the end of 8 years no residual value will be realized. Working capital of ₹ 30,00,000 will be needed. The 100% capacity of the project is 2,00,000 units p.a. but the Production and Sales Volume is expected are as under :

Year	Number of Units
1	60,000 units
2	80,000 units
3-5	1,40,000 units
6-8	1,20,000 units

Other Information:

(i) Selling price per unit ₹ 200

(ii) Variable cost is 40 of sales.

(iii) Fixed cost p.a. ₹ 30,00,000.

(iv) In addition to these advertisement expenditure will have to be incurred as under:

Year	*1*	*2*	*3-5*	*6-8*
Expenditure (₹)	*50,00,000*	*25,00,000*	*10,00,000*	*5,00,000*

(v) Income Tax is 25%.

(vi) Straight line method of depreciation is permissible for tax purpose. (vii) Cost of capital is 10%.

(viii) Assume that loss cannot be carried forward.

Year	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
PVF@ 10	*0.909*	*0.826*	*0.751*	*0.683*	*0.621*	*0.564*	*0.513*	*0.467*

Advise about the project acceptability.

Ans. **Computation of initial cash outlay(COF)**

	(₹ in lakhs)
Project Cost	240
Working Capital	30
	270

Calculation of Cash Inflows(CIF):

Years	**1**	**2**	**3-5**	**6-8**
Sales in units	60,000	80,000	1,40,000	1,20,000

	₹	₹	₹	₹
Contribution (₹ 200 x 60% x No. of Unit)	72,00,000	96,00,000	1,68,00,000	1,44,00,000
Less: Fixed cost	30,00,000	30,00,000	30,00,000	30,00,000
Less: Advertisement	50,00,000	25,00,000	10,00,000	5,00,000
Less: Depreciation (24000000/8) = 30,00,000	30,00,000	30,00,000	30,00,000	30,00,000
Profit /(loss)	(38,00,000)	11,00,000	98,00,000	79,00,000
Less: Tax @ 25%	NIL	2,75,000	24,50,000	19,75,000
Profit/(Loss) after tax	(38,00,000)	8,25,000	73,50,000	59,25,000
Add: Depreciation	30,00,000	30,00,000	30,00,000	30,00,000
Cash inflow	(8,00,000)	38,25,000	1,03,50,000	89,25,000

(Note: Since variable cost is 40%, Contribution shall be 60% of sales)

Computation of PV of CIF

Year	CIF ₹	PV Factor @ 10%	₹
1	(8,00,000)	0.909	(7,27,200)
2	38,25,000	0.826	31,59,450
3	1,03,50,000	0.751	77,72,850
4	1,03,50,000	0.683	70,69,050
5	1,03,50,000	0.621	64,27,350
6	89,25,000	0.564	50,33,700
7	89,25,000	0.513	45,78,525
8	89,25,000		
Working Capital	30,00,000	0.467	55,68,975
			3,88,82,700
	PV of COF		2,70,00,000
		NPV	1,18,82,700

Recommendation: Accept the project in view of positive NPV.

Q.146 Purchase Machine or Not | MTP May 22(2)

Manoran jan 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 incr ease 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 Tea & Coffee charges	(120 × 10 ×3) + (40 ×15 × 3) + (40 ×10 × 1) x 200 days	11,60,000
(b)	AMC of machine		(75,000)
(c)	Electricity charges	500 ×12 ×12	(72,000)
(d)	Coffee Beans	(W.N.) 144 × 90	(12,960)
(e)	Tea Powder	(W.N.) 480 × 70	(33,600)
(f)	Sugar	(W.N.) 1248 × 50	(62,400)
(g)	Milk	(W.N.) 12480 × 50	(6,24,000)
(h)	Paper Cup	(W.N.) 1,37,280 × 0.2	(27,456)
(i)	Depreciation	10,00,000/5	(2,00,000)
Profit before Tax			**52,584**
(-) Tax @ 25%			**(13,146)**
Profit after Tax			**39,438**
Depreciation			**2,00,000**
CFAT			**2,39,438**

B. Computation of NPV

Year	Particulars	CF	PVF @ 12%	PV
0	Cost of machine	(10,00,00)	1	(10,00,000)
1-5	CFAT	2,39,438	3.6048	8,63,126
Net Present Value				**(1,36,874)**

Since NPV of the machine is negative, it should not be purchased.

Working Note:

Computation of Qty of consumable

No. of Tea Cups = [(120 × 3 × 200 days) + (40 × 1 × 200 days) × 1.2 = 96,000

No. of Coffee cups = 40 × 3 × 200 days × 1.2 = 28,800

No. of coffee beans packet $= \frac{28800}{200}$ = 144

No. of Tea Powder Packets $= \frac{96000}{200}$ = 480

Qty of Sugar $= \frac{(96000 + 28800) X 10g}{1000g}$ = 1248 kgs

Qty of Milk $= \frac{(96000 + 28800) x 100ml}{1000ml}$ = 12,480 litres

No. of paper cups = (96,000 + 28,800) × 1.1 = 1,37,280

Q.147 Purchase Machine or Not MTP May 21(1)

GG Pat hology Lab Ltd. is using 2D sonography machine which has reached the end of its useful life. The lab is intending to upgrade along with the technology by investing in 3D sonography machine as per the choices preferred by the patients. Following new 3D s onography machine of two different brands with same features is available in the market:

Brand	Cost of machine (Rs.)	Life of machine (Rs.)	Maintenance Cost (Rs.)			SLM Depreciation rate (%)
			Year 1-5	Year 6-10	Year 11-15	
X	15,00,000	15	50,000	70,000	98,000	6
Y	10,00,000	10	70,000	1,15,000	-	6

Residual Value of machines shall be dropped by 10% and 40% of Purchase price for Brand X and Y respectively in the first year and thereafter shall be depreciated at the rate mentioned above on the original cost.

Alternatively, the machine of Brand Y 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 Rs. 2,24,000. Annual Rent for the subsequent 4 years shall be Rs. 2,25,000.
- Annual Rent for the final 5 years shall be Rs. 2,70,000.
- The Rent/Agreement can be terminated by GG Labs by making a payment of Rs. 2,20,000 as penalty. This penalty would be reduced by Rs. 22,000 each year of the period of rental agreement.

You are required to:

(i) ADVISE which brand of 3D sonography machine should be acquired assuming that the use of machine shall be continued for a period of 20 years.

(ii) 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 GG Labs is 12%.

The present value factor of Rs. 1 @ 12% for different years is given as under:

Year	PVF	Year	PVF
1	0.893	9	0.361
2	0.797	10	0.322
3	0.712	11	0.287
4	0.636	12	0.257
5	0.567	13	0.229

6	0.507	14	0.205
7	0.452		0.183
8	0.404	16	0.163

Ans. Since the life span of each machine is different and time span exceeds the useful lives of each modeI, we shall use Equivalent Annual Cost method to decide which brand should be chosen.

(i) If machine is used for 20 years

(a) Residual value of machine of brand X

= [Rs. 15,00,000 – (1 - 0.10)] - (Rs. 15,00,000 × 0.06 × 14) = Rs. 90,000

(b) Residual value of machine of brand Y

= [Rs. 10,00,000 – (1 - 0.40)] - (Rs. 10,00,000 × 0.06 × 9) = Rs. 60,000

Present Value (PV) of cost if machine of brand X is purchased

Period	Cash Outflow (Rs.)	PVF @ 12%	PV (Rs.)
0	15,00,000	1.000	15,00,000
1-5	50,000	3.605	1,80,250
6-10	70,000	2.046	1,43,220
11-15	98,000	1.161	1,13,778
15	(90,000)	0.183	(16,470)
			19,20,778

PVAF for 1-15 years = 6.812

Equivalent Annual Cost = $\frac{1920778}{6.812}$ = Rs. 2,81,969.76

Present Value (PV) of cost if machine of brand Y is purchased

Period	Cash Outflow (Rs.)	PVF @ 12%	PV (Rs.)
0	10,00,000	1.000	10,00,000
1-5	70,000	3.605	2,52,350
6-10	1,15,000	2.046	2,35,290
10	(60,000)	0.322	(19,320)
			14,68,320

PVAF for 1-10 years = 5.651

Equivalent Annual Cost = $\frac{1468320}{5.651}$ = Rs. 2,59,833.66

Present Value (PV) of cost if machine of brand Y is taken on rent

Period	Cash Outflow (Rs.)	PVF @ 12%	PV (Rs.)
0	2,24,000	1.000	2,24,000
1-4	2,25,000	3.038	6,83,550
5-9	2,70,000	2.291	6,18,570
			15,26,120

PVAF for 1-10 years = 5.651

Equivalent Annual Cost = $\frac{1526120}{5.651}$ = Rs. 2,70,061.94

Decision: Since Equivalent Annual Cash Outflow is least in case of purchase of Machine of brand Y the same should be purchased.

(ii) If machine is used for 5 years

(a) Scrap value of machine of brand X
= [Rs. 15,00,000 – (1 - 0.10)] - (Rs. 15,00,000 × 0.06 × 4) = Rs. 9,90,000

(b) Scrap value of machine of brand Y
= [Rs. 10,00,000 – (1 - 0.40)] - (Rs. 10,00,000 × 0.06 × 4) = Rs. 3,60,000

Present Value (PV) of cost if machine of brand X is purchased

Period	Cash Outflow (Rs.)	PVF @ 12%	PV (Rs.)
0	15,00,000	1.000	15,00,000
1-5	50,000	3.605	1,80,250
5	(9,90,000)	0.567	(5,61,330)
			11,18,920

Present Value (PV) of cost if machine of brand Y is purchased

Period	Cash Outflow (Rs.)	PVF @ 12%	PV (Rs.)
0	10,00,000	1.000	10,00,000
1-5	70,000	3.605	2,52,350
5	(3,60,000)	0.567	(2,04,120)
			10,48,230

Present Value (PV) of cost if machine of brand Y is taken on rent

Period	Cash Outflow (Rs.)	PVF @ 12%	PV (Rs.)
0	2,24,000	1.000	2,24,000
1-4	2,25,000	3.038	6,83,550
5	1,10,000*	0.567	62,370
			9,69,920

* [Rs. 2,20,000 - (Rs. 22,000 × 5) = Rs. 1,10,000]

Decision: Since Cash Outflow is least in case of rent of Machine of brand Y the same should be taken on rent.

Q.148 Replace Machine using NPV | PY July 21

An exis ting company has a machine which has been in operation for two years, its estimated remaining useful life is 4 years with no residual value in the end. Its current market value is ₹ 3 lakhs. The management is considering a proposal to purchase an improved model of a machine gives increase output. The details are as under:

Particulars	*Existing Machine*	*New Machine*
Purchase Price	*₹ 6,00,000*	*₹ 10,00,000*
Estimated Life	*6 years*	*4 years*
Residual Value	*0*	*0*
Annual Operating days	*300*	*300*
Operating hours per day	*6*	*6*
Selling price per unit	*₹ 10*	*₹ 10*
Material cost per unit	*₹ 2*	*₹ 2*
Output per hour in units	*20*	*40*
Labour cost per hour	*₹ 20*	*₹ 30*

Fixed overhead per annum excluding depreciation	*₹ 1,00,000*	*₹ 60,000*
Working Capital	*₹ 1,00,000*	*₹ 2,00,000*
Income-tax rate	*30%*	*30%*

Assuming that - cost of capital is 10% and the company uses written down value of depreciation @ 20% and it has several machines in 20% block.

Advice the management on the Replacement of Machine as per the NPV method. The discounting factors table given below:

Discounting Factors	*Year 1*	*Year 2*	*Year 3*	*Year 4*
10%	*0.909*	*0.826*	*0.751*	*0.683*

Ans.

(i) Calculation of Net Initial Cash Outflows:

Particulars	₹
Purchase Price of new machine	10,00,000
Add: Net Working Capital	1,00,000
Less: Sale proceeds of existing machine	3,00,000
Net initial cash outflows	8,00,000

(ii) Calculation of annual Profit Before Tax and depreciation

Particulars	**Existing machine**	**New Machine**	**Differential**
(1)	**(2)**	**(3)**	**(4) = (3) – (2)**
Annual output	36,000 units	72,000 units	36,000 units
	₹	₹	₹
(A) Sales revenue @ ₹ 10 per unit	3,60,000	7,20,000	3,60,000
(B) Cost of Operation			
Material @ ₹ 2 per unit	72,000	1,44,000	72,000
Labour			
Old = 1,800 × ₹ 20	36,000		
New = 1,800 × ₹ 30		54,000	18,000
Fixed overhead excluding depreciation	1,00,000	60,000	(40,000)
Total Cost (B)	2,08,000	2,58,000	50,000
Profit Before Tax and depreciation (PBTD) (A – B)	**1,52,000**	**4,62,000**	**3,10,000**

(i) Calculation of Net Present value on replacement of machine

Year	**PBTD**	**Depreciation @ 20% WDV**	**PBT**	**Tax @ 30%**	**PAT**	**Net cash flow**	**PVF @ 10%**	**PV**
(1)	**(2)**	**(3)**	**(4 = 2-3)**	**(5)**	**(6 = 4-5)**	**(7 = 6 + 3)**	**(8)**	**(9 = 7 x 8)**
1	3,10,000	1,40,000	1,70,000	51,000	1,19,000	2,59,000	0.909	2,35,431.000
2	3,10,000	1,12,000	1,98,000	59,400	1,38,600	2,50,600	0.826	2,06,995.600
3	3,10,000	89,600	2,20,400	66,120	1,54,280	2,43,880	0.751	1,83,153.880

4	3,10,000	71,680	2,38,320	71,496	1,66,824	2,38,504	0.683	1,62,898.232
								7,88,478.712
Add: Release of net working capital at year end 4 (1,00,000 x 0.683)								68,300.000
Less: Initial Cash Outflow								8,00,000.000
NPV								**56,778.712**

Advice: Since the incremental NPV is positive, existing machine should be replaced.

Working Notes:

1. **Calculation of Annual Output**

Annual output = (Annual operating days x Operating hours per day) x output per hour

Existing machine = (300 x 6) x 20 = 1,800 x 20 = 36,000 units

New machine = (300 x 6) x 40 = 1,800 x 40 = 72,000 units

2. **Base for incremental depreciation**

Particulars		₹
WDV of Existing Machine		
Purchase price of existing machine		6,00,000
Less: Depreciation for year 1	1,20,000	
Depreciation for Year 2	96,000	2,16,000
WDV of Existing Machine (i)		**3,84,000**
Depreciation base of New Machine		
Purchase price of new machine		10,00,000
Add: WDV of existing machine		3,84,000
Less: Sales value of existing machine		3,00,000
Depreciation base of New Machine (ii)		**10,84,000**
Base for incremental depreciation [(ii) – (i)]		**7,00,000**

(Note: The above solution have been done based on incremental approach) Alternatively, solution can be done based on Total Approach as below:

(i) Calculation of depreciation:

Existing Machine						
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Opening balance	6,00,000	4,80,000	3,84,000	3,07,200	2,45,760	1,96,608.00
Less: Depreciation @ 20%	1,20,000	96,000	76,800	61,440	49,152	39,321.60
WDV	4,80,000	3,84,000	3,07,200	2,45,760	1,96,608	1,57,286.40

New Machine				
	Year 1	**Year 2**	**Year 3**	**Year 4**
Opening balance	**10,84,000***	8,67,200	6,93,760	5,55,008.00
Less: Depreciation @ 20%	**2,16,800**	**1,73,440**	**1,38,752**	**1,11,001.60**
WDV	8,67,200	6,93,760	5,55,008	4,44,006.40

* As the company has several machines in 20% block, the value of Existing Machine from the block calculated as below shall be added to the new machine of ₹ 10,00,000:

WDV of existing machine at the beginning of the year ₹ 3,84,000
Less: Sale Value of Machine ₹ 3,00,000
WDV of existing machine in the block ₹ 84,000
Therefore, opening balance for depreciation of block = ₹ 10,00,000 + ₹ 84,000 = ₹ 10,84,000

(ii) Calculation of annual cash inflows from operation:

Particulas	EXISTING MACHINE			
	Year 3	Year 4	Year 5	Year 6
Annual output (300 operating Days x 6 operating hours x 20 output per hour)	**36,000 units**	**36,000 units**	**36,000 units**	**36,000 units**
	₹	₹	₹	₹
(A) **Sales revenue @₹10 per unit**	**3,60,000.00**	**3,60,000.00**	**3,60,000.00**	**3,60,000.00**
(B) Less: Cost of Operation				
Material @ ₹ 2 per unit	72,000.00	72,000.00	72,000.00	72,000.00
Labour @ ₹ 20 per hour for (300 x 6) hours	36,000.00	36,000.00	36,000.00	36,000.00
Fixed overhead	1,00,000.00	1,00,000.00	1,00,000.00	1,00,000.00
Depreciation	76,800.00	61,440.00	49,152.00	39,321.60
Total Cost (B)	**2,84,800.00**	**2,69,440.00**	**2,57,152.00**	**2,47,321.60**
Profit Before Tax (A – B)	75,200.00	90,560.00	1,02,848.00	1,12,678.40
Less: Tax @ 30%	22,560.00	27,168.00	30,854.40	33,803.52
Profit After Tax	**52,640.00**	**63,392.00**	**71,993.60**	**78,874.88**
Add: Depreciation	76,800.00	61,440.00	49,152.00	39,321.60
Capital				1,00,000.00
Annual Cash Inflows	**1,29,440.00**	**1,24,832.00**	**1,21,145.60**	**2,18,196.48**

Particulars	NEW MACHINE			
	Year 1	Year 2	Year 3	Year 4
Annual output (300 operating days x 6 operating hours x 40 output per hour)	**72,000 units**	**72,000 units**	**72,000 units**	**72,000 units**
	₹	₹	₹	₹
(A) **Sales revenue @ ₹10 per unit**	**7,20,000.00**	**7,20,000.00**	**7,20,000.00**	**7,20,000.00**
(B) Less: Cost of Operation				
Material @ ₹ 2 per unit	1,44,000.00	1,44,000.00	1,44,000.00	1,44,000.00
Labour @ ₹ 30 per hour for (300 x 6) hours	54,000.00	54,000.00	54,000.00	54,000.00
Fixed overhead	60,000.00	60,000.00	60,000.00	60,000.00
Depreciation	2,16,800.00	1,73,440.00	1,38,752.00	1,11,001.60
Total Cost (B)	**4,74,800.00**	**4,31,440.00**	**3,96,752.00**	**3,69,001.60**
Profit Before Tax (A – B)	2,45,200.00	2,88,560.00	3,23,248.00	3,50,998.40

Less: Tax @ 30%	73,560.00	86,568.00	96,974.40	1,05,299.52
Profit After Tax	1,71,640.00	2,01,992.00	2,26,273.60	2,45,698.88
Add: Depreciation	2,16,800.00	1,73,440.00	1,38,752.00	1,11,001.60
Add: Release of Working Capital				2,00,000.00
Annual Cash Inflows	**3,88,440.00**	**3,75,432.00**	**3,65,025.60**	**5,56,700.48**

(iii) Calculation of Incremental Annual Cash Flow:

Particulars	Year 1 (₹)	Year 2 (₹)	Year 3 (₹)	Year 4 (₹)
Existing Machine (A)	1,29,440.00	1,24,832.00	1,21,145.60	2,18,196.48
New Machine (B)	3,88,440.00	3,75,432.00	3,65,025.60	5,56,700.48
Incremental Annual Cash Flow (B – A)	2,59,000.00	2,50,600.00	2,43,880.00	3,38,504.00

(iv) Calculation of Net Present Value on replacement of machine:

Year	Incremental Annual Cash Flow (₹) (A)	Discounting factor @ 10% (B)	Present Value of Incremental Annual Cash Flow (₹) (A x B)
1	2,59,000.00	0.909	2,35,431.000
2	2,50,600.00	0.826	2,06,995.600
3	2,43,880.00	0.751	1,83,153.880
4	3,38,504.00	0.683	2,31,198.232
Total Incremental Inflows			**8,56,778.712**
Less: Net Initial Cash Outflows (Working note)			8,00,000.000
Incremental NPV			**56,778.712**

Advice: Since the incremental NPV is positive, existing machine should be replaced.

Working Note:

Calculation of Net Initial Cash Outflows:

Particulars	₹
Cost of new machine	10,00,000
Less: Sale proceeds of existing machine	3,00,000
Add: incremental working capital required (₹ 2,00,000 – ₹ 1,00,000)	1,00,000
Net initial cash outflows	**8,00,000**

Q.149 Which Finance to choose | RTP Nov 18

XYZ Ltd. requires an equipment costing ₹50,00,000; the same will be utilized over a period of 5 years. It has two financing options in this regard:

(i) Arrangement of a loan of ₹50,00,000 at an interest rate of 14 percent per annum; the loan being repayable in 5 equal year end instalments; the equipment can be sold at the end of fifth year for ₹5,00,000.

(ii) Leasing the equipment for a period of five years at an early rental of ₹16,50,000 payable at the year end. The rate of depreciation is 15 percent on Written Down Value (WDV) basis, income tax rate is 35 percent and discount rate is 12 percent.

ADVISE which of the financing options should XYZ Ltd. exercise and why?

Ans. **Option A**

The loan amount is repayable together with the interest at the rate of 14% on loan amount and is repayable in equal instalments at the end of each year. The PVAF at the rate of 14% for 5 years is 3.432, the amount payable will be

$$\text{Annual Payment} = \frac{5000000}{3.432} = ₹14,56,876$$

Schedule of Debt Repayment

End of year	Total Payment (₹)	Interest (₹)	Principal (₹)	Principal amount outstanding (₹)
1	14,56,876	7,00,000	7,56,876	42,43,124
2	14,56,876	5,94,037	8,62,839	33,80,285
3	14,56,876	4,73,240	9,83,636	23,96,649
4	14,56,876	3,35,531	11,21,345	12,75,304
5	14,56,876	1,81,572*	12,75,304	0

*Balancing Figure

Schedule of Cash Outflows: Debt Alternative **(Amount in ₹)**

End of year	Debt Payment	Interest	Depreciation	Total	Tax Shield	Cash Outflows	PV factor @12%	Present Value
1	14,56,876	7,00,000	7,50,000	14,50,000	5,07,500	9,49,376	0.893	8,47,793
2	14,56,876	5,94,037	6,37,500	12,31,537	4,31,038	10,25,838	0.797	8,17,593
3	14,56,876	4,73,240	5,41,875	10,15,115	3,55,290	11,01,586	0.712	7,84,329
4	14,56,876	3,35,531	4,60,594	7,96,125	2,78,644	11,78,232	0.636	7,49,356
5	14,56,876	1,81,572	3,91,505	5,73,077	2,00,577	12,56,299	0.567	7,12,322
								39,11,393
Less:	PV of Salvage							(12,57,904)
								26,53,489

Total present value of Outflows = ₹ 26,53,489

Option B

Lease Rent ₹16,50,000
Tax Shield (5,77,500)
Outflow 10,72,500 × 3.605 = ₹38,66,363
Since PV of outflows is lower in the Borrowing option, XYZ Ltd. should avail of the loan and purchase the equipment.