

PRACTICE BOOK

An Additional Practice Book
For Extensive Revision

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CHAPTER-1
FINANCING DECISIONS – LEVERAGES

Q.4 The following information is related to Yizi Company Ltd. for the year ended 31st March, 2021:

Equity shares capital (of ₹10 each)	50 lakhs
12% Bonds of ₹ 1,000 each	37 lakhs
Sales	84 lakhs
Fixed cost (excluding interest)	6.96 lakhs
Financial leverage	1.49
Profit-volume Ratio	27.55%
Income Tax Applicable	40%

You are required to CALCULATE:

- (i) Operating Leverage; (ii) Combined leverage; and (iii) Earnings per share.
Show calculations up-to two decimal points.

Ans: Computation of profit after Tax (PAT)

Particulars	(₹)
Sales	84,00,000
Contribution (Sales x P/V) ratio	23,14,200
Less: Fixed cost (excluding interest)	(6,96,000)
EBIT (Earning before interest and tax)	16,18,200
Less: Interest on debentures (12% x ₹37 lakh)	4,44,000
Less: Other fixed interest (balancing figure)	(88,160)*
EBT (Earnings before tax)	10,86,040
Less: Tax @ 40%	4,34,416
PAT(Profit after tax)	6,51,624

(i) Operating Leverage:

$$= \frac{\text{Contribution}}{\text{EBIT}} = \frac{23,14,200}{16,18,200} = 1.43$$

(ii) Combined Leverage:

$$= \text{Operating Leverage} \times \text{Financial Leverage} \\ = 1.43 \times 1.49 = 2.13$$

OR,

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

$$\text{Combined Leverage} = \frac{\text{Contribution}}{\text{EBT}} \times \frac{₹23,14,200}{₹10,86,040} = 2.13$$

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{16,18,200}{10,86,040} = 1.49$$

$$\text{So, EBT} = \frac{16,18,200}{1.49} = ₹ 10,86,040$$

$$\text{Accordingly, other fixed interest} = ₹ 16,18,200 - ₹ 10,86,040 - ₹ 4,44,000 = 88,160$$

(iii) Earnings per share (EPS):]

$$= \frac{PAT}{\text{No. of shares outstanding}} = \frac{₹6,51,624}{5,00,000 \text{ equity shares}} = ₹1.30$$

Q.5

Following are the selected financial information of A Ltd. And B Ltd. For the current Financial Year.

Particulars	A Ltd.	B. Ltd.
Variable Cost Ratio	60%	50%
Interest	₹20,000	₹1,00,000
Operating Leverage	5	2
Financial Leverage	3	2
Tax Rate	30%	30%

You are required to FIND out:

- (i) EBIT
- (ii) Sales
- (iii) Fixed Cost
- (iv) Identify the company which is better placed with reasons based on leverages.

Ans: **Company A**

$$(i) \text{ Financial Leverage} = \frac{EBIT}{EBT \text{ i.e. } EBIT - \text{Interest}}$$

$$\text{So, } 3 = \frac{EBIT}{EBIT - ₹20,000}$$

$$\begin{aligned} \text{Or, } 3(EBIT - 20,000) &= EBIT \\ \text{Or, } 2 \text{ EBIT} &= 60,000 \\ \text{Or, EBIT} &= 30,000 \end{aligned}$$

$$(ii) \text{ Operating Leverage} = \frac{\text{Contribution}}{EBIT} \text{ Or, } 5 = \frac{\text{Contribution}}{₹30,000}$$

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

$$\text{Sales} = \frac{\text{Contribution}}{P/V \text{ Ratio } (1 - \text{variable cost ratio})} = \frac{₹1,50,000}{40\%} = ₹3,75,000$$

$$\begin{aligned} (iii) \text{ Fixed Cost} &= \text{Contribution} - \text{EBIT} \\ &= ₹ 1,50,000 - 30,000 \\ \text{Or, Fixed Cost} &= ₹ 1,20,000 \end{aligned}$$

Company B

$$(i) \quad \text{Financial Leverage} = \frac{EBIT}{EBT \text{ i.e. } EBIT - \text{Interest}}$$

$$\text{So, } 2 = \frac{EBIT}{EBIT - ₹1,00,000}$$

$$\text{Or, } 2(EBIT - ₹1,00,000) = EBIT$$

$$\text{Or, } 2EBIT - ₹2,00,000 = EBIT$$

$$\text{Or, } EBIT = ₹2,00,000$$

$$(ii) \quad \text{Operating Leverage} = \frac{\text{Contribution}}{EBIT}$$

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

$$\text{Or, Contribution} = ₹4,00,000$$

$$\text{Sales} = \frac{\text{Contribution}}{P/V \text{ Ratio } (1 - \text{variable cost ratio})} = \frac{₹4,00,000}{50\%} = ₹8,00,000$$

$$(iii) \quad \text{Fixed Cost} = \text{Contribution} - EBIT$$

$$= ₹4,00,000 - ₹2,00,000$$

$$\text{Or, Fixed Cost} = ₹2,00,000$$

	Company A (₹)	Company B (₹)
Sales	3,75,000	8,00,000
Less:	2,25,000	4,00,000
Contribution	1,50,000	4,00,000
Less: Fixed Cost	1,20,000	2,00,000
Earnings before interest and tax (EBIT)	30,000	2,00,000
Less: Interest	20,000	1,00,000
Interest before tax (EBT)	10,000	1,00,000
Less: Tax @ 30%	3,000	30,000
Earnings after tax (EAT)	7,000	70,000

Comment based on Leverage

Comment based on leverage – Company B is better than company A of the following reasons:

- Capacity of Company B to meet interest liability is better than that of companies A (from EBIT/interest ratio)

$$\left[A = \frac{₹30,000}{₹20,000} = 1.5 \quad B = \frac{₹20,000}{₹1,00,000} = 2 \right]$$

- Company B has the least financial risk as the total risk (business and financial) of company B is lower (combined leverage of Company A-15 and Company B-4)

Q.13 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 (ROI 20%)	10,000	5,000
	20,000	20,000

Ans: (i) **Operating Leverage (OL)**

	Situation-I	Situation-II
	(₹)	(₹)
Sales (3000 units @ 30 percent unit)	90,000	90,000
Less: Variable Cost (@15 percent unit)	45,000	45,000
Contribution (C)	45,000	45,000
Less: Fixed Cost	15,000	20,000
EBIT	30,000	25,000
Operating Leverage (OL) = $\frac{C}{EBIT}$	$\frac{45,000}{30,000}$ =1.5	$\frac{45,000}{30,000}$ =1.8

(ii) **Financial Leverage (FL)**

	A (₹)	B (₹)
Situation I		
EBIT	30,000	30,000
Less: Interest on debt	2,000	1,000
EBT	28,000	28,000
Financial Leverage (FL) = $\frac{EBIT}{EBT}$	$\frac{30,000}{28,000}$ =1.07	$\frac{30,000}{29,000}$ =1.034

	A (₹)	B (₹)
Situation-II		
EBIT	25,000	25,000
Less: Interest on debt	2,000	1,000
EBT	23,000	24,000
Financial Leverage (FL) = $\frac{EBIT}{EBT}$	$\frac{25,000}{23,000}$ =1.09	$\frac{25,000}{24,000}$ =1.04

(iii) Combined Leverage (CL)

	A	B
Situation-I		
CL = FL x OL	1.5x1.07=1.61	1.5x1.03=1.55
Situation-II		
CL x FL x OL	1.8x1.09=1.96	1.8x1.04=1.872

Q.18 From the following information prepare income statement of Company A and B “

Particulars	Company A	Company B
Margin of safety	0.20	0.25
Interest	3,000	2,000
Profit volume ratio	25%	33.33%
Financial leverage	4	3
Tax Rate	45%	45%

Ans: Income Statement

Particulars	Company A (₹)	Company B (₹)
Sales	80,000	36,000
Less: Variable Cost	60,000	24,000
Contribution	20,000	12,000
Less: Fixed Cost	16,000	9,000
EBIT	4,000	3,000
Less: Interest	3,000	2,000
EBT	1,000	1,000
Tax (45%)	450	450
EAT	550	550

Workings:

(i) Company A

$$\begin{aligned} \text{Financial Leverage} &= \text{EBIT}/(\text{EBIT}-\text{Interest}) \\ 4 &= \text{EBIT}/(\text{EBIT}- ₹3,000) \\ 4\text{EBIT}- ₹ 12,000 &= \text{EBIT} \end{aligned}$$

$$3\text{EBIT} = ₹ 12,000$$

$$\text{EBIT} = ₹ 4,000$$

Company B

$$\text{Financial Leverage} = \text{EBIT}/(\text{EBIT} - \text{interest})$$

$$3 = \text{EBIT}/(\text{EBIT} - ₹ 2,000)$$

$$3\text{EBIT} - ₹ 6000 = \text{EBIT}$$

$$2\text{EBIT} = ₹ 6,000$$

$$\text{EBIT} = ₹ 3,000$$

(ii) Company A

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

$$= 1/0.20 = 5$$

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

$$5 = \text{Contribution} / ₹ 4,000$$

$$\text{Contribution} = ₹ 20,000$$

Company B

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

$$= 1/0.25 = 4$$

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

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

$$4 = \text{Contribution} / ₹ 3,000$$

$$\text{Contribution} = ₹ 12,000$$

(iii) Company A

$$\text{Profit Volume Ratio} = 25\% \text{ (Given)}$$

$$\text{Profit Volume Ratio} = \text{Contribution}/\text{Sales} \times 100$$

$$25\% = ₹ 20,000/\text{Sales}$$

$$\text{Sales} = ₹ 20,000/25\%$$

$$\text{Sales} = ₹ 80,000$$

Company B

$$\text{Profit Volume Ratio} = 33.33\%$$

$$\text{Therefore, Sales} = ₹ 12,000/33.33\%$$

$$\text{Sales} = ₹ 36,000$$

CHAPTER -2

COST OF CAPITAL

Q.12 CALCULATE the cost of equity from the following data using realized yield approach:

Year	1	2	3	4	5
Dividend per share (₹)	1.00	1.00	1.20	1.25	1.15
Price per share (at the beginning) (₹)	9.00	9.75	11.5	11.00	10.60

Ans: In this question, we will first calculate the yield for last 4 years and then will calculate it's geometric mean.

Yield for last 4 years:

$$1 + Y_1 = \frac{D_1 + P_1}{P_0} = \frac{₹1 + ₹9.75}{₹9} = 1.1944$$

$$1 + Y_2 = \frac{D_2 + P_2}{P_1} = \frac{₹1 + ₹11.50}{₹9.75} = 1.12821$$

$$1 + Y_3 = \frac{D_3 + P_3}{P_2} = \frac{₹1.2 + ₹11}{₹11.5} = 1.0609$$

$$1 + Y_4 = \frac{D_4 + P_4}{P_3} = \frac{₹1.25 + ₹10.60}{₹11} = 1.0772$$

Geometric mean:

$$K_e = [(1 + Y_1) \times (1 + Y_2) \times \dots \times (1 + Y_n)]^{1/n-1}$$

$$K_e = [1.1944 \times 1.12821 \times 1.0609 \times 1.0772]^{1/4-1} = 1.015 = 15\%$$

Q.18 CALCULATE the WACC using the following data by using:

- (a) Book value weights
- (b) Market value weights

The capital structure of the company is as under: (₹)

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

The market prices of these securities are:

Debentures	₹ 105 per debenture
Preference shares	₹110 per preference share
Equity shares	₹ 24 per equity share

Additional information:

- (1) ₹ 100 per debenture redeemable at par, 10% coupon rate, 4% floatation costs, 10-year maturity.

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

(3) Equity shares has ₹ 4 flotation cost and market price of ₹ 24 per share.

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

Corporate tax rate is 30%. Use YTM method to calculate cost of debentures and preference shares.

Ans: (i) **Cost of Equity (K_e)**

$$= \frac{D_1}{P_0 - F} + g = \frac{1}{₹24 - ₹4} + 0.05 = 0.1 \text{ or } 10\%$$

(ii) **Cost of Debt (K_d)**

Current market price (P₀) – flotation cost

$$= I (1-t) \times PVAF (r,10) + RV \times PVIF (r,10)$$

$$₹ 105 - 4\% \text{ of } ₹105 = ₹10 (1-0.3) \times PVAF (r,10) + ₹100 \times PVAF (r,10)$$

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

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

Calculation of IRR

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

Cost of Debt (K_d) = 6.89%

(iv) **Cost of preference shares (K_a)**

Current market price (P₀) – flotation cost = PD x PVAF (r,10) + RV x PVIF (r,10)

$$₹ 110 - 2\% \text{ of } ₹110 = ₹5 \times PVAF (r,10) + ₹100 \times PVIF (r,10)$$

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

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

Calculation of IRR

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

Cost of preference shares (K_p) = 4.08%

(a) Calculation of WACC using book value weights

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

WACC (K_o) = 0.07743 or 7.74%

(b) Calculation of WACC using market value weights

Source of capital	Market Value	Weights	After tax cost of capital	WACC (K_o)
	(₹)	(a)	(b)	C=(a)x(b)
10% Debentures (₹105 x 5,000)	5,25,000	0.151	0.0689	0.0104
5% Preference shares (₹110x5,000)	5,50,000	0.158	0.0408	0.0064
Equity shares (₹ 24x1,00,000)	24,00,000	0.691	0.10	0.0691
	34,75,000	1.000		0.0859

WACC (K_o) = 0.0859 or 8.59%

Q.19 ABC Ltd. has the following capital structure, which is considered to be optimum as on 31st March, 2022.

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

The company share has a market price of ₹23.60. Next year dividend per share is 50% of year 2021 EPS. Following is the uniform trend of EPS for the preceding 10 years which is expected to continue in future:

Year	EPS	Year	EPS
2012	1.00	2017	1.61
2013	1.10	2018	1.77
2014	1.21	2019	1.95
2015	1.33	2020	2.15
2016	1.46	2021	2.36

The company issued new debentures carrying 16% rate of interest and the current market price of debenture is ₹ 96. Preference shares of ₹ 9.20 (with annual dividend of ₹ 1.1 per share) were also issued. The company is in 50% tax bracket.

(A) CALCULATE after tax:

(i) Cost of new debt

(ii) Cost of new preference shares

- (iii) Cost of 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 2021.
- (D) COMPUTE marginal cost of capital when the fund exceeds the amount calculated in (C), assuming new equity is issued at ₹20 per share?

Ans: (A) (i) Cost of new debt

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

$$= \frac{₹ 16 (1-05)}{₹ 96} = 0.0833$$

(ii) Cost of new preference shares

$$K_p = \frac{PD}{P_o} = \frac{₹ 1.1}{9.2} = 0.12$$

(iii) Cost of new equity shares

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

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

Calculation of g when there is a uniform trend (on the basis of EPS)

$$g = \frac{\text{EPS (2014)} - \text{EPS (2013)}}{\text{EPS (2013)}}$$

$$= \frac{₹ 1.10 - ₹ 1.00}{₹ 1.00} = 0.10 \text{ or } 10\%$$

Calculation of D_1

$$D_1 = 50\% \text{ of } 2022\text{EPS} = 50\% \text{ of } 2.36 = ₹ 1.18$$

(B) Calculation of marginal cost of capital

Type of Capital	EPS	Year	EPS
(1)	(2)	(3)	(2) x (3) = 4
Debenture	0.15	0.0833	0.0125
Preference share	0.05	0.1200	0.0060
Equity Share	0.80	0.1500	0.1200
Marginal cost of capital			0.1385

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

$$\begin{aligned} \text{Retained earnings} &= 50\% \text{ of EPS of } 2022 \times \text{outstanding equity shares} \\ &= 0.50 \times ₹ 2.36 \times 10,000 \text{ shares} = ₹ 11,800 \end{aligned}$$

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

So, ₹ 11,800 = 80% of total capital

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

(D) If the company spends in excess of ₹ 14,750, it will have to issue new equity shares at ₹ 20 per share.

$$\therefore \text{The cost of new issue of equity shares will be} = \frac{D_1}{P_0} + g = \frac{\text{₹ } 1.18}{\text{₹ } 20} + 0.10 = 0.159$$

The marginal cost of capital will be:

Type of Capital	Proportion	Specific cost	Product
(1)	(2)	(3)	(2) x (3) = 4
Debentures	0.15	0.0833	0.0125
Preference Shares	0.05	0.1200	0.0060
Equity Shares (New)	0.80	0.1590	0.1272
			0.1457

Q.29 Stop go 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 its cost of capital is 20%. It's Earnings before Interest and Taxes (EBIT) are expected to remain constant in future. Its entire earnings are distributed as dividend. Applicable tax rate is 30 percent.

You are required to calculate the impact on the following on account of the change in the capital structure as per Modigliani and Miller (MM) Hypothesis:

- The market value of the company
- It's cost of capital, and
- It's cost of equity

Ans: (a) Working Note:

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

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

Therefore, Net Income to equity-holders = 228 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

$$\begin{aligned}
 \text{(i) Market value of levered firm} &= \text{Value of unlevered firm} + \text{Tax Advantage} \\
 &= 1,140 \text{ lakhs} + (200 \text{ lakhs} \times 0.3) \\
 &= 1,200 \text{ lakhs}
 \end{aligned}$$

The impact is that the market value of the company has increased by 60 lakhs (₹1,200 lakhs - 1,140 lakhs) Calculation of Cost of Equity

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

(ii) Cost of Capital

Components	Amount (₹ In lakhs)	Cost of Capital %	Weight	WACC %
Equity	1000	20.7	83.33	17.25
Debt	20083 33	(15% × 0.7) = 105	16.67	1.75
	1200		19:00	17.25

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.

$$\text{Cost of Capital (Ke)} = K_{au}(1 - tL)$$

Where,

K_a = Cost of equity in an unlevered company

t = Tax rate

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

$$K_e = 0.2 \times \left(1 - \frac{₹ 200 \text{ lakhs}}{₹ 1,200 \text{ lakhs}} \times 0.3\right)$$

So, cost of capital = 0.19 or 19%

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

Where,

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

K_d = Cost of debt

t = Tax rate

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

$$K_e = 0.20 + 0.007 = 0.207 \text{ or } 20.7\%$$

So, cost of Equity 20.7%

Q.30 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:

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

Ans: (a) **Assuming no tax as per MM Approach :**

Calculation of Value of Firms 'A Ltd.' and 'B Ltd' according to MM Hypothesis Market Value of 'B Ltd' [Unlevered(u)]

Total Value of Unlevered Firm (V.) = [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 k, as there is no debt) = 0.18

Market Value of 'A Ltd' [Levered Firm (1)]

Total Value of Levered Firm (Vi) = 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) “

	Particular	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 = NO / 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	1,00,000
H	Equity Capitalization Rate [ke = NI /S]	0.2504	0018
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	01152
Debt	54,00,000	0.54	0.12*	0.0648
Total	81,60,000			0.18

$K_d = 12\%$ (since there is no tax)

WACO = 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))

$$\text{Total Value of unlevered Firm (V)} = \text{NOI} (1 - k_e) = 18,00,000 (1 - 0.40) / 0.18 \\ = ₹60,00,000$$

K_e of unlevered Firm (given) = 0.18

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

Market Value of 'A Ltd' [Levered Firm (1)]

$$\text{Total Value of Levered Firm (VL)} = V_u + (\text{Debt} \times \text{Tax}) \\ = ₹ 60,00,000 + (54,00,000 \times 0.4) \\ = ₹ 81,60,000$$

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

$$= 18\% \text{ (i.e. } K_e = K)$$

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

***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

$$*K 12\% (1 - 0.4) = 12\% \times 0.67.2\%$$

$$\text{WACC} = 13.23\%$$

Q.36 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 : $R_f = 10\%$

$$R_m - R_f = 18\%$$

$$B = 1.25$$

$$D_0 = 12.76$$

$$D-5 = 10$$

$$\text{Flotation cost} = 5\%$$

Using CAPM,

$$\begin{aligned} K_e &= R_t + \beta (R_m - R_f) \\ &= 10\% + 1.25 (18\%) \\ &= 32.50\% \end{aligned}$$

Calculation of growth rate in dividend

$$12.76 = 10 (1 + g)^5$$

$$1.276 = (1 + g)^5$$

$$(1 + 5\%)^5 = 1.276$$

...From FV table

$$g = 5\%$$

$$\text{Price of share after 6 years} = \frac{D_T}{K_a - g} = \frac{12.76 (1.05)^T}{0.325 - 0.05}$$

$$P_6 = \frac{12.76 \times 1/407}{0.275}$$

$$P_6 = 65.28$$

Redemption value of debenture (RV) = $65.28 \times 2 = 130.56$ (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:

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

Re-demotion 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

$$K_p = 3\% + \frac{5\% - 3\%}{[3.39 - (-13.65)]} \times 13.65$$

$$= 3\% + \frac{2\%}{17.04} \times 13.65$$

$$K_p = 4.6021\%$$

CHAPTER - 3

INVESTMENT DECISIONS - CAPITAL BUDGETING

Q.7 CALCULATE the internal rate of return of an investment of 1,36,000 which yields the following cash inflows:

Year	Cash Inflows (₹)
1	30,000
2	40,000
3	60,000
4	30,000
5	20,000

Ans: Let us discount cash flows by 10%

Year	Cash Inflows (₹)	Discounting factor at 10%	Present Value (₹)
1	30,000	0.909	27,270
2	40,000	0.826	33,040
3	60,000	0.751	45,060
4	30,000	0.683	20,490
5	20,000	0.621	12,420
Total present value			1,38,280
Less: Initial Investment			1,36,000
NPV			+2,280

The NPV calculated @ 10% is positive. Therefore, a higher discount rate is suggest, say, 12%.

Year	Cash Inflows (₹)	Discounting factor at 10%	Present Value (₹)
1	30,000	0.893	26,790
2	40,000	0.797	31,880
3	60,000	0.712	42,720
4	30,000	0.636	19,080
5	20,000	0.567	11,340
Total present value			1,31,810
Less: Initial Investment			1,36,000
NPV			-4,190

The internal rate of return is, thus, more than 10% but less than 12%. The exact rate can be obtained by interpolation:

$$\begin{aligned}
 \text{IRR} &= \text{LR} + \frac{\text{NPV at LR}}{\text{NPV at LR} - \text{NPV at HR}} \times (\text{HR} - \text{LR}) \\
 &= 10 + \frac{2,280}{2,280 - (-4,190)} \times (12 - 10) \\
 &= 10 + \frac{2,280}{6,470} \times (12 - 10) = 10 + 0.704 \\
 \text{IRR} &= 10.704\%
 \end{aligned}$$

Q.11 Suppose ABC Ltd. is considering two Project X and Project Y for investment. The cash flows associated with these projects are as follows:

Year	Project X (₹)	Project Y (₹)
0	(2,50,000)	(3,00,000)
1	2,00,000	50,000
2	1,00,000	1,00,000
3	50,000	3,00,000

Assuming Cost of Capital be 10%, IDENTIFY which project should be accepted as per NPV Method and IRR Method.

Ans: Net Present Value of Projects

Year	Cash inflows of project X (₹)	Cash Inflows of Project Y (₹)	Present Value Factor @ 10 (₹)	PV of Project X (₹)	PV of Project Y (₹)
0	(2,50,000)	(3,00,000)	1.000	(2,50,000)	(3,00,000)
1	2,00,000	50,000	0.909	1,81,000	45,450
2	1,00,000	1,00,000	0.826	82,600	82,600
3	50,000	3,00,000	0.751	37,550	2,25,300
NPV				51,950	53,350

Internal Rate of Returns of Projects

Since, by discounting cash flows at 10%, we are getting values far from zero. Therefore, let us discount cash flows using 20% discounting rate.

Year	Cash inflows of project X (₹)	Cash Inflows of Project Y (₹)	Present Value Factor @ 20 (₹)	PV of Project X (₹)	PV of Project Y (₹)
0	(2,50,000)	(3,00,000)	1.000	(2,50,000)	(3,00,000)
1	2,00,000	50,000	0.833	1,66,600	41,650
2	1,00,000	1,00,000	0.694	69,400	69,400
3	50,000	3,00,000	0.579	28,950	1,73,700
NPV				14,950	(15,250)

Since, by discounting cash flows at 20% we are getting that value of project X is positive and value of project Y is negative. Therefore, let us discount cash flows of Project X using 25% discounting rate and Project Y using discount rate of 15%.

Year	Cash inflows of project X (₹)	Present Value Factor @25%	PV Project X (₹)	Cash Inflows of project Y (₹)	Present Value Factor @ 15%	PV of Project Y (₹)
0	(2,50,000)	1.000	(2,50,000)	(3,00,000)	1.000	(3,00,000)
1	2,00,000	0.800	1,60,000	50,000	0.870	43,500
2	1,00,000	0.640	64,000	1,00,000	0.756	75,600
3	50,000	0.512	25,600	3,00,000	0.658	1,97,400
NPV			(400)			16,500

The internal rate can be obtained by interpolation:

$$IRR_x = 20\% + \frac{14,950}{14,950 - (400)} \times (25\% - 20\%)$$

$$= 20\% \left(\frac{14,950}{15,350} \times 5\% \right) = 24.87\%$$

$$IRR_y = 15\% + \frac{16,500}{16,500 - (15,250)} \times (20\% - 15\%)$$

$$= 15\% + \% \left(\frac{16,500}{31,750} \times 5\% \right) = 17.60\%$$

Overall Position

	Project X	Project Y
NPV @ 10%	51,950	53,350
IRR	24.87%	17.60%

Thus, there is contradiction in ranking by two methods.

Scenario 3- Disparity in life of proposals (Unequal Lives)

Conflict in ranking may also arise if we are comparing two projects (especially mutually exclusive) having unequal lives. This can be understood with the help of following illustration:

Q.12 Suppose MVA Ltd. is considering two Project A and Project B for investment. The cash flows associated with these projects are as follows:

Year	Project A (₹)	Project B (₹)
0	(500,000)	(5,00,000)
1	7,50,000	2,00,000
2	0	2,00,000
3	0	7,00,000

Assuming Cost of Capital equal to 7 2%, ANALYSE which project should be accepted as per NPV Method and IRR Method?

Ans: **Net Present Value of Projects**

Year	Cash Inflows of Project A (₹)	Cash Inflows of Project B (₹)	Present Value Factor @ 12%	PV of Project A (₹)	PV of Project B (₹)
0	(5,00,000)	(5,00,000)	1.000	(5,00,000)	(5,00,000)
1	7,50,000	2,00,000	0.893	6,69,750	1,78,600
2	0	2,00,000	0.797	0	1,59,400
3	0	7,00,000	0.712	0	4,98,400
NPV				1,69,750	3,36,400

Internal Rate of Returns of projects

Let us discount cash flows using 50% discounting rate.

Year	Cash Inflows of Project A (₹)	Cash Inflows of Project B (₹)	Present Value Factor @ 50%	PV of Project A (₹)	PV of Project B (₹)
0	(5,00,000)	(5,00,000)	1.000	(5,00,000)	(5,00,000)
1	7,50,000	2,00,000	0.667	5,00,250	1,33,400
2	0	2,00,000	0.444	0	88,800
3	0	7,00,000	0.296	0	2,07,200
NPV				250	(70,600)

Since, IRR of project A shall be 50% as NPV is very small. Further, by discounting cash flows at 50%, we are getting NPV of Project B negative. Therefore, let us discount cash flows of Project B using 15% discounting rate.

Year	Cash Inflows of Project B (₹)	Present Value Factor @ 15%	PV of Project B (₹)
0	(5,00,000)	1.000	(5,00,000)
1	2,00,000	0.870	1,74,000
2	2,00,000	0.756	1,51,200
3	7,00,000	0.658	4,60,600
NPV			2,85,800

The internal rate can be obtained by interpolation:

$$\begin{aligned} \text{IRR}_B &= 15\% + \frac{2,85,800}{2,85,800 - (-70,600)} \times (50\% - 15\%) \\ &= 15\% + \left(\frac{2,85,800}{3,56,400} \times 35\% \right) = 43.07\% \end{aligned}$$

Overall Position

	Project A	Project B
NPV @ 12%	₹ 1,69,750	₹ 3,36,400
IRR	50.00%	43.07%

Thus, there is contradiction in ranking by two methods.

Q.19 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:

- (i) Calculate the adjusted present value of the investment,
- (ii) Calculate the adjusted discount rate and
- (iii) Explain the circumstances under which this adjusted discount rate may be used to evaluate future investments.

Ans: (i) Calculation of adjusted Present Value of Investment (APV)

Adjusted PV = Base Case PV + PV of financing decisions associated with the project

Base Case NPV for the project:

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

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

$$\begin{aligned} \text{Thus, the amount to be raised} &= ₹270 \text{ lakhs} + 10 \text{ lakhs} \\ &= 280 \times 0.1 \times 0.3 \end{aligned}$$

$$\begin{aligned} \text{Annual tax relief on interest payment} &= ₹280 \times 0.1 \times 0.3 \\ &= ₹8.4 \text{ lakhs in perpetuity} \end{aligned}$$

$$\begin{aligned} \text{The value of tax relief in perpetuity} &= ₹8.4 \text{ lakhs}/0.1 \\ &= ₹84 \text{ lakhs} \end{aligned}$$

$$\begin{aligned} \text{Therefore, APV} &= \text{Base case PV-Issue Costs} + \text{PV of Tax Relief on debt interest} \\ &= ₹30 \text{ lakhs} - ₹10 \text{ lakhs} + ₹84 \text{ lakhs} = ₹104 \text{ lakhs} \end{aligned}$$

(ii) Calculation of Adjusted Discount Rate (ADR)

Annual income/savings required to allow an NPV to zero

Let the annual income be x.

$$(-) 280 \text{ lakhs} + (\text{Annual Income}/0.14) = (-) ₹104 \text{ lakhs}$$

$$\text{Annual income}/0.14 = ₹104 + 280 \text{ lakhs}$$

$$\text{Therefore, Annual income} = ₹176 \times 0.14 = ₹24.64 \text{ lakhs}$$

$$\begin{aligned} \text{Adjusted discount rate} &= (24.64 \text{ lakhs}/₹280 \text{ lakhs}) \times 100 \\ &= 8.8\% \end{aligned}$$

(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 evaluate 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 introducing debt into the capital structure cannot be ignored.

Q.26 Alley Pvt. Ltd. is planning to invest in a machinery that would cost 1,00,000 at the beginning of year 1. Net cash inflows from operations have been estimated at 36,000 per annum for 3 years. The company has two options for smooth functioning of the machinery - one is service, and another is replacement of parts. If the company opts to service a part of the machinery at the end of year 1 at 20,000, in such a case, the scrap value at the end of year 3 will bet 25,000. However, if the company decides not to service the part, then it will have to be replaced at the end of year 2 at 30,800, and in this case, the machinery will work for the 4th year also and get operational cash inflow of 36,000 for the 4th year. It will have to be scrapped at the end of year 4 at 18,000.

Assuming cost of capital at 10% and ignoring taxes, DETERMINE the purchase of this machinery based on the net present value of its cash flows.

If the supplier gives a discount of 10,000 for purchase, what would be your decision?

Note: The PV factors at 10% are:

Year	0	1	2	3	4	5	6
PV Factor	1	0.9091	0.8264	0.7513	0.6830	0.6209	0.5645

Ans: **Option I: Purchase Machinery and Service Part at the end of Year 1.**

Net Present value of cash flow @ 10% per annum discount rate.

$$\begin{aligned} \text{NPV (in ₹)} &= - 1,00,000 + \frac{36,000}{(1.1)} + \frac{36,000}{(1.1)^2} + \frac{36,000}{(1.1)^3} - \frac{20,000}{(1.1)} + \frac{25,000}{(1.1)^3} \\ &= - 1,00,000 + 36,000 (0.9091 + 0.8264 + 0.7513) - (20,000 \times 0.9091) \\ &\quad + (25,000 \times 0.7513) \\ &= 1,00,000 + (36,000 \times 2.4868) - 18,182 + 18,782.5 \\ &= - 1,00,000 + 89,524.8 - 18,182 + 18,782.5 \\ \text{NPV} &= - 9,874.7 \end{aligned}$$

Since, Net present value is negative; therefore this option is not to be considered.

If Supplier gives a discount of ₹10,000, then:

$$\text{NPV (in ₹)} = + 10,000 - 9,874.5 = + 125.3$$

In this case, net present value is positive but very small; therefore, this options may not be advisable.

Option II: Purchase Machinery and replace part at the end of Year 2.

$$\text{NPV (in ₹)} = - 10,00,000 + \frac{36,000}{(1.1)} + \frac{36,000}{(1.1)^2} + \frac{36,000}{(1.1)^3} - \frac{20,000}{(1.1)^2} + \frac{25,000}{(1.1)^4}$$

$$= -1,00,000 + 36,000 (0.9091 + 0.8264 + 0.7513) - (30,800 \times 0.8264) + (54,000 \times 0.6830)$$

$$= -1,00,000 + 36,000 (2.4868) - 25,453.12 + 36,882$$

$$\text{NPV} = +953.68$$

Net Present value is positive, but very low as compared to the investment.

If the supplier gives a discount of ₹ 10,000, then:

$$\text{NPV (in ₹)} = 10,000 + 953.68 = 10,953.68$$

Decision: Option II is worth investing as the net present value is positive and higher as compared to Option I.

Q.28 XYZ Ltd. is planning to introduce a new product with a project life of 8 years. Initial equipment cost will be 3.5 crores. Additional equipment costing 25,00,000 will be purchased at the end of the third year from the cash inflow of this year. At the end of 8 years, the original equipment will have no resale value, but additional equipment can be sold for 2,50,000. A working capital of 40,00,000 will be needed and it will be released at the end of eighth year. The project will be financed with sufficient amount of equity capital.

The sales volumes over eight years have been estimated as follows:

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

A sales price of 240 per unit is expected and variable expenses will amount to 60% of sales revenue. Fixed cash operating costs will amount 36,00,000 per year. The loss of any year will be set off from the profits of subsequent two years. The company is subject to 30 per cent tax rate and considers 12 per cent to be an appropriate after-tax cost of capital for this project. The company follows straight line method of depreciation.

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

The PV factors at 12% are

Year	1	2	3	4	5	6	7	8
PV factors	0.893	0.797	0.712	0.636	0.567	0.507	0.452	0.404

Ans: Workings:

(a) Calculation of annual cash flows

(₹ in lakh)

Year	Sales	VC	FC	Dep.	Profit	Tax	PAT	Dep.	Cash inflow
1	172.80	103.68	36	43.75	(10.63)	-	-	43.75	33.12
2	259.20	155.52	36	43.75	23.93	3.99*	19.94	43.75	63.69
3	624.00	374.40	36	43.75	169.85	50.955	118.895	43.75	162.645
4-5	648.00	388.80	36	48.75	174.95	52.485	122.465	48.75	170.715
6-8	432.00	259.20	36	48.75	88.55	26.565	61.985	48.75	110.235

(b) Calculation of Depreciation:

$$\text{- On initial equipment} = \frac{350 \text{ lakh}}{8 \text{ years}} = 43.75 \text{ lakh}$$

$$\text{- On addition equipment} = \frac{\text{₹ } 25 - \text{₹ } 2.5 \text{ lakh}}{5 \text{ years}} = 4.5 \text{ lakh}$$

(c) * Calculation of tax in 2nd year:

	₹ in lakh
Profit for the year	23.93
Less: Set off of unabsorbed depreciation in 1 st year	(10.63)
Taxable profit	13.30
Tax@30%	3.99

(d) Calculation of initial cash outflow

	₹ in lakh
Cost of New Equipment	350
Add: Working Capital	40
Outflow	390

Calculation of NPV

Year	Cash Flows	PV factor @12%	PV of Cash flows	Remark
0	(390)	1.000	(390.00)	Initial equipment cost
1	33.12	0.893	29.57	
2	63.69	0.797	50.76	
3	162.645	0.712	115.80	
3	(25.00)	0.712	(17.80)	Additional equipment cost
4	170.715	0.636	108.57	
5	170.715	0.567	96.79	
6	110.235	0.507	55.89	
7	110.235	0.452	49.83	
8	110.235	0.404	44.53	
8	40.00	0.404	16.16	Release of working capital
8	2.50	0.404	1.01	Additional equipment salvage value
Net Present Value			161.11	

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

Q.29 A large profit-making company is considering the installation of a machine to process the waste produced by one of its existing manufacturing processes to be converted into a marketable product. At present, the waste is removed by a contractor for disposal on payment by the company of ₹150 lakh per annum for the next four years. The contract can be terminated upon installation of the aforesaid machine on payment of a compensation of ₹90 lakh before the processing operation starts. This compensation is not allowed as deduction for tax purposes.

The machine required for carrying out the processing will cost ₹600 lakh. At the end of the 4TH year, the machine can be sold for ₹60 lakh and the cost of dismantling and removal will be ₹45 lakh.

Sales and direct costs of the product emerging from waste processing for 4 years are estimated as under:

(f 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	65	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

- 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 utilize space which would otherwise have been rented out for 30 lakh per annum. Labor 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-
- Factory overheads include apportionment of general factory overheads except to the extent of insurance charges of ₹90 lakh per annum payable on this venture. The company's tax rate is 30%.

Consider cost of capita l@ 14%, the present value factors of which is given below for four years:

Year	1	2	3	4
PV factors@14%	0.877	0.769	0.674	0.592

ADVISE the management on the desirability of installing the machine for processing the waste. All calculations should form part of the answer.

Ans: Statement of Operating Profit from processing of waste

(₹ in lakh)

	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
Depreciation (as per income tax rules)	150	114	84	63
Total cost (B)	630	654	846	918
Profit {(C)=(A) –(B)}	336	312	408	336
Less: Tax (30%)	100.8	93.6	122.4	100.8
Profit after Tax (PAT)	235.2	218.4	285.6	235.2
Less: Loss of rent on storage space (Opportunity cost)	30	30	30	30
PAT after opportunity cost	252.2	188.4	255.6	205.2

Statement of Incremental Cash Flows

(₹ in lakh)

Year	0	1	2	3	4
Cost of machine	(600)				
Material stock	(60)	(105)	-	-	165
Compensation for contract	(90)	-	-	-	-
Contract payment saved	-	150	150	150	150
Tax on contract payment	-	(45)	(45)	(45)	(45)
Incremental profit	-	336	312	408	336
Depreciation added back	-	150	114	84	63
Tax on profits	-	(100.8)	(93.6)	(122.4)	(100.8)
Profit on sale of machinery (net)	-	-	-	-	15
Total incremental cash flows	(750)	385.2	437.4	474.6	583.2
Present value factor	1	0.877	0.769	0.674	0.592
Present value of cash flows	(750)	337.82	336.36	319.88	345.25
		589.32			

Advice: Since the net present value of cash flows is 589.32 lakh which is positive the management should install the machine for processing the waste.

Notes:

1. Material stock increase are taken in cash flows.
2. Idle time wages have also been considered.
3. Apportioned factory overheads are not relevant only insurance charges of this project are relevant.

4. Sale of machinery- Net income after deducting removal expenses taken. Tax on capital gains is ignored.
5. Saving in contract payment and income tax thereon is considered in the cash flows.

Q.33 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: (i) Calculation of Adjusted Present Value of Investment (APV)

Adjusted PV = Base Case PV + PV of financing decisions associated with the project

Base Case NPV for the project:

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

Issue costs = ₹10 lakhs

Thus, the amount to be raised = ₹270 lakhs + ₹10 lakhs
= ₹280 lakhs

Annual tax relief on interest payment = $280 \times 0.1 \times 0.3$
= ₹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.

$$(-) ₹280 \text{ lakhs} \times (\text{Annual Income} / 0.14) = (-) ₹104 \text{ lakhs}$$

$$\text{Annual Income} / 0.14 = (-) ₹104 + ₹280 \text{ lakhs}$$

Therefore, Annual income = ₹176 X 0.14 = ₹24.64 lakhs

$$\text{Adjusted discount rate} = (₹24.64 \text{ lakhs} / 280 \text{ lakhs}) \times 100 = 8.8\%$$

iii) Useable circumstances: This ADR may be used to evaluate future investments only if the business risk of the new venture is identical to the one being evaluated here and the project is to be financed by the same method on the same terms. The effect on the company's cost of capital of introducing debt into the capital structure cannot be ignored.

Q.34 From the following details relating to a project, analyze the sensitivity of the project to changes in the Initial Project Cost, Annual Cash Inflow and Cost of Capital: Particulars

Initial Project Cost	₹2,00,00,000
Annual Cash Inflow	₹60,00,000
Project Life	5 years
Cost of Capital	10%

To which of the 3 factors, the project is most sensitive if the variable is adversely affected by 10?

Cumulative Present Value Factor for 5 years for 10% is 3.791 and for 11% is 3.696.

Ans: Calculation of NPV through Sensitivity Analysis

	₹
PV of cash inflows (60,00,000 × 3.791)	2,27,46,000
Initial Project Cost	2,00,00,000
NPV	27,46,000

Situation	NPV	Changes in NPV
Base(present)	₹27,46,000	
If initial project cost is varied adversely by 10%	(₹2,27,46,000 – ₹2,20,00,000*) = ₹7,46,000	(27,46,000- 7,46,000) 27,46,000₹ = (72.83%)

If annual cash inflow is varied adversely by 10%	[₹54,00,000(revised cash flow) ** × 3.791) – (₹2,00,00,000)] = ₹4,71,400	(₹27,46,000- ₹4,71,400) ₹27,46,000 = 82.83%
If cost of capital is varied adversely by 10% i.e. it becomes 11%	(₹60,00,000 × 3.696)– ₹2,00,00,000 = 21,76,000	(27,46,000- 21,76,400) 27,46,000 = 20.76%

*Revised initial project Cost = 2,00,00,000 × 110% = 2,20,00,000

**Revised Cash Flow = 60,00,000 × (100 – 10) % = 54,00,000

Conclusion: Project is most sensitive to 'annual cash inflow'

Q.35 Kanoria Enterprises wishes to evaluate two mutually exclusive projects X and Y. They 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.36 Door Ltd. is considering an investment of ₹4,00,000. This investment is expected to generate substantial cash inflows over the next five years. Unfortunately, the annual cash flows from this investment is uncertain, and the following profitability distribution has been established.

Annual Cash Flow (₹)	Probability
50,000	0.3
1,00,000	0.3
1,50,000	0.4

At the end of its 5 years life, the investment is expected to have a residual value of 40,000.

The cost of capital is 5%

- i) Calculate NPV under the three different scenarios.
- ii) Calculate Expected Net Present Value.
- iii) Advise Door Ltd. on whether the investment is to be undertaken.

Year	1	2	3	4	5
DF @ 5%	0.952	0.907	0.864	0.823	0.784

Ans: (i) Calculation of NPV under three different scenarios

Particulars	1 st Scenario	2 nd Scenario	3 rd Scenario
Annual Cash Flow	50,000	1,00,000	1,50,000
PV of cash inflows (Annual Cash Flow × 4.33*)	2,16,500	4,33,000	6,49,500
PV of Residual Value (40,000 × 0.784)	31,360	31,360	31,360
Total PV of Cash Inflow	2,47,860	4,64,360	6,80,860
Initial investment	4,00,000	4,00,000	4,00,000
NPV	(1,52,140)	64,360	2,80,860

* .952 + .907 + .864 + .823 + .784 = 4.33

(ii) Calculation of Expected Net present Value under three different scenarios

Particulars	1 st Scenario	2 nd Scenario	3 rd Scenario	Total (₹)
Annual Cash Flow	₹50,000	₹1,00,000	₹1,50,000	
Probability	0.3	0.3	0.4	
Expected Value	₹15,000	₹30,000	₹60,000	1,05,000
PV of Expected value (1,05,000 × 4.33)				4,54,650
PV of Residual Value (40,000 × 0.784)				31,360
Total PV of Cash Inflow				4,86,010
Initial investment				4,00,000
Expected Net Present Value				86,010

Q.37 A Ltd. is considering two mutually exclusive projects X and Y. You have been given below the Net Cash flow probability distribution of each project:

Project-X		Project-Y	
Net Cash Flow (₹)	Probability	Net Cash Flow(₹)	Probability
50,000	0.30	1,30,000	0.20
60,000	0.30	1,10,000	0.30
70,000	0.40	90,000	0.50

- i) Compute the following:
 - a) Expected Net Cash Flow of each project.

- b) Variance of each project.
 c) Standard Deviation of each project.
 d) Coefficient of Variation of each project.
 ii) Identify which project do you recommend? Give reason

Ans: (i) Calculation of Expected Net Cash Flow (ENCF) of Project X and Project Y

Net Cash Flow (₹)	Probability	Expected Net Cash Flow (₹)	Net Cash Flow (₹)	Probability	Expected Net Cash Flow (₹)
50,000	0.30	15,000	1,30,000	0.20	26,000
60,000	0.30	18,000	1,10,000	0.30	33,000
70,000	0.40	28,000	90,000	0.50	45,000
ENCF		61,000			1,04,000

(b) Variance of Projects

- Project X

$$\text{Variance } (\sigma^2) = (50,000 - 61,000)^2 \times (0.3) + (60,000 - 61,000)^2 \times (0.3) + (70,000 - 61,000)^2 \times (0.4) \\ = 3,63,00,000 + 3,00,000 + 3,24,00,000 = 6,90,00,000$$

Project Y

$$\text{Variance } (\sigma^2) = (1,30,000 - 1,04,000)^2 \times (0.2) + (1,10,000 - 1,04,000)^2 \times (0.3) + \\ (90,000 - 1,04,000)^2 \times (0.5) \\ = 13,52,00,000 + 1,08,00,000 + 9,80,00,000 = 24,40,00,000$$

(c) Standard Deviation of Projects

- Project X

$$\text{Standard Deviation } (\sigma) = \sqrt{\text{Variance } (\sigma^2)} = \sqrt{6,90,00,000} = 8,306.624$$

- Project Y Standard Deviation $(\sigma) = \sqrt{\text{Variance } (\sigma^2)} = \sqrt{24,40,00,000} = 15,620,499$

(d) Coefficient of Variation of Projects

Projects	Coefficient of variation Standard Deviation (<u> </u>) Expected Net Cash Flow	Risk	Expected Net Cash Flow
X	$\frac{8,306.24}{61,000} = 0.136$ or 13.60%	Less	Less
Y	$\frac{15,620.499}{1,04,000} = 0.150$ or 15.00%	More	More

- i) In project X risk per rupee of cash flow is 0.136 (approx.) while in project Y it is 0.15 (approx.). Therefore, Project X is better than Project Y.

Q.38 K.P. Ltd. is investing Rs.50 lakhs in a project. The life of the project is 4 years. Risk free rate of return is 6% and risk premium is 6%, other information is as under:

Sales of 1st year	Rs.50 lakhs
Sales of 2nd year	Rs.60 lakhs
Sales of 3rd year	Rs.70 lakhs
Sales of 4th year	Rs.80 lakhs
P/V Ratio (same in all the years)	50%
Fixed Cost (Excluding Depreciation) of 1st year	Rs.10 lakhs
	Rs.12 lakhs
Fixed Cost (Excluding Depreciation) of 3rd year	Rs.14 lakhs
Fixed Cost (Excluding Depreciation) of 4th year	Rs.16 lakhs

Ignoring interest and taxes,

You are required to calculate NPV of given project on the basis of Risk Adjusted Discount Rate.

Discount factor @ 6% and 12% are as under:

Year	1	2	3	4
Discount Factor @ 6%	0.943	0.890	0.840	0.792
Discount Factor @ 12%	0.893	0.797	0.712	0.636

Ans: Calculation of Cash Flow

Year	Sales (Rs. in Lakhs) (A)	P/V ratio (B)	Contribution (Rs. in Lakhs) (C) = (A x B)	Fixed Cost (Rs. in Lakhs) (D)	Cash Flows (Rs. In lakhs) (E) = (C - D)
1	50	50%	25	10	15
2	60	50%	30	12	18
3	70	50%	35	14	21
4	80	50%	40	16	24

Q.39 Ltd. is considering a project with the following details:

Initial Project Cost		1,00,000		
Annual Cash Inflow (₹)	1	2	3	4
	30,000	40,000	50,000	60,000
Project Life (Years)	4			
Cost of Capital	10%			

- i) MEASURE the sensitivity of the project to change in initial project cost and Annual cash inflows (considering each factor at a time) such that NPV become zero.
- ii) IDENTIFY which of the two factors; the project is most sensitive to affect the acceptability of the project?

Year	1	2	3	4	5
PVIF _{0.10, t}	0.909	0.826	0.751	0.683	0.621

Ans: Computation of Net Present Value (NPV):

Year	PVF @ 10%	Original Cash Flows (₹)	PV (₹)	PV (₹)
0	1	(1,00,000)		(1,00,000)
1	0.909	30,000	27,270	
2	0.826	40,000	33,040	
3	0.751	50,000	37,550	
4	0.683	60,000	40,980	1,38,840
NPV				38,840

Determination of the most Sensitive factor:

- (i) Sensitivity Analysis w.r.t. Initial Project cost (such that NPV becomes zero):
NPV of the project would be zero when the initial project cost is increased by ₹38,840.

$$\text{Percentage change in Initial project cost} = \frac{38,840}{1,00,000} \times 100 = 38.84\%$$

- (ii) Sensitivity Analysis w.r.t. Annual Cash inflows (such that NPV becomes zero):
NPV of the project would be zero when the Annual cash inflows is decreased by ₹38,840.

$$\text{Percentage change in the Annual cash inflows} = \frac{38,840}{1,38,840} \times 100 = 27.97\%$$

Conclusion: Annual cash inflows factor is the most sensitive as only a change beyond 27.97% in savings makes the project unacceptable.

- Q.49 HMR Ltd. is considering replacing a manually operated old machine with a fully automatic new machine. The old machine had been fully depreciated for tax purpose but has a book value of ₹2,40,000 on 31st March 2021. The machine has begun causing problems with breakdowns and it cannot fetch more than ₹30,000 if sold in the market at present. It will have no realizable value after 10 years. The company has been offered ₹1,00,000 for the old machine as a trade in on the new machine which has a price (before allowance for trade in) of ₹4,50,000. The expected life of new machine is 10 years with salvage value of ₹35,000. Further, the company follows straight line depreciation method but for tax purpose, written down value method depreciation @ 7.5% is allowed taking that this is the only machine in the block of assets.

Given below are the expected sales and costs from both old and new machine:

	Old machine (₹)	New machine (₹)
Sales	8,10,000	8,10,000
Material cost	1,80,000	1,26,250
Labor cost	1,35,000	1,10,000
Variable overhead	56,250	47,500
Fixed overhead	90,000	97,500
Depreciation	24,000	41,500
PBT	3,24,750	3,87,250
Tax @ 30%	97,425	1,16,175
PAT	2,27,325	2,71,075

From the above information, ANALYSE whether the old machine should be replaced or not if required rate of return is 10%? Ignore capital gain tax.

PV factors @ 10%:

Year	1	2	3	4	5	6	7	8	9	10
PVF	0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467	0.424	0.386

Ans. **Workings:**

1. Calculation of Base for depreciation or Cost of New Machine

Particulars	(₹)
Purchase price of new machine	4,50,000
Less: Sale price of old machine	1,00,000
	3,50,000

2. Calculation of Profit before tax as per books

	Old machine (₹)	New machine (₹)	Difference (₹)
PBT as per books	3,24,750	3,87,250	62,500
Add: Depreciation as per books	24,000	41,500	17,500
Profit before tax and depreciation (PBSD)	3,48,750	4,28,750	80,000

Calculation of Incremental NPV

Year	PVF @ 10%	PBTD (₹)	Dep. @7.5% (₹)	PBT (₹)	Tax@30% (₹)	Cash Inflows (₹)	PV of Cash Inflows (₹)
	1	2	3	4	(5) = (4) x 0.30	(6) = (4) - (5) + (3)	(7) = (6) x (1)
1	0.909	80,000.00	26,250.00	53,750.00	16,125.00	63,875.00	58,062.38
2	0.826	80,000.00	24,281.25	55,718.75	16,715.63	63,284.38	52,272.89
3	0.751	80,000.00	22,460.16	57,539.84	17,261.95	62,738.05	47,116.27
4	0.683	80,000.00	20,775.64	59,224.36	17,767.31	62,232.69	42,504.93
5	0.621	80,000.00	19,217.47	60,782.53	18,234.76	61,765.24	38,356.21
6	0.564	80,000.00	17,776.16	62,223.84	18,667.15	61,332.85	34,591.73
7	0.513	80,000.00	16,442.95	63,557.05	19,067.12	60,932.88	31,258.57
8	0.467	80,000.00	15,209.73	64,790.27	19,437.08	60,562.92	28,282.88
9	0.424	80,000.00	14,069.00	65,931.00	19,779.30	60,220.70	25,533.58
10	0.386	80,000.00	13,013.82	66,986.18	20,095.85	59,904.15	23,123.00
							3,81,102.44
Add: PV of Salvage value of new machine (35,000 x 0.386)							13,510.00
Total PV of incremental cash inflows							3,94,612.44
Less: Cost of new machine							3,50,000.00
Incremental Net Present Value 44,612.44							

Analysis: Since the Incremental NPV is positive, the old machine should be replaced.

Q.50 ABC & Co. is considering whether to replace an existing machine or to spend money on revamping it. ABC & Co. currently pays no taxes. The replacement machine costs 18,00,000 now and requires maintenance of 2,00,000 at the end of every year for eight years. At the end of eight years, it would have a salvage value of 4,00,000 and would be sold. The existing machine requires increasing amounts of maintenance each year and its salvage value fall each year as follows:

Year	Maintenance (₹)	Salvage (₹)
Present	0	8,00,000
1	2,00,000	5,00,000
2	4,00,000	3,00,000
3	6,00,000	2,00,000
4	8,00,000	0

The opportunity cost of capital for ABC & Co. is 15%.

REQUIRED:

When should the company replace the machine?

The following present value table is given for you:

Year	Present value of ₹ 1 at 15% discount rate
1	0.8696
2	0.7561
3	0.6575
4	0.5718
5	0.4972
6	0.4323
7	0.3759
8	0.3269

Ans: ABC & Co. Equivalent Annual Cost (EAC) of new machine

	₹
(i) Cost of new machine now	18,00,000
Add: PV of annual repairs @ ₹2,00,000 per annum for 8 years (₹2,00,000 x 4.4873)	8,97,460
	26,97,460
Less: PV of salvage value at the end of 8 years (₹4,00,000 x 0.3269)	1,30,760
	25,66,700
Equivalent annual cost (EAC) (25,66,700/4.4873)	5,71,992

PV of cost of replacing the old machine in each of 4 years with new machine:

Scenario	Year	Cash Flow	PV @ 15%	PV
		₹		₹
Replace Immediately	0	(5,71,992)	1.00	(5,71,992)
	0	8,00,000	1.00	8,00,000
				2,28,008
Replace in one year	1	(5,71,992)	0.8696	(4,97,404)
	1	(2,00,000)	0.8696	(1,73,920)
	1	5,00,000	0.8696	4,34,800
				(2,36,524)
Replace in two years	1	(2,00,000)	0.8696	(1,73,920)
	2	(5,71,992)	0.7561	(4,32,483)
	2	(4,00,000)	0.7561	(3,02,440)
	2	3,00,000	0.7561	2,26,830
				(6,82,013)

Replace in three years	1		0.8696	(1,73,920)
	2	(2,00,000)	0.7561	(3,02,440)
	3	(4,00,000)	0.6575	(3,76,085)
	3	(5,71,992)	0.6575	(3,94,500)
	3	(6,00,000)	0.6575	1,31,500
		2,00,000		(11,15,445)
Replace in four years	1		0.8696	(1,73,920)
	2	(2,00,000)	0.7561	(3,02,440)
	3	(4,00,000)	0.6575	(3,94,500)
	4	(6,00,000)	0.5718	(3,27,065)
	4	(5,71,992)	0.5718	(4,57,440)
		(8,00,000)		(16,55,365)

Advice: The company should replace the old machine immediately because the PV of cost of replacing the old machine with new machine is least.

CHAPTER - 4

Financial Analysis & Planning – Ratio Analysis

Q.1 The total sales (all credit) of a firm are ₹6,40,000. It has a gross profit margin of 15 per cent and a current ratio of 2.5. The firm's current liabilities are ₹ 96,000; inventories ₹ 48,000 and cash ₹16,000.

- a) DETERMINE the average inventory to be carried by the firm, if an inventory turnover of 5 times is expected? (Assume 360 days a year).
- b) DETERMINE the average collection period if the opening balance of debtors is intended to be of ₹ 80,000? Assume 360 days a year).

Ans: (a) Inventory turnover = $\frac{\text{Cost of goods sold}}{\text{Average inventory}}$

Since gross profit margin is 15 percent, the cost of goods sold should be 85 percent of the sales.

$$\text{Cost of goods sold} = 0.85 \times ₹ 6,40,000 = ₹ 5,44,000$$

$$\text{Thus, } = \frac{₹ 5,44,000}{\text{Average inventory}} = 5$$

$$\text{Average inventory} = \frac{₹ 5,44,000}{5} = ₹ 1,08,800$$

(b) Average collection period = $\frac{\text{Average Receivables}}{\text{Credit Sales}} \times 360 \text{ days}$

$$\text{Average Receivables} = \frac{(\text{Opening Receivables} + \text{Closing Receivables})}{2}$$

Closing balance of receivables is found as follows:

	₹	₹
Current assets (2.5 of current liabilities)		2,40,000
Less: Inventories	48,000	
Cash	16,000	64,000
∴ Receivables		1,76,000

$$\text{Average Receivables} = \frac{(\text{₹}1,76,000 + \text{₹} 80,000)}{2} = ₹ 1,28,000$$

$$\text{So, Average collection period} = \frac{(\text{₹}1,28,000)}{\text{₹} 6,40,000} \times 360 = 72 \text{ days}$$

Q.4 Ganpati Limited has furnished the following ratios and information relating to the year ended 31st March, 2021:

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

You are required to:

- CALCULATE the operating expenses for the year ended 31st March, 2021.
- PREPARE a Balance Sheet as on 31st March in the following format:

Balance Sheet as on 31st March, 2021

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

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

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

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

	(₹)	Assets	(₹)
Share Capital	10,50,000	Fixed Assets	1,70,00,000
Reserve and Surplus	4,50,000	Current Assets:	
15% Debentures	4,00,000	Stock	1,50,000
Payable	2,00,000	Receivables	2,00,000
		Cash	50,000
	21,00,000		21,00,000

Working Notes:

(i) Share Capital and Reserves and Surplus

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

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

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

The ratio of shares capital to reserves is 7:3

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

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

(ii) Debentures

Interest on Debentures @ 15% = ₹ 60,000

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

(iii) Current Assets

Current Ratio = 2

Payables = ₹ 2,00,000

\therefore Current Assets = 2 Current Liabilities = 2 x 2,00,000 = ₹ 4,00,000

(iv) Fixed Assets

	(₹)
Share Capital	10,50,000
Reserves and Surplus	4,50,000
Debentures	4,00,000
Payable	2,00,000
	21,00,000
Less: Current Assets	4,00,000
Fixed Assets	17,00,000

(v) Composition of Current Assets

Inventory Turnover = 12

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

$$\text{Closing stock} = \frac{\text{₹ 18,00,000}}{12} = \text{₹ 1,50,000}$$

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

Q.5 Using the following information, PREPARE the balance sheet:

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

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

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

Ans: Working Notes:

(i) Long term Debt

$$0.5 = \frac{\text{Long-term debt}}{\text{Net worth}} = \frac{\text{Long-term debt}}{(\text{common stock} + \text{retained earnings})} = \frac{\text{Long-term debt}}{\text{₹1,00,000} + \text{₹1,00,000}}$$

$$\therefore \text{Long term debt} = \text{₹ 1,00,000}$$

(ii) Total assets

$$\begin{aligned} \text{Total liabilities and Equity} &= \text{Notes and payable} + \text{Long-term debt} + \text{Common stock} \\ &+ \text{Retained earnings} \\ &= \text{₹ 1,00,000} + \text{₹ 1,00,000} + \text{₹ 1,00,000} + \text{₹ 1,00,000} = \text{₹ 4,00,000} \end{aligned}$$

$$\therefore \text{Total assets} = \text{Total liabilities and Equity} = \text{₹ 4,00,000}$$

(iii) Sales and Cost of Goods sold

$$\text{Total asset turnover} = 2.5 = \frac{\text{sales}}{\text{Total assets}} = \frac{\text{sales}}{\text{₹ 4,00,000}}$$

$$\begin{aligned} \therefore \text{Sales} &= ₹ 10,00,000 \\ \text{Cost of goods sold} &= (100\% - \text{Gross Profit margin}) \times \text{Sales} \\ &= (100\% - 10) \times ₹ 10,00,000 = ₹ 9,00,000 \end{aligned}$$

(iv) Current Assets

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

$$\therefore \text{Inventory} = ₹ 1,00,000$$

$$\text{Average collection period} = 18 = \frac{\text{Receivables} \times 360}{\text{sales}} = \frac{\text{Receivables} \times 360}{₹ 10,00,000}$$

$$\therefore \text{Accounts receivables} = ₹ 50,000$$

$$\text{Acid-test ratio} = 1 = \frac{\text{cash} + \text{Accounts Receivables}}{\text{Notes and Payables}} = \frac{\text{cash} + ₹ 50,000}{₹ 1,00,000}$$

$$\therefore \text{Cash} = ₹ 50,000$$

(v) Plant and equipment

$$= \text{Total Assets} - \text{Current Assets}$$

$$= ₹ 4,00,000 - (₹ 1,00,000 + ₹ 50,000 + 50,000) = ₹ 2,00,000$$

Balance Sheet

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

Q.10 In a meeting held at Solan towards the end of 2023-24, the Directors of HPCL Ltd. have taken a decision to diversify. At present HPCL Ltd. sells all finished goods from its own warehouse. The company issued debentures on 07.04.2020 and purchased fixed assets on the same day. The purchase prices have remained stable during the concerned period.

Following information is provided to you:

INCOME STATEMENT:

Particulars	2019-20 (₹)		2020-21 (₹)	
	Cash Sales	30,000		32,000
Credit Sales	2,70,000	3,00,000	3,42,000	3,74,000
Less: Cost of goods sold		2,30,000		2,98,000
Gross profit		64,000		76,000
Less: Operating Expenses:				
Warehousing	13,000		14,000	

Transport	6,000		10,000	
Administrative	19,000		19,000	
Selling	11,000	49,000	14,000	57,000
Net Profit		15,000		19,000

BALANCE SHEET

Assets & Liabilities	2019-20 (₹)		2020-21 (₹)	
Fixed Assets (Net Block)	-	30,000	-	40,000
Receivable	50,000		82,000	
Cash at Bank	10,000			
Stock	60,000		7,000	
Total Current Assets (CA)	1,20,000		94,000	
Payables				
Total current Liabilities (CL)	50,000		1,83,000	
Working Capital (CA - CL)	50,000		76,000	
Net Assets			76,000	
		70,000		1,07,000
		1,00,000		1,47,000
Presented by:				
Share capital	75,000		75,000	
Reserves and Surplus	25,000		42,000	
Debentures	-		30,000	
	10,000		1,47,000	

You are required to CALCULATE the following ratios for the years 2019-20 and 2020-21 :

- (i) Gross Profit Ratio
- (ii) Operating Expenses to Sales Ratio
- (iii) Operating Profit Ratio
- (iv) Capital Turnover Ratio
- (v) Stock Turnover Ratio
- (vi) Net Profit to Net Worth Ratio
- (vii) Receivables Collection Period

Ratio relating to capital employed should be based on the capital at the end of the year. Give the reasons for change in the ratios for 2 years. Assume opening stock of 40,000 for the year 2019-20. Ignore Taxation.

Ans:

Computation of Ratios		
Ratio	2021-22 (₹)	2022-23 (₹)
1. Gross profit ratio (Gross profit/sales)	$\frac{64,000 \times 100}{3,00,000} = 21.3\%$	$\frac{76,000 \times 100}{3,74,000} = 20.3\%$
2. Operating expense to sales ratio (Operating exp/Total sales)	$\frac{49,000 \times 100}{3,00,000} = 16.3\%$	$\frac{57,000 \times 100}{3,74,000} = 15.3\%$
3. Operating profit (Operating profit/Total sales)	$\frac{15,000 \times 100}{3,00,000} = 5\%$	$\frac{19,000 \times 100}{3,74,000} = 5.08\%$
4. Capital turnover ratio (Sales/capital employed)	$\frac{3,00,000}{1,00,000} = 3$	$\frac{3,74,000}{1,47,000} = 2.54$
5. Stock turnover ratio (COGS/Average stock) (Refer to W.N.1)	$\frac{2,36,000}{50,000} = 4.72$	$\frac{2,98,000}{77,000} = 387$
6. Net profit to Net worth ratio (Net profit/Net worth)	$\frac{15,000 \times 100}{1,00,000} = 15\%$	$\frac{19,000 \times 100}{1,17,000} = 16.24\%$
7. Receivables collection period (Average receivables/Average daily credit sales) (Refer to W.N. 2)	$\frac{50,000}{739.73} = 67.6 \text{ days}$	$\frac{82,000}{936.99} = 87.5 \text{ days}$
Working notes (W.N.):		
1. Average Stock =(Opening stock +closing stock)/2	$(40,000 + 60,000)/2 = 50,000$	$(60,000 + 94,000)/2 = 77,000$
2. Average daily sales =credit sales/365	$\frac{2,70,000}{365} = 739.73$	$\frac{3,42,000}{365} = 936.99$

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

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

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

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

Q.11 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, 2021:

(i) The company went in for re-organization 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: Calculation of stock

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

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

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

Receivables	= 4/5 th of quick assets = (₹ 80,000 - ₹ 30,000) x 4/5 = ₹ 40,000
Receivables turnover	= $\frac{\text{Receivables}}{\text{Credit Sales}} \times 12 \text{ Months} = 2 \text{ months}$ = $\frac{40,000 \times 12}{\text{Credit Sales}} = 2 \text{ Months}$
2x 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 $\frac{15}{100}$ = ₹ 36,000
Return on net worth (net profit)	
Net worth	= ₹ 1,00,000 + ₹ 30,000 = ₹ 1,30,000
Net profit	= ₹ 1,30,000 x $\frac{10}{100}$ = ₹ 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		36,000
To debenture interest	1000		
To administration and other expenses (bal. fig.)	22,000		
To net profit	13,000		
	36,000		36,000

Projected Balance Sheet as at 31st March, 2023

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

Q.12 X Co. has made plans for the next year. It is estimated that the company will employ total assets of ₹8,00,000; 50 per cent of the assets being financed by borrowed capital at an interest cost of 8 per cent per year. The direct costs for the year are estimated at ₹ 4,80,000 and all other operating expenses are estimated at ₹80,000. The goods will be sold to customers at 150 per cent of the direct costs. Tax rate is assumed to be 50 per cent. You are required to CALCULATE: (i) Operating profit margin (before tax); (ii) net profit margin (after tax); (iii) return on assets (on operating profit after tax); (iv) asset turnover and (v) return on owners' equity.

Ans: The net profit is calculated as follows:

Particulars	₹
Sales (15% of ₹ 4,80,000)	7,20,000
Direct costs	(4,80,000)
Gross profit	2,40,000
Operating expenses	(80,000)
Profit before interest and Tax (EBIT)	1,60,000
Interest charges (8% of ₹4,00,000)	32,000
Profit before taxes	1,28,000
Taxes (@ 50%)	(64,000)
Net profit after taxes	64,000

$$(i) \quad \text{Operating profit margin} = \frac{EBIT}{Sales} = \frac{₹ 1,60,000}{₹ 7,20,000} = 0.2222 \text{ or } 22.22\%$$

$$(ii) \quad \text{Net profit margin} = \frac{\text{Net profit after taxes}}{Sales} = \frac{₹ 64,000}{₹ 7,20,000} = 0.89 \text{ or } 8.9\%$$

$$(iii) \quad \text{Return on asset} = \frac{EBIT (1-T)}{Assets} = \frac{₹ 1,60,000 (1-05)}{₹ 8,00,000} = 0.10 \text{ or } 10\%$$

$$(iv) \quad \text{Assets turnover} = \frac{Sales}{Assets} = \frac{₹ 7,20,000}{₹ 8,00,000} = 0.9 \text{ times}$$

$$(v) \quad \text{Return on equity} = \frac{\text{Net profit after taxes}}{\text{Owners' equity}} = \frac{₹ 64,000}{50\% ₹ 8,00,000}$$

$$= \frac{₹ 64,000 (1-05)}{₹ 4,00,000} = 0.16 \text{ or } 16\%$$

Q.14 ABC Company sells plumbing fixtures on terms of 2/10, net 30. Its financial statements over the last 3 years are as follows:

Particulars	2018-19	2019-20	2020-21
	₹	₹	₹

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	₹	₹	₹
Accruals	2,30,000	3,00,000	3,80,000
Bank loan (short-term)	2,00,000	2,10,000	2,25,000
	1,00,000	1,00,000	1,40,000
Long-term debt			
Common stock	5,30,000	6,10,000	7,45,000
Retained earnings	3,00,000	3,00,000	3,00,000
	1,00,000	1,00,000	1,00,000
	5,00,000	5,50,000	5,50,000
Sales			
Cost of goods sold	14,30,000	15,60,000	16,95,000
Net profit	₹	₹	₹
	40,00,000	43,00,000	38,00,000
	32,00,000	36,00,000	33,00,000
	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 01.04.2018, ANALYSE the company's financial condition and performance over the last 3 years. Are there any problems.

Ans:

Particulars	2018-19	2019-20	2020-21
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 correction period (365/Receivables turnover ratio)	18.25 (365/20)	19.52 (365/18.70)	26.41 (365/13.82)
Inventory turnover ration (COGS/Average inventory) (Refer Working Notes)	8 $\left(\frac{₹3,20,000}{₹4,00,000}\right)$	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 $\left(\frac{₹8,00,000}{₹4,00,000}\right)$	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 $\left(\frac{₹3,00,000}{₹4,00,000}\right)$	0.047 $\left(\frac{₹2,00,000}{₹43,00,000}\right)$	0.026 $\left(\frac{₹1,00,000}{₹38,00,000}\right)$
Total Assets 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 $\left(\frac{₹38,00,000}{₹16,95,000}\right)$

Q.24 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:**

$$\frac{\text{Reserve and Surplus}}{\text{Shareholder's Funds}} = 0.5$$

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

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

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

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

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

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

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

(ii) Calculation of Value of Stock: Sales

$$\frac{\text{Sales}}{\text{Shareholder's Funds}} = 1.5$$

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

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

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

$$\text{Cost of Goods Sold} = 30,00,000 - 6,00,000$$

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

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

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

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

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

$$\text{Average stock} = ₹ 4,00,000$$

(iii) Calculation of Debtors:

$$\text{Debtors Turnover Ratio} = 6$$

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

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

$$\text{Average Debtors} = \text{Rs. } 5,00,000$$

(iv) Calculation of Current Liabilities:

$$\text{Net Working Capital Turnover ratio} = 2.5$$

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

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

$$\text{Current Assets} - \text{Current Liabilities} = 12,00,000$$

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

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

$$\text{Current Assets} = 2.5 \text{ Current Liabilities} \quad \dots 2$$

From (1) & (2),

$$2.5 \text{ Current Liabilities} - \text{Current Liabilities} = 12,00,000$$

$$1.5 \text{ Current Liabilities} = 12,00,000$$

$$\text{Current Liabilities} = ₹ 8,00,000$$

(v) Calculation of cash balance:

$$\text{Current Assets} = 2.5 \text{ Current liabilities}$$

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

Q.25 The following figures are related to the trading activities of M Ltd.

$$\text{Total assets} \quad \quad \quad ₹ 10,00,000$$

$$\text{Debt to total assets} \quad \quad 50\%$$

$$\text{Interest cost} \quad \quad \quad 10\% \text{ per year}$$

Direct Cost 10 times of the interest cost
 Operating Exp. ₹ 1,00,000
 The goods are sold to customers at a margin of 50% on the direct cost
 Tax Rate is 30%
 You are required to calculate
 (i) Net profit margin
 (ii) Net operating profit margin
 (iii) Return on assets
 (iv) Return on owner's equity

Ans: (i) Computation of Net Profit Margin

$$\text{Debt} = (10,00,000 \times 50\%) = ₹ 5,00,000$$

$$\text{Interest cost} = 5,00,000 \times \left(\frac{10}{100}\right) = ₹ 50,000$$

$$\text{Direct cost} = 50,000 \times 10 = ₹ 5,00,000$$

$$\text{Sales} = 5,00,000 \times 150\% = ₹ 7,50,000$$

₹

$$\text{Gross profit} = 7,50,000 - 5,00,000 = 2,50,000$$

$$\text{Less: Operating expenses} = 1,00,000$$

$$\therefore \text{EBIT} = 1,50,000$$

$$\text{Less: Interest} = 50,000$$

$$\therefore \text{EBT} = 1,00,000$$

$$\text{Less: Tax@ 30\%} = 30,000$$

$$\therefore \text{PAT} = 70,000$$

$$\text{Net profit margin} = \left(\frac{70,000}{7,50,000}\right) \times 100 = 9.33$$

(ii) Net Operating Profit margin

$$\text{Net operating profit margin} = \left(\frac{\text{EBIT}}{\text{SALES}}\right) \times 100$$

$$= \left(\frac{1,70,000}{7,50,000}\right) \times 100 = 20\%$$

(iii) Return on Assets

$$\text{Return on Assets} = \left[\left(\frac{\text{PAT} + \text{INTEREST}}{\text{TOTAL ASSETS}}\right) \times 100\right]$$

$$= \left[\left(\frac{1,20,000}{10,00,000}\right) \times 100\right] = 12\%$$

OR

$$\text{Return of Assets} = \frac{\text{EBIT}}{\text{ASSETS}} \times 100 = \frac{1,50,000}{10,00,000} \times 100 = 15\%$$

OR

$$= \frac{70,000}{10,00,000} \times 100 = 7\%$$

OR

$$= \left[\left(\frac{1,50,000(1-0.3)}{10,00,000} \right) \right] \times 100 = 10.5\%$$

(iv) Return on owner's equity

$$\begin{aligned} \text{Return} &= \left(\frac{\text{PAT}}{\text{Owner's Equity}} \right) \times 100 \\ &= \left(\frac{70,000}{5,00,000} \right) \times 100 = 14\% \end{aligned}$$

Q.29 From the following table of financial ratios of R. Textiles Limited, comment on various ratios given at the end:

Ratios	2017	2018	Average of Textile Industry
Liquidity Ratios			
Current ratio	2.2	2.5	2.5
Quick ratio	1.5	2	1.5
Receivable turnover ratio	6	6	6
Inventory turnover	9	10	6
Receivables collection period	87 days	86 days	85 days
Operating profitability			
Operating income – ROI	25%	22%	15%
Operating profit margin	19%	19%	10%
Financing decisions			
Debt ratio	49.00%	48.00%	57%
Return			
Return on equity	24%	25%	15%

COMMENT on the following aspect of R. Textiles 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. This may happen due to reduction in receivable collection period and quick inventory turnover. However, this also indicates idleness of funds. Overall it is reasonably good. All the liquidity ratios are either better or same in both the year compare to the Industry Average.

Operating Profits	Operating Income-ROI reduced from last year but Operating Profit Margin has been maintained. This may happen due to variability of cost on turnover. However, both the ratio are still higher than the industry average.
Financing	The company has reduced its debt capital by 1% and saved operating profit for equity shareholders. It also signifies that dependency on debt compared to other industry players (57%) is low. Return to the shareholders R's ROE is 24 per cent in 2017 and 25 per cent in 2018 compared to an industry average of 15 per cent. The RO E is stable and improved over the last year.

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

Balance Sheet

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

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

	₹ in lakhs	
	March 31, 2019	March 31, 2020
Sales	22,500	23,800
Less: Cost of Goods sold	(20,860)	(21,100)
Gross Profit	1,640	2,700
Less: Selling, General and Administrative expenses	(1,100)	(1,750)
Earnings before Interest and Tax (EBIT)	540	950
Less: Interest Expense	(350)	(300)
Earnings before Tax (EBT)	190	650
Less: Tax	(57)	(195)
Profits after Tax (PAT)	133	455

Required:

CALCULATE for the year 2019-20-

- (a) Inventory turnover ratio
- (b) Financial Leverage
- (c) Return on Capital Employed (ROCE)
- (d) Return on Equity (ROE)
- (e) Average Collection period.

[Take 1 year = 365 days]

Ans:

Ratios for the year 2019-20

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

$$(b) \text{ Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{\text{₹}950}{\text{₹}650} = 1.46$$

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

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

$$(d) \text{ ROE} = \frac{\text{Profit after tax}}{\text{Average shareholder's funds}} \\ = \frac{\text{₹}455}{\text{₹}2,500} \times 100 = 18.2\%$$

$$(e) \text{ Average collection period} \\ \text{Average Sale per day} = \frac{\text{₹}23,800}{365} = \text{₹ } 65.20\text{Lakhs} \\ \text{Average collection period} = \frac{\text{Average Receivables}}{\text{Average sales per day}} \\ = \frac{\text{₹}(1,400+1,100)}{\frac{2}{\text{₹}65.2}} \\ = \frac{\text{₹}1,250}{\text{₹}65.2} = 19.17\text{days}$$

Q.32 Following information has been provided from the books of M/s Laxmi & Co. for the year ending on 31st March, 2020:

Net Working Capital	₹4,80,000
Bank overdraft	₹ 80,000
Fixed Assets to Proprietary ratio	0.75
Reserves and Surplus	₹ 3,20,000
Current ratio	2.5
Liquid ratio (Quick Ratio)	1.5

You are required to PREPARE a summarized Balance Sheet as at 31st March, 2020.

Ans. (i) Current Assets and Current Liabilities computation:

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

Or Current assets = 2.5 Current liabilities

Now, Working capital = Current assets - Current liabilities

Or ₹4,80,000 = 2.5 Current liability - Current liability

Or 1.5 Current liability = ₹4,80,000

∴ Current Liabilities = ₹3,20,000

So, Current Assets = ₹3,20,000 × 2.5 = ₹8,00,000

(ii) Computation of stock

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

Or 1.5 = $\frac{\text{Current assets} - \text{Inventories}}{\text{₹3,20,000}}$

Or 1.5 × ₹3,20,000 = ₹8,00,000 - Inventories

Or Inventories = ₹8,00,000 - ₹4,80,000

Or Stock = ₹3,20,000

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

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

∴ Fixed Assets = 0.75 Proprietary fund (PF) [FA + NWC = PF]

or NWC = PF - FA [(i.e. .75 PF)]

and Net Working Capital (NWC) = 0.25 Proprietary fund

Or ₹4,80,000/0.25 = Proprietary fund

Or Proprietary fund = ₹19,20,000

and Fixed Assets = 0.75 proprietary fund

= 0.75 × ₹19,20,000 = ₹14,40,000

Capital = Proprietary fund - Reserves & Surplus

= ₹19,20,000 - ₹3,20,000 = ₹16,00,000

Sundry Creditors = (Current liabilities - Bank overdraft)

= (₹ 3,20,000 - ₹80,000) = ₹2,40,000

Balance Sheet as at 31st March, 2020

Liabilities	₹	Assets	₹
Capital	16,00,000	Fixed Assets	14,40,000
Reserves & Surplus	3,20,000	Stock	3,20,000
Bank overdraft	80,000	Other Current	4,80,000
Sundry creditors	2,40,000	Assets	
	22,40,000		22,40,000

Q.34 Following information has been gathered from the books of Cram Ltd. for the year ended 31st March 2021, the equity shares of which is trading in the stock market at ₹28:

Particulars	Amount (₹)
Equity Share Capital (Face value @ ₹ 20)	20,00,000
10% Preference Share capital	4,00,000
Reserves & Surplus	16,00,000
12.5% Debentures	12,00,000
Profit before Interest and Tax for the year	8,00,000

CALCULATE the following when company falls within 25% tax bracket:

(i) Return on Capital Employed

(ii) Earnings Per share

(iii) P/E Ratio

Ans:

(i) Return on Capital Employed (ROCE)

$$\begin{aligned} \text{ROCE (Pre-tax)} &= \frac{\text{Profit before interest and taxes (PBIT)}}{\text{Capital Employed}} \times 100 \\ &= \frac{8,00,000}{52,00,000} \times 100 \\ &= 15.38\% \text{ (approx.)} \end{aligned}$$

$$\begin{aligned} \text{ROCE (Post-tax)} &= \frac{\text{PBIT}(1-t)}{\text{Capital Employed}} \times 100 \\ &= \frac{₹8,00,000(1-0.25)}{₹52,00,000} \times 100 \\ &= 11.54\% \text{ (approx.)} \end{aligned}$$

(ii) Earnings Per share (EPS)

$$\begin{aligned} &\frac{\text{Profit available to equity shareholders}}{\text{Number of equity shares outstanding}} \\ &= \frac{₹4,47,500}{1,00,000} \\ &= ₹4.475 \end{aligned}$$

(iii) P/E Ratio

$$\begin{aligned} &= \frac{\text{Market Price per Share (MPS)}}{\text{Earning per Share (EPS)}} \\ &= \frac{₹28}{₹4.475} \\ &= 6.26 \text{ times (approx.)} \end{aligned}$$

Workings:

(a) Income Statement

Particulars	Amount (₹)
Profit before Interest and Tax (PBIT)	8,00,000
Interest on Debentures (12.5% of ₹12,00,000)	(1,50,000)
Profit before Tax (PBT)	6,50,000
Tax @ 25%	(1,62,500)
Profit after Tax (PAT)	4,87,500
Preference Dividend (10% of ₹4,00,000)	(40,000)
Profit available to Equity shareholders	4,47,500

(b) Calculation of Capital Employed

= Equity Shareholder's Fund + Preference share Capital + Debentures

= (₹20,00,000 + ₹16,00,000) + ₹4,00,000 + ₹12,00,000 = ₹52,00,000

Q.35 FM Ltd. is in a competitive market where every company offers credit. To maintain the competition, FM Ltd. sold all its goods on credit and simultaneously received the goods on credit. The company provides the following information relating to current financial year:

Debtors Velocity	3 months
Creditors Velocity	2 months
Stock Turnover Ratio (on Cost of Goods Sold)	1.5
Fixed Assets turnover Ratio (on Cost of Goods Sold)	4
Gross Profit Ratio	25%
Bills Receivables	₹ 75,000
Bills Payables	₹30,000
Gross Profit	₹ 12,00,000

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

DETERMINE:

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

Ans:

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

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

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

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

$$\text{Cost of Goods Sold} = \text{Sales} - \text{Gross Profit}$$

$$= ₹48,00,000 - ₹12,00,000 = ₹36,00,000$$

(ii) Determination of Sundry Debtors:

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

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

$$\text{Debtors' turnover ratio} = \frac{\text{Credit Sales}}{\text{Average Accounts Receivable}}$$

$$= \frac{48,00,000}{\text{Bills Receivable} + \text{Sundry Debtors}} = 4$$

Or, Sundry Debtors + Bills receivable = ₹12,00,000

Sundry Debtors = ₹12,00,000 – ₹75,000 = ₹11,25,000

(iii) Determination of Closing Stock

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

So, Average Stock = ₹24,00,000

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

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

Or 2 Opening Stock + ₹30,000 = ₹48,00,000

Or 2 Opening Stock = ₹47,70,000

Or, Opening Stock = ₹23,85,000

So, Closing Stock = ₹23,85,000 + ₹30,000 = ₹24,15,000

(iv) Determination of Sundry Creditors:

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

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

$$\text{Creditors turnover ratio} = \frac{\text{Credit Purchases*}}{\text{Average Accounts Payables}}$$

$$\frac{36,30,000}{\text{Sundry Creditors} + \text{Bills Payables}} = 6$$

So, Sundry Creditors + Bills Payable = ₹6,05,000

Or, Sundry Creditors + ₹30,000 = ₹6,05,000

Or, Sundry Creditors = ₹5,75,000

(v) Determination of Fixed Assets

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

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

Or, Fixed Asset = ₹9,00,000

Workings:

*Calculation of Credit purchases:

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

₹36,00,000 = ₹23,85,000 + Purchases – ₹24,15,000

Purchases (credit) = ₹36,30,000

Calculation of credit purchase also can be done as below:

Or Credit Purchases = Cost of goods sold + Difference in Opening Stock

Or Credit Purchases = 36,00,000 + 30,000 = ₹36,30,000

CHAPTER - 5

CAPITAL STRUCTURE

Q.2 Indra Ltd. has an EBIT of ₹ 1,00,000. The company makes use of both the debt and equity capital. The firm has 10% debentures of ₹ 5,00,000 and the firm's equity capitalization rate is 15%. You are required to COMPUTE:

- (i) Total value of the firm
- (ii) Overall cost of capital.

Ans:

	₹
EBIT	1,00,000
Less: Interest (@ 10% on ₹ 5,00,000)	50,000
Earning available for equity holders	50,000
Equity capitalization rate i.e. K_e	15%

$$\text{Value of equity (S)} = \frac{\text{Earnings available for equity holders}}{K_e}$$

$$= \frac{₹ 50,000}{0.15} ₹ 3,33,333$$

$$\text{Value of Debt (D) (given)} \quad ₹ 5,00,000$$

$$\text{Total value of the firm (V) D + S (5,00,000 + 3,33,333)} \quad ₹ 8,33,333$$

$$\text{(ii) Overall cost of capital (K}_0\text{)} = K_e \left(\frac{S}{V}\right) + K_d \left(\frac{D}{V}\right)$$

$$= 0.15 \left(\frac{₹ 3,33,333}{₹ 8,33,333}\right) + 0.10 \left(\frac{₹ 5,00,000}{₹ 8,33,333}\right)$$

$$= \frac{1}{₹ 8,33,333} [₹ 50,000 + ₹ 50,000] = 12.00\%$$

$$\text{Or, } K_0 = \frac{EBIT}{V} = \frac{₹ 1,00,000}{₹ 8,33,333} = 12.00\%$$

Q.5 Alpha Ltd. and Beta Ltd. are identical except for capital structure. Alpha Ltd. has 50 per cent debt and 50 per cent equity, whereas Beta Ltd. has 20 per cent debt and 80 per cent equity (All percentages are in market-value terms). The borrowing rate for both the companies is 8 per cent in a no-tax world, and capital markets are assumed to be perfect.

- (a) (i) If you own 2 per cent of the shares of Alpha Ltd., DETERMINE your return if the company has net operating income of ₹3,60,000 and the overall capitalization rate of the company (K_0) is 18 per cent.
- (ii) CALCULATE the implied required rate of return on equity of Alpha Ltd.
- (b) Beta Ltd. has the same net operating income as Alpha Ltd.
- (i) CALCULATE the implied required rate of return on equity of Beta Ltd.
- (ii) ANALYSE why does it differ from that of Alpha Ltd

Ans: (a) Value of the Alpha Ltd. = $\frac{NOI}{K_0} = \frac{₹ 3,60,000}{18\%} = ₹ 20,00,000$

(i) Return on Equity shares of Alpha Ltd.

	₹
Value of the company	20,00,000
Market value of debt (50% x ₹ 20,00,000)	10,00,000
Market value of equity (50% x ₹ 20,00,000)	10,00,000
	₹
Net operating income	3,60,000
Less: Interest on debt (8% x ₹10,00,000)	80,000
Earnings available to equity shareholders	2,80,000
Return on 2% equity shares (2% x ₹ 2,80,000)	5,600

(ii) Implied required rate of return on equity of Alpha Ltd.

$$= \frac{\text{Earnings available for equity shareholders}}{\text{Market value of Equity}} = \frac{₹ 2,80,000}{₹ 10,00,000} = 28\%$$

(b) (i) Calculation of implied rate of return on equity of Beta Ltd.

	₹
Total Value of company	20,00,000
Market value of debt (20% x ₹ 20,00,000)	4,00,000
Market value of equity (80% x ₹ 20,00,000)	16,00,000
	₹
Net operating income	3,60,000
Less: Interest on debt (8% x ₹ 4,00,000)	32,000
Earnings available to shareholders	3,28,000

Implied required rate of return n equity

$$= \frac{\text{Earnings available for equity shareholders}}{\text{Market value of Equity}} = \frac{₹ 3,28,000}{₹ 16,00,000} = 20.5\%$$

(ii) Implied required rate of return on equity of Beta Ltd. Is lower than that of Alpha Ltd. Because Beta Ltd. Uses less debt in its capital structure. As the equity capitalization 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.6 There are two companies N Ltd. and M Ltd., having same earnings before interest and taxes (EBIT) of ₹ 20,000. M Ltd. is a levered company having a debt of ₹1,00,000 @ 7% rate of interest. The cost of equity of N Ltd. is 10% and of M Ltd. is 11.50%. COMPUTE how arbitrage process will be carried on?

Ans:

	Company	
	M Ltd	N Ltd
EBIT	₹20,000	₹20,000
Debt (D)	₹ 1,00,000	---
K_e	11.50%	10%
K_d	7%	--

$$\text{Value of equity (S)} = \frac{\text{NOI} - \text{Interest}}{\text{Cost of Equity}}$$

$$S_M = \frac{₹ 20,000 - ₹ 7,000}{11.50\%} = ₹ 1,13,043$$

$$S_N = \frac{₹ 20,000}{10\%} = ₹ 2,00,000$$

$$\text{Value of Firm (V)} = S + D$$

$$V_M = ₹ 1,13,043 + ₹ 1,00,000 = ₹ 2,13,043$$

$$V_N = ₹ 2,00,000$$

Arbitrage Process:

If you have 10% shares of M Ltd., Your value of investment in equity shares is 10% of ₹ 1,13,043 i.e. ₹ 11,304.30 and return will be 10% of (₹ 20,000 – ₹ 7,000) = ₹ 1,300.

Alternate Strategy will be:

Sell your 10% shares of levered firm for ₹ 11,304.30 and borrow 10% of levered firm's debt i.e. ₹ 10,000 (10% of ₹ 1,00,000) and invest the money i.e. 10% in unlevered firm's stock.

Total resources/Money we have = ₹ 11,304.30 +

₹ 21,304.3 and you invest 10% of ₹ 2,00,000 = ₹ 20,000

Surplus cash available we you is = ₹ 21,304.3 – ₹ 20,000 = ₹ 1,304.3

Your return = 10% EBIT of unlevered firm – interest to be paid on borrowed funds

i.e. = 10% of ₹ 20,000 – 7% of ₹ 10,000 = ₹ 2,000 – ₹ 700 = ₹ 1,300

Now your return remains the same i.e. ₹ 1,300 which you are getting from N Ltd before investing in M Ltd. But still you have ₹ 1,304.3 excess money available with you. Hence, you are better off by doing arbitrage.

In the above example you have not invested entire amount received from “sale of shares of levered company plus amount borrowed.” You maintained same level of earning and reduced

investment. Alternatively, you could have invested entire amount in unlevered company. In that case you annual earnings would have increased. An example for the same is as follows:

Q.9 Following data is available in respect of two companies having same business risk:
Capital employed = ₹ 2,00,000, EBIT = ₹30,000

Sources	Levered Company (₹)	Unlevered Company (₹)
Debt (@10%)	1,00,000	Nil
Equity	1,00,000	2,00,000
Ke	20%	12.5%

An investor is holding 15% shares in Unlevered company. CALCULATE the increase in annual earnings of investor if he switches his holding from Unlevered to Levered Company.

Ans:

1. Valuation of firms

Particulars	Levered Firm (₹)	Unlevered Firm (₹)
EBIT	30,000	30,000
Less: Interest on debt (10% x ₹ 1,00,000)	10,000	Nil
Earnings available to equity shareholders	20,000	30,000
Ke	20%	12.5%
Value of Equity (S) (Earnings available to Equity shareholders/Ke)	1,00,000	2,40,000
Debt (D)	1,00,000	Nil
Value of Firm (V) = S + D	2,00,000	2,40,000

Value of Unlevered company is more than that of Levered company therefore investor will sell his shares in Unlevered company and buy shares in Levered company. Market value of Debt and Equity of Levered company are in the ratio of ₹ 1,00,000 : ₹ 2,40,000 i.e. 1:2.4. To maintain the level of risk he will lend proportionate amount (50%) and invest balance amount (50%) in shares of Levered Company.

2. Investment & Borrowings

Sell shares in Unlevered company (₹ 2,40,000 x 15%)	<u>36,000</u>
Lend money (₹ 36,000 x 50%)	18,000
Buy shares in Levered company (₹ 36,000 x 50%)	<u>18,000</u>
Total	<u>36,000</u>

3. Change in return

	₹
Income from shares in Levered company (₹ 18,000 x 20%)	3,600
Interest on money lent (₹ 18,000 x 10%)	<u>1,800</u>
Total Income after switch over	5,400
Less: Income from Unlevered firm (₹ 36,000 x 12.5%)	<u>4,500</u>
Incremental Income due to arbitrage	<u>900</u>

Q.10 Blue Ltd., an all equity financed company is considering the repurchase of ₹275 lakhs equity shares and to replace it with 15% debentures of the same amount. Current market value of the company is ₹ 1,750 lakhs with its cost of capital of 20%. The company's Earnings before Interest and Taxes (EBIT) are expected to remain constant in future years. The company also has a policy of distributing its entire earnings as dividend.

Assuming the corporate tax rate as 30%, 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)

Approach:

- (i) Market value of the company
- (ii) Overall Cost of capital
- (iii) Cost of equity

Ans: **Workings:**

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

$$₹ 1,750 \text{ lakhs} = \frac{\text{Net Income (NI) for Equity holders}}{0.20}$$

$$\text{Net Income to equity holders/EAT} = ₹ 350 \text{ lakhs}$$

$$\text{Therefore, EBIT} = \frac{\text{EAT}}{1-t} = \frac{₹ 350 \text{ lakhs}}{(1-0.3)} = ₹ 500 \text{ Lakhs}$$

Income Statement

Particulars	All Equity (₹ in lakhs)	Equity & Debt (₹ in lakhs)
EBIT (as calculated above)	500	500.00
Interest on ₹ 275 lakhs @ 15%	-	41.25
EBT	500	458.25
Tax @ 30%	150	137.63
Income available to equity holders	350	321.12

(i) Market Value of the company

$$\begin{aligned} \text{Market value of levered firm} &= \text{Value of unlevered firm} + \text{Tax Advantage} \\ &= ₹ 1,750 \text{ lakhs} + (₹ 275 \text{ lakhs} \times 0.3) \\ &= ₹ 1,832.5 \text{ lakhs} - ₹ 1,750 \text{ lakhs} \\ &= ₹ 82.50 \text{ lakhs} \end{aligned}$$

(ii) Overall Cost of Capital

Market Value of Equity = Market value of levered firm - Equity repurchased
= ₹ 1832.50 lakhs - ₹ 275 lakhs = ₹ 1557.50 lakhs

$$\begin{aligned} \text{Cost of Equity (K}_e\text{)} &= \frac{\text{Net Income for Equity holders}}{\text{Market value of equity}} \times 100 \\ &= \frac{\text{₹ 321.12 lakhs}}{\text{₹ 1,557.50 lakhs}} \times 100 = 20.62\% \end{aligned}$$

$$\text{Cost of debt (K}_d\text{)} = I(1-t) = 15(1-0.3) = 10.50\%$$

Components	Amount (₹ in lakhs)	Cost of capital	Weight	WACC (K _o)
Equity	1,557.50	20.62	0.85	17.53
Debt	275.00	10.50	0.15	1.58
	1,832.50		1	19.11

(iii) Cost of Equity

The impact is that cost of equity has risen by (0.62%- 20%) due to the presence of financial risk i.e. introduction of debt in capital structure.

Note: Cost of Capital and Cost of equity can also be calculated with the help of following formulas, though there will be no change in the final answers.

$$\text{Cost of Capital (K}_o\text{)} = K_{eu} [1 - (t \times L)]$$

Where,

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

T = Tax rate

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

$$\text{So, } K_o = 0.20 \left[1 - \left(0.3 \times \frac{\text{₹275 lakhs}}{\text{₹1,832.5 lakhs}} \right) \right] = 0.191 \text{ or } 19.10\% \text{ (approx.)}$$

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

Where,

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

K_d = Cost of debt

T = Tax rate

$$\text{So, } K_e = 0.20 + \left((0.20 - 0.15) \times \frac{\text{₹275 lakhs (1-0.3)}}{\text{₹ 1,557.5 lakhs}} \right) = 0.2062 \text{ or } 20.62\%$$

Q.20 Alpha Limited requires funds amounting to ₹ 80 lakh for its new project. To raise the funds, the company has following two alternatives:

- (i) To issue Equity Shares of ₹100 each (at par) amounting to ₹60 lakh and borrow the balance amount at the interest of 12% p.a., or
- (ii) To issue Equity Shares of ₹ 100 each (at par) and 12% Debentures in equal proportion.

The Income-tax rate is 30%.

IDENTIFY the point of indifference between the available two modes of financing and state which option will be beneficial in different situations.

Ans:

(i) Amount = ₹ 80,00,000

Plan I = Equity of ₹ 60,00,000 + Debt of ₹ 20,00,000

Plan II = Equity of ₹ 40,00,000 + 12% Debentures of ₹ 40,00,000

Plan I: Interest Payable on Loan

$$= 12\% \times ₹ 20,00,000 = ₹ 2,40,000$$

Plan II: Interest Payable on Debentures

$$= 12\% \times ₹ 40,00,000 = ₹ 4,80,000$$

Computation of Point of Indifference

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

$$\frac{(EBIT - ₹2,40,000)(1-0.3)}{60,000} = \frac{(EBIT - ₹4,80,000)(1-0.3)}{40,000}$$

$$2 (EBIT - 2,40,000) = 3 (EBIT - 4,80,000)$$

$$2 EBIT - 4,80,000 = 3 EBIT - 14,40,000$$

$$2 EBIT - 3 EBIT = - 14,40,000 + 4,80,000$$

$$EBIT = 9,60,000$$

(ii) Earnings per share (EPS) under Two Situations for both the Plans

Situation A (EBIT is assumed to be ₹ 9,50,000)		
Particulars	Plan I	Plan II
EBIT	9,50,000	9,50,000
Less: Interest @ 12%	(2,40,000)	(4,80,000)
EBT	7,10,000	4,70,000
Less: Taxes @ 30%	(2,13,000)	(1,41,000)
EAT	4,97,000	3,29,000
No. of Equity Shares	60,000	40,000
EPS	8.28	8.23

Comment: In Situation A, when expected EBIT is less than the EBIT at indifference point then, Plan I is more viable as it has higher EPS. The advantage of EPS would be available from the use of equity capital and not debt capital.

Situation B (EBIT is assumed to be 9,70,000)		
Particulars	Plan I	Plan II
EBIT	9,70,000	9,70,000
Less: Interest @ 12%	(2,40,000)	(4,80,000)
EBT	7,30,000	4,90,000
Less: Taxes @ 30%	(2,19,000)	(1,47,000)
EAT	5,11,000	3,43,000
No. of Equity Shares	60,000	40,000
EPS	8.52	8.58

Comment: In Situation B, when expected EBIT is more than the EBIT at indifference point then, Plan II is more viable as it has higher EPS. The use of fixed-cost source of funds would be beneficial from the EPS viewpoint. In this case, financial leverage would be favourable.

(Note: The problem can also be worked out assuming any other figure of EBIT which is more than 9,60,000 and any other figure less than 9,60,000. Alternatively, the answer may also be based on the factors/governing the capital structure like the cost, risk, control, etc. Principles).

Q.23 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:

(i) 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:

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

$$\text{So } \frac{EBIT(1-0.3)}{40,00,000 \text{ shares}} = \frac{(EBIT - ₹9,00,000)(1-0.3)}{1,00,000 \text{ shares}}$$

$$\text{Or, } 2.8 \text{ EBIT} - 25,20,000 = 0.7 \text{ EBIT}$$

$$\text{Or, } 2.1 \text{ EBIT} = 25,20,000$$

$$\text{EBIT} = 12,00,000$$

Q.24 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 up to ₹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 ₹5 lakh + Equity of ₹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 maximizes the earnings per share.

Working Notes:

1. Calculation of interest on Debt.

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

2. Number of equity shares to be issued

$$\text{Plan I : } \frac{₹45,00,000}{₹300 \text{ (Market Price of share)}} = 15,000 \text{ shares}$$

$$\text{Plan II: } \frac{₹30,00,000}{₹300 \text{ (Market Price of share)}} = 10,000 \text{ shares}$$

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

Q.25 RM Steels Limited requires ₹ 10,00,000 for construction of a new plant. It is considering three financial plans:

- The company may issue 1,00,000 ordinary shares at ₹ 10 per share;
- The company may issue 50,000 ordinary shares at ₹ 10 per share and 5000 debentures of ₹100 denominations bearing a 8 per cent rate of interest; and
- The company may issue 50,000 ordinary shares at ₹10 per share and 5,000 preference shares at ₹ 100 per share bearing a 8 per cent rate of dividend.

If RM Steels Limited's earnings before interest and taxes are ₹ 20,000; ₹ 40,000; ₹ 80,000; ₹1,20,000 and ₹2,00,000, you are required to compute the earnings per share under each of the three financial plans?

Which alternative would you recommend for RM Steels and why? Tax rate is 50%.

Ans:

(i) Computation of EPS under three-financial plans

Plan I: Equity Financing

	₹	₹	₹	₹	₹
EBIT	20000	40000	80000	120000	200000
Interest	0	0	0	0	0
EBT	20000	40000	80000	120000	200000
Less: Tax @ 50%	10000	20000	40000	60000	100000
PAT	10000	20000	40000	60000	100000
No. of equity shares	100000	100000	100000	100000	100000
EPS	0.10	0.2	0.4	0.6	1

Plan II : Debt - Equity Mix

	₹	₹	₹	₹	₹
EBIT	20000	40000	80000	120000	200000
Less: Interest	40000	40000	40000	40000	40000
EBT	(20000)	0	40000	80000	160000
Less: Tax @ 50%	10000*	0	20000	40000	80000
PAT	(10000)	0	20000	40000	80000
No. of equity shares	50000	50000	50000	50000	50000
EPS	(₹0.20)	0	0.4	0.8	1.6

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

Plan III : Preference Shares - Equity Mix

	₹	₹	₹	₹	₹
EBIT	20000	40000	80000	120000	200000
Less: Interest	0	0	0	0	0
EBT	20000	40000	80000	120000	200000
Less: Tax @ 50%	10000	20000	40000	60000	100000
PAT	10000	20000	40000	60000	100000
Less: Pref. dividend	40000*	40000*	40000	40000	40000
PAT after Pref. dividend	(30000)	(20000)	0	20000	60000
No. of Equity shares	50000	50000	50000	50000	50000
EPS	(0.60)	(0.40)	0	0.4	1.2

- In case of cumulative preference shares, the company has to pay cumulative dividend to preference shareholders, when company earns sufficient profits.
- From the above EPS computations tables under the three financial plans we can see that when EBIT is ₹80,000 or more, Plan II: Debt-Equity mix is preferable over the Plan I and Plan III, as rate of EPS is more under this plan. On the other hand an EBIT of less than 80,000, Plan I: Equity Financing has higher EPS than Plan II and Plan III. Plan III Preference share Equity mix is not acceptable at any level of EBIT, as EPS under this plan is lower.
- The choice of the financing plan will depend on the performance of the company and other macro-economic conditions. If the company is expected to have higher operating profit Plan II:
- Debt - Equity Mix is preferable. Moreover, debt financing gives more benefit due to availability of tax shield.

Q.26 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	
Income		₹ 18,00,000
12% Debt	₹ 54,00,000	-
Equity Capitalization Rate	-	18
Rate		

Required:

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

Ans:

(a) Assuming no tax as per MM Approach.

- Calculation of Value of Firms '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)	1800000	1800000
B. Less: Interest on Debt (I)	648000	-
C. Earnings of Equity Shareholders (NI)	1152000	1800000
D. Overall Capitalization Rate (ko)	0.18	0.18
E. Total Value of Firm (V = NOI/ko)	10000000	10000000
F. Less: Market Value of Debt	5400000	-
G. Market Value of Equity (S)	4600000	10000000
H. Equity Capitalization Rate [ke = NI / S]	0.2504	0.18
I. Weighted Average Cost of Capital [WACC (ko)]* ko = (ke x S/V) + (kd x D/V)	0.18	0.18

*Computation of WACC A Ltd

Component of Capital	Amount	Weight	Cost of Capital	WACC
Equity	4600000	0.46	0.2504	0.1152
Debt	5400000	0.54	0.12*	0.0648
Total	8160000			0.18

*K_d = 12% (since there is no tax)

WACC = 18%

- (b) Assuming 40% taxes as per MM Approach
Calculation of Value of Firms 'A Ltd.' and 'B Ltd' according to MM Hypothesis Market Value of 'B Ltd' [Unlevered(u)]

$$\text{Total Value of unlevered Firm (V}_u) = \left[\frac{\text{NOI}(1-t)}{k_e} \right] = \left[\frac{1800000(1-0.40)}{0.18} \right] = ₹6000000$$

k_e of unlevered Firm (given) = 0.18

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

$$= 0.18 \text{ Market Value of 'A Ltd' [Levered Firm (I)]}$$

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

$$= ₹60,00,000 + (54,00,000 \times 0.4)$$

$$= ₹81,60,000$$

Computation of Weighted Average Cost of Capital (WACC) of 'B Ltd.' = 18% (i.e. $K_e = K_o$)

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

Particulars	A Ltd.
Net Operating Income (NOI)	1800000
Less: Interest on Debt (I)	648000
Earnings Before Tax (EBT)	1152000
Less: Tax @ 40%	460800
Earnings for equity shareholders (NI)	691200
Total Value of Firm (V) as calculated above	8160000
Less: Market Value of Debt	5400000
Market Value of Equity (S)	2760000
Equity Capitalization Rate [$k_e = \text{NI}/S$]	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 A Ltd

Component of Capital	Amount	Weight	Cost of Capital	WACC
Equity	2760000	0.338	0.2504	0.0846
Debt	5400000	0.662	0.072*	0.0477
Total	8160000			0.1323

$$*k_d = 12\% (1 - 0.4) = 12\% \times 0.6 = 7.2\%$$

$$\text{WACC} = 13.23\%$$

Q.27 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%
 Tax Rate 50%
- (d) Equity shares of the face value of ₹10 each will be issued at a premium of ₹ 10 per share.
 Expected EBIT is ₹ 1,00,000.
 You are required to compute the following for each plan:
 (i) Earnings per share (EPS)
 (ii) Financial breakeven point

Ans:

- i) Computation of Earnings per Share (EPS)

Plans	X(₹)	Y(₹)	Z(₹)
Earnings before interest & tax (EBIT)	100000	100000	100000
Less: Interest charges (10% of ₹ 2,00,000)	--	(20000)	--
Earnings before tax (EBT)	100000	80000	100000
Less: Tax @ 50%	(50000)	(40000)	(50000)
Earnings after tax (EAT)	50000	40000	50000
Less: Preference share dividend (10% of ₹2,00,000)	--	--	(20000)
Earnings available for equity shareholders (A)	50000	40000	30000
No. of equity shares (B)	20000	10000	10000
Plan X = ₹ 4,00,000 / ₹ 20			
Plan Y = ₹ 2,00,000 / ₹20			
Plan Z = ₹2,00,000 / ₹20			
E.P.S (A - B)	2.5	4	3

- (ii) Computation of Financial Break-even Points

$$\text{Financial Break-even point} = \frac{\text{Interest} + \text{Preference dividend}}{(1 - \text{tax rate}) \text{ Proposal 'X'}} = 0$$

Proposal 'Y' = ₹20,000 (Interest charges)

Proposal 'Z' = Earnings required for payment of preference share dividend
 = ₹20,000 ÷ (1 - 0.5 Tax Rate) = ₹40,000

- (iii) Computation of Indifference Point between the plans Combination of Proposals

(a) Indifference point where EBIT of proposal "X" and proposal 'Y' is equal

$$\frac{(\text{EBIT})(1 - 0.5)}{20000 \text{ Shares}} = \frac{(\text{EBIT} - 20,000)(1 - 0.5)₹}{10,000 \text{ shares}}$$

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

$$\text{EBIT} = ₹40,000$$

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

$$\frac{(\text{EBIT})(1 - 0.5)}{20000 \text{ Shares}} = \frac{\text{EBIT}(1 - 0.5) - ₹20000}{10,000 \text{ shares}}$$

$$0.5 \text{ EBIT} = \text{EBIT} - ₹40000$$

$$0.5 \text{ EBIT} = ₹40,000$$

$$EBIT = \frac{₹40000}{80000} = ₹0.5$$

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

$$\frac{(EBIT - ₹20000)(1 - 0.5)}{10000 \text{ Shares}} = \frac{EBIT(1 - 0.5) - ₹20,000}{10,000 \text{ shares}}$$

$$0.5 EBIT - ₹10,000 = 0.5 EBIT - ₹20,000$$

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.30 Earnings before interest and tax of a company are ₹ 4,50,000. Currently the company has 80,000 Equity shares of ₹ 10 each, retained earnings of ₹ 12,00,000. It pays annual interest of ₹ 1,20,000 on 12% Debentures. The company proposes to take up an expansion scheme for which it needs additional fund of ₹ 6,00,000. It is anticipated that after expansion, the company will be able to achieve the same return on investment as at present.

It can raise fund either through debts at rate of 12% p.a. or by issuing Equity shares at par. Tax rate is 40%.

Required:

Compute the earning per share if:

- (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)	800000
Debentures {(₹1,20,000/12) - 100}	1000000
Retained earnings	1200000
Total capital employed	3000000

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

(3) Return on Capital Employed (ROCE):

$$\begin{aligned} ROCE &= \frac{EBIT}{\text{Capital employed}} \times 100 \\ &= \frac{₹450000}{₹3000000} \times 100 = 15\% \end{aligned}$$

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

After expansion, capital employed = ₹30,00,000 + ₹6,00,000 = ₹36,00,000

$$\text{Desired EBIT} = 15\% \times 36,00,000 = ₹5,40,000$$

(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)	450000	540000	540000
Less: Interest – Old Debt	120000	120000	120000
- New Debt	--	72000	--
		(₹6,00,000 – 12%)	
Earnings before Tax (EBT)	330000	348000	420000
Less: Tax (40% of EBT)	132000	139200	168000
PAT/EAT	198000	208800	252000
No. of shares outstanding	80000	80000	140000
Earnings per Share (EPS)	2.475	2.610	1.800
	$\left(\frac{₹198000}{80000}\right)$	$\left(\frac{₹208800}{80000}\right)$	$\left(\frac{₹252000}{140000}\right)$

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.32 (a) The following are the costs and values for the firms A and B according to the traditional approach.

	Firm A	Firm B
Total value of firm, V (in ₹)	50,000	60,000
Market value of debt, D (in ₹)	0	30,000
Market value of equity, E (in ₹)	50,000	30,000
Expected net operating income (in ₹)	5,000	5,000
Cost of debt (in ₹)	0	1,800
Net Income (in ₹)	5000	3,200
Cost of equity, $K_e = NI/V$	10.00	10.70%

(i) Compute the Equilibrium value for Firm A and B in accordance with the M-M approach. Assume that (a) taxes do not exist and (b) the equilibrium value of K_e is 9.09%

(ii) Compute Value of Equity and Cost of Equity for both the firms.

(b) 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
	<u>₹ 10,00,000</u>

The earnings per share (EPS) of the company were 2.50 in 2021 and the expected growth in equity dividend is 10% per year. The next year's dividend per share (DPS) is 50% of EPS of the year 2021. The current market price per share (MPS) is 25.00. The 15% new debentures can be issued by the company. The company's debentures are currently selling at 96 per debenture. The new 12% Pref. share can be sold at a net price of 91.50 (face value 100 each). The applicable tax rate is 30%.

You are required to calculate

(a) After tax cost of

(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) Computation of Equilibrium value of Firms A & B under MM Approach :

As per MM approach K_o is equal to K_{eu}

$$\therefore K_o = K_{au} (1 - t) = 9.09 (1 - 0) = 9.09$$

Particulars	A	B
EBIT (NOI) (*)	5000	5000
K_o (%)	9.09	9.09
Equilibrium value (3) $(NOI/KO) \times 100$	55005.5	55005.5
	$\frac{5000}{9.09} \times 100$	$\frac{5000}{9.09} \times 100$

(ii) Computation of value of equity and cost of equity of Firms A & B :

Particulars	A	B
Equilibrium value (3)	55005.5	55005.5
Less: Value of Debt	-	30000
Value of Equity	55005.5	25005.5

Cost of Equity of Firm A (unlevered) = 9.09

Cost of Debt of Firm B (K_d) (levered) = $(1800/30000) \times 100 = 6\%$

Cost of Equity of Firm B (Levered) = $K_o + (K_o - K_d) \times (\text{Debt/Equity})$

$$= 9.09 + (9.09 - 6) \times (30000/25005.5)$$

$$= 9.09 + 3.09 \times 1.2909 + 3.71 = 12.80\%$$

(OR)

$$\text{Cost of Equity of Firm B (Levered)} = \left(\frac{NI}{\text{Value of Equity}} \right) \times 100 = \left(\frac{3200}{25005.5} \right) \times 100 = 12.8\%$$

(b) (a) (i) After tax cost of new Debt:

$$K_d = I \frac{(1-t)}{P_1} = 15 \frac{(1-0.3)}{96} = 0.1094 \text{ (or) } 10.94\%$$

(ii) After tax cost of New Preference share capital: PD 12

$$K_p = \frac{PD}{P_0} = \left(\frac{12}{91.5} \right) = 0.1311 \text{ (or) } 13.11\%$$

(iii) After tax cost of Equity shares:

$$K_e = \left(\frac{D_1}{P_0} \right) + g = \left[\frac{(2.50 \times 50\%)}{25} \right] + 0.1 = 0.15 \text{ (or) } 15\%$$

(b) Marginal Cost of Capital:

Type of capital	Proportions	Specific cost	Product
Equity Shares	0.80	0.15	0.12
Preference Shares	0.05	0.1311	0.0066
Debentures	0.15	0.1094	0.0164
...Marginal cost of capital		0.1430	

(c) Amount that can be spend for capital investment

$$\begin{aligned} \text{Retained earnings} &= 50\% \text{ of EPS} \times \text{No. of outstanding Equity shares} \\ &= 1.25 \times 50,000 = ₹62,500 \end{aligned}$$

₹ 62,500 is 80% of total capital.

$$\therefore \text{Amount of Capital Investment} = \frac{62500}{0.80} = ₹78,125$$

Q.42 The following data relates to two companies belonging to the same risk class:

Particulars	Bee Ltd.	Cee Ltd.
12% Debt	₹27,00,000	-
Equity Capitalization Rate	-	18
Expected Net Operating Income	₹9,00,000	₹9,00,000

You are required to:

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

Ans:

(a) Assuming no tax as per MM Approach.

Calculation of Value of Firms 'Bee Ltd.' and 'Cee Ltd' according to MM Hypothesis

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

$$\text{Total Value of Unlevered Firm (V}_u) = [\text{NOI}/k_e] = 9,00,000/0.18 = ₹50,00,000$$

k_e of Unlevered Firm (given) = 0.18

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

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

$$\begin{aligned} \text{Total Value of Levered Firm (V}_L) &= V_u + (\text{Debt} \times \text{Nil}) \\ &= ₹50,00,000 + (27,00,000 \times \text{nil}) \\ &= ₹50,00,000 \end{aligned}$$

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

Particulars	Bee Ltd.
Net Operating Income (NOI)	900000
Less: Interest on Debt (I)	324000
Earnings of Equity Shareholders (NI)	576000
Overall Capitalization Rate (k_o)	0.18
Total Value of Firm ($V = \text{NOI}/k_o$)	5000000
Less: Market Value of Debt	2700000
Market Value of Equity (S)	2300000
Equity Capitalization Rate [$k_e = \text{NI}/S$]	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	2300000	0.46	0.2504	0.1152
Debt	2700000	0.54	0.12*	0.0648
Total	5000000			0.18

* $K_d = 12\%$ (since there is no tax)

WACC = 18%

(b) Assuming 40% taxes as per MM Approach

Calculation of Value of Firms 'Bee Ltd.' and 'Cee Ltd' according to MM Hypothesis

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

$$\begin{aligned} \text{Total Value of unlevered Firm } (V_u) &= [\text{NOI} (1 - t) / k_e] \\ &= 9,00,000 (1 - 0.40) / 0.18 \\ &= ₹30,00,000 \end{aligned}$$

K_e of unlevered Firm (given) = 0.18

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

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

$$\begin{aligned} \text{Total Value of Levered Firm } (V_L) &= V_u + (\text{Debt} \times \text{Tax}) \\ &= ₹30,00,000 + (27,00,000 \times 0.4) = ₹40,80,000 \end{aligned}$$

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

$$= 18\% \text{ (i.e. } K_e = K_o)$$

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

Particulars	Bee Ltd. (₹)
Net Operating Income (NOI)	900000
Less: Interest on Debt (I)	324000
Earnings Before Tax (EBT)	576000
Less: Tax @ 40%	230400
Earnings for equity shareholders (NI)	345600
Total Value of Firm (V) as calculated above	4080000
Less: Market Value of Debt	2700000
Market Value of Equity (S)	1380000
Equity Capitalization Rate [$k_e = \text{NI}/S$]	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	1380000	0.338	0.2504	0.0846
Debt	2700000	0.662	0.072*	0.0477
Total	4080000			0.1323

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

WACC = 13.23%

Q.43 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) 20% on (14,00,000 + 4,00,000)	360000	360000
Less: Interest on old debentures @ 10% on 4,00,000	40000	40000
	320000	320000
Less: Interest on New debt @ 12% on ₹4,00,000	48000	-
Earnings Before Tax (After interest)	272000	320000
Less: Tax @ 50%	136000	160000
Earnings for equity shareholders (EAIT)	136000	160000
Number of Equity Shares (in numbers)	30000	40000
Earnings per Share (EPS)	4.53	4.00
Price/ Earnings Ratio	8	10
Probable Price Per Share	36.24 (8 × 4.53)	40 (10 × 4)

Working Notes:

	(₹)
1. Calculation of Present Rate of Earnings	
Equity Share capital (30,000 × ₹10)	300000
10% Debentures $(40000 \times \frac{100}{10})$	400000
Reserves (given)	700000
	1400000
Earnings before interest and tax (EBIT) given	280000
Rate of Present Earnings = $(\frac{280000}{1400000} \times 100)$	20%
2. Number of Equity Shares to be issued in Plan $\frac{400000}{40}$	10000
Thus, after the issue total number of shares	30000 + 10000 = 40000
3. Debt/Equity Ratio if ₹4,00,000 is raised as debt:	$(\frac{800000}{1800000} \times 100) = 44.44\%$

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

CHAPTER - 7 DIVIDEND DECISIONS

Q.14 The following information is given below in case of Aditya Ltd. :

Earnings per share	= ₹ 60
Capitalization rate	= 15%
Return on investment	= 25%
Dividend payout ratio	= 30%

(i) COMPUTE price per share using Walter's Model.

(ii) WHAT would be optimum dividend payout ratio per share under Gordon's Model.

Ans:

(i) As per Walter's Model, Price per share is computed by using the following formula:

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

Where,

P = Market Price of the share

E = Earnings per share

D = Dividend per share

K_e = Cost of equity/rate of capitalization/discount rate.

r = Internal rate of return/return on investment

Apply the above formula, price per share

$$P = \frac{18 + \frac{0.25}{0.15} (60 - 18)}{0.15}$$

$$\text{Or, } P = \frac{18 + 70}{0.15} = ₹ 586.67$$

(ii) As per Gordon's Model, when $r < K_e$, optimum dividend payout ratio is 'Zero'.

Q.16 M Ltd. belongs to a risk class for which the capitalization rate is 10%. It has 25,000 outstanding shares and the current market price is ₹100. It expects a net profit of ₹ 2,50,000 for the year and the Board is considering dividend of ₹ 5 per share.

M Ltd. requires to raise ₹5,00,000 for an approved investment expenditure. ILLUSTRATE, how the MM approach affects the value of M Ltd. if dividends are paid or not paid.

Ans: (i) According to Dividend Discount Model approach, the firm's expected or required return on equity is computed as follows:

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

$$K_e = \frac{20(1 + 0.075) + 7.5\%}{1,460}$$

$$= 0.0147 + 0.075 = 0.0897 \text{ or } 8.97\%$$

Q.18 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)	₹ 10
Dividend per share (DPS)	₹ 6
Cost of capital (Ke)	20%
Internal rate of return on investment	25%
Retention Ratio	40%

Ans: (i) Calculation of market price per share

According to Miller – Modigliani (MM) Approach:

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

Where,

Existing market price (P₀) = ₹ 150

Expected dividend per share (D₁) = ₹ 8

Capitalization rate (ke) = 0.10

Market price at year end (P₁) = to be determined

(a) If expected dividends are declared, then

$$\begin{aligned} ₹ 150 &= \frac{P_1 + 8}{1 + 0.10} \\ P_1 &= ₹ 165 \end{aligned}$$

(iii) Calculation Of Number Of Shares to be issued

	(a) Dividends are declared (₹ lakh)	(b) Dividends are not Declared (₹ lakh)
Net income	300	300
Total dividends	(80)	-
Retained earnings	220	300
Investment budget	600	600
Amount to be raised by new issues	380	300
Relevant market price (₹ per share)	157	165
No. of new shares to be issued (in lakh)(₹ 380 ÷ 157; ₹ 300 ÷ 165)	2.42	1.82

(iv) Calculation of market value of the shares

	(a) Dividends are declared	(b) Dividends are not Declared
Existing shares (in lakhs)	10.00	10.00
New shares (in lakhs)	2.42	1.82
Total shares (in lakhs)	12.42	11.82
Market price per share (₹)	157	165
Total market value of shares at the end of the year (₹ in lakh)	12.42×157 = 1,950 (approx.)	11.82×165 = 1,950 (approx.)

Hence, it is proved that the total market value of shares remains unchanged irrespective of whether dividends are declared, or not declared.

Q.19 The annual report of XYZ Ltd. provides the following information for the Financial Year 2020-21:

Particulars	Amount (₹)
Net Profit	50 lakhs
Outstanding 15% preference shares	100 lakhs
No. of equity shares	5 lakhs
Return on Investment	20%
Cost of capital i.e. (K_e)	16%

CALCULATE price per share using Gordon's Model when dividend pay-out is:

- (i) 25%;
- (ii) 50%;
- (iii) 100%.

Ans. The following figures are collected from the annual report of XYZ Ltd.

Net profit	₹30 lakhs
Outstanding 12% preference shares	₹100 lakhs
No. of equity shares	3 lakhs
Return on investment	20%
Cost of capital i.e. (K_e)	16%

CALCULATE price per share using Gordon's Model when dividend pay-out is (i) 25% (ii) 50% and (iii) 100%

	₹ in lakhs
Net profit	30
Less: Preference dividend	12
Earning from equity shareholders	18
Earnings per share	$18/3 = ₹6.00$

Price per share according to Gordon's Model calculated as follows:

$$P_o = \frac{E_1 (1-b)}{K_e - br}$$

Here, $E_1 = 6$, $K_e = 16\%$

(i) When dividend pay-out is 25%

$$P_o = \frac{6 \times 0.25}{0.16 - (0.75 \times 0.2)} = \frac{1.5}{0.16 - 0.15} = 150$$

(ii) When dividend pay-out is 50%

$$P_o = \frac{6 \times 0.25}{0.16 - (0.5 \times 0.2)} = \frac{1.5}{0.16 - 0.10} = 50$$

(iii) When dividend pay-out is 100%

$$P_o = \frac{6 \times 1}{0.16 - (0.0 \times 0.2)} = \frac{6}{0.16} = 37.50$$

Q.20 A&R Ltd. is a large-cap multinational company listed in BSE in India with a face value of ₹ 100 per share. The company is expected to grow @ 15% p.a. for next four years then 5% for an indefinite period. The shareholders expect 20% return on their share investments. Company paid ₹ 120 as dividend per share for the FY 2020-21. The shares of the company traded at an average price of ₹3,122 on last day. FIND out the intrinsic value of per share and state whether shares are overpriced or underpriced.

Ans: Current Market price = $20 \times 25 = 500$ per share
 Book value of the company before repurchase = ₹ 4 cr (400 x 1 lakh shares)
 Amount paid for repurchase = 1.25 cr (25,000 shares x 500 per share)
 Book Value of company after repurchase = ₹ 2.75 cr (4cr - 1.25cr)

No of shares after repurchase = 75,000 shares
 Book value per share = 367 per share

Q.33 The following figures are collected from the annual report of XYZ Ltd.:

Net Profit	30 lakhs
Outstanding 12% preference shares	100 lakhs
No. of equity shares	3 lakhs
Return on Investment	20%
Cost of capital i.e. (K_e)	16%

CALCULATE price per share using Gordon's Model when dividend pay-out is (i) 25%; (ii) 50% and (iii) 100%.

Ans:

	₹in lakhs
Net Profit	30
Less: Preference dividend	12
Earning for equity shareholders	18
Therefore earning per share	$18/3 = ₹6.00$

Price per share according to Gordon's Model is calculated as follows:

$$P_0 = \frac{E_1(1 - b)}{K_e - br}$$

Here, $E_1 = 6$, $K_e = 16\%$

(i) When dividend pay-out is 25%

$$P_0 = \frac{6 \times 0.25}{0.16 - (0.75 \times 0.2)} = \frac{1.5}{0.16 - 0.15} = 150$$

(ii) When dividend pay-out is 50%

$$P_0 = \frac{6 \times 0.5}{0.16 - (0.5 \times 0.2)} = \frac{3}{0.16 - 0.10} = 50$$

(iii) When dividend pay-out is 100%

$$P_0 = \frac{6 \times 1}{0.16 - (0 \times 0.2)} = \frac{6}{0.16} = 37.5$$

Q.38 Aakash Ltd. has ₹10 lakh equity shares outstanding at the start of the accounting year 2021. The existing market price per share is ₹150. Expected dividend is ₹ 8 per share. The rate of capitalization appropriate to the risk class to which the company belongs is 10%.

- (i) CALCULATE the market price per share when expected dividends are: (a) declared, and (b) not declared, based on the Miller - Modigliani approach.
- (ii) CALCULATE number of shares to be issued by the company at the end of the accounting year on the assumption that the net income for the year is ₹3 crore, investment budget is ₹ 6 crores, when (a) Dividends are declared, and (b) Dividends are not declared.
- (iv) PROOF that the market value of the shares at the end of the accounting year will remain unchanged irrespective of whether (a) Dividends are declared, or (ii) Dividends are not declared.

Ans:

(i) Calculation of market price per share

According to Miller - Modigliani (MM) Approach:

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

Where,

Existing market price (P_0) = ₹150

Expected dividend per share (D_1) = ₹ 8

Capitalization rate (k_e) = 0.10

Market price at year end (P_1) = to be determined

(a) If expected dividends are declared, then

$$₹150 = \frac{P_1 + ₹8}{1 + 0.1}$$

$$\therefore P_1 = ₹157$$

(b) If expected dividends are not declared, then

$$₹150 = \frac{P_1 + 0}{1 + 0.10}$$

$$\therefore P_1 = ₹165$$

(ii) Calculation of number of shares to be issued

	(a) Dividends are declared (₹ lakh)	(b) Dividends are not Declared (₹ lakh)
Net income	300	300
Total dividends	(80)	-
Retained earnings	220	300
Investment budget	600	600
Amount to be raised by new issues	380	300
Relevant market price (₹ per share)	157	165
No. of new shares to be issued (in lakh) (₹380 ÷ 157; ₹300 ÷ 165)	2.42	1.82

(iii) Calculation of market value of the shares

	(a) Dividends are declared	(b) Dividends are not Declared
Existing shares (in lakhs)	10.00	10.00
New shares (in lakhs)	2.42	1.82
Total shares (in lakhs)	12.42	11.82
Market price per share (₹)	157	165
Total market value of shares at the end of the year (₹ in lakh)	$12.42 \times 157 = 1,950$ (approx.)	$11.82 \times 165 = 1,950$ (approx.)

Hence, it is proved that the total market value of shares remains unchanged irrespective of whether dividends are declared, or not declared.

Q.39 The following figures have been collected from the annual report of ABC Ltd. for the current financial year:

Net Profit	₹75 lakhs
Outstanding 12% preference shares	₹250 lakhs
No. of equity shares	7.50 lakhs
Return on Investment	20%
Cost of capital i.e. (K_e)	16%

- COMPUTE the approximate dividend pay-out ratio so as to keep the share price at ₹ 42 by using Walter's model?
- DETERMINE the optimum dividend pay-out ratio and the price of the share at such pay-out.
- PROVE that the dividend pay-out ratio as determined above in (b) is optimum by using random pay-out ratio.

Ans: (a)

	₹ in lakhs
Net Profit	75
Less: Preference dividend	30
Earning for equity shareholders	45
Earning per share = $45/7.5 = ₹6.00$	

Let, the dividend per share be D to get share price of ₹42

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e}$$
$$₹42 = \frac{D + \frac{0.2}{0.16}(6 - D)}{0.16}$$
$$6.72 = \frac{0.16D + 1.2 - 0.20D}{0.16}$$
$$0.04D = 1.2 - 1.0752$$

$$D = 3.12$$

$$D/P \text{ ratio} = \frac{DPS}{EPS} \times 100 = \frac{3.12}{6} \times 100 = 52\%$$

So, the required dividend payout ratio will be = 52%

- (b) Since $r > K_e$, the optimum dividend pay-out ratio would 'Zero' (i.e. $D = 0$), Accordingly, value of a share:

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e}$$
$$P = \frac{0 + \frac{0.2}{0.16}(6 - 0)}{0.16} = 46.875$$

- (c) The optimality of the above pay-out ratio can be proved by using 25%, 50%, 75% and 100% as pay-out ratio: At 25% pay-out ratio

$$P = \frac{1.5 + \frac{0.2}{0.16}(6 - 1.5)}{0.16} = 44.531$$

At 50% pay-out ratio

$$P = \frac{3 + \frac{0.2}{0.16}(6 - 3)}{0.16} = 42.188$$

At 75% pay-out ratio

$$P = \frac{4.5 + \frac{0.2}{0.16}(6 - 4.5)}{0.16} = 39.844$$

At 100% pay-out ratio

$$P = \frac{6 + \frac{0.2}{0.16}(6 - 6)}{0.16} = 37.50$$

From the above it can be seen that price of share is maximum when dividend pay-out ratio is 'zero' as determined in (b) above.

CHAPTER - 8

MANAGEMENT OF WORKING CAPITAL

Q.6 PREPARE monthly cash budget for six months beginning from April 2021 on the basis of the following information:

(i) Estimated monthly sales are as follows:

January	₹		₹
February	1,00,000	June	80,000
March	1,20,000	July	1,00,000
April	1,40,000	August	80,000
May	80,000	September	60,000
January	60,000	October	1,00,000

(ii) Wages and salaries are estimated to be payable as follows: -

January	₹		₹
April	9,000	July	10,000
May	8,000	August	9,000
June	10,000	September	9,000

- (iii) Of the sales, 80% is on credit and 20% for cash. 75% of the credit sales are collected within one month after sale and the balance in two months after sale. There are no bad debt losses.
- (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 10% debentures of ₹ 1,20,000. Interest on these has to be paid quarterly in January, April and so on.
- (vi) The firm is to make an advance payment of tax of ₹ 5,000 in July, 2021.
- (vii) The firm had a cash balance of ₹ 20,000 on April 1, 2021, 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: Workings:

Collection from debtors:

(Amount in ₹)

	February	March	April	May	June	July	August	September
Total sales	1,20,000	1,40,000	80,000	60,000	80,000	1,00,000	80,000	60,000
Credit sales (80% of total sales)	96,000	1,12,000	64,000	48,000	64,000	80,000	64,000	48,000
Collections:								
One month		72,000	84,000	48,000	36,000	48,000	60,000	48,000

Two months			24,000	28,000	16,000	12,000	16,000	20,000
Total collections			1,08,000	76,000	52,000	60,000	76,000	68,000

Monthly Cash Budget for Six months, April to September, 2022

	April	May	June	July	August	September
Receipts:						
Opening balance	20,000	20,000	20,000	20,000	20,000	20,000
Cash sales	16,000	12,000	16,000	20,000	16,000	12,000
Collection from debtors	1,08,000	76,000	52,000	60,000	76,000	68,000
Total cash available (A)	1,44,000	1,08,000	88,000	1,00,000	1,12,000	1,00,000
Payments:						
Purchases	48,000	64,000	80,000	64,000	48,000	80,000
Wages & salaries	9,000	8,000	10,000	10,000	9,000	9,000
Interest on debentures	3,000	---	---	3,000	---	---
Tax payment	---	---	---	5,000	---	---
Total payments (B)	60,000	72,000	90,000	82,000	57,000	89,000
Minimum cash balance desired	20,000	20,000	20,000	20,000	20,000	20,000
Total cash needed (C)	80,000	92,000	1,10,000	1,02,000	77,000	1,09,000
Surplus - deficit (A-C)	64,000	16,000	(22,000)	(2,000)	35,000	(9,000)
Investment/financing Temporary Investments	(64,000)	(16,000)	----	(35,000)	-----	(64,000)
Liquidation of temporary investments or temporary borrowings	----	----	22,000	2,000	----	9,000
Total effect of investment/financing (D)	(64,000)	(16,000)	22,000	2,000	(35,000)	9,000
Closing cash balance (A+D-B)	20,000	20,000	20,000	20,000	20,000	20,000

Q.9 Prachi Ltd is a manufacturing company producing and selling a range of cleaning products to wholesale customers. It has three suppliers and two customers. Prachi Ltd relies on its cleared funds forecast to manage its cash.

You are an accounting technician for the company and have been asked to prepare a cleared funds forecast for the period Saturday 7 August to Wednesday 11 August 2021 inclusive. You have been provided with the following information:

(1) Receipts from customers

	Credit terms	Payment method	7 Aug 2021 sales	7 Jul 2021 sales
W Ltd	1 calendar month	BACS	₹150,000	₹130,000
X Ltd	None	Cheque	₹180,000	₹160,000

- (a) Receipt of money by BACS (Bankers' Automated Clearing Services) is instantaneous.
 (b) X Ltd's cheque will be paid into Prachi Ltd's bank account on the same day as the sale is made and will clear on the third day following this (excluding day of payment).

(2) Payments to suppliers

Supplier name	Credit terms	Payment method	7 Aug 2021 purchases	7 Jul 2021 purchases	7 Jun 2021 purchases
A Ltd	1 calendar month	Standing order	₹ 65,000	₹55,000	₹45,000

B Ltd	2 calendar months	Cheque	₹ 85,000	₹80,000	₹75,000
C Ltd	None	Cheque	₹ 95,000	₹90,000	₹85,000

- (a) Prachi Ltd has set up a standing order for ₹45,000 a month to pay for supplies from A Ltd. This will leave Prachi's bank account on 7 August. Every few months, an adjustment is made to reflect the actual cost of supplies purchased (you do NOT need to make this adjustment).
- (b) Prachi Ltd will send out, by post, cheques to B Ltd and C Ltd on 7 August. The amounts will leave its bank account on the second day following this (excluding the day of posting).

(3) Wages and salaries

	July 2021	August 2021
Weekly wages	₹12,000	₹13,000
Monthly salaries	₹56,000	₹59,000

- (a) Factory workers are paid cash wages (weekly). They will be paid one week's wages, on 11 August, for the last week's work done in July (i.e. they work a week in hand).
- (b) All the office workers are paid salaries (monthly) by BACS. Salaries for July will be paid on 7 August.

(4) Other miscellaneous payments

- (a) Every Saturday morning, the petty cashier withdraws ₹200 from the company bank account for the petty cash. The money leaves Prachi's bank account straight away.
- (b) The room cleaner is paid ₹ 30 from petty cash every Monday morning.
- (c) Office stationery will be ordered by telephone on Sunday 8 August to the value of ₹300. This is paid for by company debit card. Such payments are generally seen to leave the company account on the next working day.
- (d) Five new software will be ordered over the Internet on 10 August at a total cost of ₹6,500. A cheque will be sent out on the same day. The amount will leave Prachi Ltd's bank account on the second day following this (excluding the day of posting).

(5) Other information

The balance on Prachi's bank account will be ₹ 200,000 on 7 August 2021. This represents both the book balance and the cleared funds. PREPARE a cleared funds forecast for the period Saturday 7th August to Wednesday 11th August 2021 inclusive using the information provided. Show clearly the uncleared funds float each day.

Ans: Cleared Funds Forecast

	9 Aug (Saturday) ₹	10 August (Sunday) ₹	11 August (Monday) ₹	12 August (Tuesday) ₹	13 August (Wednesday) ₹
Receipts					
W Ltd	1,30,000	0	0	0	0
X Ltd	0	0	0	1,80,000	0
(a)	1,30,000	0	0	1,80,000	0
Payments					

A Ltd	45,000	0	0	0	0
B Ltd	0	0	75,000	0	0
C Ltd	0	0	95,000	0	0
Wages					
Salaries	56,000	0	0	0	0
Petty Cash	200	0	0	0	0
Stationery	0	0	300	0	0
(b)	1,01,200	0	1,70,300	0	12,000
Cleared excess Receipts over payments (a) - (b)	28,800	0	(1,70,300)	1,80,000	(12,000)
Cleared balance b/f	2,00,000	2,28,800	2,28,800	58,500	2,38,500
Cleared balance c/f (c)	2,28,800	2,28,800	58,500	2,38,500	2,26,500
Un-cleared funds float					
Receipts	1,80,000	1,80,000	1,80,000	0	0
Payments	(1,70,000)	(1,70,300)	0	(6,500)	(6,500)
(d)	10,000	9,700	180,000	(6,500)	(6,500)
Total book balance c/f (c)+ (d)	2,38,800	2,38,500	2,38,500	2,32,000	2,20,000

Q.25 PQ Ltd., a company newly commencing business in 2020-21 has the following projected Profit and Loss Account:

	(₹)	(₹)
Sales		2,10,000
Cost of goods sold		1,53,000
Gross Profit		57,000
Administrative Expenses	14,000	
Selling Expenses	13,000	27,000
Profit before tax		30,000
Provision for taxation		10,000
Profit after tax		20,000
The cost of goods sold has been arrived at as under:		
Materials used	84,000	
Wages and manufacturing Expenses	62,500	
Depreciation	23,500	

	1,70,000	
Less: Stock of Finished goods (10% of goods produced not yet sold)	17,000	
	1,53,000	

The figure given above relate only to finished goods and not to work-in-progress. Goods equal to 15% of the year's production (in terms of physical units) will be in process on the average requiring full materials but only 40% of the other expenses. The company believes in keeping materials equal to two months' consumption in stock.

All expenses will be paid one month in advance. Suppliers of materials will extend 1-1/2 months credit. Sales will be 20% for cash and the rest at two months' credit. 70% of the Income tax will be paid in advance in quarterly instalments. The company wishes to keep ₹ 8,000 in cash. 10% has to be added to the estimated figure for unforeseen contingencies.

PREPARE an estimate of working capital.

Note: All workings should form part of the answer.

Ans: Statement showing the requirements of Working Capital

Particulars	(₹)	(₹)
A. Current Assets:		
Inventory:		
Stock of Raw material (₹ 96,600 × 2/12)	16,100	
Stock of Work-in-progress (As per Working Note)	16,350	
Stock of Finished goods (₹ 1,46,500 × 10/100)	14,650	
Receivables (Debtors) (₹1,27,080 × 2/12)	21,180	
Cash in Hand	8,000	
Prepaid Expenses:		
Wages & Mfg. Expenses (₹66,250 × 1/12)	5,521	
Administrative expenses (₹ 14,000 × 1/12)	1,167	
Selling & Distribution Expenses (₹13,000 × 1/12)	1,083	
Advance taxes paid {(70% of ₹10,000) × 3/12}	1,750	
Gross Working Capital	85,801	85,801
B. Current Liabilities:		
Payables for Raw materials (₹1,12,700 × 1.5/12)	14,088	
Provision for Taxation (Net of Advance Tax) (₹10,000 × 30/100)	3,000	
Total Current Liabilities	17,088	17,088
C. Excess of CA over CL		68,713
Add: 10% for unforeseen contingencies		6,871
Net Working Capital requirements		75,584

Working Notes:**(i) Calculation of Stock of Work-in-progress**

Particulars	(₹)
Raw Material (₹ 84,000 × 15%)	12,600
Wages & Mfg. Expenses (₹ 62,500 × 15% × 40%)	3,750
Total	16,350

(ii) Calculation of Stock of Finished Goods and Cost of Sales

Particulars	(₹)
Direct material Cost [₹ 84,000 + ₹ 12,600]	96,600
Wages & Mfg. Expenses [₹62,500 + ₹ 3,750]	66,250
Depreciation	0
Gross Factory Cost	1,62,850
Less: Closing W.I.P	(16,350)
Cost of goods produced	1,46,500
Add: Administrative Expenses	14,000
	1,60,500
Less: Closing stock	(14,650)
Cost of Goods Sold	1,45,850
Add: Selling and Distribution Expenses	13,000
Total Cash Cost of Sales	1,58,850
Debtors (80% of cash cost of sales)	1,27,080

(iii) Calculation of Credit Purchase

Particulars	(₹)
Raw material consumed	96,600
Add: Closing Stock	16,100
Less: Opening Stock	---
Purchases	1,12,700

Q.26 M.A. Limited is commencing a new project for manufacture of a plastic component. The following cost information has been ascertained for annual production of 12,000 units which is the full capacity:

	Costs per unit (₹)
Materials	40.00
Direct labor and variable expenses	20.00
Fixed manufacturing expenses	6.00

Depreciation	10.00
Fixed administration expenses	4.00
	80.00

The selling price per unit is expected to be ₹ 96 and the selling expenses ₹ 5 per unit, 80% of which is variable.

In the first two years of operations, production and sales are expected to be as follows:

Year	Production (No. of units)	Sales (No. of units)
1	6,000	5,000
2	9,000	8,500

To assess the working capital requirements, the following additional information is available:

- (a) Stock of materials 2.25 months' average consumption
 (b) Work-in-process Nil
 (c) Debtors 1 month's average sales.
 (d) Cash balance ₹ 10,000
 (e) Creditors for supply of materials 1 month's average purchase during the year.
 (f) Creditors for expenses 1 month's average of all expenses during the year.

PREPARE, for the two years:

- (i) A projected statement of Profit/Loss (Ignoring taxation); and
 (ii) A projected statement of working capital requirements.

Ans:

	Year 1	Year 2
Production (Units)	6000	9000
Sales (Units)	5000	8,500
	(₹)	(₹)
Sales revenue (A) (Sales unit × ₹ 96)	4,80,000	8,16,000
Cost of production:		
Materials cost (Units produced × ₹ 40)	2,40,000	3,60,000
Direct labour and variable expenses (Units produced × ₹ 20)	1,20,000	1,80,000
Fixed manufacturing expenses (Production Capacity: 12,000 units × ₹ 6)	72,000	72,000
Depreciation (Production Capacity : 12,000 units × ₹ 10)	1,20,000	1,20,000
Fixed administration expenses (Production Capacity : 12,000 units × ₹ 4)	48,000	48,000
Total Costs of Production	6,00,000	7,80,000
Add: Opening stock of finished goods (Year 1 : Nil; Year 2 : 1,000 units)	---	1,00,000
Cost of Goods available for sale (Year 1: 6,000 units; Year 2:	6,00,000	8,80,000

10,000 units)		
Less: Closing stock of finished goods at average cost (year 1: 1000 units, year 2 : 1500 units) (Cost of Production × Closing stock/ units produced)	(1,00,000)	(1,32,000)
Cost of Goods Sold	5,00,000	7,48,000
Add: Selling expenses – Variable (Sales unit × ₹ 4)	20,000	34,000
Add: Selling expenses -Fixed (12,000 units × ₹ 1)	12,000	12,000
Cost of Sales : (B)	5,32,000	7,94,000
Profit (+) / Loss (-): (A - B)	(-) 52,000	(+)22,000

Note: Value of closing stock valued at average cost of goods available for sale

Working Notes:

1. Calculation of creditors for supply of materials:

	Year 1 (₹)	Year 2 (₹)
Materials consumed during the year	2,40,000	3,60,000
Add: Closing stock (2.25 month's average consumption)	45,000	67,500
	2,85,000	4,27,500
Less: Opening Stock	---	45,000
Purchases during the year	2,85,000	3,82,500
Average purchases per month (Creditors)	23,750	31,875

2. Creditors for expenses:

	Year 1 (₹)	Year 2 (₹)
Direct labour and variable expenses	1,20,000	1,80,000
Fixed manufacturing expenses	72,000	72,000
Fixed administration expenses	48,000	48,000
Selling expenses (variable + fixed)	32,000	46,000
Total (including	2,72,000	3,46,000
Average per month	22,667	28,833

- (ii) **Projected Statement of Working Capital requirements**

	Year 1 (₹)	Year 2 (₹)
Current Assets:	1,20,000	1,80,000
Inventories: -		
-Stock of materials (2.25 month's average consumption)	45,000	67,500
- Finished goods	1,00,000	1,32,000

Debtors (1 month's average sales) (including profit)	40,000	68,000
Cash	10,000	10,000
Total Current Assets/ Gross working capital	1,95,000	2,77,500
Current Liabilities:		
Creditors for supply of materials (Refer to working note 1)	23,750	31,875
Creditors for expenses (Refer to working note 2)	22,667	28,833
Total Current Liabilities: (B)	46,417	60,708
Estimated Working Capital Requirements: (A-B)	1,48,583	2,16,792

Projected Statement of Working Capital Requirement (Cash Cost Basis)

	Year 1 (₹)	Year 2 (₹)
A. Current Assets:		
Inventories:		
- Stock of Raw Material (6,000 units × ₹ 40 × 2.25/12); (9,000 units × ₹ 40 × 2.25 /12)	45,000	67,500
- Finished Goods (Refer working note 3)	80,000	1,11,000
Receivables (Debtors) (Refer working note 4)	36,000	56,250
Minimum Cash balance	10,000	10,000
Total Current Assets/ Gross working capital (A)	1,71,000	2,44,750
(B) Current Liabilities	23,750	31,875
Creditors for raw material (Refer working note 1)	22,667	28,833
Total Current Liabilities	46,417	60,708
Net Working Capital (A – B)	1,24,583	1,84,042

Working Note:

3. Cash Cost of Production:

	Year 1 (₹)	Year 2 (₹)
Cost of Production as per projected Statement of P&L	6,00,000	7,80,000
Less: Depreciation	1,20,000	1,20,000
Cash Cost of Production	4,80,000	6,60,000
Add: Opening Stock at Average Cost:	--	80,000
Cash Cost of Goods Available for sale	4,80,000	7,40,000
Less : Closing Stock at Avg. Cost $\left(\frac{₹ 4,80,000 \times 1,000}{6,000} \right); \left(\frac{₹ 7,40,000 \times 1500}{10,000} \right)$	(80,000)	(1,11,000)
Cash Cost of Goods Sold	4,00,000	6,29,000

4. Receivables (Debtors)

	Year 1 (₹)	Year 2 (₹)
Cash Cost of Goods Sold	4,00,000	6,29,000
Add : Variable Expenses @ ₹ 4	20,000	34,000
Add : Total Fixed Selling expenses (12,000 units × ₹1)	12,000	12,000
Cash Cost of Debtors	4,32,000	6,75,000
Average Debtors	36,000	56,250

Q.27 Aneja Limited, a newly formed company, has applied to a commercial bank for the first time for financing its working capital requirements. The following information is available about the projections for the current year:

Estimated level of activity: 1,04,000 completed units of production plus 4,000 units of work-in-progress. Based on the above activity, estimated cost per unit is:

Raw material	₹ 80 per unit
Direct wages	₹ 30 per unit
Overheads (exclusive of depreciation)	₹ 60 per unit
Total cost	₹ 170 per unit
Selling price	₹ 200 per unit

Raw materials in stock: Average 4 weeks consumption, work-in-progress (assume 50% completion stage in respect of conversion cost) (materials issued at the start of the processing).

Finished goods in stock 8,000 units
 Credit allowed by suppliers Average 4 weeks
 Credit allowed to debtors/receivables Average 8 weeks
 Lag in payment of wages Average 1.5 weeks

Cash at banks (for smooth operation) is expected to be ₹25,000.

Assume that production is carried on evenly throughout the year (52 weeks) and wages and overheads accrue similarly. All sales are on credit basis only.

You are required to CALCULATE the net working capital required.

Ans: **Calculation of Net Working Capital requirement:**

	(₹)	(₹)
A. Current Assets:		
Inventories:		
Raw material stock (Refer to Working note 3)	6,64,615	
- Work in progress stock (Refer to Working note 2)	5,00,000	

Finished goods stock (Refer to Working note 4)	13,60,000	
Receivables (Debtors) (Refer to Working note 5)	25,10,769	
Cash and Bank balance	25,000	
Gross Working Capital	50,60,384	50,60,384

B. Current Liabilities:		
Creditors for raw materials (Refer to Working note 6)	7,15,740	
Creditors for wages (Refer to Working note 7)	91,731	
	8,07,471	8,07,471
Net Working Capital (A - B)		42,52,913

Working Notes:

1. Annual cost of production

	(₹)
Raw material requirements	86,40,000
{{(1,04,000 units × ₹ 80) + ₹3,20,000}	
Direct wages {(1,04,000 units × ₹ 30) + ₹60,000}	31,80,000
Overheads (exclusive of depreciation) {{(1,04,000 × ₹60) + ₹1,20,000}	63,60,000
Gross Factory Cost	1,81,80,000
Less: Closing W.I.P	(5,00,000)
Cost of Goods Produced	1,76,80,000
Less: Closing Stock of Finished Goods (₹1,76,80,000 × 8,000/1,04,000)	1,76,80,000
Total Cash Cost of Sales	1,63,20,000

2. Work in progress stock

	(₹)
Raw material requirements (4,000 units × ₹ 80)	3,20,000
Direct wages (50% × 4,000 units × ₹ 30)	60,000
Overheads (50% × 4,000 units × ₹ 60)	1,20,000
	5,00,000

3. Raw material stock

It is given that raw material in stock is average 4 weeks consumption. Since, the company is newly formed, the raw material requirement for production and work in progress will be issued and consumed during the year.

Hence, the raw material consumption for the year (52 weeks) is as follows:

	(₹)
For Finished goods (1,04,000 × ₹ 80)	83,20,000
For Work in progress (4,000 × ₹ 80)	3,20,000
	86,40,000

Raw Material stock $\frac{86,40,000}{52 \text{ weeks}} \times 4 \text{ week}$ i.e. ₹6,64,614

4. Finished goods stock: 8,000 units @ ₹ 170 per unit = ₹ 13,60,000

5. Debtors for sale: $1,63,20,000 \times \frac{8}{52} = 25,10,769$

6. Creditors for raw material:

Material Consumed (₹ 83,20,000 + ₹ 3,20,000)	₹ 86,40,000
Add: Closing stock of raw material	₹ 6, 64,615
Purchases of Raw Material	

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

7. Creditors for wages

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

Q.28 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 reveal 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.

	(₹)	(₹)
(i) Inventories:		
Material (1 month) (₹ 6,75,000 / 12 Months x 1 month)	56,250	
Finished goods (1 month) (₹ 21,60,000 / 12 Months x 1 month)	1,80,000	2,36,250
(ii) Receivables (Debtors)		
For Domestic Sales (₹ 15,17,586 / 12 Months x 1 month)	1,26,466	
For Export Sales (₹ 7,54,914 / 12 Months x 3 month)	1,88,729	3,15,195
(iii) Prepayment of Selling expenses (₹ 1,12,500 / 12 Months x 3 month)		28,125
(iii) Cash in hand & at bank (net of overdraft)		1,75,000
Total Current Assets		7,54,570
B. Current Liabilities:		
(i) Payables (Creditors) for materials (2 months) (₹ 6,75,000 / 12 Months x 2 month)		1,12,500
(ii) Outstanding wages (0.5 months) (₹ 5,40,000 / 12 Months x 0.5 month)		22,500
(iii) Outstanding manufacturing expenses		63,750

(₹ 7,65,000 12 Months x1 month)		
(iv) Outstanding administrative expenses		15,000
(₹ 1,80,000 12 Months x1 month)		
(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 = $\frac{₹ 1,12,500}{₹ 26,10,000} \times ₹ 18,00,000 = ₹ 34,914$

4. Assumptions

(i) It is assumed that administrative expenses is related to production activities.

(ii) Value of opening and closing stocks are equal.

Q.31 Consider the balance sheet of Maya Limited as on 31 December, 2020. The company has received a large order and anticipates the need to go to its bank to increase its borrowings. As a result, it has to forecast its cash requirements for January, February and March, 2021. Typically, the company collects 20 per cent of its sales in the month of sale, 70 per cent in the subsequent month, and 10 per cent in the second month after the sale. All sales are credit sales.

Equity & liabilities	Amount (₹ in '000)	Assets	Amount (₹ in '000)
Equity shares capital	100	Net fixed assets	1,836
Retained earnings	1,439	Inventories	545
Long-term borrowings	450	Accounts receivables	530
Accounts payables	360	Cash and bank	50
Loan from banks	400		
Other liabilities	212		
	2,961		2,961

Purchases of raw materials are made in the month prior to the sale and amounts to 60 per cent of sales. Payments for these purchases occur in the month after the purchase. Labour costs, including overtime, are expected to be ₹ 1,50,000 in January, ₹ 2,00,000 in February, and ₹ 1,60,000 in March. Selling, administrative, taxes, and other cash expenses are expected to be ₹ 1,00,000 per month for January through March. Actual sales in November and December and projected sales for January through April are as follows (in thousands):

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

On the basis of this information:

- PREPARE a cash budget and DETERMINE the amount of additional bank borrowings necessary to maintain a cash balance of ₹50,000 at all times for the months of January, February, and March.
- PREPARE a pro forma balance sheet for March 31.

Ans: **(a) Cash Budget**

	Nov.	Dec.	Jan.	Feb.	Mar.
	₹	₹	₹	₹	₹
Opening Balance (A)			50	50	50
Sales	500	600	600	1,000	650
Receipts:					
Collections, current month's sales			120	200	130
Collections, previous month's sales			420	420	700
Collections, previous 2 month's sales			50	60	60
Total (B)			590	680	890
Purchases			360	600	390
Payments:					
Payment for purchases			360	600	390

Labor costs			150	200	160
Other expenses			100	100	100
Total (C)			610	900	650
Surplus/Deficit (D) = (A + B - C)			30	(170)	290
Minimum cash balance (E)			50	50	50
Additional borrowings (F) = (E - D)			20	220	(240)
Additional borrowings			20	220	(240)
Cumulative borrowings (Opening balance of 400)			420	640	400

The amount of financing peaks in February owing to the need to pay for purchases made the previous month and higher labor costs. In March, substantial collections are made on the prior month's billings, causing large net cash inflow sufficient to pay off the additional borrowings.

(b) Pro forma Balance Sheet, 31st March, 2022

Equity & liabilities	Amount (₹ in 100)	Assets	Amount (₹ in '000)
Equity shares capital	100	Net fixed assets	1,836
Retained earnings	1,529	Inventories	635
Long-term borrowings	450	Accounts receivables	620
Accounts payables	450	Cash and bank	50
Loan from banks	400		
Other liabilities	212		
	3,141		3,141

$$\begin{aligned} \text{Accounts receivable} &= \text{Sales in March} \times 0.8 + \text{Sales in February} \times 0.1 \\ &= ₹ 650 \times 0.8 + ₹ 1,000 \times 0.1 = ₹ 620 \end{aligned}$$

$$\begin{aligned} \text{Inventories} &= ₹ 545 + \text{Total purchases from January to March} - \text{Total sales from} \\ &\quad \text{January to March} \times 0.6 \\ &= ₹ 545 + (₹ 600 + ₹ 390 + ₹ 450) - (₹ 600 + ₹ 1000 + ₹ 650) \times 0.6 = \\ &\quad ₹ 635 \end{aligned}$$

$$\text{Accounts payable} = \text{Purchases in March} = ₹ 450$$

$$\begin{aligned} \text{Retained earnings} &= ₹ 1,439 + \text{Sales} - \text{Payment for purchases} - \text{Labor costs and} - \\ &\quad \text{Other expenses, all for January to March} \\ &= ₹ 1,439 + (₹ 600 + ₹ 1000 + ₹ 650) - (₹ 360 + ₹ 600 + ₹ 390) - \\ &\quad (₹ 150 + ₹ 200 + ₹ 160) - (₹ 100 + ₹ 100 + ₹ 100) = ₹ 1,529 \end{aligned}$$

Q.32 PQR Ltd. having an annual sale of ₹ 30 lakhs, is re-considering its present collection policy. At present, the average collection period is 50 days and the bad debt losses are 5% of sales. The

company is incurring an expenditure of ₹ 30,000 on account of collection of receivables. Cost of funds is 10 percent.

The alternative policies are as under:

	Alternative I	Alternative II
Average Collection Period	40 days	30 days
Bad Debt Losses	4% of sales	3% of sales
Collection Expenses	₹60,000	₹95,000

DETERMINE the alternatives on the basis of incremental approach and state which alternative is more beneficial.

Ans: Evaluation of Alternative Collection Programs

	Present Policy	Alternative I	Alternative II
	₹	₹	₹
Sales Revenues	30,00,000	30,00,000	30,00,000
Average Collection Period (ACP) (days)	50	40	30
Receivables (₹) $(sales \times \frac{ACP}{360})$	4,16,667	3,33,333	2,50,000
Reduction in Receivables from Present Level (₹)	--	83,334	1,66,667
Savings in Interest @ 10% p.a. (A)		₹8,333	₹16,667
% of Bad Debt Loss	5%	4%	3%
Amount (₹)	1,50,000	1,20,000	90,000
Reduction in Bad Debts from Present Level (B)	--	30,000	60,000
Incremental Benefits from Present Level (C) = (A) + (B)		38,333	76,667
Collection Expenses (₹)	30,000	60,000	95,000
Incremental Collection Expenses from Present Level (D)		30,000	65,000
Incremental Net Benefit (C - D)	--	₹8,333	₹11,667

Conclusion: From the analysis it is apparent that Alternative I has a benefit of ₹8,333 and Alternative II has a benefit of ₹11,667 over present level. Alternative II has a benefit of ₹3,334 more than Alternative I. Hence Alternative II is more viable.

(Note: In absence of Cost of Sales, sales has been taken for purpose of calculating investment in receivables. 1 year = 360 days.)

Q.33 As a part of the strategy to increase sales and profits, the sales manager of a company proposes to sell goods to a group of new customers with 10% risk of non-payment. This group would require one and a half months credit and is likely to increase sales by ₹ 1,00,000

p.a. Production and Selling expenses amount to 80% of sales and the income-tax rate is 50%. The company's minimum required rate of return (after tax) is 25%. Should the sales manager's proposal be accepted? ANALYSE Also COMPUTE the degree of risk of non-payment that the company should be willing to assume if the required rate of return (after tax) were (i) 30%, (ii) 40% and (iii) 60%.

Ans: Statement showing the Evaluation of Proposal

Particulars	₹
A. Expected Profit:	
Net Sales	1,00,000
Less: Production and Selling Expenses @ 80%	(80,000)
Profit before providing for Bad Debts	20,000
Less: Bad Debts @10%	(10,000)
Profit before Tax	10,000
Less: Tax @ 50%	(5,000)
Profit after Tax	5,000
B. Opportunity Cost of Investment in Receivables	(2,500)
C. Net Benefits (A - B)	2,500

Advise: The sales manager's proposal should be accepted. Working

Note: Calculation of Opportunity Cost of Funds

$$\text{Opportunity Cost} = \frac{\text{Total Cost of Collection Period}}{12} \times \frac{\text{Required Rate of Return}}{100} = 80,000 \times \frac{1.5}{12} \times \frac{25}{100} = ₹ 2,500$$

Statement showing the Acceptable Degree of Risk of Non-payment

Particulars	Required Rate of Return		
	30%	40%	60%
Sales	1,00,000	1,00,000	1,00,000
Less: Production and Sales Expenses	80,000	80,000	80,000
Profit before providing for Bad Debts	20,000	20,000	20,000
Less: Bad Debts (assume X)	X	X	X
Profit before tax	20,000 - X	20,000 - X	20,000 - X
Less: Tax @ 50%	(20,000 - X) 0.5	(20,000 - X) 0.5	(20,000 - X) 0.5
Profit after Tax	10,000 - 0.5X	10,000 - 0.5X	10,000 - 0.5X
Required Return (given)	30% of 10,000*	40% of 10,000*	60% of 10,000*
	= ₹3,000	= ₹4,000	= ₹6,000

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

$$= ₹ 80,000 \times \frac{15}{12} = ₹ 10,000$$

Computation of the value and percentage of X in each case is as follows:

Case I	$10,000 - 0.5x$	$= 3,000$
	$0.5x$	$= 7,000$
X		$= 7,000/0.5 = ₹14,000$
Bad Debts as % of sales		$= ₹14,000/₹1,00,000 \times 100 = 14\%$
Case II	$10,000 - 0.5x$	$= 4,000$
	$0.5x$	$= 6,000$
X		$= 6,000/0.5 = ₹12,000$
Bad Debts as % of sales		$= ₹12,000/₹1,00,000 \times 100 = 12\%$
Case III	$10,000 - 0.5x$	$= 6,000$
	$0.5x$	$= 4,000$
X		$= 4,000/0.5 = ₹8,000$
Bad Debts as % of sales		$= ₹8,000/₹1,00,000 \times 100 = 8\%$

Thus, it is found that the Acceptable Degree of risk of non-payment is 14%, 12% and 8% if required rate of return (after tax) is 30%, 40% and 60% respectively.