



CA INTER

VIGHNAHARTA

LIST FOR

FINANCIAL

MANAGEMENT

**MOST IMPORTANT
QUESTIONS with
ANSWERS**

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ॐ गं गणपतये नमः



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COST OF CAPITAL

Q.1: The Capital structure of PQR Ltd. is as follows:

	(₹)
10% Debenture	3,00,000
12% Preference Shares	2,50,000
Equity Share (face value ₹ 10 per share)	5,00,000
	10,50,000

Additional Information:

- ₹ 100 per debenture redeemable at par has 2% floatation cost & 10 years of maturity. The market price per debenture is ₹ 110.
- ₹ 100 per preference share redeemable at par has 3% floatation cost & 10 years of maturity. The market price per preference share is ₹ 108.
- Equity share has ₹ 4 floatation cost and market price per share of ₹ 25. The next year expected dividend is ₹ 2 per share with annual growth of 5%. The firm has a practice of paying all earnings in the form of dividends.
- Corporate Income Tax rate is 30%.

Required:

Calculate Weighted Average Cost of Capital (WACC) using market value weights.

[Jan 21 (10 Marks)]

ANSWER:

Workings:

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

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

$$3. \text{ Cost of Preference Shares } (K_p) = \frac{PD + \frac{(RV - NP)}{n}}{\frac{(RV + NP)}{2}} = \frac{12 + \frac{(100 - 97)}{10}}{\frac{(100 + 97)}{2}} = \frac{12 + 0.3}{98.5} = 0.125 \text{ (approx.)}$$

Calculation of WACC using market value weights

Source of capital	Market Value	Weights	After tax cost of capital	WACC (K _o)
	(₹)	(a)	(b)	(c) = (a) × (b)
10% Debentures (₹ 110 × 3,000)	3,30,000	0.178	0.073	0.013
12% Preference shares (₹ 108 × 2,500)	2,70,000	0.146	0.125	0.018
Equity shares (₹ 25 × 50,000)	12,50,000	0.676	0.145	0.098
	18,50,000	1.00		0.129

WACC (K_0) = 0.129 or 12.9% (approx.)

Q.2: Indel Ltd. has the following capital structure, which is considered to be optimum as on 31st March, 2021:

Particulars	(₹)
14% Debentures	60,000
11% Preference shares	20,000
Equity Shares (10,000 shares)	3,20,000
	4,00,000

The company share has a market price of ₹ 47.20. Next year dividend per share is 50% of year 2020 EPS. The following is the uniform trend of EPS for the preceding 10 years which is expected to continue in future.

Year	EPS (₹)	Year	EPS (₹)
2011	2.00	2016	3.22
2012	2.20	2017	3.54
2013	2.42	2018	3.90
2014	2.66	2019	4.29
2015	2.93	2020	4.72

The company issued new debentures carrying 16% rate of interest and the current market price of debenture is ₹ 96.

Preference shares of ₹ 18.50 (with annual dividend of ₹ 2.22 per share) were also issued. The company is in 30% tax bracket.

(A) CALCULATE after tax:

- Cost of new debt
- Cost of new preference shares
- New equity share (assuming new equity from retained earnings)

(B) CALCULATE marginal cost of capital when no new shares are issued.

(C) DETERMINE the amount that can be spent for capital investment before new ordinary shares must be sold, assuming that the retained earnings for next year's investment is 50 percent of earnings of 2020.

(D) COMPUTE marginal cost of capital when the fund exceeds the amount calculated in (C), assuming new equity is issued at ₹ 40 per share? [RTP May 21]

ANSWER:

(A) (i) Cost of new debt

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

$$= \frac{₹ 16(1 - 0.3)}{₹ 96} = 0.11667$$

(ii) Cost of new preference shares

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

(iii) Cost of new equity shares

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

$$= \frac{₹ 2.36}{₹ 47.20} + 0.10$$

$$= 0.05 + 0.10 = 0.15$$

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

$$= \frac{\text{EPS (2012)} - \text{EPS (2011)}}{\text{EPS (2011)}} = \frac{₹ 2.20 - ₹ 2.00}{₹ 2.00} = 0.10 \text{ or } 10\%$$

Calculation of D_1

$$D_1 = 50\% \text{ of } 2020 \text{ EPS} = 50\% \text{ of } ₹ 4.72 = ₹ 2.36$$

(B) Calculation of marginal cost of capital

Type of Capital	Proportion	Specific Cost	Product
(1)	(2)	(3)	(2) × (3) = (4)
Debentures	0.15	0.11667	0.0175
Preference Share	0.05	0.1200	0.0060
Equity Share	0.80	0.1500	0.1200
Marginal cost of capital			0.1435

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

$$\begin{aligned} \text{Retained earnings} &= 50\% \text{ of EPS of 2020} \times \text{outstanding equity shares} \\ &= 50\% \text{ of } ₹ 4.72 \times 10,000 \text{ shares} = ₹ 23,600 \end{aligned}$$

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

So, ₹ 23,600 = 80% of Total Capital

$$\therefore \text{Capital investment before issuing equity shares} = \frac{₹ 23,600}{0.80} = ₹ 29,500$$

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

\therefore The cost of new issue of equity shares will be:

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

The marginal cost of capital will be:

Type of Capital	Proportion	Specific Cost	Product
(1)	(2)	(3)	(2) × (3) = (4)
Debentures	0.15	0.11667	0.0175
Preference Shares	0.05	0.1200	0.0060
Equity Shares (New)	0.80	0.1590	0.1272
Marginal cost of capital			0.1507

Q.3: CALCULATE the WACC by using Market value weights.

The capital structure of the company is as under:

	(Rs.)
Debentures (Rs.100 per debenture)	10,00,000
Preference shares (Rs.100 per share)	10,00,000
Equity shares (Rs.10 per share)	20,00,000
	40,00,000

The market prices of these securities are:

Debentures	Rs. 115 per debenture
Preference shares	Rs. 120 per preference share
Equity shares	Rs. 265 each.

Additional information:

- (1) Rs.100 per debenture redeemable at par, 10% coupon rate, 2% floatation cost, 10-year maturity.
- (2) Rs.100 per preference share redeemable at par, 5% coupon rate, 2% floatation cost and 10-year maturity.
- (3) Equity shares have a floatation cost of Rs. 1 per share.

The next year expected dividend is Rs. 5 with an annual growth of 15%. The firm has the practice of paying all earnings in the form of dividend.

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

[MTP March 21 (10 Marks)]

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

$$= \frac{D_1}{P_0 - F} + g = \frac{\text{Rs. } 5}{\text{Rs. } 265 - \text{Rs. } 1} + 0.15 = 0.1689 \text{ or } 16.89\%$$

(ii) Cost of Debt (K_d)

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

Year	Cash flows (Rs.)	Discount factor @ 5%	Present Value	Discount factor @ 7%	Present Value (Rs.)
0	112.7	1.000	(112.7)	1.000	(112.7)
1 to 10	7	7.722	54.05	7.024	49.17
10	100	0.614	61.40	0.508	50.80
NPV			+2.75		-12.73

Calculation of IRR

$$\text{IRR} = 5\% + \frac{2.75}{2.75 - (-12.73)} (7\% - 5\%) = 5\% + \frac{2.75}{15.48} (7\% - 5\%) = 5.36\%$$

Cost of Debt (k_d) = 5.36%

(iii) Cost of Preference shares (K_p)

Calculation of NPV at discount rate of 2% and 5%

Year	Cash flows (Rs.)	Discount factor @ 2%	Present Value	Discount factor @ 5%	Present Value (Rs.)
0	117.6	1.000	(117.6)	1.000	(117.6)
1 to 10	5	8.983	44.92	7.722	38.61
10	100	0.820	82.00	0.614	61.40
NPV			+9.32		-17.59

Calculation of IRR

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

Cost of Preference Shares (k_p) = 3.04%

Calculation of WACC using market value weights

Source of capital	Market Value	Weights	After tax cost of capital	WACC (K _o)
	(Rs.)	(a)	(b)	(c) = (a)×(b)
10% Debentures (Rs.115× 10,000)	11,50,000	0.021	0.0536	0.00113
5% Preference shares (Rs.120 × 10,000)	12,00,000	0.022	0.0304	0.00067
Equity shares (Rs.265 × 2,00,000)	5,30,00,000	0.957	0.1689	0.16164
	5,53,50,000	1.000		0.16344

WACC (K_o) = 0.16344 or 16.344%

Q.4: In March, 2021 Tiruv Ltd.'s share was sold for Rs. 219 per share. A long term earnings growth rate of 11.25% is anticipated. Tiruv Ltd. is expected to pay dividend of Rs. 5.04 per share.

- (i) **DETERMINE** the rate of return an investor can expect to earn assuming that dividends are expected to grow along with earnings at 11.25% per year in perpetuity?
- (ii) It is expected that Tiruv Ltd. will earn about 15% on book equity and shall retain 60% of earnings. In this case, whether, there would be any change in growth rate and cost of equity? **ANALYSE**.

[MTP April 21 (5 Marks)]

ANSWER:

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

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

Where,

K_e = Cost of equity share capital

D_1 = Expected dividend at the end of year 1

P_0 = Current market price of the share.

g = Expected growth rate of dividend.

$$\text{Therefore, } K_e = \frac{5.04}{219} + 0.1125 = 13.55\%$$

- (ii) With rate of return on retained earnings (r) of 15% and retention ratio (b) of 60%, new growth rate will be as follows:

$$g = br = 0.60 \times 0.15 = 0.09 \text{ or } 9\%$$

Accordingly, dividend will also get changed and to calculate this, first we shall calculate previous retention ratio (b_1) and then EPS assuming that rate of return on retained earning (r) is same.

With previous Growth Rate of 11.25% and $r = 15\%$, the retention ratio comes out to be:

$$0.1125 = b_1 \times 0.15$$

$$b_1 = 0.75 \text{ and payout ratio} = 0.25$$

With 0.25 payout ratio, the EPS will be as follows:

$$\text{EPS} = \frac{5.04}{0.25} = \text{Rs. } 20.16$$

With new payout ratio of 40% ($1 - 0.60$) the new dividend will be:

$$D_1 = \text{Rs. } 20.16 \times 0.40 = \text{Rs. } 8.064$$

Accordingly new K_e will be:

$$K_e = \frac{8.064}{219} + 0.09 = 12.68\%$$

Q.5: Following are the information of TT Ltd.:

Particulars	
Earnings per share	₹ 10
Dividend per share	₹ 6
Expected growth rate in Dividend	6%
Current market price per share	₹ 120
Tax Rate	30%
Requirement of Additional Finance	₹ 30 lakhs
Debt Equity Ratio (For additional Finance)	2 : 1
Cost of Debt	
0-5,00,000	10%
5,00,001 – 10,00,000	9%
Above 10,00,000	8%

Assuming that there is no Reserve and Surplus available in TT Ltd.

You are required to:

- Find the pattern of finance for additional requirement
- Calculate post tax average cost of additional debt
- Calculate cost of equity
- Calculate the overall weighted average after tax cost of additional finance. [July 21 (10 Marks)]

ANSWER:

- (a) Pattern of raising additional finance

Equity	1/3 of ₹ 30,00,000	= ₹ 10,00,000
Debt	2/3 of ₹ 30,00,000	= ₹ 20,00,000

The capital structure after raising additional finance:

Particulars	(₹)
Shareholder's Funds	
Equity Capital	10,00,000
Debt (Interest at 10% p.a.)	5,00,000
(Interest at 9% p.a.)	5,00,000
(Interest at 8% p.a.) (20,00,000 – 10,00,000)	10,00,000
Total Funds	30,00,000

- (b) Determination of post-tax average cost of additional debt

$$K_d = I (1 - t)$$

Where,

I = Interest Rate

t = Corporate tax-rate

On First ₹ 5,00,000 = 10% (1 – 0.3) = 7% or 0.07

On Next ₹ 5,00,000 = 9% (1 – 0.3) = 6.3% or 0.063

On Next ₹ 10,00,000 = 8% (1 – 0.3) = 5.6% or 0.056

Average Cost of Debt

$$= \frac{(\text{₹ } 5,00,000 \times 0.07) + (\text{₹ } 5,00,000 \times 0.063) + (\text{₹ } 10,00,000 \times 0.056)}{\text{₹ } 20,00,000} \times 100 = 6.125\%$$

(c) Determination of cost of equity applying Dividend growth model:

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

Where,

K_e = Cost of equity

D_1 = $D_0 (1 + g)$

D_0 = Dividend paid

g = Growth rate = 6%

P_0 = Current market price per share = ₹ 120

$$K_e = \frac{\text{₹ } 6 (1 + 0.06)}{\text{₹ } 120} + 0.06 = \frac{\text{₹ } 6.36}{\text{₹ } 120} + 0.06 = 0.113 \text{ or } 11.3\%$$

(d) Computation of overall weighted average after tax cost of additional finance

Particulars	(₹)	Weighted	Cost of funds	Weighted Cost (%)
Equity	10,00,000	1/3	11.3%	3.767
Debt	20,00,000	2/3	6.125%	4.083
WACC	30,00,000			7.85

(Note: In the above solution different interest rate have been considered for different slab of Debt)

Alternative Solution

(a) Pattern of raising additional finance

Equity 1/3 of ₹ 30,00,000 = ₹ 10,00,000

Debt 2/3 of ₹ 30,00,000 = ₹ 20,00,000

The capital structure after raising additional finance:

Particulars	(₹)
Shareholders' Funds	
Equity Capital	10,00,000
Debt (Interest at 8% p.a.)	20,00,000
Total Funds	30,00,000

(b) Determination of post-tax average cost of additional debt

$$K_d = I (1 - t)$$

Where,

I = Interest Rate

t = Corporate tax-rate

$$K_d = 8\% (1 - 0.3) = 5.6\%$$

(c) Determination of cost of equity applying Dividend growth model:

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

Where,

K_e = Cost of equity

$D_1 = D_0 (1 + g)$

D_0 = Dividend paid

g = Growth rate = 6%

P_0 = Current market price per share = ₹ 120

Then, $K_e = \frac{₹ 6 (1 + 0.06)}{₹ 120} + 0.06 = \frac{₹ 6.36}{₹ 120} + 0.06 = 0.113$ or 11.3%

(d) Computation of overall weighed average after tax cost of additional finance

Particulars	(₹)	Weights	Cost of funds	Weighted Cost (%)
Equity	10,00,000	1/3	11.3%	3.767
Debt	20,00,000	2/3	5.6%	3.733
WACC	30,00,000			7.50

(Note: In the above solution single interest rate have been considered for Debt)

Q.6: The following is the capital structure of Sharda Ltd. as on 31.12.2020:

	(₹)
Equity shares: 2,00,000 shares (of ₹ 100 each)	2,00,00,000
9% Preference Shares (of ₹ 100 each)	60,00,000
8% Debentures	90,00,000
	3,50,00,000

The market price of the company's share is ₹ 120 and it is expected that a dividend of ₹ 12 per share would be declared for the year 2021. The dividend growth rate is 5% and the company is in the 30% tax bracket.

- (i) CALCULATE the company's weighted average cost of capital.
- (ii) Further, in order to finance an expansion plan, the company intends to borrow a fund of ₹ 2 crores bearing 12% rate of interest. In this situation, WHAT will be the company's revised weighted average cost of capital? This financing decision is expected to increase dividend from ₹ 12 to ₹ 14 per share. However, the market price of equity share is expected to decline from ₹ 120 to ₹ 115 per share.

In case of both (i) and (ii) above, use market value weight while calculating weighted average cost of capital.

[MTP Oct 21 (5 Marks)]

ANSWER:

(i) Computation of the weighted average cost of capital

Source of finance	Market Value of capital (₹)	Weight	After tax Cost of capital (%)	WACC (%)
(a)		(b)	(c)	(d) = (b) x (c)
Equity share (Working note 1) [₹ 120 × 2,00,000 shares]	2,40,00,000	0.6154	15	9.231
9% Preference Share	60,00,000	0.1538	9	1.3842
8% Debentures	90,00,000	0.2308	5.60	1.2925

	3,90,00,000	1.0000		11,9077
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(ii) **Computation of Revised Weighted Average Cost of Capital**

Source of finance (a)	Market Value of capital (₹)	Weight (b)	After tax Cost of capital (%) (c)	WACC (%) (d) = (b) x (c)
Equity shares (working note 2) [₹ 115 × 2,00,000 shares]	2,30,00,000	0.3966	17.17	6.8096
9% Preference shares	60,00,000	0.1034	9.00	0.9306
8% Debentures	90,00,000	0.1552	5.60	0.8691
12% Loan	2,00,00,000	0.3448	8.40	2.8963
	5,80,00,000	1.0000		11.5056

Working Notes:

(1) Cost of Equity Shares

$$K_e = \{\text{Dividend Per Share (D}_1\text{)} / \text{Market Price Share (P}_0\text{)}\} + \text{Growth Rate}$$

$$= 12/120 + 0.05$$

$$= 0.15 \text{ or } 15\%$$

(2) Revised cost of equity shares (K_e)

$$\text{Revised } K_e = 14/115 + 0.05$$

$$= 0.1717 \text{ or } 17.17\%$$

Q.7: Gamma Limited has 5,00,000, ₹ 1 ordinary shares whose current ex-dividend market price is ₹ 1.50 per share. The company has just paid a dividend of 27 paise per share, and dividends are expected to continue at this level for some time. If the company has no debt capital, COMPUTE the weighted average cost of capital?

ANSWER

Market value of equity, E = 5,00,000 shares x ₹1.50 = ₹7,50,000

Market value of debt, D = Nil

$$\text{Cost of equity capital, } K_e = \frac{D_1}{P_0} = \frac{₹ 0.27}{₹ 1.50} = 0.18$$

Since there is no debt capital, WACC = K_e = 18 per cent.

Q.8: The following details are provided by the GPS Limited:

	(₹)
Equity Share Capital	65,00,000
12% Preference Share Capital	12,00,000
15% Redeemable Debentures	20,00,00
10% Convertible Debentures	8,00,000

The cost of equity capital for the company is 16.30% and income tax rate for the company is 30%.

You are required to CALCULATE the Weighted Average Cost of Capital (WACC) of the company.

ANSWER

Calculation of Weighted Average Cost of Capital (WACC)

Source	(₹)	Weight	Cost of Capital after tax	WACC
Equity Capital	65,00,000	0.619	0.163	0.1009
12% Preference Capital	12,00,000	0.114	0.120	0.0137
15% Redeemable Debentures	20,00,000	0.190	0.105*	0.020
10% Convertible Debentures	8,00,000	0.076	0.070**	0.0053
Total	1,05,00,000	1.0000		0.1399

* Cost of 15% Redeemable Debentures (after tax) = $15 (1 - 0.30)$
= 10.5% or 0.105

** Cost of 10% Convertible Debentures (after tax) = $10 (1 - 0.30) = 7\%$ or 0.070

Weighted Average Cost of Capital (WACC) = 0.1399 = 13.99%

(Note: In the above solution, the Cost of Debentures has been computed without considering the impact of special features i.e. redeemability and convertibility in absence of requisite information.)

Q.9: ABC Company's equity share is quoted in the market at ₹ 25 per share currently. The company pays a dividend of ₹ 2 per share and the investor's market expects a growth rate of 6% per year.

You are required to:

- CALCULATE the company's cost of equity capital.
- If the company issues 10% debentures of face value of ₹ 100 each and realises ₹ 96 per debentures while the debentures are redeemable after 12 years at a premium of 12%, CALCULATE cost of debenture using YTM?

Assume Tax Rate to be 50%.

ANSWER

- Cost of Equity Capital (K_e):

$$K_e = \frac{\text{Expected dividend per share } (D_1)}{\text{Market price per share } (P_0)} + \text{Growth Rate}(g)$$
$$= \frac{₹ 2 \times 1.06}{₹ 25} + 0.06 = 0.1448 \text{ or } 14.48\%$$

- Cost of Debenture (K_d):

Using Present Value method (YTM)

Identification of relevant cash flows

Year	Cash Flows
0	Current market price (P_0) = ₹ 96
1 to 12	Interest net of tax $[I(1-t)] = 10\% \text{ of } ₹ 100 (1 - 0.5) = ₹ 5$
12	Redemption value (RV) = ₹ 100 (1.12) = ₹ 112

Calculation of Net Present Values (NPV) at two discount rates

Year	Cash flows (₹)	Discount factor @ 5% (L)	Present Value (₹)	Discount factor @ 10% (H)	Present Value (₹)
0	(96)	1.000	(96.00)	1.000	(96.00)
1 to 12	5	8.863	44.32	6.814	34.07
12	112	0.557	62.38	0.319	35.73
NPV			+10.7		-26.2.

Calculation of IRR

$$IRR = L + \frac{NPV_L}{NPV_L - NPV_H} (H - L)$$

$$= 5\% + \frac{₹ 10.7}{₹ 10.7 - (₹ - 26.2)} (10\% - 5\%) = 5\% + \frac{₹ 53.5}{₹ 36.9} = 6.45\%$$

Therefore, $K_d = 6.45\%$

Q.10: Masco Limited wishes to raise additional finance of ₹ 10 lakhs for meeting its investment plans. It has ₹ 2,10,000 in the form of retained earnings available for investment purposes. Further details are as following:

(1)	Debt/ Equity mix	3 : 7
(2)	Cost of debt:	
	Upto ₹ 1,80,000	10% (before tax)
	Beyond ₹ 1,80,000	16% (before tax)
(3)	Earnings per share	₹ 4
(4)	Dividend pay out	50% of earnings
(5)	Expected growth rate of dividend	10%
(6)	Current market price per share	₹ 44
(7)	Tax rate	50%

You are required to:

- DETERMINE the pattern for raising the additional finance.
- DETERMINE the past-tax average cost of additional debt.
- DETERMINE the cost of retained earnings and cost of equity.
- COMPUTE the overall weighted average after tax cost of additional finance.

ANSWER

- Pattern for raising the additional finance:

Equity 70% of ₹ 10,00,000 = ₹ 7,00,000

Debt 30% of ₹ 10,00,000 = ₹ 3,00,000

The capital structure after raising additional finance:

	(₹)
Shareholders' funds	

Equity Capital	(₹ 7,00,000 - ₹ 2,10,000)	4,90,000
Retained earnings		2,10,000
Debt (Interest at 10% p.a.)		1,80,000
(Interest at 16% p.a.)	(₹3,00,000-₹1,80,000)	1,20,000
Total Funds		10,00,000

(b) Determination of post-tax average cost of additional debt:

$$K_d = I (1 - t)$$

Where,

I = Interest Rate

t = Corporate tax-rate

$$\text{On ₹ 1,80,000} = 10\% (1 - 0.5) = 5\% \text{ or } 0.05$$

$$\text{On ₹ 1,20,000} = 16\% (1 - 0.5) = 8\% \text{ or } 0.08$$

Average Cost of Debt

$$\frac{(\text{₹ 1,80,000} \times 0.05) + (\text{₹ 1,20,000} \times 0.08)}{\text{₹ 3,00,000}} \times 100 = 6.2\%$$

(c) Determination of cost of retained earnings and cost of equity by applying Dividend growth model:

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

Where,

$$D_0 = \text{Dividend paid} = 50\% \text{ of EPS} = 50\% \times \text{₹ 4} = \text{₹ 2}$$

$$g = \text{Growth rate} = 10\%$$

$$P_0 = \text{Current market price per share} = \text{₹ 44}$$

$$\text{So, } K_e \text{ or } K_r = \frac{\text{₹ 2} (1 + 0.10)}{\text{₹ 44}} + 0.10 = \frac{\text{₹ 2.2}}{\text{₹ 44}} + 0.10 = 0.05 + 0.10 = 0.15 \text{ or } 15\%$$

(d) Computation of overall weighted average after tax cost of additional

Particulars	Amount (₹)	Weights	Cost of funds	Weighted Cost (%)
Equity (including retained earnings)	7,00,000	0.70	15%	10.5
Debt	3,00,000	0.30	6.2%	1.86
WACC	10,00,000			12.36

Q.11: Determine the cost of capital of Best Luck Limited using the book value (BV) and market value (MV) weights from the following information:

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

Additional information:

- I. **Equity:** Equity shares are quoted at ₹130 per share and a new issue priced at ₹125 per share will be fully subscribed; flotation costs will be ₹ 5 per share.
- II. **Dividend:** During the previous 5 years, dividends have steadily increased from ₹ 10.60 to ₹ 14.19 per share. Dividend at the end of the current year is expected to be ₹ 15 per share.
- III. **Preference shares:** 15% Preference shares with face value of ₹ 100 would realise ₹105 per share.
- IV. **Debentures:** The company proposes to issue 11-year 15% debentures but the yield on debentures of similar maturity and risk class is 16%; flotation cost is 2%.
- V. **Tax:** Corporate tax rate is 35%. Ignore dividend tax.

Floatation cost would be calculated on face value.

ANSWER

$$(i) \text{ Cost of Equity } (K_e) = \frac{D_1}{P_0 - F} + g = \frac{₹ 15}{₹ 125 - ₹ 5} + 0.06^*$$

$$K_e = 0.125 + 0.06 = 0.185$$

*Calculation of g:

$$₹ 10.6(1+g)^5 = ₹ 14.19$$

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

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

$$(ii) \text{ Cost of Retained Earnings } (K_r) = \frac{D_1}{P_0} + g = \frac{₹ 15}{₹ 125} + 0.06 = 0.18$$

$$(iii) \text{ Cost of Preference Shares } (K_p) = \frac{P_d}{P_0} = \frac{₹ 15}{₹ 105} = 0.1429$$

$$(iv) \text{ Cost of Debentures } (K_d) = \frac{I(1-t) + \left(\frac{RV-NP}{n}\right)}{\frac{RV+NP}{2}}$$

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

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

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

Market price of debentures (approximation method)

$$= ₹ 15 \div 0.16 = ₹ 93.75$$

$$\text{Sale proceeds from debentures} = ₹ 93.75 - ₹ 2 \text{ (i.e., floatation cost)} = ₹ 91.75$$

Market value (P₀) of debentures can also be found out using the present value method:

$$P_0 = \text{Annual Interest} \times \text{PVIFA (16\%, 11 years)} + \text{Redemption value} \times \text{PVIF (16\%, 11 years)}$$

$$P_0 = ₹ 15 \times 5.029 + ₹ 100 \times 0.195$$

$$P_0 = ₹ 75.435 + ₹ 19.5 = ₹ 94.935$$

$$\text{Net Proceeds} = ₹ 94.935 - 2\% \text{ of } ₹ 100 = ₹ 92.935$$

Accordingly, the cost of debt can be calculated

Total Cost of Capital [BV weights and MV weights]

(Amount in (₹) lakh)

Source of Capital	Weights		Specific Cost (K)	Total cost	
	BV	MV		(BV × K)	(MV × K)
Equity Shares	120	160*	0.1850	22.2	29.6
Retained Earnings	30	40*	0.1800	5.4	7.2
Preference Shares	36	33.75	0.1429	5.14	4.82
Debentures	9	10.4	0.1095	0.986	1.139
Total	195	244.15		33.73	42.76

*Market Value of equity has been apportioned in the ratio of Book Value of equity and retained earnings i.e., 120:30 or 4:1.

Weighted Average Cost of Capital (WACC):

$$\text{Using Book Value} = \frac{₹ 33.73}{₹ 195} = 0.1729 \text{ or } 17.29\%$$

$$\text{Using Market Value} = \frac{₹ 42.76}{₹ 244.15} = 0.1751 \text{ or } 17.51\%$$

Q.12: Kalyanam Ltd. has an operating profit of ₹ 34,50,000 and has employed Debt which gives total Interest Charge of ₹ 7,50,000. The firm has an existing Cost of Equity and Cost of Debt as 16% and 8% respectively. The firm has a new proposal before it, which requires funds of ₹ 75 Lakhs and is expected to bring an additional profit of ₹ 14,25,000. To finance the proposal, the firm is expecting to issue an additional debt at 8% and will not be issuing any new equity shares in the market. Assume no tax culture.

You are required to CALCULATE the Weighted Average Cost of Capital (WACC) of Kalyanam Ltd.:

- Before the new Proposal
- After the new Proposal

ANSWER

Workings:

$$\begin{aligned} \text{(i) Value of Debt} &= \frac{\text{Interest}}{\text{Cost of debt } (K_d)} \\ &= \frac{₹ 7,50,000}{0.08} = ₹ 93,75,000 \end{aligned}$$

$$\begin{aligned} \text{(b) Value of equity capital} &= \frac{\text{Operating profit} - \text{Interest}}{\text{Cost of equity } (K_e)} \\ &= \frac{₹ 34,50,000 - ₹ 7,50,000}{0.16} \\ &= ₹ 1,68,75,000 \end{aligned}$$

(c) New Cost of equity (K_e) after proposal

$$= \frac{\text{Increased Operating Profit} - \text{Interest on Increased debt}}{\text{Equity capital}}$$

$$= \frac{(\text{₹ } 34,50,000 + \text{₹ } 14,25,000) - (\text{₹ } 7,50,000 + \text{₹ } 6,00,000)}{\text{₹ } 1,68,75,000}$$

$$= \frac{\text{₹ } 48,75,000 - \text{₹ } 13,50,000}{\text{₹ } 1,68,75,000}$$

$$= \frac{\text{₹ } 35,25,000}{\text{₹ } 1,68,75,000}$$

$$= 0.209 \text{ or } 20.9\%$$

(i) Calculation of Weighted Average Cost of Capital (WACC) before the new Proposal

Sources	(₹)	Weight	Cost of Capital	WACC
Equity	1,68,75,000	0.6429	0.160	0.1029
Debt	93,75,000	0.3571	0.080	0.0286
Total	2,62,50,000	1		0.1315 or 13.15%

(ii) Calculation of Weighted Average Cost of Capital (WACC) after the new proposal

Sources	(₹)	Weight	Cost of Capital	WACC
Equity	1,68,75,000	0.5000	0.209	0.1045
Debt	1,68,75,000	0.5000	0.080	0.0400
Total	3,37,50,000	1		0.1445 or 14.45%

Q.13: 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

Year	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

ANSWER

(i) Calculation of Cost of Convertible Debentures:

Given that,

$$R_F = 10\%$$

$$R_m - R_f = 18\%$$

$$B = 1.25$$

$$D_0 = 12.76$$

$$D_5 = ₹ 10$$

Flotation Cost = 5%

Using CAPM,

$$K_e = R_f + \beta (R_m - R_f)$$

$$= 10\% + 1.25 (18\%)$$

$$= 32.50\%$$

Calculation of growth rate in dividend

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

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

$$(1+5\%)^5 = 1.276 \text{ from FV Table}$$

$$g = 5\%$$

$$\text{Price of share after 6 years} = \frac{D_7}{K_e - g} = \frac{12.76 (1.05)^7}{0.325 - 0.05}$$

$$P_6 = \frac{12.76 \times 1.407}{0.275}$$

$$P_6 = 65.28$$

$$\text{Redemption Value of Debenture (RV)} = 65.28 \times 2 = 130.56 \text{ (RV)}$$

$$NP = 95$$

$$n = 6$$

$$K_d = \frac{\text{INT} (1 - t) + \left(\frac{RV - NP}{n} \right)}{\frac{(RV - NP)}{2}} \times 100$$

$$= \frac{15 (1 - 0.4) + \left(\frac{130.56 - 95}{6} \right)}{\frac{(130.56 - 95)}{2}} \times 100$$

$$= \frac{9 + 5.93}{112.78} \times 100$$

$$K_d = 13.24\%$$

(ii) Calculation of Cost of Preference Shares:

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

Redemption Value = 100

Year	Cash Flows (₹)	PVF @ 3%	PV (₹)	PVF @ 5%	PV (₹)
0	103.40	1	103.40	1	103.40
1-10	-5	8.530	-42.65	7.722	-38.61
10	-100	0.744	-74.40	0.614	-61.40
			-13.65		3.39

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

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

$$K_p = 4.6021\%$$



LEVERAGES

Q.1: Following information has been extracted from the accounts of newly incorporated Textyl Pvt. Ltd. for the Financial Year 2020-21:

Sales	₹ 15,00,000
P/V ratio	70%
Operating Leverage	1.4 times
Financial Leverage	1.25 times

Using the concept of leverage, find out and verify in each case:

- The percentage change in taxable income if sales increase by 15%.
- The percentage change in EBIT if sales decrease by 10%.
- The percentage change in taxable income if EBIT increase by 15%.

[RTP May 21]

ANSWER:

Workings:

- Contribution = Sales × P/V ratio
= ₹ 15,00,000 × 70% = ₹ 10,50,000
- Operating Leverage = $\frac{\text{Contribution}}{\text{Earnings before interest and tax (EBIT)}}$
Or, 1.4 = $\frac{₹ 10,50,000}{\text{EBIT}}$
EBIT = ₹ 7,50,000
- Financial leverage = $\frac{\text{EBIT}}{\text{EBT}}$
Or, 1.25 = $\frac{₹ 7,50,000}{\text{EBT}}$
EBT = ₹ 6,00,000
- Fixed Cost = Contribution – EBIT
= ₹ 10,50,000 – ₹ 7,50,000 = ₹ 3,00,000
- Interest = EBIT – EBT
= ₹ 7,50,000 – ₹ 6,00,000 = ₹ 1,50,000
- Income Statement

Particulars	Amount (₹)
Sales	15,00,000
Less: Variable cost (30% of ₹ 15,00,000)	4,50,000
Contribution (70% of ₹ 15,00,000)	10,50,000
Less: Fixed costs	3,00,000
Earnings before interest and tax (EBIT)	7,50,000
Less: Interest	1,50,000

Earnings before tax (EBT)

6,00,000

$$(i) \text{ Combined Leverage} = \frac{\text{Contribution}}{\text{EBT}} = \frac{\text{₹ } 10,50,000}{\text{₹ } 6,00,000} = \mathbf{1.75 \text{ times}}$$

$$\begin{aligned} \text{Or, Combined Leverage} &= \text{Operating Leverage} \times \text{Financial Leverage} \\ &= 1.4 \times 1.25 = \mathbf{1.75 \text{ times}} \end{aligned}$$

So, if sales is increased by 15% then taxable income (EBT) will be increased by $1.75 \times 15\% = \mathbf{26.25\%}$

Verification

Particulars	Amount (₹)
New Sales after 15% increase (₹ 15,00,000 + 15% of ₹ 15,00,000)	17,25,000
Less: Variable cost (30% of ₹ 17,25,000)	5,17,500
Contribution (70% of ₹ 17,25,000)	12,07,500
Less: Fixed costs	3,00,000
Earnings before interest and tax (EBIT)	9,07,500
Less: Interest	1,50,000
Earnings before tax after change (EBT)	7,57,500

Increase in Earnings before tax (EBT) = ₹ 7,57,500 - ₹ 6,00,000 = ₹ 1,57,500

So, percentage change in Taxable Income (EBT) = $\frac{\text{₹ } 1,57,500}{\text{₹ } 6,00,000} \times 100 = \mathbf{26.25\%}$, hence **verified**

$$(ii) \text{ Degree of Operating Leverage (Given)} = \mathbf{1.4 \text{ times}}$$

So, if sales is decreased by 10% then EBIT will be decreased by $1.4 \times 10\% = \mathbf{14\%}$

Verification

Particulars	Amount (₹)
New Sales after 10% decrease (₹ 15,00,000 - 10% of ₹ 15,00,000)	13,50,000
Less: Variable cost (30% of ₹ 13,50,000)	4,05,000
Contribution (70% of ₹ 13,50,000)	9,45,000
Less: Fixed costs	3,00,000
Earnings before interest and tax after change (EBIT)	6,45,000

Decrease in Earnings before interest and tax (EBIT) = ₹ 7,50,000 - ₹ 6,45,000 = ₹ 1,05,000

So, percentage change in EBIT = $\frac{\text{₹ } 1,05,000}{\text{₹ } 7,50,000} \times 100 = \mathbf{14\%}$, hence **verified**

$$(iii) \text{ Degree of Financial Leverage (Given)} = \mathbf{1.25 \text{ times}}$$

So, if EBIT increases by 15% then Taxable Income (EBT) will be increased by $1.25 \times 15\% = \mathbf{18.75\%}$

Verification

Particulars	Amount (₹)
New EBIT after 15% increase (₹ 7,50,000 + 15% of ₹ 7,50,000)	8,62,500
Less: Interest	1,50,000
Earnings before Tax after change (EBT)	7,12,500

Increase in Earnings before Tax = ₹ 7,12,500 - ₹ 6,00,000 = ₹ 1,12,500

So, percentage change in Taxable Income (EBT) = $\frac{₹ 1,12,500}{₹ 6,00,000} \times 100 = 18.75\%$, hence verified

Q.2: Following information are related to four firms of the same industry:

Firm	Change in Revenue	Change in Operating Income	Charge in Earnings per Share
P	25%	23%	30%
Q	27%	30%	26%
R	24%	36%	20%
S	20%	30%	20%

For all the firms, FIND OUT:

- Degree of operating leverage, and
- Degree of combined leverage.

[MTP March 21]

ANSWER:

Calculation of Degree of Operating leverage and Degree of Combined leverage

Firm	Degree of Operating Leverage (DOL) = $\frac{\% \text{ change in Operating Income}}{\% \text{ change in Revenue}}$	Degree of Combined Leverage (DCL) = $\frac{\% \text{ change in EPS}}{\% \text{ change in Revenue}}$
P	$\frac{23\%}{25\%} = 0.92$	$\frac{30\%}{25\%} = 1.2$
Q	$\frac{30\%}{27\%} = 1.11$	$\frac{26\%}{27\%} = 0.96$
R	$\frac{36\%}{24\%} = 1.50$	$\frac{20\%}{24\%} = 0.83$
S	$\frac{30\%}{20\%} = 1.50$	$\frac{20\%}{20\%} = 1.00$

Q.3: Following data of MT Ltd. under Situations 1, 2 and 3 and Financial Plan A and B is given:

Installed Capacity (units)	3,600
Actual Production and Sales (units)	2,400
Selling price per unit (Rs.)	30
Variable cost per unit (Rs.)	20
Fixed Costs (Rs.): Situation	1 3,000
Situation	2 6,000
Situation	3 9,000

Capital Structure:

Particulars	Financial Plan	
	A	B

Equity	Rs. 15,000	Rs. 22,500
Debt	Rs. 15,000	Rs. 7,500
Cost of Debt	12%	12%

Required:

- (i) CALCULATE the operating leverage and financial leverage.
- (ii) FIND out the combinations of operating and financial leverage which give the highest value and the least value. [MTP April 21 (10 Marks)]

ANSWER:

(i) Operating Leverage

	Situation 1 (Rs.)	Situation 2 (Rs.)	Situation 3 (Rs.)
Sales (S)			
2,400 units @ Rs. 30 per unit	72,000	72,000	72,000
Less: Variable Cost (VC) @ Rs. 20 per unit	48,000	48,000	48,000
Contribution (C)	24,000	24,000	24,000
Less: Fixed Cost (FC)	3,000	6,000	9,000
EBIT	21,000	18,000	15,000
Operating Leverage = $\frac{C}{EBIT}$	$\frac{Rs. 24,000}{Rs. 21,000} = 1.14$	$\frac{Rs. 24,000}{Rs. 18,000} = 1.33$	$\frac{Rs. 24,000}{Rs. 15,000} = 1.60$

Financial Leverage

	Financial Plan	
	A (Rs.)	B (Rs.)
Situation 1		
EBIT	21,000	21,000
Less: Interest on debt	1,800	900
(Rs. 15,000 x 12%); (Rs. 7,500 x 12%)		
EBT	19,200	20,100
Financial Leverage = $\frac{EBIT}{EBT}$	$\frac{Rs. 21,000}{Rs. 19,200} = 1.09$	$\frac{Rs. 21,000}{Rs. 20,100} = 1.04$
Situation 2		
EBIT	18,000	18,000
Less: Interest on debt	1,800	900
EBT	16,200	17,100
Financial Leverage = $\frac{EBIT}{EBT}$	$\frac{Rs. 18,000}{Rs. 16,200} = 1.11$	$\frac{Rs. 18,000}{Rs. 17,100} = 1.05$
Situation 3		
EBIT	15,000	15,000
Less: Interest on debt	1,800	900
EBT	13,200	14,100

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

$$\frac{\text{Rs. 15,000}}{\text{Rs. 13,200}} = 1.14$$

$$\frac{\text{Rs. 15,000}}{\text{Rs. 14,100}} = 1.06$$

(ii) Combined Leverages

$$\text{CL} = \text{OL} \times \text{FL}$$

	Financial Plan	
	A (Rs.)	B (Rs.)
(a) Situation 1	$1.14 \times 1.09 = 1.24$	$1.14 \times 1.04 = 1.19$
(b) Situation 2	$1.33 \times 1.11 = 1.48$	$1.33 \times 1.05 = 1.40$
(c) Situation 3	$1.60 \times 1.14 = 1.82$	$1.60 \times 1.06 = 1.70$

The above calculations suggest that the highest value is in Situation 3 financed by Financial Plan A and the lowest value is in the Situation 1 financed by Financial Plan B.

Q.4: A company had the following balance sheet as on 31st March, 2021:

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

The additional information given is under:

Fixed cost per annum (excluding interest) ₹ 6 crores

Variable operating cost ratio 60%

Total assets turnover ratio 2.5

Income-tax rate 40%

Calculate the following and comment:

(i) Earnings per share

(ii) Operating Leverage

(iii) Financial Leverage

(iv) Combined Leverage

[July 21 (10 Marks)]

ANSWER:

Total Assets = ₹ 30 crores

Total Assets Turnover Ratio = 2.5

Hence, Total Sales = $30 \times 2.5 = ₹ 75$ crores

Computation of Profit after Tax (PAT)

Particulars	(₹ in crores)
Sales	75.00
Less: Variable Operating Cost @ 60%	45.00
Contribution	30.00
Less: Fixed Cost (Other than Interest)	6.00
EBIT/ PBIT	24.00
Less: Interest on Debentures (15% x 15)	2.25
EBT/ PBT	21.75
Less: Tax @ 40%	8.70
EAT/ PAT	13.05

(i) Earnings per Share

$$\text{EPS} = \frac{\text{PAT}}{\text{Number of Equity Shares}} = \frac{13.05}{0.75} = ₹ 17.40$$

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

(ii) Operating Leverage

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

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

(iii) Financial Leverage

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

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

(iv) Combined Leverage

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

Or,

$$= \text{Operating Leverage} \times \text{Financial Leverage}$$

$$= 1.25 \times 1.103 = 1.379$$

The combined leverage studies the choice of fixed cost in cost structure and choice of debt in capital structure. It studies how sensitive the change in EPS is vis-à-vis change in sales. The leverages operating, financial and combined are used as measurement of risk.

Q.5: The following details of PQR Limited for the year ended 31st March, 2021 are given below:

Operating leverage	1.4
Combined leverage	2.8
Fixed Cost (Excluding interest)	₹ 2.10 lakhs
Sales	₹ 40.00 lakhs
10% Debentures of ₹ 100 each	₹ 25.00 lakhs
Equity Share Capital of ₹ 10 each	₹ 20.00 lakhs
Income tax rate	30 per cent

REQUIRED:

- Calculate Financial leverage
- Calculate P/V ratio and Earning per Share (EPS)
- If the company belongs to an industry, whose assets turnover is 1.6, does it have a high or low assets turnover?
- At what level of sales, the Earning before Tax (EBT) of the company will be equal to zero?

In the question, assume that 10% Debentures and Share Capital consists of total liabilities.

[MTP Oct 21 (8 Marks)]

ANSWER:

(i) Financial leverage

Combined Leverage = Operating Leverage x Financial Leverage

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

(ii) P/V Ratio and EPS

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

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

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

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

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

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

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

$$\text{Profit after tax} = \text{EBT} - \text{Tax @ 30\%}$$

$$= 2,75,000 - 82,500$$

$$= 1,92,500$$

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

(iii) Assets turnover

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

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

0.89 < 1.6, means lower than industry turnover.

(iv) EBT zero means 100% reduction in EBT. Since combined leverage is 2.8, sales have to be dropped by $100/2.8 = 35.71\%$. Hence new sales will be

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

Q.6: The Capital structure of PS Ltd. for the year ended 31st March, 2021 consisted as follows:

Particulars	Amount in ₹
Equity shares capital (face value ₹ 10 each)	10,000
10% debentures (₹ 100 each)	1,00,000

During the year 2020-21, sales decreased to 10,000 units as compared to 12,000 units in the previous year. However, the selling price stood at ₹ 12 per unit and variable cost at ₹ 8 per unit for both the years. The fixed expenses were at ₹ 20,000 p.a. and the income tax rate is 30%.

You are required to **CALCULATE** the following:

- The degree of financial leverage at 12,000 units and 10,000 units.
- The degree of operating leverage at 12,000 units and 10,000 units.
- The percentage change in EPS due to change in units sold. [MTP Nov 21 (5 Marks)]

ANSWER:

Sales in units	12,000 (₹)	10,000 (₹)
Sales value	1,44,000	1,20,000
Variable Cost	(96,000)	(80,000)
Contribution	48,000	40,000
Fixed expenses	(20,000)	(20,000)
EBIT	28,000	20,000
Debenture Interest	(10,000)	(10,000)
EBT	18,000	10,000
Tax @ 30%	(5,400)	(3,000)

Profit after tax (PAT)	12,600	7,000
(i) Financial Leverage = $\frac{EBIT}{EBT}$	$= \frac{₹ 28,000}{₹ 18,000} = 1.56$	$= \frac{₹ 20,000}{₹ 10,000} = 2$
(ii) Operating leverage = $\frac{Contribution}{EBIT}$	$= \frac{₹ 48,000}{₹ 28,000} = 1.71$	$= \frac{₹ 40,000}{₹ 20,000} = 2$
(iii) Earnings per share (EPS)	$= \frac{₹ 12,600}{₹ 1,000} = ₹ 12.6$	$= \frac{₹ 7,000}{₹ 1,000} = ₹ 7$
Decrease in EPS	$= 12.6 - ₹ 7 = ₹ 5.6$	
% decrease in EPS	$= \frac{5.6}{12.6} \times 100 = 44.44\%$	

Q.7: The following particulars relating to Navya Ltd. for the year ended 31st March 2021 is given:

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

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

Particulars	Amount (₹)
Equity share capital (1,00,000 shares of ₹ 10 each)	10,00,000
Reserves and surplus	5,00,000
7% debentures	10,00,000
Current liabilities	5,00,000
Total	30,00,000

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

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

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

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

ANSWER:**Statement showing Profitability of Alternative schemes for Financing**

(₹ in '00,000)

Particulars	Existing	Alternative Schemes		
		(i)	(ii)	(iii)
Equity Share capital (existing)	10	10	10	10
New issues	-	10	5	-
	10	20	15	10
7% debentures	10	10	10	10
6% debentures	-	-	5	10
	20	30	30	30
Debentures interest (7%)	0.7	0.7	0.7	0.7
Debenture interest (6%)	-	-	0.3	0.6
	0.7	0.7	1.0	1.3
Output (units in lakh)	1	1.5	1.5	1.5
Contribution per. unit (₹) (Selling price - Variable Cost)	20	22	22	22
Contribution (₹ lakh)	20	33	33	33
Less: Fixed cost	10	15	15	15
EBIT	10	18	18	18
Less: Interest (as calculated above)	0.7	0.7	1.0	1.3
EBT	9.3	17.3	17	16.7
Less: Tax (40%)	3.72	6.92	6.8	6.68
EAT	5.58	10.38	10.20	10.02
Operating Leverage (Contribution /EBIT)	2.00	1.83	1.83	1.83
Financial Leverage (EBIT/EBT)	1.08	1.04	1.06	1.08
Combined Leverage (Contribution/EBT)	2.15	1.91	1.94	1.98
EPS (EAT/No. of shares) (₹)	5.58	5.19	6.80	10.02
Risk	-	Lowest	Lower than option (3)	Highest

Return	-	Lowest	Lower than option (3)	Highest
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From the above figures, we can see that the Operating Leverage is same in all alternatives though Financial Leverage differs. Alternative (iii) uses the maximum amount of debt and result into the highest degree of financial leverage, followed by alternative (ii). Accordingly, risk of the company will be maximum in these options. Corresponding to this scheme, however, maximum EPS (i.e. ₹ 10.02 per share) will be also in option (iii).

So, if Navya Ltd. is ready to take a high degree of risk, then alternative (iii) is strongly recommended. In case of opting for less risk, alternative (ii) is the next best option with a reduced EPS of ₹ 6.80 per share. In case of alternative (i), EPS is even lower than the existing option, hence not recommended.

Q.8: Information of A Ltd. is given below:

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

Required :

(i) From the given data complete following statement:

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

(ii) Calculate Financial Leverage and Combined Leverage.

(iii) Calculate the percentage change in earning per share, if sale increased by 5%.

[Dec 21 (10 Marks)]

ANSWER:

(i) **Working Notes**

Earning after tax (EAT) is 5% of sales

Income tax is 50%

So, EBT is 10% of Sales

Since Interest Expenses is ₹ 30,000

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

Now Degree of operating leverage = 4

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

Or, Contribution = 4 EBIT

Or, Sales – Variable Cost = 4 EBIT

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

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

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

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

Or, 60% of Sales = ₹ 7,20,000

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

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

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

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

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

EAT = 50% of ₹ 1,20,000 = ₹ 60,000

Income Statement

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

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

Combined Leverage = Operating Leverage x Financial Leverage

= 4 x 1.25 = **5 times**

Or,

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

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

(iii) Percentage Change in Earnings per share

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

$$\therefore \% \text{ Change in EPS} = \underline{\underline{25\%}}$$

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

Q.9: From the following information extracted from the books of accounts of Imax Ltd., Calculate percentage change in earnings per share, if sales increase by 10% and Fixed Operating cost is ₹ 1,57,500.

Particulars	(₹)
EBIT (Earnings before Interest and Tax)	31,50,000
Earnings before Tax (EBT)	14,00,000

ANSWER

Operating Leverage (OL)

$$= \frac{\text{Contribution}}{\text{EBIT}} = \frac{\text{EBIT} + \text{Fixed Cost}}{\text{EBIT}} = \frac{₹ 31,50,000 + ₹ 1,57,500}{₹ 31,50,000} = 1.05$$

Financial Leverage (FL)

$$= \frac{\text{EBIT}}{\text{EBT}} = \frac{₹ 31,50,000}{₹ 14,00,000} = 2.25$$

Combined Leverage (CL)

$$= 1.05 \times 2.25 = 2.3625$$

Percentage Change in Earnings per share

$$\text{DCL} = \frac{\% \text{ change in EPS}}{\% \text{ change in Sales}} = 2.3625 = \frac{\% \text{ change in EPS}}{10\%}$$

$$\therefore \% \text{ change in EPS} = \underline{\underline{23.625\%}}$$

Hence, if sales increases by 10%, EPS will be increased by 23.625%.

Q.10: Consider the following information for Mega Ltd.:

Production level	2,500 units
Contribution per unit	₹ 150
Operating leverage	6
Combined leverage	24
Tax rate	30%

Required:

COMPUTE its earnings after tax.

ANSWER

Workings:

$$1. \text{ Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}}$$

$$= \frac{\text{₹ } 150 \times 2,500}{\text{EBIT}} = \frac{\text{₹ } 3,75,000}{\text{EBIT}} = 6$$

$$\therefore \text{EBIT} = \frac{\text{₹ } 3,75,000}{6} = \text{₹ } 62,500$$

$$2. \text{ Operating Leverage (OL)} \times \text{Financial Leverage (FL)} = \text{Combined Leverage (CL)}$$

$$6 \times \text{Financial Leverage} = 24$$

$$\therefore \text{Financial Leverage} = 4$$

$$\text{Also, Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = 4$$

$$\therefore \text{EBT} = \frac{\text{EBIT}}{4} = \frac{\text{₹ } 62,500}{4} = \text{₹ } 15,625$$

Computation of Earnings after tax

$$\text{Earnings after Tax (EAT)} = \text{EBT} (1 - t)$$

$$= \text{₹ } 15,625 (1 - 0.30) = \text{₹ } 15,625 \times 0.70$$

$$\therefore \text{Earnings after Tax (EAT)} = \text{₹ } 10,938$$

Q.11: From the following information, prepare Income Statement of Company A & 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%

ANSWER**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

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

Company B

$$\begin{aligned}\text{Financial Leverage} &= \text{EBIT} / (\text{EBIT} - \text{Interest}) \\ 3 &= \text{EBIT} / (\text{EBIT} - ₹ 2,000) \\ 3\text{EBIT} - ₹ 6000 &= \text{EBIT} \\ 2\text{EBIT} &= ₹ 6,000 \\ \text{EBIT} &= ₹ 3,000\end{aligned}$$

(ii) Company A

$$\begin{aligned}\text{Operating Leverage} &= 1 / \text{Margin of Safety} \\ &= 1 / 0.20 \\ &= 5 \\ \text{Operating Leverage} &= \text{Contribution} / \text{EBIT} \\ 5 &= \text{Contribution} / ₹ 4,000 \\ \text{Contribution} &= ₹ 20,000\end{aligned}$$

Company B

$$\begin{aligned}\text{Operating Leverage} &= 1 / \text{Margin of Safety} \\ &= 1 / 0.25 \\ &= 4 \\ \text{Operating Leverage} &= \text{Contribution} / \text{EBIT} \\ 4 &= \text{Contribution} / ₹ 3,000 \\ \text{Contribution} &= ₹ 12,000\end{aligned}$$

(iii) Company A

$$\begin{aligned}\text{Profit Volume Ratio} &= 25\% (\text{Given}) \\ \text{Profit Volume Ratio} &= \text{Contribution} / \text{Sales} \times 100 \\ 25\% &= ₹ 20,000 / \text{Sales} \\ \text{Sales} &= ₹ 20,000 / 25\% \\ \text{Sales} &= ₹ 80,000\end{aligned}$$

Company B

$$\begin{aligned}\text{Profit Volume Ratio} &= 33.33\% \\ \text{Therefore, Sales} &= ₹ 12,000 / 33.33\% \\ \text{Sales} &= ₹ 36,000\end{aligned}$$

Q.12: The capital structure of PS Ltd. at the end of the current Financial Year consisted as follows:

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

During the year, sales decreased to 1,00,000 units as compared to 1,20,000 units in the previous year. However, the selling price stood at ₹ 12 per unit and variable cost at ₹ 8 per unit for both the years. The fixed expenses were at ₹ 2,00,000 p.a. and the income tax rate is 30%.

You are required to CALCULATE the following:

- The degree of financial leverage at 1,20,000 units and 1,00,000 units.
- The degree of operating leverage at 1,20,000 units and 1,00,000 units.
- The percentage change in EPS.

ANSWER

Income Statement with required calculations

Particulars	(₹)	(₹)
Sales in units	1,20,000	1,00,000
Sales Value	14,40,000	12,00,000
Variable Cost	(9,60,000)	(8,00,000)
Contribution	4,80,000	4,00,000
Fixed Expenses	(2,00,000)	(2,00,000)
EBIT	2,80,000	2,00,000
Debenture Interest	(1,00,000)	(1,00,000)
EBT	1,80,000	1,00,000
Tax @ 30%	(54,000)	(30,000)
Profit after tax (PAT)	1,26,000	70,000
No. of shares	10,000	10,000
(i) Financial Leverage = $\frac{\text{EBIT}}{\text{EBT}}$	$\frac{\text{₹ 2,80,000}}{\text{₹ 1,80,000}}$ = 1.56	$\frac{\text{₹ 2,00,000}}{\text{₹ 1,00,000}}$ = 2
(ii) Operating Leverage = $\frac{\text{Contribution}}{\text{EBIT}}$	$\frac{\text{₹ 4,80,000}}{\text{₹ 2,80,000}}$ = 1.71	$\frac{\text{₹ 4,00,000}}{\text{₹ 2,00,000}}$ = 2
(iii) Earnings per share (EPS) = $\frac{\text{PAT}}{\text{No. of shares}}$	$\frac{\text{₹ 1,26,000}}{\text{₹ 10,000}}$ = 12.6	$\frac{\text{₹ 70,000}}{\text{₹ 10,000}}$ = 7
Decrease in EPS	$= \text{₹ 12.6} - \text{₹ 7} = \text{₹ 5.6}$ $\% \text{ decrease in EPS} = \frac{5.6}{12.6} \times 100$ $= 44.44\%$	

Q.13: The Sale revenue of TM excellence Ltd. @ ₹ 20 Per unit of output is ₹ 20 lakhs and Contribution is ₹ 10 lakhs. At the present level of output, the DOL of the company is 2.5. The company does not have any Preference Shares. The number of Equity Shares are 1 lakh. Applicable corporate Income Tax rate is 50% and the rate of

interest on Debt Capital is 16% p.a. CALCULATE the EPS (at sales revenue of ₹ 20 lakhs) and amount of Debt Capital of the company if a 25% decline in Sales will wipe out EPS.

ANSWER

(i) Calculation of Fixed Cost

$$DOL = \frac{\text{Contribution}}{\text{Contribution} - \text{Fixed Cost}} \text{ or } 2.5 = \frac{₹ 10,00,000}{EBIT} \text{ or } EBIT = ₹ 4,00,000$$

$$EBIT = \text{Contribution} - \text{Fixed Cost}$$

$$₹ 4,00,000 = ₹ 10,00,000 - \text{Fixed Cost}$$

$$\text{Fixed Cost} = ₹ 10,00,000 - ₹ 4,00,000 = ₹ 6,00,000$$

(ii) Calculation of Degree of Combined Leverage (DCL)

Question says that 25% change in sales will wipe out EPS. Here, wipe out means it will reduce EPS by 100%.

$$DCL = \frac{\text{Percentage Change in EPS}}{\text{Percentage Change in Sales}} = \frac{100\%}{25\%} = 4$$

(iii) Calculation of Degree of Financial Leverage (DFL)

$$DCL = DOL \times DFL$$

$$4 = 2.5 \times DFL$$

$$\text{So, DFL} = 1.6$$

(iv) Calculation of Interest and amount of Debt

$$DFL = \frac{EBIT}{EBIT - \text{Int}} \text{ Or, } 1.6 = \frac{₹ 4,00,000}{₹ 4,00,000 - \text{Int}} \text{ Or, Int} = ₹ 1,50,000$$

$$\text{Debt} \times \text{Interest rate} = \text{Amount of Interest}$$

$$\text{Debt} \times 16\% = ₹ 1,50,000$$

$$\text{Debt} = ₹ 9,37,500$$

(v) Calculation of Earnings per share (EPS)

$$EPS = \frac{(EBIT - \text{Int})(1 - t)}{N} = \frac{(₹ 4,00,000 - ₹ 1,50,000) 0.5}{1,00,000} = ₹ 1.25$$

Q.14: Betatronics Ltd. has the following balance sheet and income statement information:

Balance Sheet

Liabilities	(₹)	Assets	(₹)
Equity capital (₹ 10 per share)	8,00,000	Net fixed assets	10,00,000
10% Debt	6,00,000	Current Assets	9,00,000
Retained earnings	3,50,000		
Current liabilities	1,50,000		
	19,00,000		19,00,000

Income Statement for the year

Particulars	(₹)
Sales	3,40,000

Operating expenses (including ₹ 60,000 depreciation)	1,20,000
EBIT	2,20,000
Less: Interest	60,000
Earnings before tax	1,60,000
Less: Taxes	56,000
Net Earnings (EAT)	1,04,000

- a. DETERMINE the degree of operating, financial and combined leverages at the current sales level, if all operating expenses, other than depreciation, are variable costs.
- b. If total assets remain at the same level, but sales (i) increase by 20 percent and (ii) decrease by 20 percent, COMPUTE the earnings per share at the new sales level?

ANSWER

- (a) Calculation of Degree of Operating (DOL), Financial (DFL) and Combined Leverages (DCL).

$$DOL = \frac{\text{₹ } 3,40,000 - \text{₹ } 60,000}{\text{₹ } 2,20,000} = 1.27$$

$$DFL = \frac{\text{₹ } 2,20,000}{\text{₹ } 1,60,000} = 1.38$$

$$DCL = DOL \times DFL = 1.27 \times 1.38 = 1.75$$

- (b) Earnings per share at the new sales level

	(i) Increase by 20%	(ii) Decrease by 20%
	(₹)	(₹)
Sales	4,08,000	2,72,000
Less: Variable expenses	72,000	48,000
Less: Fixed cost	60,000	60,000
Earnings before interest and taxes	2,76,000	1,64,000
Less: Interest	60,000	60,000
Earnings before taxes	2,16,000	1,04,000
Less: Taxes	75,600	36,400
Earnings after taxes (EAT)	1,40,400	67,600
Number of equity shares	80,000	80,000
EPS	1.76	0.85

Working Notes:

- (i) Variable Costs = ₹ 60,000 (total cost – depreciation)
- (ii) Variable Costs at:
- (a) Sales level of ₹ 4,08,000 = ₹ 72,000 (increase by 20%)
- (b) Sales level of ₹ 2,72,000 = ₹ 48,000 (decrease by 20%)

Q.15: A company had the following Balance Sheet at the end of the current Financial Year:

Liabilities	(₹) in crores	Assets	(₹) in Crores
Equity Share Capital (50 lakh shares of ₹ 10 each)	5	Fixed Assets (Net)	12.5
Reserves and Surplus	1	Current Assets	7.5
15% Debentures	10		
Current Liabilities	4		
	20		20

The additional information given is as under:

Fixed cost per annum (excluding interest)	₹ 4 crores
Variable operating cost ratio	65%
Total assets turnover ratio	2.5
Income Tax rate	30%

Required:

CALCULATE the following and comment:

- Earnings Per Share
- Operating Leverage
- Financial Leverage
- Combined Leverage

ANSWER

Workings:

Total Assets = ₹ 20 crores

Total Assets Turnover Ratio = 2.5

Hence, Total Sales = $20 \times 2.5 = ₹ 50$ crores

Computation of Profit after Tax (PAT)

Liabilities	(₹) in crores
Sales	50.00
Less: Variable Operating Cost @ 65%	32.50
Contribution	17.50
Less: Fixed Cost (other than Interest)	4.00
EBIT	13.50
Less: Interest on Debentures (15% x ₹ 10 crores)	1.50
PBT	12.00
Less: Tax @ 30%	3.60
PAT	8.40

- Earnings per Share

$$\text{EPS} = \frac{\text{PAT}}{\text{Number of Equity Shares}} = \frac{\text{₹ 8.40 Crores}}{50,00,000} = \text{₹ 16.80}$$

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

(ii) Operating Leverage

$$\text{Operating leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{\text{₹ 17.30 Crores}}{\text{₹ 13.50 crores}} = 1.296$$

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

(iii) Financial Leverage

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{PBT}} = \frac{\text{₹ 13.50 crores}}{\text{₹ 12.00 crores}} = 1.125$$

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

(iv) Combined Leverage

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

Or,

$$= \text{Operating Leverage} \times \text{Financial Leverage}$$

$$= 1.296 \times 1.125 = 1.458$$

The combined leverage studies the choice of fixed cost in cost structure and choice of debt in capital structure. It studies how sensitive the change in EPS is vis-à-vis change in sales. The leverages, operating, financial and combined are used as measurement of risk.

Q.16: CALCULATE the operating leverage, financial leverage and combined leverage from the following data under Situation I and II and Financial Plan A and B:

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

Fixed Cost:

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

Capital Structure:

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

ANSWER**(i) Operating Leverage (OL)**

	Situation-I	Situation-II
	(₹)	(₹)
Sales (3,000 units @ ₹ 30 per unit)	90,000	90,000
Less: Variable Cost (@ ₹ 15 per 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	$= \frac{₹ 45,000}{₹ 25,000}$ = 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	29,000
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	1.5 x 1.07 = 1.61	1.5 x 1.034 = 1.55
Situation -II		
CL = FL x OL	1.8 x 1.09 = 1.96	1.8 x 1.04 = 1.872

Q.17: The following particulars relating to Navya Ltd. for the year ended 31st March is given:

Output	1,00,000 units at normal capacity
--------	-----------------------------------

Selling price per unit	₹ 40
Variable cost per unit	₹ 20
Fixed cost	₹ 10,00,000

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

Liabilities	(₹)
Equity share capital (1,00,000 shares of ₹ 10 each)	10,00,000
Reserves and surplus	5,00,000
7% debentures	10,00,000
Current liabilities	5,00,000
Total	30,00,000

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

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

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

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

ANSWER

Statement showing Profitability of Alternative Schemes for Financing

(₹ in '00,000)

Particulars	Existing	Alternative Schemes		
		(i)	(ii)	(iii)
Equity Share capital (existing)	10	10	10	10
New issues	--	10	5	-
	10	20	15	10
7% debentures	10	10	10	10
6% debentures	--	--	5	10
	20	30	30	30
Debenture interest (7%)	0.7	0.7	0.7	0.7
Debenture interest (6%)	--	--	0.3	0.6
	0.7	0.7	1.0	1.3
Output (units in lakh)	1	1.5	1.5	1.5
Contribution per. Unit (₹) (Selling price - Variable Cost)	20	22	22	22

Contribution (₹ lakh)	20	33	33	33
Less: Fixed cost	10	15	15	15
EBIT	10	18	18	18
Less: Interest (as calculated above)	9.3	17.3	17	16.7
Less: Tax (40%)	3.72	6.92	6.8	6.68
EAT	5.58	10.38	10.20	10.02
Operating Leverage (Contribution / EBIT)	2.00	1.83	1.83	1.83
Financial Leverage (EBIT/EBT)	1.08	1.04	1.06	1.08
Combined Leverage (Contribution/EBT)	2.15	1.91	1.94	1.98
EPS (EAT/No. of shares (₹))	5.58	5.19	6.80	10.02
Risk	--	Lowest	Lower than option (3)	Highest
Return	--	Lowest	Lower than option (3)	Highest

From the above figures, we can see that the Operating Leverage is same in all alternatives though Financial Leverage differs. Alternative (iii) uses the maximum amount of debt and result into the highest degree of financial leverage, followed by alternative (ii). Accordingly, risk of the company will be maximum in these options. Corresponding to this scheme, however, maximum EPS (i.e., ₹ 10.02 per share) will be also in option (iii).

So, if Navya Ltd. is ready to take a high degree of risk, then alternative (iii) is strongly recommended. In case of opting for less risk, alternative (ii) is the next best option with a reduced EPS of ₹ 6.80 per share. In case of alternative (i), EPS is even lower than the existing option, hence not recommended.

Q.18: The following details of a company for the year ended 31st March are given below:

Operating leverage	2:1
Combined leverage	2.5:1
Fixed Cost excluding interest	₹ 3.4 lakhs
Sales	₹ 50 lakhs
8% Debentures of ₹ 100 each	₹ 30.25 lakhs
Equity Share Capital of ₹ 10 each	34 lakhs
Income Tax Rate	30%

CALCULATE:

- Financial Leverage
- P/V ratio and Earning per Share (EPS)
- If the company belongs to an industry, whose assets turnover is 1.5, does it have a high or low assets turnover?
- At what level of sales, the Earning before Tax (EBT) of the company will be equal to zero?

ANSWER

$$\begin{aligned}\text{(i) Financial Leverage} &= \text{Operating Leverage (OL)} \times \text{Financial Leverage (FL)} \\ 2.5 &= 2 \times \text{FL} \\ \text{Or, FL} &= 1.25 \\ \text{Financial Leverage} &= 1.25\end{aligned}$$

(ii) P/V Ratio and Earning per share (EPS)

$$\text{Operating Leverage} = \frac{\text{Contribution (C)}}{\text{Contribution} - \text{Fixed Cost (FC)}}$$

$$2 = \frac{C}{C - 3,40,000}$$

$$\text{Or, C} = 2(C - 3,40,000)$$

$$\text{Or, C} = 2C - 6,80,000$$

$$\text{Or, Contribution} = ₹ 6,80,000$$

$$\begin{aligned}\text{Now, P/V ratio} &= \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \\ &= \frac{6,80,000}{50,80,000} \times 100 = 13.6\%\end{aligned}$$

Therefore, P/V Ratio = 13.6%

$$\begin{aligned}\text{EBT} &= \text{Sales} - \text{Variable Cost} - \text{Fixed Cost} - \text{Interest} \\ &= ₹ 50,00,000 - ₹ 50,00,000 (1 - 0.136) - ₹ 3,40,000 - (8\% \times ₹ 30,25,000) \\ &= ₹ 50,00,000 - ₹ 43,20,000 - ₹ 3,40,000 - ₹ 2,42,000 \\ &= ₹ 98,000\end{aligned}$$

$$\text{PAT} = \text{EBT}(1 - T) = ₹ 98,000(1 - 0.3) = ₹ 68,600$$

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

$$\text{EPS} = \frac{₹ 68,600}{3,40,000 \text{ shares}} = ₹ 0.202$$

(iii) Assets turnover

$$\begin{aligned}\text{Assets turnover} &= \frac{\text{Sales}}{\text{total Assets}^*} \\ &= \frac{₹ 50,00,000}{₹ 34,00,000 + ₹ 30,25,000} = 0.78\end{aligned}$$

0.78 < 1.5 means lower than industry turnover.

*Total Asset = Equity share capital + 8% Debentures

(iv) EBT zero means 100% reduction in EBT. Since combined leverage is 2.5, sales have to be dropped by $100/2.5 = 40\%$. Hence new sales will be $₹ 50,00,000 \times (100 - 40)\% = ₹ 30,00,000$.

Therefore, at ₹ 30,00,000 level of sales, the Earnings before Tax (EBT) of the company will be zero.

Alternatively

$$\begin{aligned}\text{Required sales when EBT is zero} &= \frac{\text{Fixed Cost} + \text{Interest} + \text{desired Profit}}{\text{P/V Ratio}} \\ &= \frac{₹ 3,40,000 + ₹ 2,42,000 + \text{zero}}{13.60\%}\end{aligned}$$

$$= \frac{₹ 5,82,000}{13.60\%}$$

$$= ₹ 42,79,412$$

[Note: The question can also be solved by first calculating EBIT with the help of Financial leverage. Accordingly, Answer to the requirement (ii) and (iv) will also vary.

Q.19: You are given the following information of 5 firms of the same industry:

Name of the Firm	Change in Revenue	Change in Operating Income	Change in Earning per share
M	28%	26%	32%
N	27%	34%	26%
P	25%	38%	23%
Q	23%	43%	27%
R	25%	40%	28%

You are required to CALCULATE for all firms:

- (i) Degree of operating leverage and
- (ii) Degree of combined leverage.

ANSWER

Calculation of Degree of Operating leverage and Degree of Combined leverage

Firm	Degree of Operating Leverage (DOL) $= \frac{\% \text{ change in Operating Income}}{\% \text{ change in Revenue}}$	Degree of Combined leverage (DCL) $= \frac{\% \text{ change in EPS}}{\% \text{ change in Revenue}}$
M	$\frac{26\%}{28\%} = 0.929$	$\frac{32\%}{28\%} = 1.143$
N	$\frac{34\%}{27\%} = 1.259$	$\frac{26\%}{27\%} = 0.963$
P	$\frac{38\%}{27\%} = 1.520$	$\frac{23\%}{25\%} = 0.920$
Q	$\frac{43\%}{23\%} = 1.870$	$\frac{27\%}{23\%} = 1.174$
R	$\frac{40\%}{25\%} = 1.60$	$\frac{28\%}{25\%} = 1.120$

Q.20: The following data have been extracted from the books of LM Ltd:

Sales - ₹ 100 lakhs

Interest Payable per annum - ₹ 10 lakhs

Operating leverage - 1.2

Combined leverage - 2.16

You are required to calculate:

- (i) The financial leverage,

(ii) Fixed cost and

(iii) P/V ratio

ANSWER

(i) Calculation of Financial Leverage:

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

$$2.16 = 1.2 \times FL$$

$$FL = 1.8$$

(ii) Calculation of Fixed cost:

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

$$1.8 = \frac{\text{EBIT}}{\text{EBT i.e.} - 10,00,000}$$

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

$$1.8 \text{ EBIT} - 18,00,000 = \text{EBIT}$$

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

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

$$1.2 = \frac{\text{Contribution}}{\text{EBIT}}$$

$$\text{Contribution} = ₹ 27,00,000$$

$$\text{Fixed Cost} = \text{Contribution} - \text{EBIT}$$

$$= ₹ 27,00,000 - ₹ 22,50,000$$

$$\text{Fixed cost} = ₹ 4,50,000$$

(iii) Calculation of P/V ratio:

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

CAPITAL STRUCTURE

Q.1: In respect of two companies having same business risk, following information is given:

Capital employed = ₹ 4,00,000; EBIT = ₹ 60,000; $K_e = 12\%$

Sources	Levered Company (₹)	Unlevered Company (₹)
Debt (@ 10%)	1,50,000	Nil
Equity	1,50,000	3,00,000

Investor is holding 20% shares in levered company. Calculate increase in annual earnings of investor if he switches his holding from Levered to Unlevered Company.

[MTP Oct 21 (5 Marks)]

ANSWER:

1. Valuation of firms

Particulars	Levered Firm (₹)	Unlevered Firm (₹)
EBIT	60,000	60,000
Less: Interest (1,50,000 × 10%)	15,000	Nil
Earnings available to Equity Shareholder/ K_e	45,000	60,000
	12%	12%
Value of Equity	3,75,000	5,00,000
Debt	1,50,000	Nil
Value of Firm	5,25,000	5,00,000

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

2. Investment & Borrowings

Sell shares in Levered company (3,75,000 × 20%)	75,000
Borrow money (1,50,000 × 20%)	<u>30,000</u>
Buy shares in Unlevered company	1,05,000

3. Change in Return

Income from shares in Unlevered company	
(1,05,000 × 12%)	12,600
Less: interest on loan (30,000 × 10%)	<u>3,000</u>
Net Income from unlevered firm	9,600
Income from Levered firm (75000 × 12%)	<u>9,000</u>

Q.2: M Ltd. belongs to a risk class for which the capitalization rate is 12%. It has 40,000 outstanding shares and the current market price is ₹ 200. It expects a net profit of ₹ 5,00,000 for the year and the Board is considering dividend of ₹ 10 per share.

M Ltd. requires to raise ₹ 10,00,000 for an approved investment expenditure. ILLUSTRATE, how the MM approach affects the value of M Ltd. if dividends are paid or not paid.

[MTP Oct 21 (5 Marks)]

ANSWER:

Given,

Cost of Equity (Ke)	12%
Number of shares in the beginning (n)	40,000
Current Market Price (P ₀)	₹ 200
Net Profit (E)	₹ 5,00,000
Expected Dividend (D ₁)	₹ 10 per share
Investment (I)	₹ 10,00,000

Situation 1 – When dividends are paid

- (i) $P_0 = \frac{P_1 + D_1}{1 + K_e}$
 $200 = \frac{P_1 + 10}{1 + 0.12}$
 $P_1 + 10 = 200 \times 1.12$
 $P_1 = 224 - 10 = 214$
- (ii) Calculation of funds required
 = Total Investment – (Net profit – Dividend)
 = 10,00,000 – (5,00,000 – 4,00,000)
 = 9,00,000
- (iii) Calculation of shares required to be issued for balance fund
 No. of shares = $\frac{\text{Funds Required}}{\text{Price at end (P}_1\text{)}}$
 $\Delta n = \frac{9,00,000}{214} = 4205.61$
- (iv) Calculation of value of firm
 $V_f = \frac{(n + \Delta n) P_1 - I + E}{1 + K_e}$
 $= \frac{(40,000 + \frac{9,00,000}{214}) 214 - 10,00,000 + 5,00,000}{1 + 0.12}$

Situation 2 – When dividends are not paid

- (i) $P_0 = \frac{P_1 + D_1}{1 + K_e}$
 $200 = \frac{P_1 + 0}{1 + 0.12}$
 $P_1 + 0 = 200 \times 1.12$
 $P_1 = 224 - 0 = 224$
- (ii) Calculation of funds required
 = Total Investment – (Net profit – Dividend)
 = 10,00,000 – (5,00,000 – 0)
 = 5,00,000
- (iii) No. of shares required to be issued for balance fund
 No. of shares = $\frac{\text{Funds Required}}{\text{Price at end (P}_1\text{)}}$
 $\Delta n = \frac{5,00,000}{224} = 2232.14$
- (iv) Calculation of value of firm
 $V_f = \frac{(n + \Delta n) P_1 - I + E}{1 + K_e}$
 $= \frac{(40,000 + \frac{5,00,000}{224}) 224 - 10,00,000 + 5,00,000}{1 + 0.12}$

$$= \frac{94,60,000 - 5,00,000}{1.12} = 80,00,000$$

$$= \frac{94,60,000 + 5,00,000}{1.12} = 80,00,000$$

Q.3: Sophisticated Limited is considering three financing plans. The key information is as follows:

(a) Total investment amount to be raised ₹ 4,00,000

(b) Plans of Financing Proportion:

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

(c) Cost of debt 10%

Cost of preference shares 10%

(d) Tax rate 30%

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

(f) Expected EBIT is ₹ 10,00,000.

You are required to DETERMINE for each plan: -

(i) Earnings per share (EPS)

(ii) The financial break-even point.

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

[MTP Oct 21 (10 Marks)]

ANSWER:

(i) Computation of Earnings per share (EPS)

Plans	A	B	C
Earnings before interest and tax (EBIT)	10,00,000	10,00,000	10,00,000
Less: Interest charges	---	(20,000) (10% x ₹ 2 lakhs)	---
Earnings before tax (EBT)	10,00,000	9,80,000	10,00,000
Less: Tax (@ 30%)	(3,00,000)	(2,94,000)	(3,00,000)
Earnings after tax (EAT)	7,00,000	6,86,000	7,00,000
Less: Preference Dividend	---	---	(20,000) (10% x ₹ 2 lakh)

Earnings available for Equity shareholders (A)	7,00,000	6,86,000	6,80,000
No. of Equity shares (B)	20,000 (₹ 4 lakh ÷ ₹20)	10,000 (₹ 2 lakh ÷ ₹20)	10,000 (₹ 2 lakh ÷ ₹20)
EPS ₹ [(A) ÷ (B)]	35	68.6	68

(ii) Calculation of Financial Break-even point

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

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

Plan B: Under this plan, there is an interest payment of ₹ 20,000 and no preference dividend. Hence, the Financial Break-even point will be ₹ 20,000 (Interest charges).

Plant C: Under this plan, there is no interest payment but an after tax preference dividend of ₹ 20,000 is paid. Hence, the Financial Break-even point will be before tax earnings of ₹ 28,571 (i.e. ₹ 20,000 ÷ 0.7)

(iii) Computation of indifference point between the plans.

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

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

Where,

EBIT = Earnings before interest and tax.

I_1 = Fixed charges (interest or pref. dividend) under Alternative 1

I_2 = Fixed charges (interest or pref. dividend) under Alternative 2

T = Tax rate

E_1 = No. of equity shares in Alternative 1

E_2 = No. of equity shares in Alternative 2

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

(a) Indifference point where EBIT of Plan A and Plan B is equal.

$$\frac{(EBIT - 0)(1 - 0.3)}{20000} = \frac{(EBIT - 20,000)(1 - 0.3)}{10,000}$$

$$0.7 \text{ EBIT (10,000)} = (0.7 \text{ EBIT} - 14,000) (20,000)$$

$$7,000 \text{ EBIT} = 14,000 \text{ EBIT} - 28 \text{ crores}$$

$$\text{EBIT} = 40,000$$

(b) Indifference point where EBIT of Plan A and Plan C is equal

$$\frac{(EBIT - 0)(1 - 0.3)}{20000} = \frac{(EBIT - 0)(1 - 0.3) - 20,000}{10,000}$$

$$0.7 \text{ EBIT (10,000)} = (0.7 \text{ EBIT} - 20,000) (20,000)$$

$$7,000 \text{ EBIT} = 14,000 \text{ EBIT} - 40 \text{ crores}$$

$$\text{EBIT} = 57,142.86$$

(c) Indifference point where EBIT of Plan A and Plan C is equal.

$$\frac{(\text{EBIT} - 20,000)(1 - 0.3)}{10,000} = \frac{(\text{EBIT} - 0)(1 - 0.3) - 20,000}{10,000}$$

$$(0.7 \text{ EBIT} - 14,000) (10,000) = (0.7 \text{ EBIT} - 20,000) (10,000)$$

$$7,000 \text{ EBIT} - 14 \text{ crore} = 7,000 \text{ EBIT} - 20 \text{ crore}$$

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

Q.4: ABC Limited is setting up a project with a capital outlay of ₹ 90,00,000. It has two alternatives in financing the project cost.

Alternative-I: 100% equity finance by issuing equity shares of ₹ 10 each

Alternative-II: Debt-equity ratio 2:1 (issuing equity shares of ₹ 10 each)

The rate of interest payable on the debts is 18% p.a. The corporate tax rate is 30%. **CALCULATE** the indifference point between the two alternative methods of financing.

[MTP Nov 21 (5 Marks)]

ANSWER:

Calculation of Indifference point between the two alternatives of financing.

Alternative-I By issue of 9,00,000 equity shares of ₹ 10 each amounting to ₹ 90 lakhs. No financial charges are involved.

Alternative-II By raising the funds in the following way:

Debt = ₹ 60 lakhs

Equity = ₹ 30 lakhs (3,00,000 equity shares of ₹ 10 each)

$$\text{Interest payable on debt} = 60,00,000 \times \frac{18}{100} = ₹ 10,80,000$$

The difference point between the two alternatives is calculated by:

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

$$\frac{(\text{EBIT} - 0)(1 - 0.30)}{9,00,000} = \frac{(\text{EBIT} - 10,80,000)(1 - 0.30)}{3,00,000}$$

$$\frac{(\text{EBIT})(0.70)}{9,00,000} = \frac{(\text{EBIT} - 10,80,000)(0.70)}{3,00,000}$$

$$\frac{\text{EBIT}(0.70)}{3} = \frac{0.70(\text{EBIT} - 10,80,000)}{1}$$

$$\text{EBIT} = 3\text{EBIT} - 32,40,000$$

$$-2 \text{ EBIT} = - 32,40,000$$

$$\text{EBIT} = \frac{32,40,000}{2}$$

$$\text{EBIT} = ₹ 16,20,000$$

Therefore, at EBIT of ₹ 16,20,000, earnings per share for the two alternatives is equal.

Q.5: 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

[RTP Nov 21]

ANSWER:

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

	All Equity (₹ in lakhs)	Equity & Debt (₹ in lakhs)
EBIT (as calculated above)	500	500
Interest on ₹ 275 lakhs @ 15%	-	<u>41.25</u>
EBT	-	<u>458.75</u>
Tax @ 30%	500	137.63
Income available to equity holders	<u>150</u>	321.12
	350	

(i) Market value of the company

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

$$\begin{aligned} \text{Change in market value of the company} &= ₹ 1,832.5 \text{ lakhs} - ₹ 1,750 \text{ lakhs} \\ &= ₹ 82.50 \text{ lakhs} \end{aligned}$$

The impact is that the market value of the company has increased by ₹ 82.50 lakhs due to replacement of equity with debt.

(ii) Overall Cost of Capital

Market Value of Equity = Market value of levered firm - Equity repurchased

$$= ₹ 1,832.50 \text{ lakhs} - ₹ 275 \text{ lakhs} = ₹ 1,557.50 \text{ lakhs}$$

Cost of Equity (K_e) = (Net Income to equity holders / Market value of equity) \times 100

$$= (₹ 321.12 \text{ lakhs} / ₹ 1,557.50 \text{ lakhs}) \times 100 = 20.62\%$$

Cost of debt (K_d) = $1 (1 - t) = 15 (1 - 0.3) = 10.50\%$

Components	Amount (₹ in lakhs)	Cost of Capital %	Weight	WACC (K_0) %
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

The impact is that the Overall Cost of Capital or K_0 has fallen by 0.89% (20% - 19.11%) due to the benefit of tax relief on debt interest payment.

(iii) Cost of Equity

The impact is that cost of equity has risen by 0.62% (20.62% - 10%) 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.

$$\text{Cost of Capital } (K_0) = K_{eu} [1 - (t \times L)]$$

Where,

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

t = Tax rate

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

$$\text{So, } K_0 = 0.20 \left[1 - \left(0.3 \times \frac{₹ 275 \text{ lakhs}}{₹ 1,832.5 \text{ lakhs}} \right) \right] = 0.191 \text{ or } 19.10\% \text{ (approx.)}$$

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

Where,

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

K_d = Cost of debt

t = Tax rate

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

Q.6: 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 ₹ 1,02,000 on 12% Debentures. The company proposes to take up an expansion scheme for which it needs additional funds 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 earnings 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 source of finance should be preferred. [Dec 21 (10 Marks)]

ANSWER:

Working Notes:

(1) Capital employed before expansion plan:

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

(2) Earnings before interest and tax (EBIT) = 4,50,00

(3) Return on Capital Employed (ROCE):

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

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

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

Desired EBIT = 15% × ₹ 36,00,000 = ₹ 5,40,000

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

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

			(₹ 6,00,000 × 12%)	
Earnings before Tax (EBT)	3,30,000	3,48,000	4,20,000	
Less: Tax (40% of EBT)	1,32,000	1,39,200	1,68,000	
PAT/EAT	1,98,000	2,08,800	2,52,000	
No. of shares outstanding	80,000	80,000	1,40,000	
Earnings per Share (EPS)	2.475	2.610	1.800	
	$\left(\frac{₹ 1,98,000}{80,000}\right)$	$\left(\frac{₹ 2,08,800}{80,000}\right)$	$\left(\frac{₹ 2,52,000}{1,40,000}\right)$	

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

Q.7: 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.

[RTP May 22]

ANSWER:

- Assuming no tax as per MM Approach.

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

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

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

K_e of Unlevered Firm (given) = 0.18

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

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

Total Value of Levered Firm (V_l) = $V_u + (\text{Debt} \times \text{Nil})$
 $= ₹ 50,00,000 + (27,00,000 \times \text{nil})$
 $= ₹ 50,00,000$

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

Particulars	Bee Ltd.
-------------	----------

Net Operating Income (NOI)	9,00,000
Less: Interest on Debt (I)	3,24,000
Earnings of Equity Shareholders (NI)	5,76,000
Overall Capitalization Rate (k_0)	0.18
Total Value of Firm ($V = \text{NOI}/K_0$)	50,00,000
Less: Market Value of Debt	27,00,000
Market value of Equity (S)	23,00,000
Equity Capitalization Rate [$k_e = \text{NI}/S$]	0.2504
Weighted Average Cost of Capital (K_0)*	0.18
$K_0 = (k_e \times S/V) + (K_d \times D/V)$	

***Computation of WACC Bee Ltd.**

Component of Capital	Amount	Weight	Cost of Capital	WACC
Equity	23,00,000	0.46	0.2504	0.1152
Debt	27,00,000	0.54	0.12*	0.0648
Total	50,00,000			0.18

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

WACC = 18%

(b) Assuming 40% taxes as per MM Approach

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

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

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

K_e of unlevered Firm (given) = 0.18

K_0 of unlevered Firm (Same as above = k_e as there is no debt) = 0.18

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

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

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

= 18% (i.e. $K_e = K_0$)

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

Particulars	Bee Ltd.
-------------	----------

Net Operating Income (NOI)	9,00,000
Less: Interest on Debt (I)	3,24,000
Earnings Before Tax (EBT)	5,76,000
Less: Tax @ 40%	2,30,400
Earnings for equity shareholders (NI)	3,45,600
Total Value of Firm (V) as calculated above	48,80,000
Less: Market Value of Debt	27,00,000
Market Value of Equity (S)	13,80,000
Equity Capitalization Rate [$k_e = NI/S$]	0.2504
Weighted Average Cost of Capital (k_0)*	13.23
$K_0 = (k_e \times S/V) + (k_d \times D/V)$	

***Computation of WACC Bee Ltd.**

Component of Capital	Amount	Weight	Cost of Capital	WACC
Equity	13,80,000	0.338	0.2504	0.0846
Debt	27,00,000	0.662	0.072*	0.0477
Total	40,80,000			0.1323

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

$WACC = 13.23\%$

Q.8: 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 at 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 ₹)	5,000	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. [Nov 2022 (4 Marks)]

ANSWER:

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

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

$$\therefore K_O = K_{eu} (1 - t) = 9.09 (1 - 0) = 9.09$$

Particulars	A	B
EBIT (NOI) (₹)	5000	5000
K_O (%)	9.09	9.09
Equilibrium value (₹) $(NOI/K_O) \times 100$	55005.5	55005.5

$$\frac{5,000}{9.09} \times 100 \quad \frac{5,000}{9.09} \times 100$$

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

Particulars	A	B
Equilibrium value (₹)	55,005.5	55,005.5
Less: Value of Debt	--	30,000
Value of Equity	55,005.5	25,005.5

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) = $K_O + (K_O - K_d) \times (\text{Debt} / \text{Equity})$
 $= 9.09 + (9.09 - 6) \times (30000/25005.5)$
 $= 9.09 + 3.09 \times 1.2 = 9.09 + 3.71 = 12.80\%$

(OR)

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

Q.9: Aaina Ltd. is considering a new project which requires a capital investment of ₹ 9 crores. Interest on term loan is 12% and Corporate Tax rate is 30%. CALCULATE the point of indifference for the project considering the Debt Equity ratio insisted by the financing agencies being 2 : 1.

ANSWER

The capital investment can be financed in two ways i.e.

By issuing equity shares only worth ₹ 9 crore or

By raising capital through taking a term loan of ₹ 6 crores and ₹ 3 crores through issuing equity shares (as the company has to comply with the 2 : 1 Debt Equity ratio insisted by financing agencies).

In first option interest will be Zero and in second option the interest will be ₹ 72,00,000

Point of Indifference between the above two alternatives =

$$\frac{\text{EBIT} \times (1-t)}{\text{No. of equity shares } (N_1)} = \frac{(\text{EBIT} - \text{Interest}) \times (1-t)}{\text{No. of equity shares } (N_2)}$$

$$\text{Or, } \frac{\text{EBIT} \times (1 - 0.30)}{90,00,000 \text{ shares}} = \frac{(\text{EBIT} - ₹ 72,00,000) \times (1 - 0.30)}{30,00,000 \text{ shares}}$$

$$\text{Or, } 0.7 \text{ EBIT} = 2.1 \text{ EBIT} - ₹ 1,51,20,000$$

$$\text{EBIT} = ₹ 1,08,00,000$$

EBIT at point of Indifference will be ₹ 1.08 crore.

(The face Value of the equity shares is assumed as ₹ 10 per share. However, indifference point will be same irrespective of face value per share.)

Q.10: Xylo Ltd. is considering two alternative financing plans as follows:

Particulars	Plan - A (₹)	Plan - B (₹)
Equity shares of ₹ 10 each	8,00,000	8,00,000
Preference Shares of ₹ 100 each	--	4,00,000
12% Debentures	4,00,000	--
	12,00,000	12,00,000

The indifference point between the plans is ₹ 4,80,000. Corporate tax rate is 30% CALCULATE the rate of dividend on preference shares.

ANSWER

Computation of Rate of Preference Dividend

$$\begin{aligned} \frac{(\text{EBIT} - \text{Interest}) (1-t)}{\text{No. of equity shares (N}_1\text{)}} &= \frac{\text{EBIT} (1-t) - \text{Preference Dividend}}{\text{No. of equity shares (N}_2\text{)}} \\ \frac{₹ 4,80,000 - ₹ 48,000) \times (1 - 0.30)}{80,00,000 \text{ shares}} &= \frac{₹ 4,80,000 (1 - 0.30) - \text{Preference Dividend}}{80,00,000 \text{ shares}} \\ \frac{₹ 3,02,400}{80,00,000 \text{ shares}} &= \frac{₹ 3,36,000 - \text{Preference Dividend}}{80,00,000 \text{ shares}} \\ ₹ 3,02,400 &= ₹ 3,36,000 - \text{Preference Dividend} \\ \text{Preference Dividend} &= ₹ 3,36,000 - ₹ 3,02,400 = ₹ 33,600 \\ \text{Rate of Dividend} &= \frac{\text{Preference Dividend}}{\text{Preference shares capital}} \times 100 \\ &= \frac{₹ 33,600}{4,00,000} \times 100 = 8.4\% \end{aligned}$$

Q.11: Ganesha Limited is setting up a project with a capital outlay of ₹ 60,00,000. It has two alternatives in financing the project cost.

Alternative-I: 100% equity finance by issuing equity shares of ₹ 10 each

Alternative-II: Debt-equity ratio 2:1 (issuing equity shares of ₹ 10 each)

The rate of interest payable on the debts is 18% p.a. The corporate tax rate is 40%. CALCULATE the indifference point between the two alternative methods of financing.

ANSWER

Calculation of Indifference point between the two alternatives of financing

Alternative - I By issue of 6,00,000 equity shares of ₹ 10 each amounting to ₹ 50 lakhs. No financial charges are involved.

Alternative - II By raising the funds in the following way:

Debt = ₹ 40 lakhs

Equity = ₹ 20 lakhs (2,00,000 equity shares of ₹ 10 each)

Interest payable on debt = $40,00,000 \times \frac{18}{100} = ₹ 7,20,000$

The difference point between the two alternatives is calculated by:

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

Where,

EBIT = Earnings before interest and taxes

I_1 = Interest charges in Alternative-I

I_2 = Interest charges in Alternative-II

T = Tax rate

E_1 = Equity shares in Alternative-I

E_2 = Equity shares in Alternative-II

Putting the values, the break-even point would be as follows:

$$\frac{(EBIT - 0)(1 - 0.40)}{6,00,000} = \frac{(EBIT - 7,20,000)(1 - 0.40)}{2,00,000}$$

$$\frac{(EBIT)(0.60)}{6,00,000} = \frac{(EBIT - 7,20,000)(0.60)}{2,00,000}$$

$$\frac{(EBIT)(0.60)}{3} = \frac{0.60 (EBIT - 7,20,000)}{1}$$

$$EBIT = 3 EBIT - 21,60,000$$

$$- 2 EBIT = - 21,60,000$$

$$EBIT = \frac{21,60,000}{2}$$

$$EBIT = ₹ 10,80,000$$

Therefore, at EBIT of ₹ 10,80,000 earnings per share for the two alternatives is equal.

Q.12: Ganapati Limited is considering three financing plans. The key information is as follows:

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

(b) Plans of Financing Proportion:

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

- (c) Cost of debt 8%
- Cost of preference shares 8%
- (d) Tax rate 50%
- (e) Equity shares of the face value of ₹ 10 each will be issued at a premium of ₹ 10 per share.
- (f) Expected EBIT is ₹ 80,000.

You are required to DETERMINE for each plan:

- (i) Earnings per share (EPS)
- (ii) The financial break-even point
- (iii) Indicate if any of the plans dominate and compute the EBIT range among the plans for indifference.

ANSWER

- (i) Computation of Earnings per share (EPS)

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

- (ii) Calculation of Financial Break-even point

Financial break-even point = Interest + Preference Dividend / (1 - t)

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

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

Plan C: Under this plan there is no interest payment but an after tax preference dividend of ₹ 8,000 is paid. Hence, the Financial Break- even point will be before tax earnings of ₹ 16,000 (i.e. ₹ 8,000 ÷ (1 - 0.5) = ₹ 16,000)

- (iii) Computation of indifference point between the plans

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

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

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

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

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

$$0.5 \text{ EBIT} = \text{EBIT} - 8,000$$

$$0.5 \text{ EBIT} = 8,000$$

$$\text{EBIT} = ₹ 16,000$$

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

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

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

$$0.25 \text{ EBIT} = 0.5 \text{ EBIT} - 8,000$$

$$0.25 \text{ EBIT} = 8,000$$

$$\text{EBIT} = ₹ 32,000$$

III. Indifference point where EBIT of Plan B and Plan C are equal.

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

$$0.5 \text{ EBIT} - 4,000 = 0.5 \text{ EBIT} - ₹ 8,000$$

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

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

Q.13: Yoyo Limited presently has ₹ 36,00,000 in debt outstanding bearing an interest rate of 10 per cent. It wishes to finance a ₹ 40,00,000 expansion programme and is considering three alternatives: additional debt at 12 per cent interest, preference shares with an 11 per cent dividend, and the issue of equity shares at ₹ 16 per share. The company presently has 8,00,000 shares outstanding and is in a 40 per cent tax bracket.

- (a) If earnings before interest and taxes are presently ₹ 15,00,000, DETERMINE earnings per share for the three alternatives, assuming no immediate increase in profitability.
- (b) ANALYSE which alternative do you prefer. COMPUTE how much would EBIT need to increase before the next alternative would be best.

ANSWER

(a)

Particulars	Alternatives		
	Alternative - I: Take additional Debt	Alternative - II: Issue 11% Preference Shares	Alternative - III: Issue further Equity Shares
	₹	₹	₹
EBIT	15,00,000	15,00,000	15,00,000

Interest on Debts:			
– On existing debt @ 10%	(3,60,000)	(3,60,000)	(3,60,000)
– On new debt @ 12%	(4,80,000)	---	---
Profit before taxes	6,60,000	11,40,000	11,40,000
Taxes @ 40%	(2,64,000)	(4,56,000)	(4,56,000)
Profit after taxes	3,96,000	6,84,000	6,84,000
Preference shares dividend	---	(4,40,000)	---
Earnings available to equity Shareholders	3,96,000	2,44,000	6,84,000
Number of shares	8,00,000	8,00,000	10,50,000
Earnings per share	0.495	0.305	0.651

- (b) For the present EBIT level, equity shares are clearly preferable. EBIT would need to increase by ₹ 2,376 – ₹ 1,500 = ₹ 876 before an indifference point with debt is reached. One would want to be comfortably above this indifference point before a strong case for debt should be made. The lower the probability that actual EBIT will fall below the indifference point, the stronger the case that can be made for debt, all other things remain the same.

Working Note:

Calculation of indifference point between debt and equity shares (in thousands) -

$$\frac{\text{EBIT} - ₹ 840}{800} = \frac{\text{EBIT} - ₹ 360}{1,050}$$

$$\text{EBIT} (1,050) - ₹ 84 (1,050) = \text{EBIT} (800) - ₹ 360 (800)$$

$$250 \text{ EBIT} = ₹ 5,94,000$$

$$\text{EBIT} = ₹ 2,376$$

Q.14: Alpha Limited required funds amounting to ₹ 80 lakh for its new project. To raise the funds, the company has following two alternatives:

- 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
- 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.

ANSWER

- Amount = ₹ 80,00,000

$$\text{Plan I} = \text{Equity of ₹ 60,00,000} + \text{Debt of ₹ 20,00,000}$$

$$\text{Plan II} = \text{Equity of ₹ 40,00,000} + 12\% \text{ Debenture of ₹ 40,00,000}$$

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.15: One-third of the total market value of Sanghmani Limited consists of loan stock, which has a cost of 10 per cent. Another company, Samsui Limited, is identical in every respect to Sanghmani Limited, except that its capital structure is all-equity, and its cost of equity is 16 per cent. According to Modigliani and Miller, if we ignored taxation and tax relief on debt capital, COMPUTE the cost of equity of Sanghmani Limited?

ANSWER

Here we are assuming that MM Approach 1958: Without tax, where capital structure has no relevance with the value of company and accordingly overall cost of capital of both levered as well as unlevered company is same.

Therefore, the two companies should have similar WACCs. Because Samsui Limited is all-equity financed, its WACC is the same as its cost of equity finance, i.e. 16 per cent. It follows that Sanghmani Limited should have WACC equal to 16 per cent also.

Therefore, Cost of equity in Sanghmani Ltd. (levered company) will be calculated as follows:

$$K_o = \frac{2}{3} \times K_e + \frac{1}{3} \times K_d = 16\% \text{ (i.e. equal to WACC of Samsui Ltd.)}$$

$$\text{Or, } 16\% = \frac{2}{3} \times K_e + \frac{1}{3} \times 10\% \quad \text{Or, } K_e = 19$$

Q.16: The following data relates 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.

ANSWER

- 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)]

$$\text{Total Value of Unlevered Firm (Vu)} = [\text{NOI}/K_e] = 18,00,000/0.18 = ₹ 1,00,00,000$$

$$K_e \text{ of Unlevered Firm (given)} = 0.18$$

$$K_o \text{ of Unlevered Firm (Same as above} = K_e \text{ as there is no debt)} = 0.18$$

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

$$\text{Total Value of Levered Firm (VL)} = Vu + (\text{Debt} \times \text{Nil})$$

$$= ₹ 1,00,00,000 + (54,00,000 \times \text{nil})$$

= ₹1,00,00,000

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

	Particulars	A Ltd.	B Ltd.
A	Net Operating Income (NOI)	₹ 18,00,000	₹ 18,00,000
B	Less: Interest on Debt (I)	₹ 6,48,000	--
C	Earnings of Equity shareholders (NI)	₹ 11,52,000	₹ 18,00,000
D	Overall Capitalization Rate (K_0)	0.18	0.18
E	Total Value of Firm ($V = \text{NOI}/K_0$)	₹ 1,00,00,000	₹ 1,00,00,000
F	Less: Market Value of Debt	₹ 54,00,000	--
G	Market Value of Equity (S)	₹ 46,00,000	₹ 1,00,00,000
H	Equity Capitalization Rate [$K_e = \text{NI}/S$]	0.2504	0.18
I	Weighted Average Cost of Capital [WACC (K_0)] $K_0 = (K_e \times S/V) + (K_d \times D/V)$	0.18	0.18

*Computation of WACC A Ltd.

Component of Capital	Amount	Weight	Cost of Capital	WACC
Equity	₹ 46,00,000	0.46	0.2504	0.1152
Debt	₹ 54,00,000	0.54	0.12*	0.0648
Total	₹ 1,00,00,000			0.18

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

(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)]

$$\begin{aligned} \text{Total Value of unlevered Firm } (V_u) &= [\text{NOI} (1 - t)/K_e] = 18,00,000 [1 - 0.40]/0.18 \\ &= ₹ 60,00,000 \end{aligned}$$

K_e of unlevered Firm (given) = 0.18

K_0 of unlevered Firm (Same as above = K_e as there is no debt) = 0.18

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

$$\begin{aligned} \text{Total value of Levered Firm } (V_L) &= V_u + (\text{Debt} \times \text{Tax}) \\ &= ₹ 60,00,000 + (₹ 54,00,000 \times 0.4) \\ &= ₹ 81,60,000 \end{aligned}$$

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

= 18% (i.e. $K_e = K_0$)

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

Particulars	A Ltd. (₹)
Net Operating Income (NOI)	18,00,000

Less: Interest on Debt (I)	6,48,000
Earnings Before Tax (EBT)	11,52,000
Less: Tax @ 40%	4,60,800
Earnings for equity shareholders (NI)	6,91,200
Total Value of Firm (V) as calculated above	81,60,000
Less: Market Value of Debt	54,00,000
Market Value of Equity (S)	27,60,000
Equity Capitalization Rate [$K_e = NI/S$]	0.2504
Weighted Average Cost of Capital (K_0)*	13.23
$K_0 = (K_e \times S/V) + (K_d \times D/V)$	13.23

*Computation of WACC A Ltd.

Component of Capital	₹	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

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

WACC = 13.23%

Q.17: Leo Ltd. has a net operating income of ₹ 21,60,000 and the total capitalisation of ₹ 120 lakhs. The company is evaluating the options to introduce debt financing in the capital structure and the following information is available at various levels of debt value.

Debt value (₹)	Interest rate (%)	Equity Capitalisation rate (%)
0	N.A.	12.00
10,00,000	7.00	12.50
20,00,000	7.00	13.00
30,00,000	7.50	13.50
40,00,000	7.50	14.00
50,00,000	8.00	15.00
60,00,000	8.50	16.00
70,00,000	9.00	17.00
80,00,000	10.00	20.00

You are required to COMPUTE the equity capitalization rate if MM approach is followed. Assume that the firm operates in zero tax regime and calculations to be based on book values.

ANSWER

As per MM approach, cost of the capital (K_0) remains constant, and cost of equity increase linearly with debt.

$$\text{Value of a Firm} = \frac{\text{NOI}}{K_0}$$

$$\therefore 1,20,00,000 = \frac{21,60,000}{K_0}$$

$$\therefore K_0 = \frac{21,60,000}{1,20,00,000} = 18\%$$

Under MM approach, $K_e = K_0 + \frac{D}{E} (K_0 - K_d)$

Statement of equity capitalization under MM approach

Debt Value (₹)	Equity Value (₹)	Debt/ Equity	Kd (%)	K0 (%)	K0 - Kd (%)	Ke = K0 + (K0 - KD) (D/E) (%)
--	1,20,00,000	0.0000	NA	18.00	18.00	18.00
10,00,000	1,10,00,000	0.0909	7.00	18.00	11.00	19.00
20,00,000	1,00,00,000	0.2000	7.00	18.00	11.00	20.20
30,00,000	90,00,000	0.3333	7.50	18.00	10.50	21.50
40,00,000	80,00,000	0.5000	7.50	18.00	10.50	23.25
50,00,000	70,00,000	0.7143	8.00	18.00	10.00	25.14
60,00,000	60,00,000	1.0000	8.50	18.00	9.50	27.50
70,00,000	50,00,000	1.4000	9.00	18.00	9.00	30.60
80,00,000	40,00,000	2.0000	10.00	18.00	8.00	34.00

Q.18: Axar Ltd. has a Sales of ₹ 68,00,000 with a Variable cost Ratio of 60%.

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

The tax rate applicable for the company is 30%.

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

ANSWER

Break Even sales = ₹ 68,00,000 × 0.75 = ₹ 51,00,000

Income Statement

	Original	Calculation of Interest at BEP (backward calculation)	Now at present level
Sales	68,00,000	51,00,000	68,00,000
Less: Variable Cost	40,80,000	30,60,000	40,80,000
Contribution	27,20,000	20,40,000	27,20,000
Less: Fixed Cost	16,32,000	16,32,000	16,32,000
EBIT	10,88,000	4,08,000	10,88,000
Less: Interest (EBIT - PBT)	?	3,93,714	3,93,714
PBT	?	14,286 (10,000/70%)	6,94,286
Less: Tax @ 30% (or PBT - PAT)	?	4,286	2,08,286
PAT	?	10,000 (Nil + 10,000)	4,86,000

Less: Preference Dividend	10,000	10,000	10,000
Earnings for Equity share holders	?	Nil (at BEP)	4,76,000
Number of Equity Shares	1,50,000	1,50,000	1,50,000
EPS	?	--	3.1733

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

Q.19: The financial advisor of Sun Ltd. is confronted with following two alternative financing plans for raising ₹10 lakhs that is needed for plant expansion and modernization

Alternative I: Issue 80% of funds with 14% Debenture [Face value (FV) ₹ 100] at par and redeem at a premium of 10% after 10 years and balance by issuing equity shares at $33\frac{1}{3}\%$ Premium.

Alternative II: Raise 10% of funds required by issuing 8% Irredeemable debentures [Face value (FV) ₹ 100] at par and the remaining by issuing equity shares at current market price of ₹ 125.

Currently, the firm has an Earnings per share (EPS) of ₹ 21

The modernization and expansion programme is expected to increase the firm's Earnings before Interest and Taxation (EBIT) by ₹ 200,000 annually.

Balance Sheet as on 31.3.2022

Liabilities	₹	Assets	₹
Current Liabilities	5,00,000	Current Assets	16,00,000
10% Long Term Loan	15,00,000	Plant & Equipment (Net)	34,00,000
Reserves & Surplus	10,00,000		
Equity Shares Capital (FV: ₹ 100 each)	20,00,000		
Total	50,00,000	Total	50,00,000

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

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

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

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

- I. Earnings per share (EPS) & Market Price Per Share (MPS)
- II. Financial Leverage
- III. Weighted Average Cost of Capital & Marginal Cost of Capital (using Book value weights)

ANSWER

Calculation of Equity Share capital and Reserves and Surplus:

Alternative 1:

$$\text{Equity share capital} = ₹ 20,00,000 + \frac{₹ 2,00,000 \times 100}{133,3333} = ₹ 21,50,000$$

$$\text{Reserves} = ₹ 10,00,000 + \frac{₹ 2,00,000 \times 33.3333}{133,3333} = ₹ 10,50,000$$

Alternative 2:

$$\text{Equity share capital} = ₹ 20,00,000 + \frac{₹ 9,00,000 \times 100}{125} = ₹ 21,20,000$$

$$\text{Reserves} = ₹ 10,00,000 + \frac{₹ 9,00,000 \times 25}{125} = ₹ 11,80,000$$

Capital Structure Plans

(Amount in ₹)

Capital	Alternative 1	Alternative 2
Equity Share capital	21,50,000	27,20,000
Reserves and surplus	10,50,000	11,80,000
10% long term debt	15,00,000	15,00,000
14% Debentures	8,00,000	--
8% irredeemable Debentures	--	1,00,000
Total Capital Employed	55,00,000	55,00,000

Computation of Present Earnings before interest and tax (EBIT)

EPS (₹)	21
No. of equity shares	20,000
Earnings for equity shareholders (I x II) (₹)	4,20,000
Profit Before Tax (III/75%)	5,60,000
Interest on long term loan (15,00,000 x 10%) (₹)	1,50,000
EBIT (IV + V) (₹)	7,10,000

$$\text{EBIT after expansion} = ₹ 7,10,000 + ₹ 2,00,000 = ₹ 9,10,000$$

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

(Amount in ₹)

Capital	Alternative 1	Alternative 2
EBIT	9,10,000	9,10,000
Less: Interest: 10% on long term loan	(1,50,000)	(1,50,000)
14% on Debentures	(1,12,000)	Nil
8% on Irredeemable Debentures	Nil.	(8000)
PBT	6,48,000	7,52,000
Less: Tax @ 25%	(1,62,000)	(1,88,000)
PAT	4,86,000	5,64,000
No. of equity shares	21,500	27,200
EPS	22.60	20.74
Applicable P/E Ratio (Working Note 1)	7	8.5

MPS (EPS X P/E ratio)	158.2	176.29
Financial Leverage EBIT/PBT	1.40	1.21

Working Note ₹

	Alternative 1	Alternative 2
Debt:		
₹ 15,00,000 + ₹ 8,00,000	23,00,000	--
₹ 15,00,000 + ₹ 1,00,000	--	16,00,000
Total capital Employed (₹)	55,00,000	55,00,000
Debt Ratio (Debt/Capital employed)	= 0.4182 = 41.82%	= 0.2909 = 29.09%
Change in Equity: ₹ 21,50,000 - ₹ 20,00,000	1,50,000	
₹ 27,20,000 - ₹ 20,00,000		7,20,000
Percentage change in equity	7.5%	36%
Applicable P/E ratio	7	8.5

Calculation of Cost of equity and various type of debt

	Alternative 1	Alternative 2
(A) Cost of equity		
EPS ₹	22.60	20.74
DPS (EPS x 60%) ₹	13.56	12.44
Growth (g)	10%	10%
Po (MPS)	158.2	176.29
Ke = Do (1 + g) / Po	$\frac{13.56 (1.1)}{158.2}$ = 9.43%	$\frac{12.44 (1.1)}{176.29}$ = 7.76%
(B) Cost of equity		
10% long term debt	10% + (1-0.25) = 7.5%	10% + (1 - 0.25) = 7.5%
14% redeemable debentures	$\frac{14(1 - 0.25) + (110 - 100/10)}{110 + 100/2}$ = 10.5 + 1/10.5 = 10.95%	Nil
8% irredeemable debentures	NA	8000 (1-0.25)/1,00,000 = 6%

Calculation of Weighted Average cost of capital (WACC)

	Alternative 1			Alternative 2		
Capital	Weights	Cost (%)	WACC	Weights	Cost (%)	WACC
Equity Share Capital	0.3909	9.43	3.69%	0.4945	7.76	3.84%

Reserves and Surplus	0.1909	9.43	1.80%	0.2145	7.76	1.66%
10% Long term Debt	0.2727	7.50	2.05%	0.2727	7.50	2.05%
14% debenture	0.1455	10.95	1.59%			
8% Irredeemable Debentures	--			0.0182	6	0.11%
			9.12%			7.66%

Calculation Marginal Cost of Capital (WACC)

	Alternative 1			Alternative 2		
Capital	(weight)	Cost (%)	MACC	(weight)	Cost (%)	MACC
Equity Share Capital	₹ 1,50,000 (0.15)	9.43	1.41%	₹ 7,20,000 (0.72)	7.76	5.59%
Reserves and Surplus	₹ 50,000 (0.05)	9.43	0.47%	₹ 1,80,000 (0.18)	7.76	1.40%
14% Debentures	₹ 8,00,000 (0.80)	10.95	8.76%	-		0.00%
8% Irredeemable Debentures	--			₹ 1,00,000 (0.10)	6	0.60%
Total Capital Employed	₹ 10,00,000		10.65%	₹ 10,00,000		7.58%

Summary of solution:

	Alternative 1	Alternative 2
Earning per share (EPS) ₹	22.60	20.74
Market price per share (MPS) ₹	158.20	176.29
Financial leverage	1.4043	1.2101
Weighted Average cost of capital (WACC)	9.12%	7.66%
Marginal cost of capital (MACC)	10.65%	7.58%

Alternative 1 of financing will be preferred under the criteria of EPS, whereas Alternative II of financing will be preferred under the criteria of MPS, Financial leverage, WACC and marginal cost of capital.

DIVIDEND DECISION

Q.1: The following figures are extracted from the annual report of RJ Ltd.:

Net Profit	₹ 50 Lakhs
Outstanding 13% preference shares	₹ 200 Lakhs
No. of Equity Shares	6 Lakhs
Return on Investment	25%
Cost of Capital (Ke)	15%

You are required to compute the approximate dividend pay-out ratio by keeping the share price at ₹ 40 by using Walter's Model. [Nov 2020 (5 Marks)]

ANSWER:

Particulars	₹ in lakhs
Net Profit	50
Less: Preference dividend (₹ 200,00,000 × 13%)	26
Earning for equity shareholders	24
Therefore, earning per share = ₹ 24 lakh / 6 lakh shares = ₹ 4	

Let, the dividend per shares be D to get share price of ₹ 40

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

$$₹ 40 = \frac{D + \frac{0.25}{0.15} (₹ 4 - D)}{0.15}$$

$$6 = \frac{0.15D + 1 - 0.25D}{0.15}$$

$$0.1D = 1 - 0.9$$

$$D = ₹ 1$$

$$D/P \text{ ratio} = \frac{DPS}{EPS} \times 100 = \frac{₹ 1}{₹ 4} \times ₹ 100 = 25\%$$

So, the required dividend pay-out ratio will be = 25%

Q.2: The following information is taken from ABC Ltd.

Net Profit for the year	₹ 30,00,000
12% Preference share capital	₹ 1,00,00,000
Equity share capital (Share of ₹ 10 each)	₹ 60,00,000
Internal rate of return on investment	22%
Cost of Equity Capital	18%

Retention Ratio

75%

Calculate the market price of the share using:

(1) Gordon's Model

(2) Walter's Model

[Jan 21 (5 Marks)]

ANSWER:

Market Prices per share by –

(1) Gordon's Model:

$$\text{Present market price per share } (P_0)^* = \frac{D_0 (1+g)}{K_e - g}$$

OR

$$\text{Present market price per share } (P_0) = \frac{D_0}{K_e - g}$$

Where,

P_0 = Present market price per share.

g = Growth rate (br) = $0.75 \times 0.22 = 0.165$

b = Retention ratio (i.e., % of earnings retained)

r = Internal rate of return (IRR)

$D_0 = E \times (1 - b) = 3 \times (1 - 0.75) = 0.75$

E = Earnings per share

$$P_0 = \frac{0.75 (1 + 0.65)}{0.18 - 0.165} = \frac{0.874}{0.015} = \text{₹ } 58.27 \text{ approx.}$$

*Alternatively, P_0 can be calculated as $\frac{E(1 - b)}{k - br} = \text{₹ } 50$

(2) Walter's Model:

$$P = \frac{D + \frac{r}{k_e} (E - D)}{k_e}$$
$$= \frac{0.75 + \frac{0.22}{0.18} (3 - 0.75)}{0.18} = \text{₹ } 19.44$$

Workings:

1. Calculation of Earnings per share

Particulars	Amount (₹)
Net Profit for the year	30,00,000
Less: Preference dividend (12% of ₹ 1,00,00,000)	(12,00,000)
Earnings for equity shareholders	18,00,000
No. of equity shares (₹ 60,00,000/₹10)	6,00,000
Therefore, Earnings per share	₹ 18,00,000/6,00,000 = ₹ 3.00

$$\left(\frac{\text{Earning for equity shareholders}}{\text{No. of equity shares}} \right)$$

2. Calculation of Dividend per share

Particulars	
Earnings per share	₹ 3
Retention Ratio (b)	75%
Dividend pay-out ratio (1-b)	25%
Dividend per share (Earnings per share x Dividend pay-out ratio)	₹ 3 x 0.25 = ₹ 0.75

Q.3: The following information is given:

Dividend per share (DPS)	Rs. 9
Cost of capital (K_e)	19%
Internal rate of return on investment	24%
Retention Ratio	25%

CALCULATE the market price per share by using:

- (i) Walter's formula
- (ii) Gordon's formula (Dividend Growth model)

[MTP March 21]

ANSWER:

Working:

Calculation of Earnings per share (EPS):

$$EPS = \frac{DPS}{\text{Dividend Payout Ratio}}$$

$$EPS = \frac{Rs. 9}{1 - 0.25} = Rs. 12$$

Market price per share by

(i) **Walter's model:**

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e} = \frac{Rs. 9 + \frac{0.24}{0.19}(Rs. 12 - Rs. 9)}{0.19} = Rs. 67.31$$

(ii) **Gordon's model (Dividend Growth model):**

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

Where,

P_0 = Present market price per share.

g = Growth rate (br) = $0.25 \times 0.24 = 0.06$

b = Retention ratio

k = Cost of Capital

r = Internal rate of return (IRR)

D_0 = Dividend per share

E = Earnings per share

$$= \frac{\text{Rs. } 9(1 + 0.06)}{0.19 - 0.06}$$

$$= \frac{\text{Rs. } 9.54}{0.13} = \text{Rs. } 73.38$$

Alternatively

$$P_0 = \frac{E(1 - b)}{k - br}$$

$$P_0 = \frac{12(1 - 0.25)}{0.19 - 0.06} = \frac{9}{0.13} = \text{Rs. } 69.23$$

Q.4: The following data is available in respect of N Ltd. for the year ended 31st March, 2021:

	Rs. (in Crore)
Share capital (@ Rs. 10 per share)	25.00
Reserves	15.00
Profit after tax (PAT)	3.70
Dividends paid	3.00
P/E ratio	26.70

Using Walter's Model:

- (i) COMMENT on the firm's dividend policy;
- (ii) DETERMINE the optimum payout ratio and
- (iii) DETERMINE the P/E ratio at which dividend payout will have no effect on share price.

[MTP April 21 (5 Marks)]

ANSWER:

Workings:

1. Earnings per share (E) $= \frac{\text{PAT}}{\text{No. of shares}} = \frac{\text{Rs. } 3.7 \text{ crores}}{2.5 \text{ crore shares}} = \text{Rs. } 1.48$
2. Return on Investment (r) $= \frac{\text{PAT}}{\text{Net worth}} \times 100 = \frac{\text{Rs. } 3.7 \text{ crores}}{\text{Rs. } (25 + 15) \text{ crores}} \times 100 = 9.25\%$
3. Dividend per share (D) $= \frac{\text{Dividend paid}}{\text{No. of shares}} = \frac{\text{Rs. } 3 \text{ crores}}{2.5 \text{ crore shares}} = \text{Rs. } 1.2$
Dividend payout ratio $= \frac{\text{Dividend}}{\text{PAT}} \times 100 = \frac{\text{Rs. } 3 \text{ crores}}{\text{Rs. } 3.7 \text{ crores}} \times 100 = 81.08\%$
4. Current Market Price (P₀) $= \text{P/E Ratio} \times E = 26.7 \times \text{Rs. } 1.48 = \text{Rs. } 39.52$
5. Growth rate (g) $= b \times r = (1 - 0.8108) \times 0.0925 = 1.75\%$
6. Cost of Capital (K_e) $= \frac{D(1+g)}{P_0} + g = \frac{\text{Rs. } 1.2 (1 + 0.0175)}{\text{Rs. } 39.52} + 0.0175 = 4.84 \%$

- (i) The value of the share as per Walter's Model:

$$P = \frac{D + \frac{r}{K_e}(E-D)}{K_e} = P = \frac{1.2 + \frac{0.0925}{0.0484}(1.48 - 1.2)}{0.0484} = \text{Rs. } 35.85$$

The firm has a dividend payout of 81.08% (i.e., Rs. 3 crores) out of Profit after tax of Rs. 3.7 crores with value of the share at Rs. 35.85. The rate of return on investment (r) is 9.25% and it is more than the K_e of 4.84%, therefore, by distributing 81.08% of earnings, the firm is not following an optimal dividend policy.

- (ii) Under Walter's model, when return on investment is more than cost of capital ($r > K_e$), the market share price will be maximum if 100% retention policy is followed. So, the optimal payout ratio would be to pay zero dividend and in such a situation, the market price would be:

$$P = \frac{0 + \frac{0.0925}{0.0484}(1.48 - 0)}{0.0484} = \text{Rs. } 58.44$$

- (iii) The P/E ratio at which dividend payout will have no effect on share price is at which the K_e would be equal to the rate of return (r) of the firm i.e. 9.25%.

$$\text{So, } K_e = \frac{D(1+g)}{P_0} + g$$

$$0.0925 = \frac{\text{Rs. } 1.2 (1 + 0.0175)}{P_0} + 0.0175$$

$$\therefore P_0 = \text{Rs. } 16.28$$

If P_0 is Rs. 16.28, then, P/E Ratio will be:

$$= \frac{P_0}{E} = \frac{\text{Rs. } 16.28}{\text{Rs. } 1.48} = 11 \text{ times}$$

Therefore, at the P/E ratio of 11, the dividend payout will have no effect on share price.

Q.5: The following information relates to LMN Ltd.

Earning of the company	₹ 30,00,000
Dividend pay-out ratio	60%
No. of shares outstanding	5,00,000
Rate of return on investment	15%
Equity capitalized rate	13%

Required:

- (ii) Determine what would be the market value per share as per Walter's model.
- (iii) Compute optimum dividend pay-out ratio according to Walter's model and the market value of company's share at that pay-out ratio. [July 21 (5 Marks)]

ANSWER:

- (i) Calculation of market value per share as per Walter's model

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

Where,

- P = Market price per shares.
 E = Earnings per share = ₹ 30,00,000/5,00,000 = ₹ 6
 D = Dividend per share = ₹ 6 x 0.60 = ₹ 3.6
 r = Return earned on investment = 15%
 Ke = Cost of equity capital = 13%

$$P = \frac{3.6 + \frac{0.15}{0.13}(6 - 3.6)}{0.13} = ₹ 49$$

- (ii) According to Walter's model, when the return on investment (r) is more than the cost of equity capital (Ke), the price per share increases as the dividend pay-out ratio decreases. Hence, the optimum dividend pay-out ratio in this case is nil.

So, at a pay-out ratio of zero, the market value of the company's share will be:

$$P = \frac{0 + \frac{0.15}{0.13}(6 - 0)}{0.13} = ₹ 53.254$$

Q.6: The following information is supplied to you:

Particulars	₹
Total Earnings	5,00,000
Equity shares (of ₹ 100 each)	50,00,000
Dividend paid	3,75,000
Price/Earnings ratio	12.5

Applying Walter's Model:

- (i) Analyse whether the company is following and optimal dividend policy.
 (ii) Compute P/E ratio at which the dividend policy will have no effect on the value of the share.
 (iii) Will your decision change, if the P/E ratio is 8 instead of 12.5? **ANALYSE.**

[MTP Nov 21 (5 Marks)]

ANSWER:

- (i) The EPS of the firm is ₹ 10 (i.e. ₹ 5,00,000/ 50,000). $r = 5,00,000/ 50,00,000 = 10\%$. The P/E Ratio is given at 12.5 and the cost of capital, Ke, may be taken at the inverse of P/E ratio. Therefore, Ke is 8 (i.e., $1/12.5$). The firm is distributing total dividends of the shares as per Walter's model may be found as follows:

$$P = \frac{D + \frac{r}{K_e} (E - D)}{K_e} = \frac{7.5 + \frac{0.1}{0.08} (10 - 7.5)}{0.08} = ₹ 132.81$$

The firm has a dividend payout of 75% (i.e., ₹ 3,75,000) out of total earnings of ₹ 5,00,000. Since, the rate of return of the firm, r , is 10% and it is more than the K_e of 8%, therefore, by distributing 75% of earnings, the firm is not following an optimal dividend policy. The optimal dividend policy for the firm would be to pay zero dividend and in such a situation, the market price would be,

$$\frac{0 + \frac{0.1}{0.08} (10 - 0)}{0.08} = ₹ 156.25$$

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

- (ii) The P/E ratio at which the dividend policy will have no effect on the value of the share is such at which the K_e would be equal to the rate of return, r , of the firm. The K_e would be 10% ($=r$) at the P/E ratio of 10. Therefore, at the P/E ratio of 10, the dividend policy would have no effect on the value of the share.
- (iii) If the P/E is 8 instead of 12.5, then the K_e which is the inverse of P/E ratio, would be 12.5 and in such a situation $k_e > r$ and the market price, as per Walter's model would be:

$$P = \frac{D + \frac{r}{K_e} (E - D)}{K_e} = \frac{7.5 + \frac{0.1}{0.125} (10 - 7.5)}{0.125} = ₹ 76$$

Q.7: Aakash Ltd. has 10 lakh equity shares outstanding at the start of the accounting year 2021. The existing market price per share is ₹ 150. Expected dividend is ₹ 8 per share. The rate of capitalization appropriate to the risk class to which the company belongs is 10%.

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

[RTP Nov 21]

ANSWER:

- (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

$$₹ 150 = \frac{P_1 + ₹ 8}{1 + 0.10}$$

$$\therefore P_1 = ₹ 157$$

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

(iii) Calculation of market value of the shares.

	(a)	(b)
	Dividends are declared	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.8: X Ltd. is a multinational company. Current market price per share is ₹ 2,185. During the F.Y. 2020-21, the company paid ₹ 140 as dividend per share. The company is expected to grow @ 12% p.a. for next four years, then 5% p.a. for an indefinite period. Expected rate of return of shareholders is 18% p.a.

- (i) Find out intrinsic value per share.
(ii) State whether shares are overpriced or underpriced.

Year	1	2	3	4	5
Discounting Factor @ 18%	0.847	0.718	0.608	0.515	0.436

[Nov 21 (5 Marks)]

ANSWER:

As per Dividend discount model, the price of share is calculated as follows:

$$P = \frac{D_1}{(1 + K_e)^1} + \frac{D_2}{(1 + K_e)^2} + \frac{D_3}{(1 + K_e)^3} + \frac{D_4}{(1 + K_e)^4} + \frac{D_4 (1 + g)}{(K_e - g)} \times \frac{1}{(1 + K_e)^4}$$

Where,

P = Price per share

K_e = Required rate of return on equity

g = Growth rate

$$P = \frac{₹ 140 \times 1.12}{(1 + 0.18)^1} + \frac{₹ 156.80 \times 1.12}{(1 + 0.18)^2} + \frac{₹ 175.62 \times 1.12}{(1 + 0.18)^3} + \frac{₹ 196.69 \times 1.12}{(1 + 0.18)^4} + \frac{₹ 220.29 (1 + 0.05)}{(0.18 - 0.05)} \times \frac{1}{(1 + 0.18)^4}$$

$$P = 132.81 + 126.10 + 119.59 + 113.45 + 916.34 = ₹ 1,408.29$$

Intrinsic value of share is ₹ 1,408.29 as compared to latest market price of ₹ 2,185. **Market price of shares is over-priced by ₹ 776.71.**

Q.9: 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.

ANSWER

Given,

Cost of Equity (K _e)	10%
Number of shares in the beginning (n)	25,000
Current Market Price (P ₀)	₹ 100
Net Profit (E)	₹ 2,50,000
Expected Dividend (D ₁)	₹ 5 per share
Investment (I)	₹ 5,00,000

Case 1 - When dividends are paid

Case 2 - When dividends are not paid

Step 1 $P_0 = \frac{P_1 + D_1}{1 + K_e}$ $100 = \frac{P_1 + 5}{1 + 0.10}$ $P_1 = 110 - 5 = 105$	Step 1 $P_0 = \frac{P_1 + D_1}{1 + K_e}$ $100 = \frac{P_1 + 0}{1 + 0.10}$ $P_1 = 110 - 0 = 110$	
Step 2 Calculation of funds required $= [\text{Total Investment} - (\text{Net profit} - \text{Dividend})]$ $= 5,00,000 - (2,50,000 - 1,25,000)$ $= 3,75,000$	Step 2 Calculation of funds required $= [\text{Total Investment} - (\text{Net profit} - \text{Dividend})]$ $= 5,00,000 - (2,50,000 - 0)$ $= 2,50,000$	
Step 3 No. of shares required to be issued for balance fund $\text{No. of shares} = \frac{\text{Funds required}}{\text{Price at end } (P_1)}$ $\Delta n = \frac{3,75,000}{105}$ $= 3,571.4285$	Step 3 No. of shares required to be issued for balance fund $\text{No. of shares} = \frac{\text{Funds required}}{\text{Price at end } (P_1)}$ $\Delta n = \frac{2,50,000}{110}$ $= 2,272.73$	
Step 4 Calculation of value of firm $V_f = \frac{(n + \Delta n)P_1 - I + E}{(1 + K_e)}$ $V_f = \frac{(25,000 + \frac{3,75,000}{105}) 105 - 5,00,000 + 2,50,000}{(1 + .10)}$ $= ₹ 25,00,000$	Step 4 Calculation of value of firm $V_f = \frac{(n + \Delta n)P_1 - I + E}{(1 + K_e)}$ $V_f = \frac{(25,000 + \frac{2,50,000}{110}) 110 - 5,00,000 + 2,50,000}{(1 + 0.10)}$ $= ₹ 25,00,000$	

Q.10: The following information is supplied to you:

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

Applying Walter's Model:

- ANALYSE whether the company is following an optimal dividend policy.
- COMPUTE P/E ratio at which the dividend policy will have no effect on the value of the share.
- Will your decision change, if the P/E ratio is 8 instead of 12.5? ANALYSE.

ANSWER

- (i) The EPS of the firm is ₹ 10 (i.e., ₹ 2,00,000/ 20,000), $r = ₹ 2,00,000 / (20,000 \text{ shares} \times ₹ 100) = 10\%$. The P/E Ratio is given at 12.5 and the cost of capital (K_e) may be taken at the inverse of P/E ratio. Therefore, K_e is 8 (i.e., $1/12.5$). The firm is distributing total dividends of ₹ 1,50,000 among 20,000 shares, giving a dividend per share of ₹ 7.50. the value of the share as per Walter's model may be found as follows:

$$P = \frac{D + \frac{r}{K_e} (E - D)}{K_e} = \frac{7.5 + \frac{0.1}{0.08} (10 - 7.5)}{0.08} = ₹ 132.81$$

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

$$= \frac{0 + \frac{0.1}{0.08} (10 - 0)}{0.08} = ₹ 156.25$$

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

- (ii) The P/E ratio at which the dividend policy will have no effect on the value of the share is such at which the K_e would be equal to the rate of return (r) of the firm. The K_e would be 10% ($= r$) at the P/E ratio of 10. Therefore, at the P/E ratio of 10, the dividend policy would have no effect on the value of the share.
- (iii) If the P/E is 8 instead of 12.5, then the K_e which is the inverse of P/E ratio, would be 12.5 and in such a situation $K_e > r$ and the market price, as per Walter's model would be:

$$P = \frac{D + \frac{r}{K_e} (E - D)}{K_e} = \frac{7.5 + \frac{0.1}{0.125} (10 - 7.5)}{0.125} = ₹ 76$$

Q.11: 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 (K_e)	20%
Internal rate of return on investment	25%
Retention Ratio	40%

ANSWER

Market price per share by

- (i) Walter's model

$$P = \frac{D + \frac{r}{K_e} (E - D)}{K_e} = \frac{6 + \frac{0.25}{0.20} (10 - 6)}{0.20} = ₹ 55$$

- (ii) Gordon's Model

$$\text{Present market price per share } (P_0) = \frac{E(1 - b)}{k - br}$$

$$P = \frac{10 (1 - 0.40)}{0.20 - (0.4 \times 0.25)}$$

$$= \frac{6}{0.1} = ₹ 60$$

Q.12: The annual report of XYZ Ltd. provides the following information:

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%;

ANSWER

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

Particulars	Amount in (₹)
Net Profit	50 Lakhs
Less: Preference dividend	15 Lakhs
Earnings for equity shareholders	35 lakhs
Earnings per share	35 lakhs / 5 lakhs = ₹ 7.00

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

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

Here, $E_1 = 7$, $K_e = 16\%$

- (i) When dividend pay-out is 25%

$$P_0 = \frac{7 \times 0.25}{0.16 - (0.75 \times 0.2)} = \frac{1.75}{0.16 - 0.15} = ₹ 175$$

- (ii) When dividend pay-out is 50%

$$P_0 = \frac{7 \times 0.5}{0.16 - (0.5 \times 0.2)} = \frac{3.5}{0.16 - 0.10} = ₹ 58.33$$

- (iii) When dividend pay-out is 100%

$$P_0 = \frac{7 \times 1}{0.16 - (0 \times 0.2)} = \frac{3.5}{0.16} = ₹ 43.75$$

Q.13: 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

current Financial Year. The shares of the company traded at an average price of ₹ 3,122 on last day. FIND out the intrinsic value per share and state whether shares are overpriced or underpriced.

ANSWER

As per Dividend discount model, the price of share is calculated as follows:

$$P = \frac{D_1}{(1+K_e)^1} + \frac{D_2}{(1+K_e)^2} + \frac{D_3}{(1+K_e)^3} + \frac{D_4}{(1+K_e)^4} + \frac{D_5}{(1+K_e)^5}$$

Where,

P = Price per share

Ke = Required rate or return on equity

g = Growth rate

$$P = \frac{₹ 120 \times 1.15}{(1+0.2)^1} + \frac{₹ 138 \times 1.15}{(1+0.2)^2} + \frac{₹ 158.7 \times 1.15}{(1+0.2)^3} + \frac{₹ 182.5 \times 1.15}{(1+0.2)^4} + \frac{₹ 209.88 \times 1.5}{(0.2-0.05)^5} \times \frac{1}{(1+0.2)^5}$$

$$P = 115 + 110.2 + 105.6 + 101.2 + 590.42 = ₹ 1,022.42$$

Intrinsic value of share is ₹ 1,022.42 as compared to latest market price of ₹ 3,122. Market price of a share is overpriced by ₹ 2,099.58.

Q.14: In the month of May of the current Financial Year, shares of RT Ltd. was sold for ₹ 1,460 per share. A long term earnings growth rate of 7.5% is anticipated. RT Ltd. is expected to pay dividend of ₹ 20 per share.

- (i) CALCULATE rate of return an investor can expect to earn assuming that dividends are expected to grow along with earnings at 7.5% per year in perpetuity?
- (ii) It is expected that RT Ltd. will earn about 10% on retained earnings and shall retain 60% of earnings. In this case, STATE whether, there would be any change in growth rate and cost of Equity?

ANSWER

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

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

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

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

- (ii) With rate of return on retained earnings (r) is 10% and retention ratio (b) is 60%, new growth rate will be as follows:

$$g = br = 0.10 \times 0.60 = 0.06$$

Accordingly, dividend will also get changed and to calculate this, first we shall calculate previous retention ratio (b₁) and then EPS assuming that rate of return on retained earnings (r) is same.

With previous Growth Rate of 7.5% and r = 10%, the retention ratio comes out to be:

$$0.075 = b_1 \times 0.10$$

$$b_1 = 0.75 \text{ and payout ratio} = 0.25$$

With 0.25 payout ratio the EPS will be as follows:

$$= \frac{₹ 20}{0.25} = ₹ 80$$

With new 0.40 (1 - 0.60) payout ratio, the new dividend will be

$$D_1 = ₹ 80 \times 0.40 = ₹ 32$$

Accordingly, new K_e will be

$$K_e = \frac{32}{1,460} + 6.0\%$$

$$\text{Or, } K_e = 8.19\%$$

Q.15: Aakash Ltd. has 10 lakh equity shares outstanding at the start of the accounting year. The existing market price per share is ₹ 150. Expected dividend is ₹ 8 per share. The rate of capitalization appropriate to the risk class to which the company belongs is 10%.

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

ANSWER

- (i) Calculation of market price per share

According to Miller - Modigliani (MM) Approach:

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

Where,

$$\text{Existing market price (P}_0\text{)} = ₹ 150$$

$$\text{Expected dividend per share (D}_1\text{)} = ₹ 8$$

$$\text{Capitalization rate (K}_e\text{)} = 0.10$$

$$\text{Market price at year end (P}_1\text{)} = \text{to be determined}$$

- (a) If expected dividends are declared, then

$$₹ 150 = \frac{P_1 + ₹ 8}{1 + 0.10}$$

$$\therefore P_1 = ₹ 157$$

- (b) If expected dividends are not declared, then

$$₹ 150 = \frac{P_1 + ₹ 0}{1 + 0.10}$$

$$P_1 = ₹ 165$$

- (ii) Calculation of number of shares to be issued

	(a) Dividends are declared	(b) Dividends are not Declared

	(₹ lakh)	(₹ 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 share (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 lakhs)	12.42 x 157 = 1,950 (approx.)	11.82 x 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.16: Mr H is currently holding 1,00,000 shares of HM Ltd, and currently the share of HM Ltd is trading on Bombay Stock Exchange at ₹ 50 per share. Mr A have a policy to re-invest the amount of any dividend received into the shared back again of HM Ltd. If HM Ltd has declared a dividend of ₹ 10 per share, please determine the no of shares that Mr A would hold after he re-invests dividend in shares of HM Ltd.

ANSWER

Ex-dividend price is ₹ 40 (50-10).

The total amount of dividend received is ₹ 10,00,000 which is re-invested at the rate of ₹ 40 per share.

Hence additional shares purchased would be 25,000.

Total holding would be 1,25,000 shares (1,00,000 + 25,000)

Q.17: Following information is given pertaining to DG Ltd.

No of shares outstanding	₹ 1 lakh shares
Earnings Per Share	25 per share
P/E Ratio	20
Book Value per share	400 per share

If company decides to repurchase 5,000 shares, at the prevailing market price, what is the resulting book value per share after repurchasing.

ANSWER

Current Market price = $20 \times 25 = 500$ per share

Book value of the company before repurchase = ₹ 4 cr (400x1 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.



CAPITAL BUDGETING

Q.1: An existing company has a machine which has been in operation for two years, its estimated remaining useful life is 4 years with no residual value in the end. Its current market value is ₹ 3 lakhs. The management is considering a proposal to purchase an improved model of a machine gives increase output. The details are as under:

Particulars	Existing Machine	New Machine
Purchase Price	₹ 6,00,000	₹ 10,00,000
Estimated Life	6 years	4 years
Residual Value	0	0
Annual Operating days	300	300
Operating hours per day	6	6
Selling price per unit	₹ 10	₹ 10
Material cost per unit	₹ 2	₹ 2
Output per hour in units	₹ 20	₹ 40
Labour Cost per hour	₹ 20	₹ 30
Fixed overhead per annum excluding depreciation	₹ 1,00,000	₹ 60,000
Working Capital	₹ 1,00,000	₹ 2,00,000
Income-tax rate	30%	30%

Assuming that - cost of capital is 10% and the company uses written down value of depreciation @ 20% and it has several machines in 20% block.

Advice the management on the Replacement of Machine as per the NPV method.

The discounting factors table given below:

Discounting Factors	Year 1	Year 2	Year 3	Year 4
10%	0.909	0.826	0.751	0.683

[July 21 (10 Marks)]

ANSWER:

(i) Calculation of Net Initial Cash Outflows:

Particulars	₹
Purchase Price of new machine	10,00,000
Add: Net Working Capital	1,00,000
Less: Sale proceeds of existing machine	3,00,000
Net initial cash outflows	8,00,000

(ii) Calculation of annual Profit Before Tax and depreciation

Particulars	Existing machine	New Machine	Differential
(1)	(2)	(3)	(4) = (3) – (2)
Annual output	36,000 units	72,000 units	36,000 units
	₹	₹	₹
(A) Sales revenue @ ₹ 10 per unit	3,60,000	7,20,000	3,60,000
(B) Cost of Operation			
Material @ ₹ 2 per unit	72,000	1,44,000	72,000
Labour			
Old = 1,800 x ₹ 20	36,000		
New = 1,800 x ₹ 30		54,000	18,000
Fixed overhead excluding depreciation	1,00,000	60,000	(40,000)
Total Cost (B)	2,08,000	2,58,000	50,000
Profit Before Tax and Depreciation (PBTd) (A – B)	1,52,000	4,62,000	3,10,000

(iii) Calculation of Net Present value on replacement of machine

Year	PBTd	Depreciation @ 20% WDV	PBT	Tax @ 30%	PAT	Net Cash flow	PVF @ 10%	PV
(1)	(2)	(3)	(4 = 2 – 3)	(5)	(6 = 4 - 5)	(7 = 6+3)	(8)	(9 = 7 x 8)
1	3,10,000	1,40,000	1,70,000	51,000	1,19,000	2,59,000	0.909	2,35,431.000
2	3,10,000	1,12,000	1,98,000	59,400	1,38,600	2,50,600	0.826	2,06,995.600
3	3,10,000	89,600	2,20,400	66,120	1,54,280	2,43,880	0.751	1,83,153.880
4	3,10,000	71,680	2,38,320	71,496	1,66,824	2,38,504	0.683	1,62,898.232
								7,88,478.712
Add: Release of net working capital at year end 4 (1,00,000 x 0.683)								68,300.000
Less: Initial Cash Outflow								8,00,000.000
NPV								56.778.712

Advice: Since the incremental NPV is positive, existing machine should be replaced.

Working Notes:

1. Calculation of Annual Output

Annual output = (Annual operating days x Operating hours per day) x output per hour

Existing machine = (300 x 6) x 20 = 1,800 x 20 = 36,000 units

New machine = (300 x 6) x 40 = 1,800 x 40 = 72,000 units

2. Base for incremental depreciation

Particulars	₹
WDV of Existing Machine	
Purchase price of existing machine	6,00,000
Less: Depreciation for year 1	1,20,000
Depreciation for year 2	<u>96,000</u>
WDV of Existing Machine (i)	3,84,000
Depreciation base of New Machine	
Purchase price of new machine	10,00,000
Add: WDV of existing machine	3,84,000
Less: Sales value of existing machine	3,00,000
Depreciation base of New Machine (ii)	10,84,000
Base for incremental depreciation [(ii) – (i)]	7,00,000

(Note: The above solution have been done based on incremental approach)

Alternatively, solution can be done based on Total Approach as below:

(i) Calculation of depreciation:

Existing Machine						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Opening balance	6,00,000	4,80,000	3,84,000	3,07,200	2,45,760	1,96,608.00
Less: Depreciation@ 20%	1,20,000	96,000	76,800	61,440	49,152	39,321.60
WDV	4,80,000	3,84,000	3,07,200	2,45,760	1,96,608	1,57,286.40

New Machine				
	Year 1	Year 2	Year 3	Year 4
Opening balance	10,84,000*	8,67,200	6,93,760	5,55,008.00
Less: Depreciation @ 20%	2,16,800	1,73,440	1,38,752	1,11,001.60
WDV	8,67,200	6,93,760	5,55,008	4,44,006.40

* As the company has several machines in 20% block, the value of Existing Machine from the block calculated as below shall be added to the new machine of ₹ 10,00,000:

WDV of existing machine at the beginning of the year ₹ 3,84,000

Less: Sale Value of Machine ₹ 3,00,000

WDV of existing machine in the block ₹ 84,000

Therefore, opening balance for depreciation of block = ₹ 10,00,000 + ₹ 84,000 = ₹ 10,84,000

(ii) Calculation of annual Cash inflow from Operation:

Particulars	EXISTING MACHINE			
	Year 3	Year 4	Year 5	Year 6
Annual output (300 operating days x 6 operating hours x 20 output per hour)	36,000 units	36,000 units	36,000 units	36,000 units
	₹	₹	₹	₹
(A) Sales revenue @ ₹ 10 per unit	3,60,000.00	3,60,000.00	3,60,000.00	3,60,000.00
(B) Less: Cost of Operation				
Material @ ₹ 2 per unit	72,000.00	72,000.00	72,000.00	72,000.00
Labour @ ₹ 20 per hour for (300 x 6) hours	36,000.00	36,000.00	36,000.00	36,000.00
Fixed overhead	1,00,000.00	1,00,000.00	1,00,000.00	1,00,000.00
Depreciation	76,800.00	61,440.00	49,152.00	39,321.60
Total Cost (B)	2,84,800.00	2,69,440.00	2,57,152.00	2,47,321.60
Profit Before Tax (A – B)	75,200.00	90,560.00	1,02,848.00	1,12,678.40
Less: Tax @ 30%	22,560.00	27,168.00	30,854.40	33,803.52
Profit After tax	52,640.00	63,392.00	71,993.60	78,874.88
Add: Depreciation	76,800.00	61,440.00	49,152.00	39,321.60
Add: Release of Working Capital				1,00,000.00
Annual Cash Inflows	1,29,440.00	1,24,832.00	1,21,145.60	2,18,196.48

Particulars	NEW MACHINE			
	Year 1	Year 2	Year 3	Year 4
Annual output (300 operating days x 6 operating hours x 40 output per hour)	72,000 units	72,000 units	72,000 units	72,000 units
	₹	₹	₹	₹
(A) Sales revenue @ ₹ 10 per unit	7,20,000.00	7,20,000.00	7,20,000.00	7,20,000.00
(B) Less: Cost of Operation				
Material @ ₹ 2 per unit	1,44,000.00	1,44,000.00	1,44,000.00	1,44,000.00
Labour @ ₹ 30 per hour for (300 x 6) hours	54,000.00	54,000.00	54,000.00	54,000.00
Fixed overhead	60,000.00	60,000.00	60,000.00	60,000.00
Depreciation	2,16,800.00	1,73,440.00	1,38,752.00	1,11,001.60

Total Cost (B)	4,74,800.00	4,31,440.00	3,96,752.00	3,69,001.60
Profit Before Tax (A – B)	2,45,200.00	2,88,560.00	3,23,248.00	3,50,998.40
Less: Tax @ 30%	73,560.00	86,568.00	96,974.40	1,05,299.52
Profit After Tax	1,71,640.00	2,01,992.00	2,26,273.60	2,45,698.88
Add: Depreciation	2,16,800.00	1,73,440.00	1,38,752.00	1,11,001.60
Add: Release of working Capital				2,00,000.00
Annual Cash Inflows	3,88,440.00	3,75,432.00	3,65,025.60	5,56,700.48

(iii) Calculation of Incremental Annual Cash Flow:

Particulars	Year 1 (₹)	Year 2 (₹)	Year 3 (₹)	Year 4 (₹)
Existing Machine (A)	1,29,440.00	1,24,832.00	1,21,145.60	2,18,196.48
New Machine (B)	3,88,440.00	3,75,432.00	3,65,025.60	5,56,700.48
Incremental Annual Cash Flow (B – A)	2,59,000.00	2,50,600.00	2,43,880.00	3,38,504.00

(iv) Calculation of Net Present value on replacement of machine:

Year	Incremental Annual Cash Flow (₹) (A)	Discounting factor @ 10% (B)	Present Value of Incremental Annual Cash Flow (₹) (A x B)
1	2,59,000.00	0.909	2,35,431.000
2	2,50,600.00	0.826	2,06,995.600
3	2,43,880.00	0.751	1,83,153.880
4	3,38,504.00	0.683	2,31,198.232
Total Incremental Inflows			8,56,778.712
Less: Net Initial Cash Outflow (Working note)			8,00,000.000
Incremental NPV			56,778.712

Advice: Since the incremental NPV is positive, existing machine should be replaced.

Working Note:

Calculation of Net Initial Cash Outflows:

Particulars	₹
Cost of new machine	10,00,000
Less: Sale proceeds of existing machine	3,00,000
Add: incremental working capital required (₹ 2,00,000 - ₹ 1,00,000)	1,00,000
Net Initial cash outflows	8,00,000

Q.2: Sadbhavna Limited is a manufacturer of computers. It wants to introduce artificial intelligence while making computers. It estimates that the annual savings from the artificial intelligence (AI) include a reduction of five employees with annual salaries of ₹ 3,00,000 each, ₹ 3,00,000 from reduction in production delays caused by inventory problem, reduction in lost sales ₹ 2,50,000 and ₹ 2,00,000 from billing issues.

The purchase price of the system for installation of artificial intelligence is ₹ 20,00,000 with installation cost of ₹ 1,00,000. The life of the system is 5 years and it will be depreciated on a straight-line basis. The salvage value is zero which will be its market value after the end of its life of five years.

However, the operation of the new system for AI requires two computer specialists with annual salaries of ₹ 5,00,000 per person. Also, the estimated maintenance and operating expenses of 1,50,000 is required.

The company's tax rate is 30% and its required rate of return is 12%.

From the above information:

- (i) **CALCULATE** the initial cash outflow and annual operating cash flow over its life of 5 years.
- (ii) Further, **EVALUATE** the project by using Payback Period, Net Present Value and Profitability Index.
- (iii) You are also **REQUIRED** to obtain the cash flows and NPV on the assumption that book salvage value for depreciation purposes is ₹ 2,00,000 even though the machine is having no real worth in terms of its resale value. Also, the book salvage value of ₹ 2,00,000 is allowed for tax purposes.

Also **COMMENT** on the acceptability of the project in (ii) and (iii) above.

[MTP Oct 21 (10 Marks)]

ANSWER:

(i) Project's Initial Cash Outlay

Cost	20,00,000
Installation Expenses	1,00,000
Total Cash Outflow	21,00,000
Depreciation per year = $21,00,000/5$	= 4,20,000

Project's Operating Cash Flows over its 5-year life

Savings (A)

Reduction in salaries (₹ 3,00,000 × 5)	15,00,000
Reduction in production delays	3,00,000
Reduction in lost sales	2,50,000
Gains due to timely billing	<u>2,00,000</u>
	22,50,000

Costs (B)

– Depreciation	4,20,000
– Additional Specialist Cost (₹ 5,00,000 × 2)	10,00,000
– Maintenance Cost	<u>1,50,000</u>
	15,70,000
Increase in Profit before tax (A – B)	6,80,000
Less: Tax @ 30%	<u>2,04,000</u>
Profit after tax	4,76,000

Cash Inflows = Profit after tax + Depreciation

$$= 4,76,000 + 4,20,000 = 8,96,000$$

(ii) Evaluation of the project by using NPV Method

Year	Cash Inflows	PVAF (12%, 5y)	Total PV
1-5	8,96,000	3.605	32,30,080
Less: Total Initial Cash Outflow			21,00,000
Net Present Value			11,30,080

Since NPV is positive, therefore, the project is acceptable.

Evaluation of the project by using Profitability Index Method

$$\begin{aligned}\text{Profitability Index} &= \text{Present Value of Cash Inflows} / \text{Present Value of Cash Outflows} \\ &= 32,30,080 / 21,00,000 \\ &= 1.538\end{aligned}$$

Since, the profitability index is more than 1, the project is acceptable.

Calculation of the Project's Payback*

Year	Net Cash Flow	Cumulative Cash Flow
1	8,96,000	8,96,000
2	8,96,000	17,92,000
3	8,96,000	26,88,000
4	8,96,000	35,84,000
5	8,96,000	44,80,000

Here, the payback period is 2 years plus a fraction of the 3rd year

$$\begin{aligned}\text{So, payback period} &= 2 \text{ years} + 3,08,000 / 8,96,000 \\ &= 2.34 \text{ years}\end{aligned}$$

* Payback period may also be solved directly as follows: $21,00,000 / 8,96,000 = 2.34$ years

(ii) Project's cash flows and NPV assuming that the book salvage for depreciation purpose is ₹ 2,00,000

$$\text{Depreciation} = (\text{₹ } 21,00,000 - 2,00,000) / 5 = 3,80,000$$

Cash Inflows for the years 1 to 5 are:

Savings (calculated as earlier)		22,50,000
Less: Costs		
– Depreciation	3,80,000	
– Additional Specialists cost	10,00,000	
– Maintenance cost	<u>1,50,000</u>	<u>15,30,000</u>
Profit before tax		7,20,000
Less: Tax @ 30%		<u>2,16,000</u>
Profit after tax		<u>5,04,000</u>
Cash Inflow (5,04,000 + 3,80,000)		<u>8,84,000</u>

Calculation of NPV

It may be noted that at the end of year 5, the book value of the project would be ₹ 2,00,000 but its realizable value is nil. So, the capital loss of ₹ 2,00,000 will result in tax savings of ₹ 60,000 (i.e., ₹ 2,00,000 × 30%), as the capital loss is available for tax purposes in view of the information given. Therefore, at the end of year 5, there would be an additional inflow of ₹ 60,000. The NPV may now be calculated as follows:

Year	Cash Flow (₹)	PVAF (12%, n)	PV
1-5	8,84,000	3.605	31,86,820
5	60,000	0.567	34,020
PV of inflows			32,20,840
Outflows			21,00,000
NPV			11,20,840

As the NPV of the project is positive, the project is acceptable.

Q.3: Superb Ltd. constructs customized parts for satellites to be launched by USA and Canada. The parts are constructed in eight locations (including the central headquarter) around the world. The Finance Director, Ms. Kuthrapali, chooses to implement video conferencing to speed up the budget process and save travel costs. She finds that, in earlier years, the company sent two officers from each location to the central headquarter to discuss the budget twice a year. The average travel cost per person, including air fare, hotels and meals, is ₹ 27,000 per trip. The cost of using video conferencing is ₹ 8,25,000 to set up a system at each location plus ₹ 300 per hour average cost of telephone time to transmit signals. A total 48 hours of transmission time will be needed to complete the budget each year. The company depreciates this type of equipment over five years by using straight line method. An alternative approach is to travel to local rented video conferencing facilities, which can be rented for ₹ 1,500 per hour plus ₹ 400 per hour average cost for telephone charges. You are Senior Officer of Finance Department. You have been asked by Ms. Kuthrapali to EVALUATE the proposal and SUGGEST if it would be worthwhile for the company to implement video conferencing. [MTP Nov 21 (10 Marks)]

ANSWER:

Option I : Cost of travel, in case Video Conferencing facility is not provided

Total Trip = No. of Locations × No. of Persons × No. of Trips per Person = $7 \times 2 \times 2 = 28$ Trips

Total Travel Cost (including air fare, hotel accommodation and meals) (28 trips × ₹ 27,000 per trip) = ₹ 7,56,000

Option II : Video Conferencing Facility is provided by Installation of Own Equipment at Different Locations

Cost of Equipment at each location (₹ 8,25,000 × 8 locations) = ₹ 66,00,000

Economic life of Machines (5 years). Annual depreciation (66,00,000/5) = ₹ 13,20,000

Annual transmission cost (48 hrs. transmission × 8 locations × ₹ 300 per hour) = ₹ 1,15,200

Annual cost of operation (13,20,000 + 1,15,200) = ₹ 14,35,200

Option III : Engaging Video Conferencing Facility on Rental Basis

Rental cost (48 hrs. × 8 location × ₹ 1,500 per hr) = ₹ 5,76,000

Telephone cost (48 hrs. × 8 locations × ₹ 400 per hr.) = ₹ 1,53,600

Total rental cost of equipment (5,76,000 + 1,53,600) = ₹ 7,29,600

Analysis: The annual cash outflow is minimum, if video conferencing facility is engaged on rental basis. Therefore, Option III is suggested.

Q.4: HMR Ltd. is considering replacing a manually operated old machine with a fully automatic new machine. The old machine had been fully depreciated for tax purpose but has a book value of ₹ 2,40,000 on 31st March 2021. The machine has begun causing problems with breakdowns and it cannot fetch more than ₹ 30,000 if sold in the market at present. It will have no realizable value after 10 years. The company has been offered ₹ 1,00,000 for the old machine as a trade in on the new machine which has a price (before allowance for trade in) of ₹ 4,50,000. The expected life of new machine is 10 years with salvage value of ₹ 35,000.

Further, the company follows straight line depreciation method but for tax purpose, written down value method depreciation @ 7.5% is allowed taking that this is the only machine in the block of assets.

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

	Old machine (₹)	New machine (₹)
Sales	8,10,000	8,10,000
Material cost	1,80,000	1,26,250
Labour cost	1,35,000	1,10,000
Variable overhead	56,250	47,500
Fixed overhead	90,000	97,500
Depreciation	24,000	41,500

PBT	3,24,750	3,87,250
Tax @ 30%	97,425	1,16,175
PAT	2,27,325	2,71,075

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

PV factors @ 10%:

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

[RTP Nov 21]

ANSWER:

Workings:

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

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

2. Calculation of Profit before tax as per books

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

Calculation of Incremental NPV

Year	PVF @ 10%	PBTd (₹)	Dep. @ 7.5% (₹)	PBT (₹)	Tax @ 30% (₹)	Cash Inflows (₹)	PV of Cash Inflows (₹)
	(1)	(2)	(3)	(4)	(5) = (4) 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 ($\text{₹ } 35,000 \times 0.386$)							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.5: Stand Ltd. is contemplating replacement of one of its machines which has become outdated and inefficient. Its financial manager has prepared a report outlining two possible replacement machines. The details of each machine are as follows: -

	Machine 1	Machine 2
Initial investment	₹ 12,00,000	₹ 16,00,000
Estimated useful life	3 years	5 years
Residual value	₹ 1,20,000	₹ 1,00,000
Contribution per annum	₹ 11,60,000	₹ 12,00,000
Fixed maintenance costs per annum	₹ 40,000	₹ 80,000
Other fixed operating costs per annum	₹ 7,20,000	₹ 6,10,000

The maintenance costs are payable annually in advance. All other cash flows apart from the initial investment assumed to occur at the end of each year. Depreciation has been calculated by straight line method and has been included in other fixed operating costs. The expected cost of capital for this project is assumed as 12% p.a..

Required:

- Which machine is more beneficial, using Annualized Equivalent Approach? Ignore tax.
- Calculate the sensitivity of your recommendation in part (i) changes in the contribution generated by machine 1.

Year	1	2	3	4	5	6
PVIF _{0.12,t}	0.893	0.797	0.712	0.636	0.567	0.507
PVIFA _{0.12,t}	0.893	1.690	2.402	3.038	3.605	4.112

[Dec 21 (10 Marks)]

ANSWER:

- Calculation of Net Cash Flows
Machine 1

Other fixed operating costs (excluding depreciation) = $7,20,000 - [(12,00,000 - 1,20,000)/3]$
= ₹ 3,60,000

Year	Initial Investment	Contribution	Fixed maintenance costs	Other fixed operating Costs (excluding depreciation)	Residual Value	Net Cash flow
	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)
0	(12,00,000)		(40,000)			(12,40,000)
1		11,60,000	(40,000)	(3,60,000)		7,60,000
2		11,60,000	(40,000)	(3,60,000)		7,60,000
3		11,60,000		(3,60,000)	1,20,000	9,20,000

Machine 2

Other fixed operation costs (excluding depreciation) = $6,10,000 - [16,00,000 - 1,00,000]/5$ = ₹ 3,10,000

Year	Initial Investment	Contribution	Fixed maintenance costs	Other fixed operating Costs (excluding depreciation)	Residual Value	Net Cash flow
	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)
0	(16,00,000)		(80,000)			(16,80,000)
1		12,00,000	(80,000)	(3,10,000)		8,10,000
2		12,00,000	(80,000)	(3,10,000)		8,10,000
3		12,00,000	(80,000)	(3,10,000)		8,10,000
4		12,00,000	(80,000)	(3,10,000)		8,10,000
5		12,00,000		(3,10,000)	1,00,000	9,90,000

Calculation of Net Present Value

		Machine 1		Machine 2	
Year	12% discount factor	Net cash flow (₹)	Present value (₹)	Net cash flow (₹)	Present value (₹)
0	1.000	(12,40,000)	(12,40,000)	(16,80,000)	(16,80,000)
1	0.893	7,60,000	6,78,680	8,10,000	7,23,330
2	0.797	7,60,000	6,05,720	8,10,000	6,45,570

3	0.712	9,20,000	6,55,040	8,10,000	5,76,720
4	0.636			8,10,000	5,15,160
5	0.567			9,90,000	5,61,330
NPV @ 12%			6,99,440		13,42,110
PVAF @ 12%			2.402		3.605
Equivalent Annualized Criterion			2,91,190.674		3,72,291.262

Recommendation: Machine 2 is more beneficial using Equivalent Annualized Criterion.

(ii) Calculation of sensitivity of recommendation in part (i) to changes in the contribution generated by machine 1

Defference in Equivalent Annualized Criterion of Machines required for changing the recommendation in part (i) = 3,72,291.262 – 2,91,190.674 = ₹ 81,100.588

$$\therefore \text{Sensitivity relating to contribution} = \frac{\text{₹}81,100.588}{\text{₹}11,60,000.00} \times 100 = 6,991 \text{ or } 7\% \text{ yearly}$$

Alternatively,

The annualized equivalent cash flow for machine 1 is lower by ₹ (3,72,291.262– 2,91,190.674) = ₹81,100.588 than for machine 2. Therefore, it would need to increase contribution for complete 3 years before the decision would be to invest in this machine.

$$\text{Sensitivity w.r.t contribution} = 81,100.588 / (11,60,000 \times 2.402) \times 100 = 2.911\%$$

Q.6: PRI Ltd. and SHA Ltd. are identical, however, their capital structure (in market-value terms) differs as follows:

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

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

- (a) (i) If Mr. Rhi, owns 6% of the equity shares of PRI Ltd., Determine his return if the Company has net operating income of ₹ 9,00,000 and the overall capitalization rate of the company (K_0) is 18%.
- (ii) CALCULATE the implied required rate of return on equity of PRI Ltd.
- (b) SHA Ltd. Has the same net operating income as PRI Ltd.
- (i) CALCULATE the implied required equity return of SHA Ltd.
- (ii) ANALYSE why does it differ from that of PRI Ltd. [MTP March 22 (10 Marks)]

ANSWER:

$$\text{Value of PRI Ltd.} = \frac{\text{NOI}}{K_0} = \frac{\text{₹}9,00,000}{18\%} = \text{₹}50,00,000$$

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

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

(ii) Implied required rate of return on equity of PRI Ltd. = $\frac{₹ 6,60,000}{₹ 20,00,000} = 33\%$

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

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

Implied required rate of return on equity = $\frac{₹ 8,20,000}{₹ 40,00,000} = 20.5\%$

(ii) Implied required rate of return on equity of SHA Ltd. is lower than that of PRI Ltd. because SHA Ltd. uses less debt in its capital structure. As the equity capitalisation is a linear function of the debt-to-equity ratio when we use the net operating income approach, the decline in required equity return offsets exactly the disadvantage of not employing so much in the way of “cheaper” debt funds.

Q.7: A Manufacturing company is presently paying a garbage disposer company ₹ 0.50 per kilogram to dispose-off the waste resulting from its manufacturing operations. At normal operating capacity, the waste is about 2,00,000 kilograms per year.

After spending ₹ 1,20,000 on research, the company discovered that the waste could be sold for ₹ 5 per kilogram if it was processed further. Additional processing would, however, require an investment of ₹ 12,00,000 in new equipment, which would have an estimated life of 10 years with no salvage value. Depreciation would be calculated by straight line method.

No Change in the present selling and administrative expenses is expected except for the costs incurred in advertising ₹ 40,000 per year, if the new product is sold. Additional processing costs would include variable cost of ₹ 2.50 per kilogram of waste put into process along with fixed cost of ₹ 60,000 per year (excluding Depreciation).

There will be no losses in processing, and it is assumed that the total waste processed in a given year will be sold in the same year. Estimates indicate that 2,00,000 kilograms of the product could be sold each year.

The management when confronted with the choice of disposing off the waste or processing it further and selling it, seeks your **ADVICE** Which alternative would you **RECOMMEND**? Assume that the firm's cost of capital is 15% and it pays on an average 50% Tax on its income.

Consider Present value of Annuity of ₹ 1 per year @ 15% p.a. for 10 years as 5.019.

[MTP March 22 (10 Marks)]

ANSWER:

Evaluation of Alternatives:

Savings in disposing off the waste

Particulars	(₹)
Outflow (2,00,000 × ₹ 0.50)	1,00,000
Less: tax savings @ 50%	50,000
Net Outflow per year	50,000

Calculation of Annual Cash Inflows in Processing of waste Material

Particulars	Amount (₹)	Amount (₹)
Sale value of waste (₹ 5 × 2,00,000 kilograms)		10,00,000
Less: Variable processing cost (₹ 2.50 × 2,00,000 kilograms)	5,00,000	
Less: Fixed processing cost	60,000	
Less: Advertisement cost	40,000	
Less: Depreciation	1,20,000	(7,20,000)
Earnings before tax (EBT)		2,80,000
Less: Tax @ 50%		(1,40,000)
Earnings after tax (EAT)		1,40,000
Add: Depreciation		1,20,000
Annual Cash inflows		2,60,000

Total Annual Benefits = Annual Cash inflows + Net savings (adjusting tax) in disposal cost
= ₹ 2,60,000 + ₹ 50,000 + 3,10,000

Calculation of Net Present Value

Year	Particulars	Amount (₹)
0	Investment in new equipment	(12,00,000)
1 to 10	Total Annual benefits x PVAF _(10 years, 15%) ₹ 3,10,000 x 5.019	15,55,890
	Net Present Value	3,55,890

Recommendation: Processing of waste is a better option as it gives a positive Net Present Value.

Note: Research Cost of ₹ 1,20,000 is not relevant for decision making as it is sunk cost.

Q.8: 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

[RTP May 22]

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

		(₹)
(i)	Cost of new machine now	18,00,000
	Add: PV of annual repairs @ ₹ 2,00,000 per annum for 8 years (₹ 2,00,000 × 4.4873)	8,97,460
		26,97,460
	Less: PV of salvage value at the end of 8 years (₹ 4,00,000 × 0.3269)	1,30,760
		25,66,700
	Equivalent annual cost (EAC) (₹ 25,66,700/4.473)	5,71,992

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

Scenario	Year	Cash Flow	PV @ 15%	PV
		(₹)		(₹)
Replace Immediately	0	(5,71,992)	1.00	(5,71,992)
	0	8,00,000	1.00	8,00,000
				2,28,008
Replace in one year	1	(5,71,992)	0.8696	(4,97,404)
	1	(2,00,000)	0.8696	(₹1,73,920)
	1	5,00,000	0.8696	4,34,800
				(2,36,524)
Replace in two years	1	(2,00,000)	0.8696	(1,73,920)
	2	(5,71,992)	0.7561	(4,32,483)
	2	(4,00,000)	0.7561	(3,02,440)
	2	3,00,000	0.7561	2,26,830
				(6,82,013)
Replace in three years	1	(2,00,000)	0.8696	(1,73,920)
	2	(4,00,000)	0.7561	(3,02,440)
	3	(5,71,992)	0.6575	(3,76,085)
	3	(6,00,000)	0.6575	(3,94,500)
	3	2,00,000	0.6575	1,31,500
				(11,15,445)

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

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

Q.9: Following data has been available for a capital project:

Annual cash inflows ₹ 1,00,000

Useful life 4 years

Salvage value 0

Internal rate of return 12%

Profitability index 1.064

You are required to CALCULATE the following for this project:

- (i) Cost of project
- (ii) Cost of capital
- (iii) Net present value
- (iv) Payback period

PV factors at different rates are given below:

Discount Factor	12%	11%	10%	9%
1 year	0.893	0.901	0.909	0.917
2 year	0.797	0.812	0.826	0.842
3 year	0.712	0.731	0.751	0.772
4 year	0.636	0.659	0.683	0.708

ANSWER

- (i) Cost of the Project

At 12% internal rate of return (IRR), the sum of total cash inflows = cost of the project i.e. initial cash outlay

Annual cash inflows = ₹ 1,00,000

Useful life = 4 years

Considering the discount factor table @ 12%, cumulative present value of cash inflows for 4 years is 3.038 (0.893 + 0.797 + 0.712 + 0.636).

Hence, total cash inflows for 4 years for the Project is:

₹ 1,00,000 × 3.038 = ₹ 3,03,800

Hence, Cost of the Project = ₹ 3,03,800

(ii) **Cost of Capital**

$$\text{Profitability index} = \frac{\text{Sum of Discounted Cash inflows}}{\text{Cash of the project}}$$

$$1.064 = \frac{\text{Sum of Discounted Cash inflows}}{\text{₹ 3,03,800}}$$

$$\therefore \text{Sum of Discounted Cash inflows} = \text{₹ 3,23,243.20}$$

$$\text{Since, Annual Cash Inflows} = \text{₹ 1,00,000}$$

$$\text{Hence, cumulative discount factor for 4 years} = \frac{\text{₹ 3,23,243.20}}{\text{₹ 1,00,000}} = 3.232$$

From the discount factor table, at discount rate of 9% the cumulative discount factor for 4 years is 3.239 (0.917 + 0.842 + 0.772 + 0.708).

Hence, Cost of Capital = 9% (approx.)

(iii) **Net Present Value (NPV)**

NPV = Sum of Present Values of Cash inflows - Cost of the Project

$$= \text{₹ 3,23,243.20} - \text{₹ 3,03,800} = \text{₹ 19,443.20}$$

(iv) **Payback Period**

$$\text{Payback period} = \frac{\text{Cost of the Project}}{\text{Annual Cash Inflows}} = \frac{\text{₹ 3,03,800}}{\text{₹ 1,00,000}} = 3.038 \text{ years}$$

Q.10: Lockwood Limited wants to replace its old machine with a new automatic machine. Two models A and B are available at the same cost of ₹ 5 lakhs each. Salvage value of the old machine is ₹ 1 lakh. The utilities of the existing machine can be used if the company purchases model A. Additional cost of utilities to be purchased in this case will be ₹ 1 lakh. If the company purchases B, then all the existing utilities will have to be replaced with new utilities costing ₹ 2 lakhs. The salvage value of the old utilities will be ₹ 0.20 lakhs. The cash flows are expected to be:

Year	Cash inflows of A (₹)	Cash inflows of B (₹)	P.V. Factor @ 15%
1	1,00,000	2,00,000	0.870
2	1,50,000	2,10,000	0.756
3	1,80,000	1,80,000	0.658
4	2,00,000	1,70,000	0.572
5	1,70,000	40,000	0.497
Salvage Value the end of year 5	50,000	60,000	

The targeted return on capital is 15%. You are required to (i) COMPUTE, for the two machines separately, net present value, discounted payback period and desirability factor and (ii) STATE which of the machines is to be selected?

ANSWER

Working:

Calculation of cash - outflow at year zero

Particulars	A (₹)	B (₹)
Cost of Machine	5,00,000	5,00,000
Cost of Utilities	1,00,000	2,00,000
Salvage value of Old Machine	(1,00,000)	(1,00,000)
Salvage of value Old utilities	--	(20,000)
Total Expenditure (Net)	5,00,000	5,80,000

(i) (a) Calculation of NPV

Year	PV Factor @ 15%	Machine A		Machine B	
		Cash Inflows (₹)	Discounted value of inflows (₹)	Cash Inflows (₹)	Discounted value of inflows (₹)
0	1.000	(5,00,000)	(5,00,000)	(5,80,000)	(5,80,000)
1	0.870	1,00,000	87,000	2,00,000	1,74,000
2	0.756	1,50,000	1,13,400	2,10,000	1,58,760
3	0.658	1,80,000	1,81,440	1,80,000	1,18,440
4	0.572	2,00,000	1,14,400	1,70,000	97,240
5	0.497	1,70,000	84,490	40,000	19,880
Salvage	0.497	50,000	24,850	60,000	29,820
Net Present Value			42,580		18,140

Since the Net present Value of both the machines is positive both are acceptable.

(b) Discounted Pay-back Period

(Amount in ₹)

Year	Machine A		Machine B	
	Discounted cash inflows	Cumulative Discounted cash inflows	Discounted cash inflows	Cumulative Discounted cash inflows
1	87,000	87,000	1,74,000	1,74,000
2	1,13,400	2,00,400	1,58,760	3,32,760
3	1,18,440	3,18,840	1,18,440	4,51,200
4	1,14,400	4,33,240	97,240	5,48,440
5	1,09,340*	5,42,580	49,700*	5,98,140

* Includes salvage value.

Discounted Payback Period (For A and B):

$$\text{Machine A} = 4 \text{ years} + \left(\frac{5,00,000 - 4,33,240}{1,09,340} \right) = 4.61 \text{ years}$$

$$\text{Machine B} = 4 \text{ years} + \left(\frac{5,80,000 - 5,48,440}{49,700} \right) = 4.63 \text{ years}$$

(c) Desirability Factor or Profitability Index:

$$\text{Profitability Index (PI)} = \frac{\text{Sum of present value of net cash inflow}}{\text{Initial cash outflow}}$$

$$\text{Machine A} = \frac{\text{₹ } 5,42,580}{\text{₹ } 5,00,000} = 1.08; \quad \text{Machine B} = \frac{\text{₹ } 5,98,140}{\text{₹ } 5,80,000} = 1.03$$

- (ii) Since the absolute surplus in the case of A is more than B and also the desirability factor, it is better to choose A.

The discounted payback period in both the cases is almost same, also the net present value is positive in both the cases, but the desirability factor (profitability index) is higher in the case of Machine A, it is therefore better to choose Machine A.

Q.11: Hindlever Company is considering a new product line to supplement its range of products. It is anticipated that the new product line will involve cash investments of ₹ 7,00,000 at time 0 and ₹ 10,00,000 in year 1. After-tax cash inflows of ₹ 2,50,000 are expected in year 2, ₹ 3,00,000 in year 3, ₹ 3,50,000 in year 4 and ₹ 4,00,000 each year thereafter through year 10. Although the product line might be viable even after year 10, the company prefers to be conservative and end all calculations at that time.

- (a) If the required rate of return is 15 per cent, COMPUTE net present value of the project. Is it acceptable?
 (b) ANALYSE what would be the case if the required rate of return were 10 per cent.
 (c) CALCULATE its internal rate of return.
 (d) COMPUTE the project's payback period.

ANSWER

- (a) Computation of NPV at 15% discount rate

Year	Cash Flow	Discount Factor (15%)	Present value
	(₹)		(₹)
0	(7,00,000)	1.000	(7,00,000)
1	(10,00,000)	0.870	(8,70,000)
2	2,50,000	0.756	1,89,000
3	3,00,000	0.658	1,97,400
4	3,50,000	0.572	2,00,200
5 - 10	4,00,000	2.163	8,65,200
Net Present Value			(1,18,200)

As the net present value is negative, the project is unacceptable.

- (b) Computation of NPV if discount rate would be 10% discount rate

Year	Cash Flow	Discount Factor (15%)	Present value
	(₹)		(₹)
0	(7,00,000)	1.000	(7,00,000)
1	(10,00,000)	0.909	(9,09,000)
2	2,50,000	0.826	2,06,500
3	3,00,000	0.751	2,25,300
4	3,50,000	0.683	2,39,050
5 - 10	4,00,000	2.974	11,89,600
Net Present Value			2,51,450

Since NPV = ₹ 2,51,450 is positive, hence the project would be acceptable.

(c) Calculation of IRR:

$$\begin{aligned} \text{IRR} &= \text{LR} + \frac{\text{NPVatLR}}{\text{NPVatLR} - \text{NPVatHR}} \times (\text{HR} - \text{LR}) \\ &= 10\% + \frac{\text{₹ } 2,51,450}{\text{₹ } 2,51,450 - (-) 1,18,200} \times (15\% - 10\%) \\ &= 10\% + 3.4012 \text{ or } 13.40\% \end{aligned}$$

(d) Computation of Pay-back period of the project:

Payback Period = 6 years:

$$- \text{₹ } 7,00,000 - \text{₹ } 10,00,000 + \text{₹ } 2,50,000 + \text{₹ } 3,00,000 + \text{₹ } 3,50,000 + \text{₹ } 4,00,000 + \text{₹ } 4,00,000 = 0$$

Q.12: Elite Cooker Company is evaluating three investment situations: (1) Produce a new line of aluminium skillets, (2) Expand its existing cooker line to include several new sizes, and (3) Develop a new, higher-quality line of cookers. If only the project in question is undertaken, the expected present values and the amounts of investment required are:

Project	Investment required ₹	Present value of Future Cash-Flows ₹
1	2,00,000	2,90,000
2	1,15,000	1,85,000
3	2,70,000	4,00,000

If projects 1 and 2 are jointly undertaken, there will be no economies; the investments required and present values will simply be the sum of the parts. With projects 1 and 3, economies are possible in investment because one of the machines acquired can be used in both production processes. The total investment required for projects 1 and 3 combined is ₹ 4,40,000. If projects 2 and 3 are undertaken, there are economies to be achieved in marketing and producing the products but not in investment. The expected present value of future cash flows for projects 2 and 3 is ₹ 6,20,000. If all three projects are undertaken simultaneously, the economies noted will still hold. However, a ₹ 1,25,000 extension on the plant will be necessary, as space is not available for all three projects. CALCULATE NPV of the projects and STATE which project or projects should be chosen?

ANSWER

Calculation of NPV

Project	Investment Required ₹	Present value of Future Cash Flows ₹	Net Present value ₹
1	2,00,000	2,90,000	90,000
2	2,00,000	1,85,000	70,000
3	2,70,000	4,00,000	1,30,000
1 and 2	3,15,000	4,75,000	1,60,000
2 and 3	3,85,000	6,20,000	2,35,000
1, 2 and 3 (Refer Working Note)	6,80,000*	9,10,000	2,30,000

Working Note:

(i) Total Investment required if all the three projects are undertaken simultaneously:

	(₹)
Project 1 & 3	4,40,000
Project 2	1,15,000
Plant extension cost	1,25,000
Total	6,80,000

(ii) Total of Present value of Cash flows if all the three projects are undertaken simultaneously:

	(₹)
Project 2 & 3	6,20,000
Project 1	2,90,000
Total	9,10,000

Project 1 and 3 should be chosen, as they provide the highest net present value.

Q.13: Cello Limited is considering buying a new machine which would have a useful economic life of five years, a cost of ₹ 1,25,000 and a scrap value of ₹ 30,000, with 80 per cent of the cost being payable at the start of the project and 20 per cent at the end of the first year. The machine would produce 50,000 units per annum of a new product with an estimated selling price of ₹ 3 per unit. Direct costs would be ₹ 1.75 per unit and annual fixed costs, including depreciation calculated on a straight-line basis, would be ₹ 40,000 per annum.

In the first year and the second year, special sales promotion expenditure, not included in the above costs, would be incurred, amounting to ₹ 10,000 and ₹ 15,000 respectively.

CALCULATE NPV of the project for investment appraisal, assuming that the company's cost of capital is 10 percent.

ANSWER**Calculation of Net Cash flow**

Contribution = $(3.00 - 1.75) \times 50,000$ = ₹ 62,500

Fixed costs = $40,000 - [(1,25,000 - 30,000)/5]$ = ₹ 21,000

Year	Capital (₹)	Contribution (₹)	Fixed costs (₹)	Adverts (₹)	Net cash flow (₹)
0	(1,00,000)	--	--	--	(1,00,000)
1	(25,000)	62,500	(21,000)	(10,000)	6,500
2	--	62,500	(21,000)	(15,000)	26,500
3	--	62,500	(21,000)	--	41,500
4	--	62,500	(21,000)	--	41,500
5	30,000	62,500	(21,000)	--	71,500

Calculation of Net Present Value

Year	Net cash flow	10% discount factor	Present value (₹)
------	---------------	---------------------	-------------------

	(₹)		
0	(1,00,000)	1.000	(1,00,000)
1	6,500	0.909	5,909
2	26,500	0.826	21,889
3	41,500	0.751	31,167
4	41,500	0.683	28,345
5	71,500	0.621	44,402
NPV			31,712

The net present value of the project is ₹ 31,712.

Q.14: Ae Bee Cee Ltd. is planning to invest in machinery, for which it has to make a choice between the two identical machines, in terms of Capacity, 'X' and 'Y'. Despite being designed differently, both machines do the same job. Further, details regarding both the machines are given below:

Particulars	Machine 'X'	Machine 'Y'
Purchase Cost of the Machine (₹)	15,00,000	10,00,000
Life (years)	3	2
Running cost per year (₹)	4,00,000	6,00,000

The opportunity cost of capital is 9%

You are required to IDENTIFY the machine which the company should buy?

The present value (PV) factors at 9% are:

Year	t_1	t_2	t_3
$PVIF_{0.09t}$	0.917	0.842	0.772

ANSWER

Statement Showing the Evaluation of Two Machines

	Particulars	Machine 'X'	Machine 'Y'
(i)	Purchase Cost	₹ 15,00,000	₹ 10,00,000
(ii)	Life of Machine	3 years	2 years
(iii)	Running Cost of Machine per year	₹ 4,00,000	₹ 6,00,000
(iv)	PVIFA (0.09, 3)	2.531	
	PVIFA (0.09, 2)		1.759
(v)	PV of Running Cost of Machine {(iii) × (iv)}	₹ 10,12,400	₹ 10,55,400
(vi)	Cash outflows of Machine {(i) + (v)}	₹ 25,12,400	₹ 20,55,400
(vii)	Equivalent PV of Annual Cash outflow {(vi) / (iv)}	₹ 9,92,651	₹ 11,68,505

Recommendation: Ae Bee Cee Ltd. should buy Machine 'X' since equivalent annual cash outflow is less than that of Machine "Y".

Q.15: 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 be ₹ 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

ANSWER

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

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

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

Since, Net Present Value is negative; therefore, this option is not to be considered.

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

$$\text{NPV (in ₹)} = +10,000 - 9,874.7 = +125.3$$

In this case, Net Present Value is positive but very small; therefore, this option may not be advisable.

Option II: Purchase Machinery and Replace Part at the end of Year 2.

$$\begin{aligned}
 \text{NPV (in ₹)} &= -1,00,000 + \frac{36,000}{(1.1)} + \frac{36,000}{(1.1)^2} + \frac{36,000}{(1.1)^3} - \frac{20,000}{(1.1)} + \frac{25,000}{(1.1)^3} \\
 &= -1,00,000 + 36,000 (0.9091 + 0.8264 + 0.7513) - (30,800 \times 0.8264) + (54,000 \times 0.6830) \\
 &= -1,00,000 + 36,000 (2.4868) - 25,453.12 + 36,882 \\
 &= -1,00,000 + 89,524.8 - 25,453.12 + 36,882 \\
 \text{NPV} &= +953.68
 \end{aligned}$$

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.16: NavJeevani hospital is considering to purchase a machine for medical projectional radiography which is priced at ₹ 2,00,000. The projected life of the machine is 8 years and has an expected salvage value of ₹ 18,000 at the end of 8th year. The annual operating cost of the machine is ₹ 22,500. It is expected to generate revenues of ₹ 1,20,000 per year for eight years. Presently, the hospital is outsourcing the radiography work to its neighbour Test Center and is earning commission income of ₹ 36,000 per annum, net of taxes.

Required:

ANALYSE whether it would be profitable for the hospital to purchase the machine. Give your recommendation under:

(i) Net Present Value method

(ii) Profitability Index method

Consider tax @ 30%. PV factor at 10% are given below:

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467

ANSWER

Determination of Cash inflows

Particulars	(₹)
Sales Revenue	1,20,000
Less: Operating Cost	22,500
	97,500
Less: Depreciation (₹ 2,00,000 - ₹ 18,000)/8	22,750
Less: Tax @ 30%	22,425
Earnings after Tax (EAT)	52,325
Add: Depreciation	22,750
Cash inflow after tax per annum	75,075
Less: Loss of Commission Income	36,000
Net Cash inflow after tax per annum	39,075
In 8 th Year:	
New Cash inflow after tax	39,075
Add: Salvage Value of Machine	18,000
Net Cash inflow in year 8	57,075

(i) Calculation of Net Present Value (NPV)

Year	CFAT (₹)	PV Factor @ 10%	Present Value of Cash inflows (₹)
1 to 7	39,075	4.867	1,90,178.03
8	57,075	0.467	26,654.03
			2,16,832.06
		Less: Cash Outflows	2,00,000.00
		NPV	16,832.06

(ii) Calculation of Profitability Index

$$\text{Profitability Index} = \frac{\text{Sum of discounted cash in flows}}{\text{Present value of cash out flows}} = \frac{2,16,832.06}{2,00,000} = 1.084$$

Advise: Since the net present value (NPV) is positive and profitability index is also greater than 1, the hospital may purchase the machine.

Q.17: 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
Units per year	0.893	0.797	0.712	0.636	0.567	0.507	0.452	0.404

ANSWER

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	48.25	174.95	52.485	122.465	48.25	170.715
6 - 8	432.00	259.20	36	48.25	88.55	25.565	61.985	48.25	110.235

(b) Calculation of Depreciation:

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

- On additional 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
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

(₹ in lakh)

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

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

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

(₹ in lakh)

Year	1	2	3	4
Sales	966	966	1,254	1,254
Material consumption	90	120	255	255
Wages	225	225	255	300
Other expenses	120	135	162	210
Other expenses	120	135	162	210
Factory overheads	165	180	330	435
Depreciation (as per income tax rules)	150	114	84	63

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

Consider cost of capital @ 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.

ANSWER

Statement of Operating Profit from processing of waste

Year	1	2	3	4
Sales (A)	966	966	1,254	1,254
Material consumption	90	120	255	255
Wages	180	195	255	300
Other expenses	120	135	162	210
Factory overheads (insurance only)	90	90	90	90
Loss of rent on storage space (opportunity cost)	30	30	30	30
Depreciation (as per income tax rules)	150	114	84	63
Total Cost (B)	660	684	876	948
Profit {(C) = (A) - (B)}	306	282	378	306
Less: Tax (30%)	91.8	84.6	113.4	91.8
Profit after tax (PAT)	214.2	197.4	264.6	214.2

Statement of Incremental Cash Flows

(₹ in lakh)

Year	0	1	2	3	7
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	--	306	282	378	306
Depreciation added back	--	150	114	84	63
Tax on profits	--	(91.8)	(84.6)	(113.4)	(91.8)
Profit on sale of machinery	--	--	--	--	15
Total incremental cash flows	(750)	364.2	416.4	4.53.6	562.2
Present value factor	1.00	0.877	0.769	0.674	0.592
Present value of cash flows	(750)	318.40	320.21	305.73	332.82
Net present value	528.16				

Advice: Since the net present value of cash flows is ₹ 528.16 lakh which is positive the management should install the machine for processing the waste.

Notes:

1. Material stock increases 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.19: Xavly Ltd. has a machine which has been in operation for 3 years. The machine has a remaining estimated useful life of 5 years with no salvage value in the end. Its current market value is ₹ 2,00,000. The company is considering a proposal to purchase a new model of machine to replace the existing machine. The relevant information is as follows:

	Existing Machine	New Machine
Cost of machine	₹ 3,30,000	₹ 10,00,000
Estimated life	8 years	5 years
Salvage value	Nil	₹ 40,000
Annual output	30,000 units	75,000 units
Selling price per unit	₹ 15	₹ 15
Annual operating hours	3,000	3,000
Material cost per unit	₹ 4	₹ 4
Labour cost per hour	₹ 40	₹ 70
Indirect cash cost per annum	₹ 50,000	₹ 65,000

The company uses written down value of depreciation @ 20% and it has several other machines in the block of assets. The Income tax rate is 30 per cent and Xavly Ltd. does not make any investment, if it yields less than 12 per cent.

ADVISE Xavly Ltd. whether the existing machine should be replaced or not.

PV factors @12%:

Year	1	2	3	4	5
PVF	0.893	0.797	0.712	0.636	0.567

ANSWER

(i) Calculation of Net Initial Cash Outflows:

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

(ii) Calculation of Base for depreciation

Particulars	₹
WDV of Existing Machine	
Cost of existing machine	3,30,000
Less: Depreciation for year 1	66,000
Depreciation for Year 2	52,800
Depreciation for Year 3	<u>42,240</u>
WDV of Existing Machine (i)	1,68,960
Depreciation base of new Machine	
Cost of new machine	10,00,000
Add: WDV of exiting machine	1,68,960
Less: Sales value of existing machine	2,00,000
Depreciation base of New Machine (ii)	9,68,960
Base for incremental depreciation [(ii) - (i)]	8,00,000

(iii) Calculation of annual profit Before Tax and depreciation

Particulars	Existing machine	New Machine	Differential
(1)	(2)	(3)	(4) = (3) - (2)
Annual output	30,000 units	75,000 units	45,000 units
	₹	₹	₹
(A) Sales revenue @ ₹ 15 per unit	4,50,000	11,25,000	6,75,000
(B) Less: Cost of Operation			
Material @ ₹ 4 per unit labour	1,20,000	3,00,000	1,80,000

Old = 3,000 x ₹ 40	1,20,000		90,000
New = 3,000 x ₹ 70		2,10,000	
Indirect cash cost	50,000	65,000	15,000
Total Cost (B)	2,90,000	5,75,000	2,85,000
Profit before Tax and depreciation (PBTd) (A - B)	1,60,000	5,50,000	3,90,000

(iv) Calculation of Incremental Net Present Value:

Year	PBTd	Dep.@20%	PBT	Tax @30%	Net cash flow	PVF@12%	PV
(1)	(2)	(3)	(4 = 2-3)	(5)	(6 = 4-5+3)	(7)	(8=6 x 7)
1	3,90,000	1,60,000	2,30,000	69,000.00	3,21,000.00	0.893	2,86,653.00
2	3,90,000	1,28,000	2,62,000	78,600.00	3,11,400.00	0.797	2,48,185.80
3	3,90,000	1,02,400	2,87,600	86,280.00	3,03,720.00	0.712	2,16,248.64
4	3,90,000	81,920	3,08,080	92,424.00	2,97,576.00	0.636	1,89,258.34
5	3,90,000	65,536	3,24,464	97,339.20	2,92,660.80	0.567	1,65,938.67
							11,06,284.45
Add: PV of Salvage Value of new machine (₹ 40,000 x 0.567)							22,680.00
Less: Initial Cash Outflow							8,00,000.00
NPV							3,28,964.45

Advise: Since the incremental NPV is positive, existing machine should be replaced.

Q.20: A & Co. is contemplating whether to replace an existing machine or to spend money on overhauling it. A & Co. currently pays no taxes. The replacement machine costs ₹ 90,000 now and requires maintenance of ₹ 10,000 at the end of every year for eight years. At the end of eight years it would have a salvage value of ₹ 20,000 and would be sold. The existing machine requires increasing amounts of maintenance each year and its salvage value falls each year as follows:

Year	Maintenance (₹)	Salvage (₹)
Present	0	40,000
1	10,000	25,000
2	20,000	15,000
3	30,000	10,000
4	40,000	0

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

REQUIRED:

When should the company replace the machine?

(Note: Present value of an annuity of Re. 1 per period for 8 years at interest rate of 15% : 4.4873; present value of Re. 1 to be received after 8 years at interest rate of 15% : 0.3269).

ANSWER

Equivalent cost of (EAC) of new machine

(i)	Cost of new machine now	90,000
	Add: PV of annual repairs @ ₹ 10,000 per annum for 8 years (₹ 10,000 x 4.4873)	44.873
		1,34,873
	Less: PV of salvages value at the end of 8 years (₹ 20,000 x 0.3269)	6,538
		1,28,335
	Equivalent annual cost (EAC) (₹ 1,28,335/4.4873)	28,600

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	(28,600)	1.00	(28,600)
		40,000	1.00	<u>40,000</u>
				<u>11,400</u>
Replace in one year	1	(28,600)	0.870	(24,882)
	1	(10,000)	0.870	(8,700)
	1	25,000	0.870	<u>21,750</u>
				<u>(11,832)</u>
Replace in two years	1	(10,000)	0.870	(8,700)
	2	(28,600)	0.756	(21,622)
	2	(20,000)	0.756	(15,120)
	2	15,000	0.756	<u>11,340</u>
				<u>(34,102)</u>
Replace in three years	1	(10,000)	0.870	(8,700)
	2	(20,000)	0.756	(15,120)
	3	(28,600)	0.658	(18,819)
	3	(30,000)	0.658	(19,740)
	3	10,000	0.658	<u>6,580</u>
				<u>(55,799)</u>
Replace in four years	1	(10,000)	0.870	(8,700)
	2	(20,000)	0.756	(15,120)
	3	(30,000)	0.658	(19,740)
	4	(28,600)	0.572	(16,359)
	4	(40,000)	0.572	<u>(22,880)</u>
				<u>(82,799)</u>

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

Q.21: A chemical company is presently paying an outside firm ₹ 1 per gallon to dispose off the waste resulting from its manufacturing operations. At normal operating capacity, the waste is about 50,000 gallons per year.

After spending ₹ 60,000 on research, the company discovered that the waste could be sold for ₹ 10 per gallon if it was processed further. Additional processing would, however, require an investment of ₹ 6,00,000 in new equipment, which would have an estimated life of 10 years with no salvage value. Depreciation would be calculated by straight line method.

Except for the costs incurred in advertising ₹ 20,000 per year, no change in the present selling and administrative expenses is expected, if the new product is sold.

The details of additional processing costs are as follows:

Variable : ₹ 5 per gallon of waste put into process.

Fixed : (Excluding Depreciation) ₹ 30,000 per year.

There will be no losses in processing, and it is assumed that the total waste processed in a given year will be sold in the same year. Estimates indicate that 50,000 gallons of the product could be sold each year.

The management when confronted with the choice of disposing off the waste or processing it further and selling it, seeks your ADVICE. Which alternative would you recommend? Assume that the firm's cost of capital is 15% and it pays on an average 50% Tax on its income.

You should consider Present value of Annuity of ₹ 1 per year @ 15% p.a. for 10 years as 5.019.

ANSWER

Evaluation of Alternatives:

Savings in disposing off the waste

Particulars	(₹)
Outflow (50,000 x ₹ 1)	50,000
Less: tax savings @ 50%	25,000
Net Outflow per year	25,000

Calculation of Annual Cash inflows in Processing of waste Material

Particulars	Amount (₹)	Amount (₹)
Sale value of waste (₹ 10 x 50,000 gallon)		5,00,000
Less: Variable processing cost (₹ 5 x 50,000 gallon)	2,50,000	
Less: Fixed processing cost	30,000	
Less: Advertisement cost	20,000	
Less: Depreciation	60,000	(3,60,000)
Earnings before tax (EBT)		1,40,000
Less: Tax @ 50%		(70,000)
Earnings after tax (EAT)		70,000
Add: Depreciation		60,000
Annual Cash inflows		1,30,000

Total Annual Benefits = Annual Cash inflows + Net savings (adjusting tax) in disposal cost
 = ₹ 1,30,000 + ₹ 25,000 = ₹ 1,55,000

Calculation of Net Present Value

Year	Particulars	Amount (₹)
0	Investment in new equipment	(6,00,000)
1 to 10	Total Annual benefit x PVAF (10 years, 15%) ₹ 1,55,000 x 5.019	7,77,945
	Net Present Value	1,77,945

Recommendation: Processing of waste is a better option as it gives a positive Net Present Value.

Note - Research cost of ₹ 60,000 is not relevant for decision making as it is sunk cost.

Q.22: Manoranjan Ltd is a News broadcasting channel having its broadcasting Centre in Mumbai. There are total 200 employees in the organisation including top management. As a part of employee benefit expenses, the company serves tea or coffee to its employees, which is outsourced from a third-party. The company offers tea or coffee three times a day to each of its employees. 120 employees prefer tea all three times, 40 employees prefer coffee all three times and remaining prefer tea only once in a day. The third-party charges ₹ 10 for each cup of tea and ₹ 15 for each cup of coffee. The company works for 200 days in a year.

Looking at the substantial amount of expenditure on tea and coffee, the finance department has proposed to the management an installation of a master tea and coffee vending machine which will cost ₹ 10,00,000 with a useful life of five years. Upon purchasing the machine, the company will have to enter into an annual maintenance contract with the vendor, which will require a payment of ₹ 75,000 every year. The machine would require electricity consumption of 500 units p.m. and current incremental cost of electricity for the company is ₹ 12 per unit. Apart from these running costs, the company will have to incur the following consumables expenditure also:

- (1) Packets of Coffee beans at a cost of ₹ 90 per packet.
- (2) Packet of tea powder at a cost of ₹ 70 per packet.
- (3) Sugar at a cost of ₹ 50 per Kg.
- (4) Milk at a cost of ₹ 50 per litre.
- (5) Paper cup at a cost of 20 paise per cup.

Each packet of coffee beans would produce 200 cups of coffee and same goes for tea powder packet. Each cup of tea or coffee would consist of 10g of sugar on an average and 100 ml of milk.

The company anticipate that due to ready availability of tea and coffee through vending machines its employees would end up consuming more tea and coffee.

It estimates that the consumption will increase by on an average 20% for all class of employees. Also, the paper cups consumption will be 10% more than the actual cups served due to leakages in them.

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

PV factors @ 12%:

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

ANSWER**A. Computation of CFAT (Year 1 to 5)**

Particulars			Amount (₹)
(a)	Savings in exiting Tea & Coffee charges	$(120 \times 10 \times 3) + (40 \times 15 \times 3) + (40 \times 10 \times 1) \times 200 \text{ days}$	11,60,000
(b)	AMC of machine		(75,000)
(c)	Electricity charges	$500 \times 12 \times 12$	(72,000)
(d)	Coffee Beans	(W.N.) 144×90	(12,960)
(e)	Tea Powder	(W.N.) 480×70	(33,600)
(f)	Sugar	(W.N.) 1248×50	(62,400)
(g)	Milk	(W.N.) 12480×50	(6,24,000)
(h)	Paper Cup	(W.N.) $1,37,280 \times 0.2$	(27,456)
(i)	Depreciation	$10,00,000/5$	(2,00,000)
Profit before Tax			52,584
(-) Tax @ 25%			(13,146)
Profit after Tax			39,438
Depreciation			2,00,000
CFAT			2,39,438

B. Computation of NPV

Year	Particulars	CF	PVF@12%	PV
0	Cost of machine	(10,00,000)	1	(10,00,000)
1-5	CFAT	2,39,438	3.6048	8,63,126
Net Present value				(1,36,874)

Since NPV of the machine is negative, it should not be purchased.

Working Note:

Computation of Qty of consumable

No. of Tea Cups = $[(120 \times 3 \times 200 \text{ days}) + (40 \times 1 \times 200 \text{ days}) \times 1.2 = 96,000$

No. of Coffee cups = $40 \times 3 \times 200 \text{ days} \times 1.2 = 28,800$

No. of coffee beans packet = $\frac{28,800}{200} = 144$

No. of Tea Powder Packets = $\frac{96,000}{200} = 480$

Qty of Sugar = $\frac{(96,000 + 28,800) 6,000}{1,000 \text{ g}} = 1248 \text{ kgs.}$

Qty of Milk = $\frac{(96,000 + 28,800) 6,000}{1,000 \text{ ml}} = 12,480 \text{ kgs.}$

No. of paper cups = $(96,000 + 28,800) \times 1.1 = 1,37,280$



FINANCIAL STATEMENT ANALYSIS

Q.1: Following information relates to RM Co. Ltd.

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

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

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

Tax rate is 30%.

You are required to calculate :

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

[Nov 2020 (5 Marks)]

ANSWER:

Computation of net profit:

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

(i) Net profit margin (After tax) = $\frac{\text{Profit after taxes}}{\text{Sales}} = \frac{₹ 1,01,500}{₹ 8,25,000} = 0.12303 \text{ or } 12.303\%$

Net profit margin (Before tax) = $\frac{\text{Profit before taxes}}{\text{Sales}} = \frac{₹ 1,45,000}{₹ 8,25,000} = 0.17576 \text{ or } 17.576\%$

(ii) Return on assets = $\frac{\text{EBIT (1-T)}}{\text{Total Assets}} = \frac{₹ 1,85,000 (1 - 0.3)}{₹ 10,00,000} = 0.1295 \text{ or } 12.95\%$

(iii) Assets turnover = $\frac{\text{Sales}}{\text{Assets}} = \frac{₹ 8,25,000}{₹ 10,00,000} = 0.825 \text{ times}$

$$(iv) \text{ Return on owner's equity} = \frac{\text{Profit after taxes}}{\text{Owners equity}} = \frac{₹ 1.01.500}{50\% \times ₹ 10,00,000} = 0.203 \text{ or } 20.3\%$$

Q.2: From the following information, complete the Balance Sheet given below:

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

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

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

[Jan 21 (5 Marks)]

ANSWER:

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

Liabilities	Amount (₹)	Assets	Amount (₹)
Equity Share Capital	2,00,000	Fixed Assets	1,20,000
Long-term Debt	90,000	Current Assets:	
Current Debt	60,000	Inventory	87,500
		Cash (balancing figure)	1,42,500
	3,50,000		3,50,000

Working Notes

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

$$\begin{aligned}\text{Cash in Hand} &= \text{Total Assets} - \text{Fixed Assets} - \text{Inventory} \\ &= ₹ 3,50,000 - ₹ 1,20,000 - ₹ 87,500 = ₹ 1,42,500\end{aligned}$$

Q.3: Given below are the estimation for the next year by Niti Ltd.

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

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

(₹ in crores)

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

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

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

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

[RTP May 21]

ANSWER:

- Return on total assets

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

- Return on total assets

(Amount in ₹)

	Financing policy (₹)		
	Conservative	Moderate	Aggressive

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

(iii) Net Working capital

(₹ in crores)

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

(iv) Current ratio

(₹ in crores)

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

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

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

Sales	₹ 75,00,000
Return on net worth	25%
Rate of income tax	50%
Share capital to reserves	6:4

Current ratio	2.5
Net profit to sales (After Income Tax)	6.50%
Inventory turnover (based on cost of goods sold)	12
Cost of goods sold	₹ 22,50,000
Interest on debentures	₹ 75,000
Receivables (includes debtors ₹ 1,25,000)	₹ 2,00,000
Payables	₹ 2,50,000
Bank Overdraft	₹ 1,50,000

You are required to:

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

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

[July 21 (10 Marks)]

ANSWER:

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

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

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

Liabilities	₹	Assets	₹
Share Capital	11,70,000	Fixed Assets	18,50,000

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

Working Notes:

(i) Calculation of Shares Capital and Reserves

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

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

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

The ratio of share capital to reserves is 6:4

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

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

(ii) Calculation of Debentures

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

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

(iii) Calculation of Current Assets

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

$$\text{Payables} = ₹ 2,50,000$$

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

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

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

(iv) Calculation of Fixed Assets

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

Fixed Assets

18,50,000

(v) Calculation of Composition of Current Assets

Inventory Turnover = 12

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

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

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

Q.5: The following figures and ratios are related to a company:

(i) Sales for the year (all credit)	₹ 30,00,000
(ii) Gross Profit ratio	25 percent
(iii) Fixed assets turnover (based on cost of goods sold)	1.5
(iv) Stock turnover (based on cost of goods sold)	6
(v) Liquid ratio	1 : 1
(vi) Current ratio	1.5 : 1
(vii) Receivables (Debtors) collection period	2 months
(viii) Reserves and surplus to Share capital	0.6 : 1
(ix) Capital gearing ratio	0.5
(x) Fixed assets to net worth	1.20 : 1

You are REQUIRED to prepare:

- (d) Balance Sheet of the company on the basis of above details.
- (e) The statement showing working capital requirement, if the company wants to make a provision for contingencies @ 10 percent of net working capital including such provision.

[MTP Oct 21 (10 Marks)]

ANSWER:

Working Notes:

- (i) Cost of Goods Sold = Sales – Gross Profit (25% of Sales)
= ₹ 30,00,000 – ₹ 7,50,000
= ₹ 22,50,000
- (ii) Closing Stock = Cost of Goods Sold / Stock Turnover

$$= ₹ 22,50,000/6 = ₹ 3,75,000$$

(iii) Fixed Assets = Cost of Goods Sold / Fixed Assets Turnover

$$= ₹ 22,50,000/1.5$$

$$= ₹ 15,00,000$$

(iv) Current Assets:

$$\text{Current Ratio} = 1.5 \text{ and Liquid Ratio} = 1$$

$$\text{Stock} = 1.5 - 1 = 0.5$$

$$\text{Current Assets} = \text{Amount of Stock} \times 1.5/0.5$$

$$= ₹ 3,75,000 \times 1.5/0.5 = ₹ 11,25,000$$

(v) Liquid Assets (Debtors and Cash)

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

$$= ₹ 11,25,000 - ₹ 3,75,000$$

$$= ₹ 7,50,000$$

(vi) Debtors = Sales \times Debtors Collection period /12

$$= ₹ 30,00,000 \times 2 /12$$

$$= ₹ 5,00,000$$

(vii) Cash = Liquid Assets – Debtors

$$= ₹ 7,50,000 - ₹ 5,00,000 = ₹ 2,50,000$$

(viii) Net worth = Fixed Assets /1.2

$$= ₹ 15,00,000/1.2 = ₹ 12,50,000$$

(ix) Reserves and Surplus

$$\text{Reserves and Share Capital} = 0.6 + 1 = 1.6$$

$$\text{Reserves and Surplus} = ₹ 12,50,000 \times 0.6/1.6$$

$$= ₹ 4,68,750$$

(x) Share Capital = Net worth – Reserves and Surplus

$$= ₹ 12,50,000 - ₹ 4,68,750$$

$$= ₹ 7,81,250$$

(xi) Current Liabilities = Current Assets/Current Ratio

$$= ₹ 11,25,000/1.5 = ₹ 7,50,000$$

(xii) Long-term Debts

$$\text{Capital Gearing Ratio} = \text{Long-term Debts} / \text{Equity Shareholders' Fund}$$

$$\text{Long-term Debts} = ₹ 12,50,000 \times 0.5 = ₹ 6,25,000$$

(a) Preparation of Balance Sheet of a Company

Balance sheet

Liabilities	Amount (₹)	Assets	Amount (₹)
Equity Share Capital	7,81,250	Fixed Assets	15,00,000
Reserves and Surplus	5,68,750	Current Assets	
Long-term Debts	6,25,000	Stock	3,75,000
Current Liabilities	7,50,000	Debtors	5,00,000
		Cash	2,50,000
	26,25,000		26,25,000

(b) Statement Showing Working Capital Requirement

	(₹)	(₹)
Current Assets		
(i) Stocks		3,75,000
(ii) Receivables (Debtors)		5,00,000
(iii) Cash in hand & at bank		2,50,000
A. Current Assets: Total		11,25,000
Current Liabilities		
B. Current Liabilities: Total		7,50,000
Net Working Capital (A – B)		3,75,000
Add: Provision for contingencies (1/9 th of Net Working Capital)		41,667
Working capital requirement		4,16,667

Q.6: Jensen and spencer pharmaceutical is in the business of manufacturing pharmaceutical drugs including the newly invented Covid vaccine. Due to increase in demand of Covid vaccines, the production had increased at all time high level and the company urgently needs a loan to meet the cash and investment requirements. It had already submitted a detailed loan proposal and project report to Expo-Impo bank, along with the financial statements of previous three years as follows:

Statement of Profit and Loss

(In ₹ '000)

	2018-19	2019-20	2020-21
Sales			
Cash	400	960	1,600
Credit	3,600	8,640	14,400
Total sales	4,000	9,600	16,000
Cost of goods sold	2,480	5,664	9,600
Gross profit	1,52	3,936	6,400
Operating expenses:			

General, administration, and selling expenses	160	900	2,000
Deprecation	200	800	1,320
Interest expenses (on borrowing)	120	316	680
Profit before tax (PBT)	1,040	1,920	2,400
Tax @ 30%	312	576	720
Profit after tax (PAT)	728	1,344	1,680

BALANCE SHEET

(In ₹ '000)

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

INDUSTRY AVERAGE OF KEY RATIOS

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

As a loan officer of Expo-Impo Bank, you are REQUIRED to apprise the loan proposal on the basis of comparison with industry average of key ratios considering closing balance for

accounts receivable of ₹ 6,00,000 and inventories of ₹ 6,40,000 respectively as on 31st March, 2018. [MTP Nov 21 (10 Marks)]

ANSWER:

(In ₹ '000)

Ratio	Formula	2018-19	2019-20	2020-21	Industry Average
Current ratio	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	$\frac{1,320}{520}$ = 2.54	$\frac{6,200}{3,456}$ = 1.80	$\frac{8,912}{5,560}$ = 1.60	2.30:1
Acid test ratio (quick ratio)	$\frac{\text{Quick Assets}}{\text{Current Liabilities}}$	$\frac{680}{520}$	$\frac{3,200}{3,456}$	$\frac{4,412}{5,560}$	1.20:1
Receivable turnover ratio	$\frac{\text{Credit Sales}}{\text{Average Accounts Receivable}}$	$\frac{3,600}{(600 + 600)/2}$ = 6	$\frac{8,640}{(600 + 3,000)/2}$ = 4.80	$\frac{14,400}{(3,000 + 4,200)/2}$ = 4	7 times
Inventory turnover ratio	$\frac{\text{COGS}}{\text{Average Inventory}}$	$\frac{2,480}{(640 + 640)/2}$ = 3.88	$\frac{5,664}{(640 + 3,000)/2}$ = 3.11	$\frac{9,600}{(3,000 + 4,500)/2}$ = 2.56	4.85 times
Long-term debt to total debt	$\frac{\text{Long term Debt}}{\text{Total Debt}} \times 100$	$\frac{1,472}{1,992} \times 100$ = 73.90%	$\frac{2,472}{5,928} \times 100$ = 41.70%	$\frac{5,000}{10,560} \times 100$ = 47.35%	24%
Debt-to-equity ratio	$\frac{\text{Long term Debt}}{\text{Shareholders' Equity}} \times 100$	$\frac{1,472}{3,128} \times 100$ = 47.06%	$\frac{2,472}{5,272} \times 100$ = 46.89%	$\frac{5,000}{7,752} \times 100$ = 64.50%	35%
Net Profit ratio	$\frac{\text{Net Profit}}{\text{Sales}} \times 100$	$\frac{728}{4,000} \times 100$ = 18.2%	$\frac{1,344}{9,600} \times 100$ = 14%	$\frac{1,680}{16,000} \times 100$ = 10.5%	18%
Return on total assets	$\frac{\text{Net Profit after taxes}}{\text{Total assets}} \times 100$	$\frac{728}{5,120} \times 100$ = 14.22%	$\frac{1,344}{11,200} \times 100$ = 12%	$\frac{1,680}{18,312} \times 100$ = 9.17%	10%
Interest coverage ratio (times interest earned)	$\frac{\text{EBIT}}{\text{Interest}}$	$\frac{1,160}{120}$ = 9.67	$\frac{2,236}{316}$ = 7.08	$\frac{3,080}{680}$ = 4.53	10

Conclusion:

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

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

Q.7: 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
Reserve & 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

[RTP Nov 21]

ANSWER:

(i) Return on Capital Employed (ROCE)

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

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

(ii) Earnings Per Share (EPS)

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

(iii) P/E Ratio

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

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

$$\begin{aligned} &= \text{Equity Shareholder's Fund} + \text{Preference share Capital} + \text{Debentures} \\ &= (\text{₹ 20,00,000} + \text{₹ 16,00,000}) + \text{₹ 4,00,000} + \text{₹ 12,00,000} = \text{₹ 52,00,000} \end{aligned}$$

Q.8: Following are the data in respect of ABC Industries for the year ended 31st March, 2021:

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

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

Required:

Complete the Balance Sheet of ABC Industries as on 31st March, 2021. All calculations should be in nearest Rupee. Assume 360 days in a year. [Dec 21 (10 Marks)]

ANSWER:

Working Notes:

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

Debt to Total Asset Ratio = 0.40

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

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

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

(2) Total Liabilities = ₹ 50,00,000

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

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

So, Reserves & Surplus = ₹ 10,00,000

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

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

Long Term Debt = ₹ 9,00,000

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

Accounts Payable = ₹ 11,00,000

(5) Gross Profit to sale = 20%

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

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

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

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

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

Closing inventory = 9,77,778

(7) Accounts Receivable period = 36 days

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

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

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

Accounts Receivable = ₹ 8,00,000

(8) **Quick Ratio** = 0.9

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

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

Cash = 8,00,000 = ₹ 9,90,000

Cash = ₹ 1,90,000

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

Balance Sheet of ABC Industries as on 31st March 2021

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

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

Q.9: 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).

ANSWER

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

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

Cost of goods sold = 0.85 × ₹ 6,40,000 = ₹ 5,44,000.

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

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

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

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

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

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

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

Q.10: The capital structure of Beta Limited is as follows:

Equity share capital of ₹ 10 each	8,00,000
9% preference share capital of ₹ 10 each	<u>3,00,000</u>
	<u>11,00,000</u>

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

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

- Dividend yield on the equity shares
- Cover for the preference and equity dividends
- Earnings per shares
- Price-earnings ratio

ANSWER

- (a) Dividend yield on the equity shares

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

- (b) Dividend coverage ratio

$$\begin{aligned} \text{(i) Preference} &= \frac{\text{Profit after taxes}}{\text{Dividend payable to preference shareholders}} \\ &= \frac{\text{₹ } 2,70,000}{\text{₹ } 27,000 \text{ (i.e. } 0.09 \times \text{₹ } 3,00,000)} = 10 \text{ times} \end{aligned}$$

$$\begin{aligned} \text{(ii) Equity} &= \frac{\text{Profit after taxes - Preference share dividend}}{\text{Dividend payable to preference shareholders at current rate of ₹ 2 per share}} \\ &= \frac{\text{₹ } 2,70,000 - \text{₹ } 27,000}{\text{₹ } 1,60,000 \text{ (i.e. } 80,000 \text{ shares} \times \text{₹ } 2)} = 1.52 \text{ times} \end{aligned}$$

$$\begin{aligned} \text{(c) Earnings per equity share} &= \frac{\text{Earnings available to equity shareholders}}{\text{Number of equity shares outstanding}} \\ &= \frac{\text{₹ } 2,43,000}{80,000} = \text{₹ } 3.04 \text{ per share} \end{aligned}$$

$$(d) \text{ Price-earning (P/E) ratio} = \frac{\text{Profit after taxes} - \text{Preference shares dividend}}{\text{Dividend payable to equity shareholders at current ratio of ₹ 2 per share}}$$

$$= \frac{\text{Market price per share}}{\text{Earnings per share}} = \frac{₹ 40}{₹ 3.04} = 13.2 \text{ times}$$

Q.11: The following accounting information and financial ratios of PQR Ltd. relates to the year ended 31st March, 2023:

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

If value of Fixed Assets as on 31st March, 2022 amounted to ₹ 26 lakhs, PREPARE a summarised Profit and Loss Account of the company for the year ended 31st March, 2023 and also the Balance Sheet as on 31st March, 2023.

ANSWER

Working Notes:

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

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

(ii) Calculation of Current Assets

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

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

(iii) Calculation of Raw Material Consumption and Direct Wages

	₹
Sales	78,00,000
Less: Gross Profit @ 15%	11,70,000
Works Cost	66,30,000

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

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

(iv) Calculation on Stock or Raw Materials (= 3 months usage)

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

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

$$= 66,30,000 \times \frac{6}{100} = ₹ 3,97,800$$

(vi) Calculation of Current Liabilities

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

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

(vii) Calculation of Receivables

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

$$= \frac{\text{Receivables}}{78,00,000} \times 365 = 60$$

Receivables = ₹ 12,82,191.78 or ₹ 12,82,192

(viii) Calculation of Long term Loan

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

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

(ix) Calculation of Cash Balance

	₹
Current Assets	22,00,000
Less: Receivables	12,82,192
Raw materials stock	3,31,500
Finished goods Stock	<u>3,97,800</u>
Cash Balance	20,11,492
	1,88,508

(x) Calculation of Net worth

Profit and Loss Account of PQR Ltd.
for the year ended 31st March,
2023

Particulars	₹	Particulars	₹
To Direct Materials	13,26,000	By Sales	78,00,000
To Direct Wages	6,63,000		
To Works (Overhead) (Bal. fig.)	46,41,000		
To Gross Profit c/d	11,70,000		
	<u>78,00,000</u>		<u>78,00,000</u>

To	Selling and Distribution Expenses (Bal. Fig.)	5,46,000	By	Gross Profit b/d	11,70,000
To	Net Profit (8% of Sales)	6,24,000			
		11,70,000			11,70,000

**Balance Sheet of PQR
Ltd. as at 31st March,
2023**

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

Q.12: Ganpati Limited has furnished the following ratios and information relating to the year ended 31st March, 2023:

Sales	₹ 60,00,000
Return on net worth	25%
Rate of income tax	50%
Share capital to reserves	7:3
Current ratio	2
Net Profit to sales	6.25%
Inventor 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, 2023.
- PREPARE a Balance Sheet as on 31st March, 2023 in the following format:

Balance Sheet as on 31st March, 2023

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

		Cash	

ANSWER

(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 and	18,00,000	
PBIT	8,10,000	26,10,000
Operating Expenses		33,90,000

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

Liabilities	₹	Assets	₹
Share Capital	10,50,000	Fixed Assets	17,00,000
Reserve and Surplus	4,50,000	Current Assets:	
15% Debentures	4,00,000	Stock	1,50,000
Payables		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 share capital to reserves is 7:3

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

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

(ii) Debentures

Interest on Debentures @ 15% = ₹ 60,000

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

(iii) Current Assets

Current Ratio = 2

Payables = ₹ 2,00,000

$\therefore \text{Current Assets} = 2 \text{ Current Liabilities} = 2 \times 2,00,000 = ₹ 4,00,000$

(iv) Fixed Assets

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

(v) Composition of Current Assets

Inventory Turnover = 12

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

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

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

Q.13: 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	?

ANSWER

Working Notes:

(i) Long term Debt

$$0.5 = \frac{\text{Long-term debt}}{\text{Net worth}} = \frac{\text{Long-term debt}}{\text{₹ 1,00,000} + \text{₹ 1,00,000}}$$

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

(ii) Total Assets

Total liabilities and Equity = Notes and payables + Long-term debt + Common stock + Retained earnings

$$= \text{₹ 1,00,000} + \text{₹ 1,00,000} + \text{₹ 1,00,000} + \text{₹ 1,00,000} = \text{₹ 4,00,000}$$

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

(iii) Sales and Cost of Goods sold

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

$$\therefore \text{Sales} = \text{₹ 10,00,000}$$

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

(iv) Current Assets

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

$$\therefore \text{Inventory} = \text{₹ 10,00,000}$$

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

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

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

$$\therefore \text{Cash} = \text{₹ 50,000}$$

(v) Plant and equipment

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

$$= \text{₹ 4,00,000} - (\text{₹ 1,00,000} + \text{₹ 50,000} + \text{₹ 50,000}) = \text{₹ 2,00,000}$$

Balance Sheet

	₹		₹
Cash	50,000	Notes and payables	1,00,000
Accounts receivables	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.14: Following information has been provided from the books of Laxmi Pvt. Ltd. for the year ending on 31st March, 2023:

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 summarised Balance Sheet as at 31st March, 2023 assuming that there is no long term debt.

ANSWER

Working Notes:

(i) Computation of Current Assets and Current Liabilities

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

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

$$\text{Now, Working capital} = \text{Current assets} - \text{Current liabilities}$$

$$₹ 4,80,000 = 2.5 \text{ Current liability} - \text{Current liability}$$

$$\text{Or, } 1.5 \text{ Current liability} = ₹ 4,80,000$$

$$\therefore \text{Current Liabilities} = ₹ 3,20,000$$

$$\text{So, Current Assets} = ₹ 3,20,000 \times 2.5 = ₹ 8,00,000$$

(ii) Computation of Inventories

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

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

$$1.5 \times ₹ 3,20,000 = ₹ 8,00,000 - \text{Inventories}$$

$$\text{Inventories} = ₹ 8,00,000 - ₹ 4,80,000 = ₹ 3,20,000$$

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

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

$$\therefore \text{Fixed Assets} = 0.75 \text{ Proprietary fund}$$

$$\text{Proprietary fund} = \text{Fixed Assets} + \text{Net Working Capital} - \text{Long Term Debt}$$

$$= 0.75 \text{ Proprietary fund} + ₹ 4,80,000 - 0$$

$$\therefore \text{Proprietary fund} = ₹ 19,20,000$$

and Fixed Assets = 0.75 proprietary fund
= 0.75 x ₹ 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 on 31st March, 2023

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

Q.15: Manan Pvt. Ltd. gives you the following information relating to the year ending 31st March, 2023:

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

You are required to CALCULATE:

- Quick Ratio
- Fixed Assets Turnover Ratio
- Proprietary Ratio
- Earnings per Share

ANSWER

Working Notes:

- Computation of Current Assets & Current Liabilities & Total Assets

Net Working Capital = Current Assets - Current Liabilities
= 2.5 - 1 = 1.5

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

(ii) Computation of Sales & Cost of Goods Sold

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

(iii) Computation of Stock & Quick Assets

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

(iv) Computation of Proprietary Fund

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

(v) Computation of Profit after tax (PAT)

$$= \text{Total Assets} \times \text{Return on Total Assets}$$

$$= ₹ 52,50,000 \times 15\%$$

$$= ₹ 7,87,500$$

(a) Quick Ratio

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

(b) Fixed Assets Turnover Ratio

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

(c) Proprietary Ratio

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

(d) Earning per Equity Share (EPS)

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

Q.16: Gig Ltd. has furnished the following information relating to the year ended 31st March, 2022 and 31st March, 2023:

	31 st March, 2022 (₹)	31 st March, 2023 (₹)
Share Capital	40,00,000	40,00,000
Reserve and Surplus	20,00,000	25,00,000
Long term loan	30,00,000	30,00,000

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

You are required to PREPARE Balance Sheet as on 31st March, 2023 in the following format:

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

ANSWER

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

So, Net profit = ₹ 5,00,000

Net Profit Ratio = 8%

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

(ii) Cost of Goods Sold

= Sales - Gross profit Margin

= ₹ 62,50,000 - 20% of ₹ 62,50,000

= ₹ 50,00,000

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

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

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

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

Balance Sheet as on 31st March 2023

Liabilities	(₹)	Assets	(₹)
Share Capital	40,00,000	Fixed Assets	75,00,000
Reserve and Surplus	25,00,000	Sundry Debtors	15,62,500
Long-term loan	30,00,000	Closing Stock	12,50,000
Sundry Creditors (Bal. fig.)	14,37,500	Cash in hand	6,25,000
	1,09,37,500		1,09,37,500

Q.17: Following information relates to Temer Ltd.:

Debtors Velocity	3 months
Creditors Velocity	2 months
Stock Turnover Ratio	1.5
Gross Profit Ratio	25%
Bills Receivables	₹ 25,000
Bills Payables	₹ 10,000
Gross Profit	₹ 4,00,000
Fixed Assets turnover Ratio	4

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

DETERMINE:

(i) Sales and cost of goods sold

(ii) Sundry Debtors

(iii) Sundry Creditors

(iv) Closing Stock

(v) Fixed Assets

ANSWER

(i) Determination of Sales and Cost of Goods Sold:

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

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

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

(ii) Determination of Sundry Debtors:

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

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

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

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

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

(iii) Determination of Sundry Creditors:

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

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

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

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

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

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

(iv) Determination of Closing Stock

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

$$\text{So, Average Stock} = ₹ 8,00,000$$

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

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

Or, Opening Stock = ₹ 7,95,000

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

(v) Determination of Fixed Assets

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

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

Or, Fixed Asset = ₹ 3,00,000

Workings:

***Calculation of Credit purchases:**

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

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

₹ 12,00,000 + ₹ 10,000 = Purchases

₹ 12,10,000 = Purchases (credit)

Assumption:

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

Q.18: From the following information and ratios, PREPARE the Balance sheet as at 31st March, 2023 and Income Statement for the year ended on that date for M/s Ganguly & Co -

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

ANSWER

1. Current Ratio = 3:1

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

CA = 3CL

WC = 10,00,000

CA - CL = 10,00,000

3CL - CL = 10,00,000

2CL = 10,00,000

CL = $\frac{10,00,000}{2}$

CL = ₹5,00,000

CA = 3 x 5,00,000

CA = ₹15,00,000

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

$$= \frac{15,00,000 - \text{Stock}}{5,00,000} = 1$$

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

Stock = ₹10,00,000

3. Stock Turnover ratio (on sales) = 5

$$\frac{\text{Sales}}{\text{Avg. Stock}} = 5$$

$$\frac{\text{Sales}}{10,00,000} = 5$$

Sales = ₹ 50,00,000

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

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

5. PBIT/PBT = 2.2

PBIT = 2.2 x 5,00,000

PBIT = 11,00,000

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

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

6. Average collection period = 30 days

Receivables = $\frac{30}{360} \times 50,00,000 = 4,16,667$

7. Fixed Assets Turnover Ratio = 0.8

50,00,000 / Fixed Assets = 0.8

Fixed Assets = ₹62,50,000

Income Statement

	(₹)
--	-----

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

Balance Sheet

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

Q.19: From the following information, you are required to PREPARE a summarised Balance Sheet for Rudra Ltd. for the year ended 31st March, 2023:

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

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

ANSWER

Balance Sheet of Rudra Ltd.

Liabilities	(₹)	Assets	(₹)
Capital	10,00,000	Fixed Assets	30,00,000
Reserves	20,00,000	Current Assets:	
Long Term Loan @ 10%	30,00,000	Stock in Trade	20,00,000
Current Liabilities:		Debtors	20,00,000
Creditors	10,00,000	Cash	5,00,000

Other Short-term Current Liability (Other STCL)	2,00,000		
Outstanding Interest	3,00,000		
	75,00,000		75,00,000

Working Notes:

Let sales be ₹ x

Balance Sheet of Rudra Ltd.

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

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

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

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

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

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

$$\text{Net worth} = \frac{x}{4}$$

$$4. \text{ Debt: Equity} = 1 : 1$$

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

$$\text{Long term loan} = \text{Net worth} = \frac{x}{20}$$

$$5. \text{ Gross Profit to Cost} = 20\%$$

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

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

$$GP = 0.2x - 0.2 GP$$

$$1.2 GP = 0.2x$$

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

$$GP = x/6$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\text{CA} = \frac{x}{6} + 5,00,000$$

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

$$\frac{x}{6} + \frac{x}{6} + \frac{x}{9} + \frac{\text{₹ } 5,00,000}{3} = \frac{x}{4} + \frac{x}{3} + \text{₹ } 5,00,000$$

$$\frac{x}{6} + \frac{x}{6} - \frac{x}{9} = ₹ 5,00,000 - \frac{₹ 5,00,000}{3}$$

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

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

$$x = ₹ 1,20,00,000$$

11. Now, from above calculations, we get,

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

$$\text{Stock} = \frac{x}{6} = \frac{₹ 1,20,00,000}{6} = ₹ 20,00,000$$

$$\text{Debtor} = \frac{x}{6} = \frac{₹ 1,20,00,000}{6} = ₹ 20,00,000$$

$$\text{Net Worth} = x/4 = ₹ 30,00,000$$

Now, Capital to Reserve is 1 : 2

$$\text{Capital} = ₹ 10,00,000$$

$$\text{And, Reserve} = ₹ 20,00,000$$

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

$$\text{Outstanding Interest} = 30,00,000 \times 10\% = 3,00,000$$

$$\text{Creditors} = \frac{x}{12} = \frac{₹ 1,20,00,000}{12} = ₹ 10,00,000$$

Current Liabilities = Creditors + Other STCL + Outstanding Interest

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

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

$$₹ 15,00,000 = \text{Other STCL} + ₹ 13,00,000$$

$$\text{Other STCL} = ₹ 2,00,000$$

WORKING CAPITAL MANAGEMENT

Q.1: WQ Limited is considering relaxing its present credit policy and is in the process of evaluating two proposed policies. Currently, the firm has annual credit sales of Rs. 180 lakh and Debtors turnover ratio of 4 times a year. The current level of loss due to bad debts is Rs. 6 lakh. The firm is required to give a return of 25% on the investment in new accounts receivables. The company's variable costs are 60% of the selling price. Given the following information, DETERMINE which is a better Policy?

(Amount in Lakhs)

	Present Policy	Proposed Policy	
		Option I	Option II
Annual credit sales (Rs.)	180	220	280
Debtors turnover ratio	4	3.2	2.4
Bad debt losses (Rs.)	6	18	38

[MTP April 21 (10 Marks)]

ANSWER:

Statement showing evaluation of Credit Policies

(Amount in lakhs)

	Particulars	Present (Rs.)	Proposed Policy (Rs.)	
			Option I	Option II
A	Expected Profit:			
	(a) Credit Sales	180	220	280
	(b) Total Cost other than Bad Debts:			
	Variable Costs (60%)	108	132	168
	(c) Bad Debts	6	18	38
	(d) Expected Profit [(a)-(b)-(c)]	66	70	74
B	Opportunity Cost of Investment in Debtors (Refer workings)	6.75	10.31	17.5
C	Net Benefits [A - B]	59.25	59.69	56.5

Recommendation: The Proposed Policy I should be adopted since the net benefits under this policy is higher than those under other policies.

Workings:

Calculation of Opportunity Cost of Investment in Debtors

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection period}^*}{12} \times \frac{\text{Rate of Return}}{100}$$

*Collection period (in months) = 12/Debtors turnover ratio

$$\text{Present Policy} = \text{Rs. } 108 \times \frac{12/4}{12} \times \frac{25}{100} = \text{Rs. } 6.75 \text{ lakhs}$$

$$\text{Proposed Policy I} = \text{Rs. } 132 \times \frac{12/3.2}{12} \times \frac{25}{100} = \text{Rs. } 10.31 \text{ lakhs}$$

$$\text{Proposed Policy II} = \text{Rs. } 168 \times \frac{12/2.4}{12} \times \frac{25}{100} = \text{Rs. } 17.5 \text{ lakhs}$$

Q.2: Current annual sale of SKD Ltd. is ₹ 360 lakhs. It's directors are of the opinion that company's current expenditure on receivables management is too high and with a view to reduce the expenditure they are considering following two new alternate credit policies:

	Policy X	Policy Y
Average collection period	1.5 months	1 months
% of default	2%	1%
Annual collection expenditure	₹ 12 lakh	₹ 20 lakh

Selling price per unit of product is ₹ 150. Total cost per unit is ₹ 120.

Current credit terms are 2 months and percentage of default is 3%.

Current annual collection expenditure is ₹ 8 lakh. Required rate of return on investment of SKD Ltd. is 20%. Determine which credit policy SKD Ltd. should follow.

[July 21 (5 Marks)]

ANSWER:

(a) Statement showing the Evaluation of Credit policies (Total Approach)

	Particulars	Present Policy (2 Months)	Proposed Policy X (1.5 Months)	Proposed Policy Y (1 Months)
		₹ in lakhs	₹ in lakhs	₹ in lakhs
A.	Expected Profit:			
	(a) Credit Sales*	360	360	360
	(b) Total Cost other than Bad Debts and collection expenditure (360/150 x 120)	288	288	288
	(c) Bad Debts	10.8 (360 x 0.03)	7.2 (360 x 0.02)	3.6 (360 x 0.01)
	(d) Collection expenditure	8	12	20
	(e) Expected Profit [(a) – (b) – (c) – (d)]	53.2	52.8	48.4

B.	Opportunity Cost of Investments in Receivables (Working Note)	9.6	7.2	4.8
C.	Net Benefits (A – B)	43.6	45.6	43.6

Recommendation: The Proposed Policy X should be followed since the net benefits under this policy are higher as compared to other policies.

***Note:** It is assumed that all sales are on credit.

Working Note:

Calculation of Opportunity Cost of Average Investments

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection period}}{12} \times \frac{\text{Rate of Return}}{100}$$

$$\text{Present Policy} = ₹ 288 \text{ lakhs} \times \frac{2}{12} \times \frac{20}{100} = ₹ 9.6 \text{ lakhs}$$

$$\text{Policy X} = ₹ 288 \text{ lakhs} \times \frac{1.5}{12} \times \frac{20}{100} = ₹ 7.2 \text{ lakhs}$$

$$\text{Policy Y} = ₹ 288 \text{ lakhs} \times \frac{1}{12} \times \frac{20}{100} = ₹ 4.8 \text{ lakhs}$$

Alternatively

Statement showing the Evaluation of Credit policies (Incremental Approach)

Particulars		Present Policy (2 Months)	Proposed Policy X (1.5 Months)	Proposed Policy Y (1 Months)
		₹ in lakhs	₹ in lakhs	₹ in lakhs
	(a) Credit Sales*	360	360	360
	(b) Cost of sales (360/150 x 120)	288	288	288
	(c) Receivables (Refer Working Note)	48	36	24
	(d) Reduction in receivables from present policy	-	12	24
(A)	Saving in Opportunity Cost of Investment in Receivables (@ 20%)	-	2.4	4.8
	(e) Bad Debts	10.8 (360 x 0.03)	7.2 (360 x 0.02)	3.6 (360 x 0.01)
(B)	Reduction in bad debts from present policy	-	3.6	7.2
	(f) Collection expenditure	8	12	20
(C)	Increase in Collection expenditure from Present policy	-	4	12
(D)	Net Benefits (A + B – C)		2	0

Recommendation: The Proposed Policy X should be followed since the net benefits under this policy are higher as compared to other policies.

***Note:** It is assumed that all sales are on credit.

Working Note:

Calculation of Investment in Receivables

$$\begin{aligned} &= \text{Total Cost} \times \frac{\text{Collection period}}{12} \\ \text{Present Policy} &= ₹ 288 \text{ lakhs} \times \frac{2}{12} = ₹ 48 \text{ lakhs} \\ \text{Policy X} &= ₹ 288 \text{ lakhs} \times \frac{1.5}{12} = ₹ 36 \text{ lakhs} \\ \text{Policy Y} &= ₹ 288 \text{ lakhs} \times \frac{1}{12} = ₹ 24 \text{ lakhs} \end{aligned}$$

Q.3: ABC Ltd. has total sales of 10,00,000 all of which are credit sales. It has a gross profit ratio of 25% and a current ratio of 2. The company's current liabilities are ₹ 2,00,000. Further, it has inventories of ₹ 80,000, marketable securities of ₹ 50,000 and cash of ₹ 30,000. From the above information:

- (iii) CALCULATE the average inventory, if the expected inventory turnover ratio is three times?
- (iv) Also CALCULATE the average collection period if the opening balance of debtors is expected to be ₹ 1,50,000.

Assume 360 days a year.

[MTP Oct 21 (5 Marks)]

ANSWER:

(i) Calculation of Average Inventory

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

$$\text{Cost of goods sold} = 10,00,000 \times \frac{75}{100} = 7,50,000$$

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

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

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

(ii) Calculation of Average collection Period

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

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

Calculation of closing balance of debtors

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

Debtors Closing Balance

2,40,000

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

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

Q.4: On 01st April, 2020, the Board of Directors of ABC Ltd. wish to know the amount of working capital that will be required to meet the programme they have planned for the year. From the following information, PREPARE a working capital requirement forecast and a forecast profit and loss account and balance sheet:

Issued share capital ₹ 6,00,000

10% Debentures ₹ 1,00,000

Fixed Assets ₹ 4,50,000

Production during the previous year was 1,20,000 units; it is planned that this level of activity should be maintained during the present year.

The expected ratios of cost to selling price are: raw materials 60%, direct wages 10% overheads 20%

Raw materials are expected to remain in store for an average of two months before issue to production. Each unit of production is expected to be in process for one month. The time lag in wage payment is one month.

Finished goods will stay in the warehouse awaiting dispatch to customers for approximately three months.

Credit allowed by creditors is two months from the date of delivery of raw materials. Credit given to debtors is three months from the date of dispatch.

Selling price is ₹ 5 per unit.

There is a regular production and sales cycle and wages and overheads accrue evenly.

[MTP Nov 21 (10 Marks)]

ANSWER:

Forecast Profit and Loss Account for the period 01.04.2020 to 31.03.2021

Particulars	₹	Particulars	₹
Materials consumed 1,20,000 @ ₹ 3	3,60,000	By Sales 1,20,000 @ ₹ 5	6,00,000
Direct wages: 1,20,000 @ ₹ 0.50	60,000		
Overheads: 1,20,000 @ ₹ 1	1,20,000		
Gross profit c/d	60,000		
	6,00,000		6,00,000
Debentures interest	10,000	By gross profit b/d	60,000

(10% of 1,00,000)			
Net profit c/d	50,000		
	60,000		60,000

Working Capital Requirement Forecast for the year 01.04.2020 to 31.03.2021

Particulars	Period (Months)	Total (₹)	Current Assets (₹)				Current Liabilities (₹)
			Raw materials	Work-in-progress	Finished goods	Debtors	Creditors
1. Material							
In store	2		60,000				
In work-in-progress	1			30,000			
In finished goods	3				90,000		
Credit to debtors	<u>3</u>					90,000	
	9						
Less: Credit from creditors	<u>2</u>						60,000
Net block period	<u>7</u>	2,10,000					
2. Wages:							
In work-in-progress	1/2			2,500			
In finished goods	3				15,000		
Credit to debtors	<u>3</u>					15,000	
	6 ½						
Less: Time lag in payment	<u>1</u>						5,000
Net block period	<u>5 ½</u>	27,500					
3. Overheads:							
In work-in-progress	½			5,000			
In finished goods	3				30,000		
Credit to debtors	<u>3</u>					30,000	
Net block period	<u>6 ½</u>	65,000					
4. Profit							
Credit to debtors	<u>3</u>					15,000	
Net block period	<u>3</u>	15,000					
Total (₹)		3,17,500	60,000	37,500	1,35,000	1,50,000	65,000

Forecast Balance Sheet as on 31.03.2021

	(₹)			(₹)
Issued share capital	6,00,000	Fixed Assets		4,50,000
Profit and Loss A/c	50,000	Current Assets:		

10% Debentures	1,00,000	Stock:		
Sundry creditors	65,000	Raw material	60,000	
Bank overdraft-		Work-in-progress	37,500	
Balancing figure	17,500	Finished goods	1,35,000	2,32,500
		Debtors		1,50,000
	8,32,500			8,32,500

The Total amount of working capital, thus, stands as follows:	₹
Requirement as per working capital	3,17,500
Less: Bank overdraft as per balance sheet	17,500
Net requirement	<u>3,00,000</u>

Notes :

1. Average monthly production: $1,20,000 \div 12 = 10,000$ units
2. Average cost per month:

Raw Material	$10,000 \times (\text{₹ } 5 \times 0.6) = \text{₹ } 30,000$
Direct wages	$10,000 \times (\text{₹ } 5 \times 0.1) = \text{₹ } 5,000$
Overheads	$10,000 \times (\text{₹ } 5 \times 0.2) = \text{₹ } 10,000$
3. Average profit per month: $10,000 \times (\text{₹ } 5 \times 0.1) = \text{₹ } 5,000$
4. Wages and overhead accrue evenly over the period and, hence, are assumed to be completely introduced for half the processing time.

Q.5: The Alliance Ltd., a Petrochemical sector company had just invested huge amount in its new expansion project. Due to huge capital investment, the company is in need of an additional ₹ 1,50,000 in working capital immediately. The Finance Manger has determined the following three feasible sources of working capital funds:

- (i) Bank loan: The Company's bank will lend ₹ 2,00,000 at 15%. A 10% compensating balance will be required, which otherwise would not be maintained by the company.
- (ii) Trade credit: The company has been offered credit terms from its major supplier of 3/30, net 90 for purchasing raw materials worth ₹ 1,00,000 per month.
- (iii) Factoring: A factoring firm will buy the company's receivables of ₹ 2,00,000 per month, which have a collection period of 60 days. The factor will advance up to 75% of the face value of the receivables at 12% on an annual basis. The factor will also charge commission of 2% on all receivables purchased. It has been estimated that the factor's services will save the company a credit department expense and bad debt expense of ₹ 1,250 and ₹ 1,750 per month respectively.

On the basis of annual percentage cost, ADVISE which alternative should the company select? Assume 360 days year. [RTP Nov 21]

ANSWER:

- (i) **Bank loan:** Since the compensating balance would not otherwise be maintained, the real annual cost of taking bank loan would be:
- $$= \frac{15}{90} \times 100 = 16.67\% \text{ p.a.}$$
- (ii) **Trade credit:** Amount upto ₹ 1,50,000 can be raised within 2 months or 60 days. The real annual cost of trade credit would be:
- $$= \frac{3}{97} \times \frac{360}{60} \times 100 = 18.56\% \text{ p.a.}$$
- (iii) **Factoring:**
- Commission charges per year = $2\% \times (\text{₹ } 2,00,000 \times 12) = \text{₹ } 48,000$
- Total Savings per year = $(\text{₹ } 1,250 + \text{₹ } 1,750) \times 12 = \text{₹ } 36,000$
- Net factoring cost per year = $\text{₹ } 48,000 - \text{₹ } 36,000 = \text{₹ } 12,000$
- Annual Cost of Borrowing ₹ 1,50,000 receivables through factoring would be:
- $$= \frac{12\% \times 1,50,000 + 12,000}{\text{₹ } 1,50,000} \times 100$$
- $$= \frac{\text{₹ } 18,000 + \text{₹ } 12,000}{\text{₹ } 1,50,000} \times 100$$
- $$= 20\% \text{ p.a.}$$
- Advise:** The Company should select alternative of Bank Loan as it has the lowest annual cost i.e. 16.67% p.a.

Q.6: The management of Trux Company Ltd. is planning to expand its business and consults you to prepare an estimated working capital statement. The records of the company reveals the following annual information:

	(₹)
Sales – Domestic at one month's credit	18,00,000
Export at three month's credit (sales price 10% below domestic price)	8,10,000
Materials used (suppliers extend two months credit)	6,75,000
Lag in payment of wages – ½ month	5,40,000
Lag in payment of manufacturing expenses (cash) – 1 month	7,65,000
Lag in payment of Administration Expenses – 1 month	1,80,000
Selling expenses payable quarterly in advance	1,12,500
Income tax payable in four installments, of which one falls in the next financial year	1,68,000

Rate of gross profit is 20%. Ignore work-in-progress and depreciation.

The company keeps one month's stock of raw materials and finished goods (each) and believes in keeping ₹ 2,50,000 available to it including the overdraft limit of ₹ 75,000 not yet utilized by the company.

The management is also of the opinion to make 10% margin for contingencies on computed figure.

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

[RTP Nov 21]

ANSWER:

Preparation of Statement of Working Capital Requirement for Trux Company Ltd.

	(₹)	(₹)
A. Current Assets		
(i) Inventories:		
Material (1 month) $\left(\frac{₹ 6,75,000}{12 \text{ months}} \times 1 \text{ month}\right)$	56,250	
Finished goods (1 month) $\left(\frac{₹ 21,60,000}{12 \text{ months}} \times 1 \text{ month}\right)$	1,80,000	2,36,250
(ii) Receivables (Debtors)		
For Domestic Sales $\left(\frac{₹ 15,17,586}{12 \text{ months}} \times 1 \text{ month}\right)$	1,26,466	
For Export Sales $\left(\frac{₹ 7,64,914}{12 \text{ months}} \times 3 \text{ month}\right)$	1,88,729	3,15,195
(iii) Prepayment of Selling expenses $\left(\frac{₹ 1,12,500}{12 \text{ months}} \times 3 \text{ month}\right)$		28,125
(iv) Cash in hand & at bank		1,75,000
Total Current Assets		7,54,570
B. Current Liabilities:		
(i) Payable (Creditors) for materials (2 months) $\left(\frac{₹ 6,75,000}{12 \text{ months}} \times 2 \text{ months}\right)$		1,12,500
(ii) Outstanding wages (0.5 months) $\left(\frac{₹ 5,40,000}{12 \text{ months}} \times 0.5 \text{ month}\right)$		22,500
(iii) Outstanding manufacturing expenses $\left(\frac{₹ 7,65,000}{12 \text{ months}} \times 1 \text{ month}\right)$		63,750
(iv) Outstanding administrative expenses $\left(\frac{₹ 1,80,000}{12 \text{ months}} \times 1 \text{ month}\right)$		15,000
(v) Income tax payable		42,000
Total Current Liabilities		2,55,750

Net Working Capital (A – B)		4,98,820
Add: 10% contingency margin		49,882
Total Working Capital required		5,48,702

Working Notes:

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

	Domestic (₹)	Export (₹)	Total (₹)
Domestic Sales	18,00,000	8,10,000	26,10,000
Less: Gross profit @ 20% on domestic sales and 11.11% on export sales (Working note-2)	3,60,000	90,000	4,50,000
Cost of Goods Sold	14,40,000	7,20,000	21,60,000
Add: Selling expenses (Working note-3)	77,586	34,914	1,12,500
Cash Cost of Sales	15,17,586	7,54,914	22,72,500

2. Calculation of gross profit on Export Sales

Let domestic selling price is ₹ 100. Gross profit is ₹ 20, and then cost per unit is ₹ 80

Export price is 10% less than the domestic price i.e. ₹ 100 – (1- 0.1) = ₹ 90

Now, gross profit will be = ₹ 90 - ₹ 80 = ₹ 10

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

3. Apportionment of Selling expenses between Domestic and Exports Sales:

Apportionment on the basis of sales value:

$$\text{Domestic Sales} = \frac{₹ 1,12,500}{₹ 26,10,000} \times ₹ 18,00,000 = ₹ 77,586$$

$$\text{Exports Sales} = \frac{₹ 1,12,500}{₹ 26,10,000} \times ₹ 8,10,000 = ₹ 34,914$$

4. Assumption

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

Q.7: You are given below the Profit & Loss Accounts for two years for a company:

Profit and Loss Account

	Year 1	Year 2		Year 1	Year 2
	(₹)	(₹)		(₹)	(₹)
To Opening Stock	32,00,000	40,00,000	By Sales	3,20,00,000	4,00,00,000
To Raw Materials	1,20,00,000	1,60,00,000	By Closing stock	40,00,000	60,00,000
To Stores	38,40,000	48,00,000	By Misc. Income	4,00,000	4,00,000

To Manufacturing Expenses	51,20,000	64,00,000			
To Other Expenses	40,00,000	40,00,000			
To Depreciation	40,00,000	40,00,000			
To Net Profit	42,40,000	72,00,000			
	3,64,00,000	4,64,00,000		3,64,00,000	4,64,00,000

Sales are expected to be ₹ 4,80,00,000 in year 3.

As a result, other expenses will increase by ₹ 20,00,000 besides other charges. Only raw materials are in stock. Assume sales and purchases are in cash terms and the closing stock is expected to go up by the same amount as between year 1 and 2. You may assume that no dividend is being paid. The Company can use 75% of the cash generated to service a loan. **COMPUTE** how much cash from operations will be available in year 3 for the purpose? Ignore income tax. **[RTP May 22]**

ANSWER:

Projected Profit and Loss Account for the year 3

Particulars	Year 2 Actual (₹ in lakhs)	Year 3 Projected (₹ in lakhs)	Particulars	Year 1 Actual (₹ in lakhs)	Year 3 Projected (₹ in lakhs)
To Materials consumed	140.00	168.00	By Sales	400.00	480.00
To Stores	48.00	57.60	By Misc. Income	4.00	4.00
To Mfg. Expenses	64.00	76.80			
To Other expenses	40.00	60.00			
To Depreciation	40.00	40.00			
To Net Profit	72.00	81.61			
	404.00	484.00		484.00	484.00

Cash Flow:

Particulars	(₹ in lakhs)
Profit	81.60
Add: depreciation	<u>40.00</u>
	121.60
Less: Cash required for increase in stock	<u>20.00</u>
Net cash inflow	101.60

Available for servicing the loan: 75% of ₹ 1,01,60,000 or ₹ 76,20,000

Working Notes:

- (i) Material consumed in year 1 = $(32 + 120 - 40)/320 = 35\%$
Material consumed in year 2 = $(40 + 160 - 60)/400 = 35\%$

Likely consumption in year 3 = $480 \times \frac{35}{100} = ₹ 168$ (lakhs)

(ii) Stores are 12% of sales & Manufacturing expenses are 16% of sales for both the years.

Q.8: A factoring firm has offered a company to buy its accounts receivables.

The relevant information is given below.

- (i) The current average collection period for the company's debt is 80 days and $\frac{1}{2}$ % of debtors default. The factor has agreed to pay over money due to the company after 60 days and it will suffer all the losses of bad debts also.
- (ii) Factor will charge commission @ 2%.
- (iii) The company spends ₹ 1,00,000 p.a. on administration of debtor. These are avoidable cost.
- (iv) Annual credit sales are ₹ 90 lakhs. Total variable costs is 80% of sales. The company's cost of borrowing is 15% per annum. Assume 365 days in a year.

Should the company enter into agreement with factoring firm?

[Dec 21 (5 Marks)]

ANSWER:

	Particulars	(₹)
A.	Annual Savings (Benefit) on taking Factoring Service	
	Cost of credit administration saved	1,00,000
	Bad debts avoided (₹ 90 lakh \times $\frac{1}{2}$ %)	45,000
	Interest saved due to reduction in average collection period [₹ 90 lakh \times $0.80 \times 0.15 \times (80 \text{ days} - 60 \text{ days})/365 \text{ days}$]	59,178
	Total	2,04,178
B.	Annual Cost of Factoring to the Firm:	
	Factoring Commission [₹ 90 lakh \times 2%]	1,80,000
	Total	1,80,000
C.	Net Annual Benefit of Factoring to the Firm (A – B)	24,178

Advice: Since savings to the firm exceeds the cost to the firm on account of factoring, therefore, the company should enter into agreement with the factoring firm.

Q.9: Following information is forecasted by R Limited for the year ending 31st March, 2022:

	Balance as at 31 st March, 2022	Balance as at 31 st March, 2021
	(₹ in lakh)	(₹ in lakh)
Raw Material	65	45
Work-in-progress	51	35
Finished goods	70	60
Receivables	135	112

Payables	71	68
Annual purchase of raw Material (all credit)	400	
Annual cost of production	450	
Annual cost of goods sold	525	
Annual operating cost	325	
Annual sale (all credit)	585	

You may take one year as equal to 365 days.

You are required to CALCULATE:

- (i) Net operating cycle period.
- (ii) Number of operating cycles in the year.
- (iii) Amount of working capital requirement.

ANSWER

1. Raw Material Storage Period (R)

$$= \frac{\text{Average Stock of Raw Material}}{\text{Annual Consumption of Raw Material}} \times 365$$

$$= \frac{\frac{\text{₹ 45} + \text{₹ 65}}{2}}{\text{₹ 380}} \times 365 = 52.83 \text{ or } 53 \text{ days}$$

Annual Consumption of Raw Material = Opening Stock + Purchases - Closing Stock

$$= \text{₹ 45} + \text{₹ 400} - \text{₹ 65} = \text{₹ 380 lakh}$$

2. Work-in-Progress (WIP) Conversion Period (W)

$$= \frac{\text{Average Stock of WIP}}{\text{Annual Cost of Production}} \times 365$$

$$= \frac{\frac{\text{₹ 35} + \text{₹ 51}}{2}}{\text{₹ 450}} \times 365 = 34.87 \text{ or } 35 \text{ days}$$

3. Finished Stock Storage Period (F)

$$= \frac{\text{Average Stock of Finished Goods}}{\text{Cost of Goods Sold}} \times 365$$

$$= \frac{\frac{\text{₹ 60} + \text{₹ 70}}{2}}{\text{₹ 525}} \times 365 = 45.19 \text{ or } 45 \text{ days.}$$

4. Receivables (Debtors) Collection Period (D)

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

$$= \frac{\frac{\text{₹ 112} + \text{₹ 135}}{2}}{\text{₹ 585}} \times 365 = 77.05 \text{ or } 77 \text{ days}$$

5. Payables (Creditors) Payment Period (C)

$$= \frac{\text{Average Payables for materials}}{\text{Annual Credit Sales}} \times 365$$

$$= \frac{\frac{₹ 68 + ₹ 71}{2}}{₹ 400} \times 63.41 \text{ or } 64 \text{ days}$$

(i) Net Operating Cycle Period

$$= R + W + F + D - C$$

$$= 53 + 35 + 45 + 77 - 6 = 146 \text{ days}$$

(ii) Number of Operating Cycles in the year

$$= \frac{365}{\text{Operating Cycle Period}} = \frac{365}{146} = 2.5 \text{ times}$$

(iii) Amount of Working Capital Required

$$= \frac{\text{Annual Operating Cost}}{\text{Number of Operating Cycles}} = \frac{₹ 325}{2.50} = ₹ 130 \text{ lakh}$$

Q.10: The following data relating to an auto component manufacturing company is available for the year 2021-22:

Raw material held in storage	20 days
Receivables' collection period	30 days
Conversion process period	10 days
(raw material - 100%, other costs - 50% complete)	
Finished goods storage period	45 days
Credit period from suppliers	60 days
Advance payment to suppliers	5 days
Total cash operating expense per annum	₹ 800 lakhs

75% of the total cash operating expenses are for raw material. 360 days are assumed in a year.

You are required to CALCULATE:

- Each item of current assets and current liabilities,
- The working capital requirement, if the company wants to maintain a cash balance of ₹ 10 lakhs at all times.

ANSWER

Since WIP is 100% complete in terms of Material and 50% complete in terms of other cost, the same has been considered for numbers of days for WIP inventory i.e. 10 days for material and 5 days for other costs respectively.

Particulars	For Raw Material	For Other Costs	Total
Cash Operating expenses	$\frac{75}{100} \times 800 = 600$	$\frac{25}{100} \times 800 = 200$	800.00
Raw Material Stock holding	$\frac{20}{360} \times 600 = 33.33$	--	33.33
WIP Conversion	$\frac{10}{360} \times 600 = 16.67$	$\frac{5}{360} \times 200 = 16.67$	19.45
Finished Goods Stock Holding	$\frac{45}{360} \times 600 = 16.67$	$\frac{45}{360} \times 200 = 25$	100.00
Receivable Collection Period	$\frac{30}{360} \times 600 = 50$	$\frac{30}{360} \times 200 = 16.67$	66.67

Advance to suppliers	$\frac{5}{360} \times 600 = 8.33$	--	8.33
Credit Period from suppliers	$\frac{60}{360} \times 600 = 100$	--	100.00

Computation of working capital

Particulars	₹ in lakhs
Raw Material Stock	33.33
WIP	19.45
Finished Goods Stock	100.00
Receivables	66.67
Advance to Supplies	8.33
Cash	10.00
	237.78
Less: Payables (Creditors)	100.00
Working capital	133.78

Q.11: The following figures and ratios are related to a company:

(i) Sales for the year (all credit)	₹ 90,00,000
(ii) Gross Profit ratio	35 percent
(iii) Fixed assets turnover (based on cost of goods sold)	1.5
(iv) Stock turnover (based on cost of goods sold)	6
(v) Liquid ratio	1.5:1
(vi) Current ratio	2.5:1
(vii) Receivables (Debtors) collection period	1 month
(viii) Reserves and surplus to Share capital	1:1.5
(ix) Capital gearing ratio	0.7875
(x) Fixed assets to net worth	1.3 : 1

You are required to PREPARE:

- Balance Sheet of the company on the basis of above details.
- The statement showing working capital requirement, if the company wants to make a provision for contingencies @ 15 percent of net working capital.

ANSWER

Working Notes:

- Cost of Goods Sold = Sales - Gross Profit (35% of Sales)

= ₹ 90,00,000 - ₹ 31,50,000

= ₹ 58,50,000
- Closing Stock = Cost of Goods Sold / Stock Turnover

= ₹ 58,50,000 / 6 = ₹ 9,75,000

$$\begin{aligned}
 \text{(iii) Fixed Assets} &= \text{Cost of Goods Sold} / \text{Fixed Assets Turnover} \\
 &= ₹ 58,50,000 / 1.5 \\
 &= ₹ 39,00,000
 \end{aligned}$$

(iv) Current Assets and Current Liabilities

Current Ratio = 2.5 and Liquid Ratio = 1.5

$$\text{CA} / \text{CL} = 2.5 \quad \dots (i)$$

$$(\text{CA} - \text{Inventories}) / \text{CL} = 1.5 \quad \dots (ii)$$

By subtracting equation (ii) from (i), we get,

$$\text{Inventories} / \text{CL} = 1$$

$$\text{Current Liabilities} = \text{Inventories (stock)} = ₹ 9,75,000$$

$$\therefore \text{Current Assets} = ₹ 9,75,000 \times 2.5 = ₹ 24,37,500$$

Or

Current Ratio/ Quick Ratio = Current Assets / Quick Assets

$$2.5 / 1.5 = \text{Current Assets} / (\text{Current Assets} - \text{Inventory})$$

$$2.5 / 1.5 \text{ Current Assets} - 2.5 / 1.5 \times ₹ 9,75,000 = \text{Current Assets}$$

Hence, Current Assets = ₹ 24,37,500

(v) Liquid Assets (Receivables and Cash)

$$= \text{Current Assets} - \text{Inventories (Stock)}$$

$$= ₹ 24,37,500 - ₹ 9,75,000$$

$$= ₹ 14,62,500$$

(vi) Receivables (Debtors) = Sales x Debtors Collection period / 12

$$= ₹ 90,00,000 \times 1 / 12$$

$$= ₹ 7,50,000$$

(vii) Cash = Liquid Assets - Receivables (Debtors)

$$= ₹ 14,62,500 - ₹ 7,50,000 = ₹ 7,12,500$$

(viii) Net worth = Fixed Assets / 1.3

$$= ₹ 39,00,000 / 1.3 = ₹ 30,00,000$$

(ix) Reserves and Surplus

Reserves and Surplus / Share Capital = 1 / 1.5

$$\text{Share Capital} = 1.5 \text{ Reserves and Surplus} \quad \dots (i)$$

$$\text{Now, Reserves and Surplus} + \text{Share Capital} = \text{Net Worth} \quad \dots (ii)$$

From (i) and (ii), we get,

$$2.5 \text{ Reserves and Surplus} = \text{Net worth}$$

$$\text{Reserves and Surplus} = ₹ 30,00,000 / 2.5 = ₹ 12,00,000$$

(x) Share Capital = Net worth - Reserves and Surplus

$$= ₹ 30,00,000 - ₹ 12,00,000$$

= ₹ 18,00,000

(xi) Long-term Debts

Capital Gearing Ratio = Long-term Debts/ Equity Shareholders' Fund

Long-term Debts = ₹ 30,00,000 × 0.7875 = ₹ 23,62,500

(a) Balance Sheet of the Company

Particulars	Figures as the end of 31-03-2021 (₹)	Figures as the end of 31.03.2020 (₹)
I. EQUITY AND LIABILITIES		
Shareholders' funds		
(a) Share capital	18,00,000	--
(b) Reserves and surplus	12,00,000	--
Non-current liabilities		
(a) Long-term borrowings	23.62,000	--
Current liabilities	9,75,000	--
Total	63,37,500	--
II. ASSETS		
Non-current assets		
Fixed assets	39,00,000	--
Current Assets		
Inventories	9,75,000	--
Trade receivables	7,50,000	--
Cash and cash equivalents	7,12,500	--
TOTAL	63,37,500	--

(b) Statement Showing Working Capital Requirement

	(₹)	(₹)
A. Current Assets		
(i) Inventories (Stocks)		9,75,000
(ii) Receivables (Debtors)		7,50,000
(iii) Cash in hand & at bank		7,12,500
Total Current Assets		24,37,500
B. Current Liabilities:		
Total Current Liabilities		9,75,000
Net Working Capital (A - B)		14,62,500
Add: Provision for contingencies (15% of Net Working Capital)		2,19,375
Working capital requirement		16,81,875

Q.12: PQ Ltd., a company newly commencing business in 2021-22 has the following projected profit and Loss Account:

	(₹)	(₹)
Sales		2,10,000
Cost of goods sold		<u>1,53,000</u>
Gross Profit		57,000
Administrative Expenses	14,000	
Selling Expense	<u>13,000</u>	<u>27,000</u>
Profit before tax		30,000
Provision for taxation		<u>10,000</u>
Profit after tax		<u>20,000</u>
The cost of goods sold has been arrived at as under:		
Materials used	84,000	
Wages and manufacturing Expenses	62,500	
Depreciation	<u>23,500</u>	
	1,70,000	
Less: Stock of Finished goods		
(10% of goods produced not yet sold)	<u>17,000</u>	
	<u>1,53,000</u>	

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.

ANSWER

Statement showing the requirements of Working Capital

	(₹)	(₹)
A. Current Assets:		
Inventory:		
Stock of Raw material (₹ 96,600 x 2/12)	16,100	
Stock of Work-in-progress (As per Working Note)	16,350	
Stock of Finished goods (₹ 1,46,500 x 10/100)	14,650	
Receivables (Debtors) (₹ 1,27,080 x 2/12)	21,180	
Cash in Hand	8,000	

Prepaid Expenses:		
Wages & Mfg. Expenses (₹ 66,250 x 1/12)	5,521	
Administrative Expenses (₹ 14,000 x 1/12)	1,167	
Selling & Distribution Expenses (₹ 13,000 x 1/12)	1,083	
Advance taxes paid {(70% of ₹ 10,000) x 3/12}	1,750	
Gross Working Capital	85,801	85,801
B. Current Liabilities:		
Payables for Raw materials (₹ 1,12,700 x 1.5/12)	14,088	
Provision for Taxation (Net of Advance Tax) (₹ 10,000 x 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 x 15%)	12,600
Wages & Mfg. Expenses (₹ 62,600 x 15% x 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	--	
Purchase	1,12,700	

Q.13: 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 labour 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 material | 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:

- A projected statement of Profit/ Loss (Ignoring taxation); and
- A projected statement of working capital requirements.

ANSWER

- (i)
- M.A. Limited**
Projected Statement of Profit/ Loss
(Ignoring Taxation)

	Year 1	Year 2
Production (Units)	6,000	9,000
Sales (Units)	5,000	8,500
	(₹)	(₹)
Sales revenue (A) (Sales unit x ₹ 96)	4,80,000	8,16,000

Cost of production:		
Material Cost (Units produced x ₹ 40)	2,40,000	3,60,000
Direct labour and variable expenses (Units produced x ₹ 20)	1,20,000	1,80,000
Fixed manufacturing expenses (Production Capacity: 12,000 units x ₹ 6)	72,000	72,000
Depreciation (Production Capacity: 12,000 units x ₹ 10)	1,20,000	1,20,000
Fixed administration expenses (Production Capacity: 12,000 units x ₹ 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: 10,000 units)	6,00,000	8,80,000
Less: Closing Stock of finished goods at average cost (Year 1: 1000 units, year 2: 1500 units) (Cost of Production x 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 x ₹ 4)	20,000	34,000
Add: Selling expenses - Fixed (12,000 units x ₹ 1)	12,000	12,000
Cost of Sales : (B)	5,32,000	7,94,000
Profit (+) / Loss (-): (A - B)	(-) 52,000	(+) 22,000

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 (2.26 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 purchase per month (Creditors)	23,750	31,875

2. Credits for expense:

	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:		
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 (A)	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 Requirement: (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 x ₹ 40 x 2.25/12); (9,000 units x ₹ 40 x 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 Assets:		
Creditors for raw material (Refer working Note 1)	23,750	31,875
Creditors for Expenses (Refer working note 2)	22,667	28,833
Total Current Liabilities	46,417	60,708
Net Working Capital (A - B)	1,25,583	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 $\left(\frac{₹ 4,80,000 \times 1,000}{6,000}\right); \left(\frac{₹ 7,40,000 \times 1,500}{10,000}\right)$	(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 expense (12,000 units x ₹ 1)	12,000	12,000
Cash Cost of Debtors	4,32,000	6,75,000
Average Debtors	36,000	56,250

Q.14: 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 projection 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 state in respect of conversion cost) (material issued at the start of the processing).

Finished goods in stock	8,000 units
Credit allowed by suppliers	Average 4 weeks
Credit allowed to debtors/receivables	Average 8 weeks
Lag in payment of wages	Average 1.5 weeks

Cash at banks (for smooth operation) is expected to be ₹ 25,000.

Assume that production is carried on evenly throughout the year (52 weeks) and wages and overheads accrue similarly. All sales are on credit basis only.

You are required to CALCULATE the net working capital required.

ANSWER**Calculation of Net Working Capital Requirement:**

	(₹)	(₹)
A. Current Assets:		
Inventories:		
– Raw material stock (Refer to Working Note 3)	6,64,615	
– Work in progress stock (Refer to Working note 2)	5,00,000	
– Finished goods stock (Refer to Working note 4)	13,60,000	
Receivables (Debtors) (Refer to Working Note 5)	25,10,769	
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**

	Year 1 (₹)
Raw material requirements {(1,04,000 units x ₹ 80) + ₹ 3,20,000}	86,40,000
Direct wages {(1,04,000 units x ₹ 30) + ₹ 60,000}	31,80,000
Overheads (exclusive of depreciation) {(1,04,000 × ₹ 60)+ ₹1,20,000}	63,60,000
Gross Factory Cost	1,81,80,000
Less: Closing W.I.P	(5,00,000)
Cost of Goods Produced	1,76,80,000
Less: Closing Stock of Finished Goods (₹1,76,80,000 × 8,000/1,04,000)	(13,60,000)
Total Cash Cost of Sales	1,63,20,000

2. Work in Progress stock

	Year 1 (₹)
--	------------

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 $\frac{₹ 86,40,000}{52 \text{ weeks}} \times 4 \text{ weeks}$ i.e. ₹ 6,64,615

4. Finished goods stock: 8,000 units @ ₹ 170 per unit = ₹ 13,60,000

5. Debtors for sale: $1,63,20,000 \times \frac{8}{52} = ₹ 25,10,769$

6. Creditors for raw material:

Material Consumed (₹ 83,20,000 + ₹ 3,20,000) ₹ 86,40,000

Add: Closing stock of raw material ₹ 6,64,615

Purchases of Raw Material ₹ 93,04,615

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.15: The management of Trux Company Ltd. is planning to expand its business and consults you to prepare an estimated working capital statement. The records of the company reveals the following annual information:

	(₹)
Sales - Domestic at one month's credit	18,00,000
Export at three month's credit (sales price 10% below domestic price)	8,10,000
Materials used (suppliers extend two months credit)	6,75,000
Lag in payment of wages - 1/2 month	5,40,000
Lag in payment of manufacturing expenses (cash) - 1 month	7,65,000
Lag in payment of Administration Expenses - 1 month	1,80,000
Selling expenses payable quarterly in advance	1,12,500
Income tax payable in four installments, of which one falls in the next financial year	1,68,000

Rate of gross profit is 20%. Ignore work-in-progress and depreciation.

The company keeps one month's stock of raw materials and finished goods (each) and believes in keeping ₹ 2,50,000 available to it including the overdraft limit of ₹ 75,000 not yet utilized by the company.

The management is also of the opinion to make 10% margin for contingencies on computed figure.

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

ANSWER

Preparation of Statement of Working Capital Requirement for Trux Company Ltd.

	(₹)	(₹)
A. Current Assets		
(i) Material (1 month) $\left(\frac{₹ 6,75,000}{12 \text{ months}} \times 1 \text{ month} \right)$ Finished goods (1 month) $\left(\frac{₹ 21,60,000}{12 \text{ months}} \times 1 \text{ month} \right)$	56,250	2,36,250
(ii) Receivables (Debtors)		
For Domestic Sales $\left(\frac{₹ 15,17,586}{12 \text{ months}} \times 1 \text{ month} \right)$	1,26,466	
For Export Sales $\left(\frac{₹ 7,54,914}{12 \text{ months}} \times 3 \text{ month} \right)$	1,88,729	3,15,195
(iii) Prepayment of Selling expenses $\left(\frac{₹ 1,12,500}{12 \text{ months}} \times 3 \text{ month} \right)$		28,125
B. Current Liabilities:		
(i) Payables (Creditors) for materials (2 months) $\left(\frac{₹ 6,75,000}{12 \text{ months}} \times 2 \text{ month} \right)$		1,12,500
(ii) Outstanding wages (0.5 months) $\left(\frac{₹ 5,40,000}{12 \text{ months}} \times 0.5 \text{ month} \right)$		22,500
(iii) Outstanding manufacturing expenses $\left(\frac{₹ 7,65,000}{12 \text{ months}} \times 1 \text{ month} \right)$		63,750
(iv) Outstanding administrative expenses $\left(\frac{₹ 1,80,000}{12 \text{ months}} \times 1 \text{ month} \right)$		15,000
(v) Income tax payable		42,000
Total Current Liabilities		2,55,750
Net Working Capital (A - B)		4,98,820
Add: 10% contingency margin		49,882
Total Working Capital required		5,48,702

Working Notes:

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

	Domestic (₹)	Export (₹)	Total (₹)
Domestic Sales	18,00,000	8,10,000	26,10,000
Less: Gross profit @ 20% on domestic sales and 11.11% on export sales (Working note-2)	3,60,000	90,000	4,50,000
Cost of Goods Sold	14,40,000	7,20,000	21,60,000
Add: Selling expenses (Working note-3)	77,586	34,914	1,12,500
Cash Cost of Sales	15,17,586	7,54,914	22,72,500

2. Calculation of gross profit on Export Sales

Let domestic selling price is ₹ 100. Gross profit is ₹ 20, and then cost per unit is ₹ 80

Export price is 10% less than the domestic price i.e. ₹ 100 - (1-0.1) = ₹ 90

Now, gross profit will be = ₹ 90 - ₹ 80 = ₹ 10

So, Gross profit ratio at expert price will be = $\frac{₹ 10}{₹ 90} \times 100 = 11.11\%$

3. Apportionment of Selling expense between Domestic and Exports sales:

Apportionment on the basis of sales value:

$$\text{Domestic Sales} = \frac{₹ 1,12,500}{₹ 26,10,000} \times ₹ 18,00,000 = ₹ 77,586$$

$$\text{Exports Sales} = \frac{₹ 1,12,500}{₹ 26,10,000} \times ₹ 8,10,000 = ₹ 34,914$$

4. Assumptions

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

Q.16: The following information relates to Zeta Limited, a publishing company:

The selling price of a book is ₹ 15, and sales are made on credit through a book club and invoiced on the last day of the month.

Variable costs of production per book are materials (₹ 5), labour (₹ 4), and overhead (₹ 2)

The sales manager has forecasted the following volumes:

Month	No. of Books
November	1,000
December	1,000
January	1,000
February	1,250
March	1,500

April	2,000
May	1,900
June	2,200
July	2,200
August	2,300

Customers are expected to pay as follows:

One month after the sale	40%
Two months after the sale	60%

The company produces the books two months before they are sold and the creditors for materials are paid two months after production.

Variable overheads are paid in the month following production and are expected to increase by 25% in April; 75% of wages are paid in the month of production and 25% in the following month. A wage increase of 12.5% will take place on 1st March.

The company is going through a restructuring and will sell one of its freehold properties in May for ₹ 25,000, but it is also planning to buy a new printing press in May for ₹ 10,000. Depreciation is currently ₹ 1,000 per month, and will rise to ₹ 1,500 after the purchase of the new machine.

The company's corporation tax (of ₹ 10,000) is due for payment in March.

The company presently has a cash balance at bank on 31 December 2021, of ₹ 1,500.

You are required to PREPARE a cash budget for the six months from January to June, 2022.

ANSWER

Workings:

1. Sale receipts

Months	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Forecast sales (S)	1,000	1,000	1,000	1,250	1,500	2,000	1,900	2,200
	₹	₹	₹	₹	₹	₹	₹	₹
S x 15	15,000	15,000	15,000	18,750	22,500	30,000	28,500	33,000
Debtors Pay:								
1 months 40%		6,000	6,000	6,000	7,500	9,000	12,000	11,400
2 months 60%		--	9,000	9,000	9,000	11,250	13,500	18,000
	--	--	15,000	15,000	16,500	29,250	25,500	29,400

2. Sale receipts

Months	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Qty produced (Q)	1,000	1,250	1,500	2,000	1,900	2,200	2,200	2,300
	₹	₹	₹	₹	₹	₹	₹	₹
Materials (Q x 5)	5,000	6,250	7,500	10,000	9,500	11,000	11,000	11,500

Paid (2 months after)	--	--	5,000	6,250	7,500	10,000	9,500	11,000
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3. Variable overheads

Months	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Qty produced (Q)	1,000	1,250	1,500	2,000	1,900	2,200	2,200	2,300
	₹	₹	₹	₹	₹	₹	₹	₹
Var. overhead (Q x 2)	2,000	2,500	3,000	4,000	3,800			
Var. overhead (Q x 2.50)						5,500	5,500	5,750
Paid one month later		2,000	2,500	3,000	4,000	3,800	5,500	5,500

4. Variable overheads

Months	Dec	Jan	Feb	Mar	Apr	May	Jun
Qty produced (Q)	1,250	1,500	2,000	1,900	2,200	2,200	2,300
	₹	₹	₹	₹	₹	₹	₹
Wages (Q x 4)	5,000	6,000	8,000				
Wages (Q x 4.50)				8,550	9,900	9,900	10,350
75% this month	3,750	4,500	6,000	6,412	7,425	7,425	7,762
25% this month		1,250	1,500	2,000	2,138	2,475	2,475
		5,750	7,500	8,412	9,563	9,900	10,237

Cash budget - six months ended June

	Jan	Feb	Mar	Apr	May	Jun
	₹	₹	₹	₹	₹	₹
Receipts:						
Sales receipts	15,000	15,000	16,500	20,250	25,500	29,400
Freehold property	-	-	-	-	25,000	-
	15,000	15,000	16,500	20,250	50,500	29,400
Payments:						
Materials	5,000	6,250	7,500	10,000	9,500	11,000
Var. overheads	2,500	3,000	4,000	3,800	5,500	5,500
Wages	5,750	7,500	8,412	9,563	9,900	10,237
Printing press	-	-	-	-	10,000	-
Corporation tax	-	-	10,000	-	-	-
	13,250	16,750	29,912	23,363	34,900	26,737
Net cash flow	1,750	(1,750)	(13,412)	(3,113)	15,600	2,663
Balance b/f	1,500	3,250	1,500	(11,912)	(15,025)	575

Cumulative cash flow	3,250	1,500	(11,912)	(15,025)	575	3,238	
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Q.17: From the information and the assumption that the cash balance in hand on 1st January 2022 is ₹ 72,500, PREPARE a cash budget.

Assume that 50 per cent of total sales are cash sales. Assets are to be acquired in the months of February and April. Therefore, provisions should be made for the payment of ₹ 8,000 and ₹ 25,000 for the same. An application has been made to the bank for the grant of a loan of ₹ 30,000 and it is hoped that the loan amount will be received in the month of May.

It is anticipated that a dividend of ₹ 35,000 will be paid in June. Debtors are allowed one month's credit. Creditors for materials purchased and overheads grant one month's credit. Sales commission at 3 per cent on sales is paid to the salesman each month.

Month	Sales	Materials Purchases (₹)	Salaries & Wages (₹)	Production Overheads (₹)	Office Selling Overheads (₹)
January	72,000	25,000	10,000	6,000	5,500
February	97,000	31,000	12,100	6,300	6,700
March	86,000	25,500	10,600	6,000	7,500
April	88,600	30,600	25,000	6,500	8,900
May	1,02,500	37,000	22,000	8,000	11,000
June	1,08,700	38,800	23,000	8,200	11,500

ANSWER

Cash Budget

	Jan	Feb	Mar	Apr	May	June	Total
	₹	₹	₹	₹	₹	₹	₹
Receipts							
Cash sales	36,000	48,500	43,000	44,300	51,25	54,350	2,77,440
Collections from debtors	--	36,000	48,500	43,000	44,300	51,250	2,23,050
Bank loan	-	-	-	-	30,000	-	30,000
Total	36,000	84,500	91,500	87,300	1,25,550	1,05,600	5,30,450
Payments							
Materials	-	25,000	31,000	25,500	30,600	37,00	1,49,100
Salaries and wages	10,000	12,100	10,600	25,000	22,000	23,000	1,02,700
Production overheads	-	6,000	6,300	6,000	6,500	8,000	32,800
Office & selling overheads	-	5,500	6,700	7,500	8,900	11,000	39,600
Sales commission	2,160	2,910	2,580	2,658	3,075	3,261	16,644
Capital expenditure	-	8,000	-	25,000	-	-	33,000
Dividend	-	-	-	-	-	35,000	35,000
Total	12,160	59,510	57,180	91,658	71,075	1,17,261	4,08,844

Net cash flow	23,840	24,990	34,320	(4,358)	54,475	(11,661)	1,21,606
Balance, beginning of month	72,500	96,340	1,21,330	1,55,650	1,51,292	2,05,767	72,500
Balance, end of month	96,340	1,21,330	1,55,650	1,51,292	2,05,767	1,94,106	1,94,196

Q.18: Consider the balance sheet of Maya Limited as on 31 December, 2022. 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, 2023. 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):

Months	₹	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 31.
- PREPARE a pro forma balance sheet for March 31.

ANSWER

- Cash Budget (in thousands)

	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

Collection, 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	450
Payments:					
Payment for purchase			360	600	390
Labour 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)

	Jan.	Feb.	Mar.
	₹	₹	₹
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 labour costs. In March, substantial collections are made on the prior month's billings, causing large net cash inflow sufficient to pay off the additional borrowings.

(b) **Pro forma Balance Sheet, 31st March, 2023**

Equity & Liabilities	Amount (₹ in '000)	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

Accounts receivable = Sales in March \times 0.8 + Sales in February \times 0.1

= ₹ 650 \times 0.8 + ₹ 1,000 \times 0.1 = ₹ 620

Inventories = ₹ 545 + Total purchases from January to March – Total sales from January to March \times 0.6

= ₹ 545 + (₹ 600 + ₹ 390 + ₹ 450) – (₹ 600 + ₹ 1000 + ₹ 650) \times 0.6 = ₹ 635

Accounts payable = Purchases in March = ₹ 450

Retained earnings = ₹ 1,439 + Sales – Payment for purchases – Labour costs and – Other expenses, all for January to March

$$= ₹ 1,439 + (₹ 600 + ₹ 1000 + ₹ 650) - (₹ 360 + ₹ 600 + ₹ 390) - (₹ 150 + ₹ 200 + ₹ 160) - (₹ 100 + ₹ 100 + ₹ 100) = ₹ 1,529$$

Q.19: PQR Ltd. having an annual sales 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 Loses	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.

ANSWER

Evaluation of Alternative Collection Programmes

	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 (₹) $\left(\text{Sales} \times \frac{\text{ACP}}{360} \right)$	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)	--	<u>30,000</u>	<u>65,000</u>
Incremental Net Benefit (C - D)	--	<u>₹ 8,333</u>	<u>₹ 11,667</u>

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.20: 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%.

ANSWER

Statement showing the Evaluation of Proposal

Particulars	₹
A. Expected Profit:	
Net Sales	1,00,000
Less: Production and Selling Expenses @ 80%	(80,000)
Profit before providing for Bad Debts	20,000
Less: Bad Debts @ 10%	(10,000)
Profit Before Tax	10,000
Less: Tax @ 50%	(5,000)
Profit after 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

$$\begin{aligned}
 \text{Opportunity Cost} &= \text{Total Cost of Credit Sales} \times \frac{\text{Collection period}}{12} \times \frac{\text{Required Rate of Return}}{100} \\
 &= ₹ 80,000 \times \frac{1.5}{12} \times \frac{25}{100} = ₹ 2,500
 \end{aligned}$$

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

$$\begin{aligned}
 \text{*Average Debtors} &= \text{Total Cost of Credit Sales} \times \frac{\text{Collection period}}{12} \\
 &= ₹ 80,000 \times \frac{1.5}{12} = ₹ 10,000
 \end{aligned}$$

Computation of the value and percentage of X in each case is as follows:

$$\begin{aligned}
 \text{Case I} \quad 10,000 - 0.5x &= 3,000 \\
 0.5x &= 7,000
 \end{aligned}$$

$$X = 7,000 / 0.5 = ₹ 14,000$$

$$\text{Bad Debts as \% of sales} = ₹ 14,000 / ₹ 1,00,000 \times 100 = 14\%$$

$$\begin{aligned}
 \text{Case II} \quad 10,000 - 0.5x &= 4,000 \\
 0.5x &= 6,000 \\
 X &= 6,000 / 0.5 = ₹ 12,000
 \end{aligned}$$

$$\text{Bad Debts as \% of sales} = ₹ 12,000 / ₹ 1,00,000 \times 100 = 12\%$$

$$\begin{aligned}
 \text{Case III} \quad 10,000 - 0.5x &= 6,000 \\
 0.5x &= 4,000 \\
 X &= 4,000 / 0.5 = ₹ 8,000
 \end{aligned}$$

$$\text{Bad Debts as \% of sales} = ₹ 8,000 / ₹ 1,00,000 \times 100 = 8\%$$

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.

Q.21: Slow Payers are regular customers of Goods Dealers Ltd. and have approached the sellers for extension of credit facility for enabling them to purchase goods. On an analysis of past performance and on the basis of information supplied, the following pattern of payment schedule emerges in regard to Slow Payers:

Pattern of Payment Schedule	
At the end of 30 days	15% of the bill
At the end of 60 days	34% of the bill
At the end of 90 days	30% of the bill
At the end of 100 days	20% of the bill
Non-recovery	1% of the bill

Slow Payers want to enter into a firm commitment for purchase of goods of ₹ 15 lakhs in 2021-22, deliveries to be made in equal quantities on the first day of each quarter in the calendar year. The price per unit of commodity is ₹ 150 on which a profit of ₹ 5 per unit is expected to be made. It is anticipated by Goods Dealers Ltd., that taking up of this contract would mean an extra recurring expenditure of ₹ 5,000 per annum. If the opportunity cost of funds in the hands of Goods Dealers is 24% per annum, would you as the finance manager of the seller recommend the grant of credit to Slow Payers? ANALYSE. Workings should form part of your answer. Assume year of 365 days.

ANSWER

Statement showing the Evaluation of Debtors Policies

Particulars	Proposed Policy ₹
A. Expected Profit:	
(a) Credit Sales	15,00,000
(b) Total Cost	
(i) Variable Cost	14,50,000
(ii) Recurring Costs	5,000
	14,55,000
(c) Bad Debts	15,000
(d) Expected Profit [(a) - (b) - (c)]	30,000
B. Opportunity Cost of Investments in Receivables	68,787
C. Net Benefits (A - B)	(38,787)

Recommendation: The Proposed Policy should not be adopted since the net benefits under this policy are negative

Working Note: Calculation of Opportunity Cost of Average Investments

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection period}}{365} \times \frac{\text{Rate of Return}}{100}$$

Particulars	15%	34%	30%	20%	Total
A. Total Cost	2,18,250	4,94,700	4,36,500	2,91,000	14,40,450
B. Collection period	30/365	60/365	90/365	100/365	
C. Required Rate of Return	24%	24%	24%	24%	
D. Opportunity Cost (A x B x C)	4,305	19,517	25,831	19,134	68,787

Q.22: PREPARE a working capital estimate to finance an activity level of 52,000 units a year (52 weeks) based on the following data:

Raw Materials	- ₹ 400 per unit
Direct Wages	- ₹ 150 per unit
Overheads (Manufacturing)	- ₹ 200 per unit
Overheads (selling & Distribution)	- ₹ 100 per unit

Selling Price - ₹ 1,000 per unit, Raw materials & Finished Goods remain in stock for 4 weeks, Work in process takes 4 weeks. Debtors are allowed 8 weeks for payment whereas creditors allow us 4 weeks.

Minimum cash balance expected is ₹50,000. Receivables are valued at Selling Price.

ANSWER

Cost Structure for 52,000 units	
Particulars	Amount (₹)
Raw Material @ ₹ 400P	2,08,00,000
Direct Wages @ ₹ 150	78,00,000
Manufacturing Overheads @ ₹ 200	1,04,00,000

Selling and Distribution OH @ ₹ 100	52,00,000
Total Cost	4,42,00,000
Sales @ ₹ 1,000	5,20,00,000

Particulars	Calculation	Amount (₹)
A. Current Assets:		
Raw Material Stock	$2,08,00,000 \times \frac{4}{52}$	16,00,000
Work in Progress (WIP) Stock**	$2,08,00,000 \times \frac{(78,00,000 + 1,04,00,000)}{52} \times \frac{4}{52}$	23,00,000
Finished Goods Stock	$4,42,00,000 \times \frac{4}{52}$	34,00,000
Receivables	$5,20,00,000 \times \frac{8}{52}$	80,00,000
Cash		50,000
	Total Current Assets	1,53,50,000
B. Current Liabilities:		
Creditors	$2,08,00,000 \times \frac{4}{52}$	16,00,000
C. Working Capital Estimates (A - B)		1,37,50,000

**Assuming that labour and overhead are incurred evenly throughout the year.

IMPORTANT THEORY

Q.1:

[Nov 2020]

- (a) List out the role of Chief Financial Officer in today's World. **(4 Marks)**
- (b) Explain in brief the methods of Venture Capital Financing. **(4 Marks)**
- (c) Distinguish between Unsystematic Risk & Systematic Risk. **(2 Marks)**

OR

What is Risk Adjusted Discount Rate?

(2 Marks)

ANSWER:

(a) **Role of Chief Financial Officer (CFO) in Today's World:** Today, the role of chief financial officer, or CFO, is no longer confined to accounting, financial reporting and risk management. It's about being a strategic business partner of the chief executive officer, or CEO. Some of the role of a CFO in today's world are as follows-

- Budgeting
- Forecasting
- Managing M&As
- Profitability analysis (for example, by customer or product)
- Pricing analysis
- Decisions about outsourcing
- Overseeing the IT function.
- Overseeing the HR function.
- Strategic planning (sometimes overseeing this function).
- Regulatory compliance.
- Risk management

(b) **Methods of Venture Capital Financing:** Some common methods of venture capital financing are as follows-

- (i) **Equity financing:** The venture capital undertakings generally require funds for a longer period but may not be able to provide returns to the investors during the initial stages. Therefore, the venture capital finance is generally provided by way of equity share capital. The equity contribution of venture capital firm does not exceed 49% of the total equity capital of venture capital undertakings so that the effective control and ownership remains with the entrepreneur.
- (ii) **Conditional loan:** A conditional loan is repayable in the form of a royalty after the venture is able to generate sales. No interest is paid on such loans. In India venture capital financiers charge royalty ranging between 2 and 15 per cent; actual rate depends on other factors of the venture such as gestation period, cash flow patterns, risk and other factors of the

enterprise. Some Venture capital financiers give a choice to the enterprise of paying a high rate of interest (which could be well above 20 per cent) instead of royalty on sales once it becomes commercially sound.

- (iii) **Income note:** It is a hybrid security which combines the features of both conventional loan and conditional loan. The entrepreneur has to pay both interest and royalty on sales but at substantially low rates. IDBI's VCF provides funding equal to 80 – 87.50% of the projects cost for commercial application of indigenous technology.
- (iv) **Participating debenture:** Such security carries charges in three phases — in the start-up phase no interest is charged, next stage a low rate of interest is charged up to a particular level of operation, after that, a high rate of interest is required to be paid.
- (c) (i) **Unsystematic Risk:** This is also called company specific risk as the risk is related with the company's performance. This type of risk can be reduced or eliminated by diversification of the securities portfolio. This is also known as diversifiable risk.
- (ii) **Systematic Risk:** It is the macro-economic or market specific risk under which a company operates. This type of risk cannot be eliminated by the diversification hence, it is non-diversifiable. The examples are inflation, Government policy, interest rate etc.

OR

Risk Adjusted Discount Rate: A risk adjusted discount rate is a sum of risk-free rate and risk premium. The Risk Premium depends on the perception of risk by the investor of a particular investment and risk aversion of the Investor.

So, Risks adjusted discount rate = Risk free rate+ Risk premium.

Q.2:

[Jan 2021]

- (a) State four tasks involved to demonstrate the importance of good Financial Management. **(4 Marks)**
- (b) Explain Electronic Cash Management System. **(4 Marks)**
- (c) Define Internal Rate of Return (IRR) **(2 Marks)**

OR

Explain in brief the following bonds:

- (i) Callable Bonds
- (ii) Puttable Bonds

ANSWER:

- (a) The best way to demonstrate the importance of good financial management is to describe some of the tasks that it involves:
- **Taking care** not to over-invest in fixed assets
 - **Balancing** cash-outflow with cash-inflows
 - **Ensuring** that there is a sufficient level of short-term working capital

- **Setting** sales revenue targets that will deliver growth
- **Increasing** gross profit by setting the correct pricing for products or services
- **Controlling** the level of general and administrative expenses by finding more cost-efficient ways of running the day-to-day business operations, and
- **Tax planning** that will minimize the taxes a business has to pay.

(b) **Electronic Cash Management System:** Most of the cash management systems now-a-days are electronically based, since 'speed' is the essence of any cash management system. Electronically, transfer of data as well as funds play a key role in any cash management system. Various elements in the process of cash management are linked through a satellite. Various places that are interlinked may be the place where the instrument is collected, the place where cash is to be transferred in company's account, the place where the payment is to be transferred etc.

(c) **Internal rate of return:** Internal rate of return for an investment proposal is the discount rate that equates the present value of the expected cash inflows with the initial cash outflow.

OR

- (i) **Callable bonds:** A callable bond has a call option which gives the issuer the right to redeem the bond before maturity at a predetermined price known as the call price (Generally at a premium).
- (ii) **Puttable bonds:** Puttable bonds give the investor a put option (i.e. the right to sell the bond) back to the company before maturity.

Q.3:

- (i) "Profit Maximization cannot be the sole objective of a company". **COMMENT.**
- (ii) **DISCUSS** the advantages and disadvantages of raising funds by issue of preference shares. **[RTP May 2021]**

ANSWER:

- (i) **Following are the reasons due to which Profit Maximization cannot be the sole objective of a company:**
 - (a) **The term profit is vague. It does not clarify what exactly it means.** It conveys a different meaning to different people. For example, profit may be in short term or long-term period; it may be total profit or rate of profit etc.
 - (b) **Profit maximisation has to be attempted with a realisation of risks involved.** There is a direct relationship between risk and profit. Many risky propositions yield high profit. Higher the risk, higher is the possibility of profits. If profit maximisation is the only goal, then risk factor is altogether ignored. This implies that finance manager will accept highly risky proposals also, if they give high profits. In practice, however, risk is very important consideration and has to be balanced with the profit objective.
 - (c) **Profit maximisation as an objective does not take into account the time pattern of returns.** Proposal A may give a higher amount of profits as compared to proposal B, yet

if the returns of proposal A begin to flow say 10 years later, proposal B may be preferred which may have lower overall profit but the returns flow is more early and quick.

- (d) **Profit maximisation as an objective is too narrow.** It fails to take into account the social considerations as also the obligations to various interests of workers, consumers, society, as well as ethical trade practices. If these factors are ignored, a company cannot survive for long. Profit maximization at the cost of social and moral obligations is a short sighted policy.

(ii) Advantages and disadvantages of raising funds by issue of preference shares

Advantages

- (i) No dilution in EPS on enlarged capital base – On the other hand if equity shares are issued it reduces EPS, thus affecting the market perception about the company.
- (ii) There is also the advantage of leverage as it bears a fixed charge (because companies are required to pay a fixed rate of dividend in case of issue of preference shares). Non-payment of preference dividends does not force a company into liquidity.
- (iii) There is no risk of takeover as the preference shareholders do not have voting rights except where dividend payment are in arrears.
- (iv) The preference dividends are fixed and pre-decided. Hence preference shareholders cannot participate in surplus profits as the ordinary shareholders can except in case of participating preference shareholders.
- (v) Preference capital can be redeemed after a specified period.

Disadvantages

- (i) One of the major disadvantages of preference shares is that preference dividend is not tax deductible and so does not provide a tax shield to the company. Hence, preference shares are costlier to the company than debt e.g. debenture.
- (ii) Preference dividends are cumulative in nature. This means that if in a particular year preference dividends are not paid they shall be accumulated and paid later. Also, if these dividends are not paid, no dividend can be paid to ordinary shareholders. The non-payment of dividend to ordinary shareholders could seriously impair the reputation of the concerned company.

Q.4: DISCUSS the advantages of Certainty Equivalent Method. **[MTP March 2021 (2 Marks)]**

ANSWER:

Advantages of Certainty Equivalent Method:

1. The certainty equivalent method is simple and easy to understand and apply.
2. It can easily be calculated for different risk levels applicable to different cash flows. For example, if in a particular year, a higher risk is associated with the cash flow, it can be easily adjusted and the NPV can be recalculated accordingly.

Q.5: **[MTP March 2021]**

- (a) **DISCUSS the advantages and disadvantages of Wealth maximization principle.**

(b) **DISCUSS** in brief the characteristics of Debentures.

(c) **DEFINE** Security Premium Notes.

Or

DEFINE Masala bond.

ANSWER:

(a) **Advantages and disadvantages of Wealth maximization principle.**

Advantages:

- (i) Emphasizes the long term gains
- (ii) Recognises risk or uncertainty
- (iii) Recognises the timing of returns
- (iv) Considers shareholders' return.

Disadvantages:

- (i) Offers no clear relationship between financial decisions and share price.
- (ii) Can lead to management anxiety and frustration.

(b) **Characteristics of Debentures are as follows:**

- Normally, debentures are issued on the basis of a debenture trust deed which lists the terms and conditions on which the debentures are floated.
- Debentures are either secured or unsecured.
- May or may not be listed on the stock exchange.
- The cost of capital raised through debentures is quite low since the interest payable on debentures can be charged as an expense before tax.
- From the investors' point of view, debentures offer a more attractive prospect than the preference shares since interest on debentures is payable whether or not the company makes profits.
- Debentures are thus instruments for raising long-term debt capital.
- The period of maturity normally varies from 3 to 10 years and may also increase for projects having high gestation period.

(c) **Secured Premium Notes:** Secured Premium Notes is issued along with a detachable warrant and is redeemable after a notified period of say 4 to 7 years. The conversion of detachable warrant into equity shares will have to be done within time period notified by the company.

OR

Masala bond: Masala (means spice) bond is an Indian name used for Rupee denominated bond that Indian corporate borrowers can sell to investors in overseas markets. These bonds are issued outside India but denominated in Indian Rupees. NTPC raised Rs. 2,000 crore via masala bonds for its capital expenditure in the year 2016.

Q.6:

[MTP April 2021]

- (a) **EXPLAIN** in brief the features of Commercial Paper.
- (b) **DESCRIBE** how agency problem can be addressed.
- (c) **DEFINE** Debt Securitisation.

Or

EXPLAIN the principles of “Trading on equity”.

[4 + 4 + 2 = 10 Marks]

ANSWER:

- (a) **A Commercial Paper** is an unsecured money market instrument issued in the form of a promissory note. The Reserve Bank of India introduced the commercial paper scheme in the year 1989 with a view to enabling highly rated corporate borrowers to diversify their sources of short-term borrowings and to provide an additional instrument to investors. Subsequently, in addition to the Corporate, Primary Dealers and All India Financial Institutions have also been allowed to issue Commercial Papers. Commercial papers are issued in denominations of Rs. 5 lakhs or multiples thereof and the interest rate is generally linked to the yield on the one-year government bond.
- (b) **Agency problem** between the managers and shareholders can be addressed if the interests of the managers are aligned to the interests of the share- holders. It is easier said than done. However, following efforts have been made to address these issues:
 - Managerial compensation is linked to profit of the company to some extent and also with the long term objectives of the company.
 - Employee is also designed to address the issue with the underlying assumption that maximisation of the stock price is the objective of the investors.
 - Effecting monitoring can be done.
- (c) **Debt Securitisation** is a process in which illiquid assets are pooled into marketable securities that can be sold to investors. The process leads to the creation of financial instruments that represent ownership interest in, or are secured by a segregated income producing asset or pool of assets. These assets are generally secured by personal or real property such as automobiles, real estate, or equipment loans but in some cases are unsecured.

OR

The use of long-term fixed interest-bearing debt and preference share capital along with equity share capital is called financial leverage or trading on equity. The use of long-term debt increases the earnings per share if the firm yields a return higher than the cost of debt. The earnings per share also increase with the use of preference share capital but due to the fact that interest is allowed to be deducted while computing tax, the leverage impact of debt is much more. However, leverage can operate adversely also if the rate of interest on long-term loan is more than the expected rate of earnings of the firm. Therefore, it needs caution to plan the capital structure of a firm.

Q.7:

[July 2021]

- (a) **Explain** in brief the forms of Post Shipment Finance.

(4 Marks)

(b) Describe the salient features of FORFAITING. (4 Marks)

(c) List out the steps to be followed by the manager to measure and maximize the Shareholder's Wealth (2 Marks)

OR

Explain the limitations of Average Rate of Return. (2 Marks)

ANSWER:

(a) **Post-shipment Finance:** It takes the following forms:

- (a) **Purchase/discounting of documentary export bills:** Finance is provided to exporters by purchasing export bills drawn payable at sight or by discounting usance export bills covering confirmed sales and backed by documents including documents of the title of goods such as bill of lading, post parcel receipts, or air consignment notes.
- (b) **E.C.G.C. Guarantee:** Post-shipment finance, given to an exporter by a bank through purchase, negotiation or discount of an export bill against an order, qualifies for post-shipment export credit guarantee. It is necessary, however, that exporters should obtain a shipment or contracts risk policy of E.C.G.C. Banks insist on the exporters to take a contracts shipments (comprehensive risks) policy covering both political and commercial risks. The Corporation, on acceptance of the policy, will fix credit limits for individual exporters and the Corporation's liability will be limited to the extent of the limit so fixed for the exporter concerned irrespective of the amount of the policy.
- (c) **Advance against export bills sent for collection:** Finance is provided by banks to exporters by way of advance against export bills forwarded through them for collection, taking into account the creditworthiness of the party, nature of goods exported, usance, standing of drawee, etc.
- (d) **Advance against duty draw backs, cash subsidy, etc.:** To finance export losses sustained by exporters, bank advance against duty draw-back, cash subsidy, etc., receivable by them against export performance. Such advances are of clean nature; hence necessary precaution should be exercised.

(b) **The Salient features of forfaiting are:**

- It motivates exporters to **explore new geographies** as payment is assured.
- An overseas buyer (importer) can import goods and services on **deferred payment terms**.
- The exporter enjoys **reduced transaction costs and complexities** of international trade transactions.
- The exporter gets to **compete in the international market** and can continue to put his working capital to good use to scale up operations.
- While importers avail of forfaiting facility from international financial institutions in order to **finance their imports at competitive rates**.

(c) For measuring and maximising shareholders' wealth, manager should follow:

Cash Flow approach not Accounting Profit

Cost benefit analysis

Application of time value of money.

OR

Limitations of Average Rate of Return

- The accounting rate of return technique, like the payback period technique, **ignores the time value of money** and considers the value of all cash flows to be equal.
- The technique uses accounting numbers that are dependent on the organization's **choice of accounting procedures**, and different accounting procedures, e.g., depreciation methods, can lead to substantially different amounts for an investment's net income and book values.
- The method **uses net income rather than cash flows**; while net income is a useful measure of profitability, the net cash flow is a better measure of an investment's performance.
- Furthermore, inclusion of only the book value of the invested asset **ignores** the fact that a project can require **commitments of working capital** and other outlays that are not included in the book value of the project.

Q.8:

- (a) **DISCUSS** the point that demonstrates the Importance of good financial management.
- (b) **EXPLAIN** some common methods of Venture capital financing. **[RTP Nov 2021]**

ANSWER:

- (a) Points that demonstrate the "Importance of good financial management":
- **Taking care** not to over-invest in fixed assets
 - **Balancing** cash-outflow with cash-inflows
 - **Ensuring** that there is a sufficient level of short-term working capital
 - **Setting** sales revenue targets that will deliver growth
 - **Increasing** gross profit by setting the correct pricing for products or services
 - **Controlling** the level of general and administrative expenses by finding more cost-efficient ways of running the day-to-day business operations, and
 - **Tax planning** that will minimize the taxes a business has to pay.
- (b) Some common methods of venture capital financing are as follows:
- (i) **Equity financing:** The venture capital undertakings generally require funds for a longer period but may not be able to provide returns to the investors during the initial stages. Therefore, the venture capital finance is generally provided by way of equity share capital. The equity contribution of venture capital firm does not exceed 49% of the total equity capital of venture capital undertakings so that the effective control and ownership remains with the entrepreneur.
 - (ii) **Conditional loan:** A conditional loan is repayable in the form of a royalty after the venture is able to generate sales. No interest is paid on such loans. In India venture capital financiers

charge royalty ranging between 2 and 15 per cent; actual rate depends on other factors of the venture such as gestation period, cash flow patterns, risk and other factors of the enterprise. Some Venture capital financiers give a choice to the enterprise of paying a high rate of interest (which could be well above 20 per cent) instead of royalty on sales once it becomes commercially sound.

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