Contents

CHAPTER 01: TIME VALUE OF MONEY

Answer for Q.NO.1.

Current market price (or) P_o (or) PV

= Rs.5 x PVIFA (12%, 6 years) (+) Rs.85 (PVIF 12%, 6 years)

= Rs. x 4.111 (+) (+) Rs.85 x 0.507

= Rs.20.555 (+) Rs.43.095

= Rs.63.65

Answer for Q.NO.2.

Year	CF	PVIF 12%	PVARIABLE COSTF
1	5	0.893	4.465
2	3	0.797	2.391
3	4	0.712	2.848
4	2	0.636	1.272
5	9	0.567	5.103
6	8 + 85	0.507	47.151
		80	63.228

Answer for Q.NO.3.

Current market price = $\frac{\text{Annual dividend}}{\text{Discount Rate}} = \frac{\text{Rs.5}}{12\%}$ = Rs.41.67

Answer for Q.NO.4.

Current Market Price = $\frac{\text{Cash flow at the end of year}(D_1)}{\text{Discount rate} - \text{Growth rate}(r-G)} = \frac{\text{Rs.5}}{12-4} = \frac{\text{Rs.5}}{8\%} = \text{Rs.62.5}$

Answer for Q.NO.5.

6.65 0.302 (12)

(10 X 6.65) + (0.302 X 120) = Rs.102.74

↓ ↓

PVIFA PVIF (10.5%, 12 years)

(10.5%, 12 years)

Answer for Q.NO.6.

$$\frac{\text{Annual dividend}}{\text{Discount rate}} = \frac{\text{Rs.10}}{10\%}$$

Value = Rs.100

Answer for Q.NO.7.

Interest rate = Coupon rate

Value of Bond (B_o) = Rs.(1000 x 14%) x PVIAF (13%, 5 years) + (1000) x (PVIF) (13% 5 years) (0.543)

= 140 x 3.517 (+) 1000 x 0.543

= 492.38 (+) 543

= Rs.1035.38

Answer for Q.NO.8.

$$\text{Value of Bond} = = \frac{\text{Annual Interest}}{\text{Discount rate}} = \frac{\text{Rs.90}}{10\%} = \text{Rs.900}$$

Answer for Q.NO.9.

The amount of interest will go on declining as the outstanding amount of bond will be reducing due to amortization. The amount of interest for five years will be:

First year:	Rs.5,000 x 0.08	= Rs.400;
Second year:	(Rs.5,000 – Rs.1,000) x 0.08	= Rs.320;
Third year:	(Rs.4,000 – Rs.1,000) x 0.08	= Rs.240;
Fourth year:	(Rs.3,000 – Rs.1,000) x 0.08	= Rs.160; and
Fifth year:	(Rs.2,000 – Rs.1,000) x 0.08	= Rs.80

The outstanding amount of bond will be zero at the end of fifth year.

Since RBML will have to return Rs.1,000 every year, the outflows every year will consist of interest payment and repayment of principal as follows:

First year:	Rs.1,000 + Rs.400	= Rs.1,400;
Second year:	Rs.1,000 + Rs.320	= Rs.1,320;
Third year:	Rs.1,000 + Rs.240	= Rs.1,240;
Fourth year:	Rs.1,000 + Rs.160	= Rs.1,160; and
Fifth year:	Rs.1,000 + Rs.80	= Rs.1,080

The above cash flows of all five years will be discounted with the cost of capital.Here, cost of capital will be the minimum expected rate of return i.e. 6%.

Value of the bond is calculated as follows:

$$V_B = \frac{\text{Rs.1,400}}{(1.06)^1} + \frac{\text{Rs.1,320}}{(1.06)^2} + \frac{\text{Rs.1,240}}{(1.06)^3} + \frac{\text{Rs.1,160}}{(1.06)^4} + \frac{\text{Rs.1,080}}{(1.06)^5}$$

$$= \frac{Rs.1,400}{1.06} + \frac{Rs.1,320}{1.1236} + \frac{Rs.1,240}{1.1910} + \frac{Rs.1,160}{1.2624} + \frac{Rs.1,080}{1.3382}$$

=Rs.1,320.75 + Rs.1,174.80 + Rs.1,041.14 + Rs.918.88 + Rs.807.05 = Rs.5,262.62

CHAPTER 02 - COST OF CAPITAL

Answer for Q.NO.1.

$K_d = \frac{Int(1-Taxrate)}{Netproceeds}$

Par:

i. $K_d = \frac{30000 \times Rs.100 \times 15\%(1-0)}{3000000 - 30000}$

$= \frac{Rs.4,50,000}{29,70,000} = 15.15\%$

ii. Premium @ 10%

$Int = \frac{Rs.4,50,000}{33,00,000} = Rs.30,000$

$= \frac{Rs.4,50,000}{Rs.32,70,000} = 13.76\%$

iii. Discount @ 10%

$Int = \frac{Rs.4,50,000}{27,00,000 - 30000}$

$\frac{Rs.4,50,000}{26,70,000} = 16.85\%$

Answer for Q.NO.2.

i. $D_d = \frac{Int(1-T)(+)\left(\frac{RV-NP}{n}\right)}{\left(\frac{RV+NP}{2}\right)}$

$= \frac{12(1-35\%)(+)\left(\frac{100-100}{7yrs}\right)}{\left(\frac{100+100}{2}\right)}$

$= \frac{7.8}{100} = 7.8\%$

ii. @ discount 10% $= \frac{12(1-35\%)(+)\left(\frac{100-100}{7yrs}\right)}{\left(\frac{100+90}{2}\right)}$

$= \frac{7.8(+)1.429}{95} = 9.715\%$

iii. Premium 10%

$$= \frac{12(1-35\%)(+)\left(\frac{100-100}{7\,\text{yrs}}\right)}{\left(\frac{100+110}{2}\right)}$$

$$= \frac{7.8(-)1.429}{105} = 6.067\%$$

Part – ii Brokerage = 2% = K_d = ?

$$K_d = \frac{12(0.65)(+)\left(\frac{100-98}{7\,\text{years}}\right)}{\left(\frac{100+110}{2}\right)}$$

$$= \frac{7.8(-)0.286}{99} = 8.168\%$$

Answer for Q.NO.3.

Here, Net Proceeds (P_O) will be issue price less floatation cost.

Po = Rs.100 - 3% of Rs.100 = Rs.97

$$K_P = \frac{PD}{P_0}$$

$$= \frac{Rs.12}{Rs.97} = 0.1237$$

Answer for Q.NO.4.

$$Kp = \frac{PD(+)\left(\frac{RV-NP}{n}\right)}{\frac{RV+NP}{2}}$$

Case 1: PD = Rs.15

RV = Rs.110

NP = 100

$$K_p = \frac{4,50,000(+)\left(\frac{33,00,000-29,70,000}{20\,\text{yrs}}\right)}{\left(\frac{33,00,000+29,70,000}{2}\right)}$$

$$K_p = \frac{4,50,000(+)16,500}{31,35,000} = 14.88\%$$

Case 2: Premium @10%

$$K_p = \frac{4,50,000 (+) \left(\frac{33,00,000 - 32,70,000}{20\,\text{yrs}} \right)}{\left(\frac{33,00,000 + 32,70,000}{2} \right)}$$

$$K_p = \frac{4,50,000 + 1,500}{32,85,000} = 13.744\%$$

Case 3: Discount @ 10%

$$K_p = \frac{4,50,000 (+) \left(\frac{33,00,000 - 26,70,000}{20\,\text{yrs}} \right)}{\left(\frac{33,00,000 + 26,70,000}{2} \right)}$$

$$K_p = \frac{4,50,000 (+) 31,500}{29,85,000} = 16.131\%$$

Answer for Q.NO.5.

$$K_e = \frac{D_1}{P_0} + g = \frac{Rs.1(1+0.1)}{Rs.55} + 0.1 = 0.12$$

Answer for Q.NO.6.

We know that as per the realised yield approach, cost of equity is equal to the realised rate of return. Therefore, it is important to compute the internal rate ofreturn by trial and error method. This realised rate of return is the discount rate which equates the present value of the dividends received in the past five yearsplus the present value of sale price of Rs.1,128 to the purchase price of Rs.1,000. The discount rate which equalises these two is 12 per cent approximately. Let us look at the table given for a better understanding:

Year	Dividend (Rs.)	Sale Proceeds (Rs.)	Discount Factor @ 12%	Present Value (Rs.)
1	100	-	0.893	89.3
2	100	-	0.797	79.7
3	100	-	0.712	71.2
4	100	-	0.636	63.6
5	100	-	0.567	56.7
5	End	1,128	0.567	639.576
				1,000.076

We find that the purchase price of Alpha Limited's share was Rs.1,000 and thepresent value of the past five years of dividends plus the present value of the sale price at the discount rate of 12 per cent is Rs.1,000.076. Therefore, the realised rateof return may be taken as 12 per cent. This 12 per cent is the cost of equity.

Answer for Q.NO.7.

Ke = R_f + ß (R_m − R_f)

Ke = 0.10 + 1.75 (0.15 − 0.10)

= 0.10 + 1.75 (0.05)= 0.1875 or 18.75%

Answer for Q.NO.8.

$$k_f = \frac{D_1}{P_0} + g = \frac{10}{200} + 0.05 = 10\%$$

$$K_e = \frac{D_1}{p_0} + g = \frac{Rs.10}{Rs.190 - Rs.5} + 0.05 = 10.41\%$$

Answer for Q.NO.9.

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

K_e = 0.125 + 0.06 = 0.185

*Calculation of g:

Rs.10.6$(1+g)^5$ = Rs.14.19

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

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

(ii) Cost of Retained Earnings (Kr) = $\frac{D_1}{P_0} + g = \frac{Rs.15}{Rs.125} + 0.06 = 0.18$

(iii) Cost of Preference Shares (Kp) = $\frac{PD}{P_0} = \frac{Rs.15}{Rs.105} = 0.1429$

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

= $\frac{Rs.15(1-0.35)\left(\frac{Rs.100 - Rs.91.75*}{11\,years}\right)}{\frac{Rs.100 + Rs.91.75*}{2}}$

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

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

Market price of debentures (approximation method)

= Rs.15 ÷ 0.16 = Rs.93.75

Sale proceeds from debentures = Rs.93.75 – Rs.2 (i.e., floatation cost) = Rs.91.75

Market value (P_0) of debentures can also be found out using the presentvalue method:

P_0 = Annual Interest × PVIFA (16%, 11 years) + Redemption value × PVIF(16%, 11 years)

P_0 = Rs.15 × 5.029 + Rs.100 × 0.195P_0 =

Rs.75.435 + Rs.19.5 = Rs.94.935

Net Proceeds = Rs.94.935 – 2% of Rs.100 = Rs.92.935

Accordingly, the cost of debt can be calculated

Total Cost of capital [BV weights and MV weights]

(Amount in (Rs.) lakh)

Source of capital	Weights		SpecificCost	Total cost	
	BV	MV	(K)	(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 ofequity and retained earnings i.e., 120:30 or 4:1.

Weighted Average Cost of Capital (WACC):

Using Book Value = $\frac{Rs.33.73}{Rs.195}$ = 0.1729 or 17.29%

Using Market Value = $\frac{Rs.42.76}{Rs.244.15}$ = 0.1751 or 17.51%

Answer for Q.NO.10.

$k_r = R_f + ß\ (Rm – Rf)$

= 7% + 1.20 (6%)=7% + 7.20

K_r= 14.2%

Answer for Q.NO.11.

i. Cost of Equity (Ke)

$= \frac{D_1}{P_0 - F} + g = \frac{Rs.1}{Rs.24 - Rs.4} + 0.05 = 0.1$

ii. Cost of Debt (K_d)

Current market price (P0) – floatation cost

= I(1-t) × PVAF (r,10) + RV × PVIF (r,10)

Rs.105 – 4% of Rs.105 = Rs.10 (1-0.3) × PVAF (r,10) + Rs.100 × PVIF (r,10)

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

Year	Cashflows (Rs.)	Discountfactor @5%	PresentValue (Rs.)	Discountfactor @7%	PresentValue (Rs.)
0	100.8	1.000	(100.8)	1.000	(100.8)
1 to 10	7	7.722	54.05	7.024	49.17
10	100	0.614	61.40	0.508	50.80
NPV			+14.65		-0.83

Calculation of IRR

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

Cost of Debt (Kd) = 6.89%

iii. Cost of Preference shares (Kp)

Current market price (P_0) – floatation cost = PD × PVAF (r,10) + RV × PVIF (r,10)

Rs.110 – 2% of Rs.110 = Rs.5×PVAF (r,10) + Rs.100×PVIF (r,10)

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

Year	Cashflows (Rs.)	Discount factor @3%	PresentValue (Rs.)	Discount factor @5%	PresentValue (Rs.)
0	107.8	1.000	(107.8)	1.000	(107.8)
1 to 10	5	8.530	42.65	7.722	38.61
10	100	0.744	74.40	0.614	61.40
NPV			+9.25		-7.79

Calculation of IRR

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

Cost of Preference Shares (K_p) = 4.08%

(a) Calculation of WACC using book value weights

Source of capital	Book Value	Weights	After tax costof capital	WACC (K_O)
	(Rs.)	(a)	(b)	(c) = (a)×(b)
10% Debentures	5,00,000	0.25	0.0689	0.01723
5% Preference shares	5,00,000	0.25	0.0408	0.0102
Equity shares	10,00,000	0.50	0.10	0.05000
	20,00,000	1.00		0.07743

WACC (K_O) = 0.07743 or 7.74%

(b) Calculation of WACC using market value weights

Source of capital	Market Value	Weights	After tax costof capital	WACC (Ko)
	(Rs.)	(a)	(b)	(c) = (a)×(b)
10% Debentures (Rs.105× 5,000)	5,25,000	0.151	0.0689	0.0104
5% Preference shares (Rs.110× 5,000)	5,50,000	0.158	0.0408	0.0064
Equity shares (Rs.24× 1,00,000)	24,00,000	0.691	0.10	0.0691
	34,75,000	1.000		0.0859

WACC (K_O) = 0.0859 or 8.59%

Answer for Q.NO.12.

i. Cost of equity: K_e (dividend growth approach)

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

$$= \frac{D_o(1+g)}{P_0} + G$$

$$= \frac{25(1+0.05)}{Rs.200} + 5\%$$

$$= \frac{26.25}{200} + 5\%$$

= 18.125%

ii. Cost of preference shares (irredeemable): K_p

Note: As per ICAI, since question is silent, issue price is considered as face value for computing net proceeds.

K_p = P_D / P_o

= Rs.9 / 100

= 9%

iii. Cost of dfebt: K_d (irredeemable)

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

$$= \frac{11(1-0.30)}{100}$$

= 7.7%

iv. Cost of retained earnings: K_r

K_r = K_e $(1 - t_p)$ $(1 - t)$

= 18.125 (1 – 0.20) (1 – 0)

= 14.5%

v. WACC (K_o)

a. Using book value weights:

Source	Book value	(a) Weights	(b) (K)	(a x b) WACC
Equity	80,00,000	0.40	18.125%	7.25%
Preference	20,00,000	0.10	9%	0.9%
Debt	60,00,000	0.30	7.7%	2.31%
R.E	40,00,000	0.20	14.5%	2.90%
	200,00,000	1.00		13.36%

b. Using market value weights:

Source	Book value	(a) Weights	(b) (K)	(a x b) WACC
Equity	160,00,000	0.64	18.125%	11.6%
Preference	24,00,000	0.096	9%	0.864%
Debt	66,00,000	0.264	7.7%	2.033%
R.E	0	0.00	14.5%	0%
	200,00,000	1.00		14.50%

K_o = WACC = 14.50%

Answer for Q.NO.13.

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

Market value of debt, D = Nil

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

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

Answer for Q.NO.14.

(A)

i) Cost of new debt

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

$= \frac{Rs.16(1-0.5)}{Rs.96} = 0.0833$

ii) Cost of new preference shares

$K_p = \frac{PD}{P_0} = \frac{Rs1.1}{Rs9.2} = 0.12$

iii) Cost of new equity shares

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

$$= \frac{Rs.1.18}{Rs.23.60} + 0.10 = 0.05 + 0.10 = 0.15$$

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

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

$$= \frac{Rs.1.10 - Rs1.00}{Rs.1.00} = 0.10$$

Calculation of D1

D1 = 50% of 2022EPS = 50% of 2.36 = Rs.1.18

(B) Calculation of marginal cost of capital

Type of Capital	Proportion	Specific Cost	Product
(1)	**(2)**	**(3)**	**(2) × (3) = (4)**
Debenture	0.15	0.0833	0.0125
Preference Share	0.05	0.1200	0.0060
Equity Share	0.80	0.1500	0.1200
Marginal cost of capital			**0.1385**

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

Retained earnings = 50% of EPS of 2022 × outstanding equity shares

= 0.50×Rs.2.36 × 10,000 shares = Rs.11,800

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

So, Rs.11,800 = 80% of Total Capital

∴ Capital investment before issuing equity shares = $\text{Rs.}\frac{11,800}{0.80} = \text{Rs. } 14,750$

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

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

The marginal cost of capital will be:

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

Answer for Q.NO.15.

(a) Pattern for raising the additional finance:

Equity 70% of Rs.10,00,000 = Rs.7,00,000

Debt 30% of Rs.10,00,000 = Rs.3,00,000

The capital structure after raising additional finance:

		(Rs.)
Shareholders' funds		
Equity Capital	(Rs.7,00,000–Rs.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.)	(Rs.3,00,000–Rs.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

On Rs.1,80,000 =10% (1 – 0.5)=5% or 0.05

On Rs.1,20,000 =16% (1 – 0.5)=8% or 0.08

Average Cost of Debt

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

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

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

Where,

D_0 = Dividend paid = 50% of EPS = 50% × Rs.4 = Rs.2

g = Growth rate =10%

P_0 = Current market price per share = Rs.44

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

(d) Computation of overall weighted average after tax cost of additionalfinance:

Particulars	**Amount (Rs.)**	**Weights**	**Cost of funds**	**WeightedCost (%)**

Equity (includingretained 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**

Answer for Q.NO.16.

Statement showing computation of K_o at different levels of debt / equity mix:

W_d	K_d	W_e	K_e	$K_o = w_d \times K_d + w_e K_e$
0	5%	1	12%	0 + 12% = 12%
0.1	5%	0.9	12%	0.5 + 10.8% = 11.3%
0.2	5%	0.8	12.5%	1 + 10% = 11%
0.3	5.5%	0.7	13%	1.65 + 9.1 = 10.75%
0.4	6%	0.6	14%	2.4 + 8.4 = 10.8%
0.5	6.5%	0.5	16%	3.25 + 8 = 11.25%
0.6	7%	0.4	20%	4.2 + 8% = 12.2%

The optimum capital structure

Answer for Q.NO.17.

Computation of WACC:

A. Using Book value weights:

Source	Amount Book value	Weights	Cost (K)	(K_o) WACC
Equity	3,00,000	0.33	0.18	0.0594
Reserve	2,00,000	0.22	0.15	0.033
Long term Debt	4,00,000	0.45	0.08	0.036
	9,00,000	1		12.84%

Note: Short term debt should not be considered for the purpose of WACC computation

B. Using Market value weights

Source	Amount Book value	Weights	Cost (K)	(K_o) WACC
Equity	4,50,000	0.4	0.18	0.072
Reserve	3,00,000	0.27	0.15	0.0405
Long term Debt	3,75,000	0.33	0.08	0.0264
	11,25,000	1		13.89%

Note: The market value of equity has been apportioned between ESC and Reserves in BV proportion.

Answer for Q.NO.18.

Determination of Redemption value:

Higher of

(i) The cash value of debentures = Rs.100

(ii) Value of equity shares =10 shares × Rs.12 $(1+0.05)^5$

=10 shares × 15.312 = Rs.153.12

Rs.153.12 will be taken as redemption value as it is higher than the cash option and is more attractive to the investors.

Calculation of Cost of Convertible debenture (using approximation method):

$$K_d = \frac{I(1-t)+\frac{(RV-NP)}{n}}{\frac{(RV+NP)}{2}} = \frac{15(1-0.35)+\frac{(153.12-100)}{5}}{\frac{(153.12+100)}{2}} = \frac{9.75+10.62}{126.53} = 16.09\%$$

Alternatively:

Calculation of Cost of Convertible debenture (using present value method):

Year	Cash flows (Rs.)	Discount factor @ 15% (L)	Present Value (Rs.)	Discount factor @ 20% (H)	Present Value (Rs.)
0	100	1.000	(100.00)	1.000	(100.00)
1 to 5	9.75	3.352	32.68	2.991	29.16
5	153.12	0.497	76.10	0.402	61.55

$$IRR = L + \frac{NPV_L}{NPV}(H-L) = 15\% + \frac{Rs.8.78}{Rs.8.78-(Rs.-9.89)}(20\%-15\%) = 0.17429$$

Answer for Q.NO.19.

(i) Calculation of Cost of Convertible Debentures:

Given that,

R_F = 10%

$R_m - R_f$ = 18%

B = 1.25

D_0 = 12.76D_5 = Rs.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 dividend12.76 = 10 $(1+g)^5$

1.276 = $(1+g)^5$

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

g = **5%**

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

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

$P_6 = 65.28$

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

NP = 95

n = 6

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

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

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

Kd = 13.24%

(ii) Calculation of Cost of Preference Shares:

Net Proceeds = 100 (1.1) - 6% of 100 (1.1)

= 110 - 6.60

= 103.40

Redemption Value = 100

Year	Cash Flows (Rs.)	PVF @3%	PV (Rs.)	PVF @5%	PV (Rs.)
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**

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

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

Kp = 4.6021%

Answer for Q.NO.20.

Step 1: Calculation of effective cost of capital in case of 14% institutional Term loan

K_t = Int Rate (1 – T)

= 14% (1 – 50%)

= 7%

Step 2: Calculation of effective cost of capital in case of 13% non-convertible debentures

$$K_d = \frac{\text{Int}(1-\text{tax})}{\text{NP}}$$

$$= \frac{13\%(1-50\%)}{243.75\%-5} = \frac{16.25}{238.75} = 6.806\%$$

Note: Since the period of debt is missing the debt is (assumption) perpetual

Conclusion: It is better to raise the funds of Rs.250L by issuing 13% NCD, since its effective list is less than option – (term loan option)

Answer for Q.NO.21.

RV = Rs.1,00,000

NP = Rs.2500

Life = 25 years

Int = 0

$FV = PV (1 + r)^n$

$1,00,000 = 2500 (1 + r)^{25}$

$0 = 2500 (1 + r)^{25} – 1,00,000$

Let r = Trail 15% and 16%

Let r = 15%

NPV = $2500 (1.15)^{25} – 1,00,000$

= 82297.38 – 1,00,000

= -17702.50

Let r = 16%

NPV = $2500 (1.16)^{25} – 1,00,000$

= 2500 (40.874) – 1,00,000

= 102185 – 1,00,000

(+) = 2185

$$= 15\% + \frac{1770205}{19887.5} \times 1$$

= 15.89%

Note: Since there is a huge difference between RV and NP we should use IRR method instead of approximation method.

Answer for Q.NO.22.

Here,

Redemption Value (RV)= Rs.1,00,000Net Proceeds (NP) = Rs.2,500 Interest= 0

Life of bond = 25 years

There is huge difference between RV and NP, therefore, in place of approximationmethod, we should use trial & error method.

FV = PV x $(1+r)^n$

Rs.1,00,000 = Rs.2,500 x $(1+r)^{25}$

Rs.40 = $(1+r)^{25}$

Trial 1: r = 15%, $(1.15)^{25}$ = 32.919

Trial 2: r = 16%, $(1.16)^{25}$ = 40.874

Here:

L = 15%, H = 16%

NPV_L = Rs.32.919- Rs.40 = Rs.-7.081

NPV_H = Rs.40.874-40 = + Rs.0.874

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

$$= 15\% + \frac{Rs-7.081}{Rs-7.081-(Rs0.874)} \times (16\%-15\%) = 15.89\%$$

Answer for Q.NO.23.

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

Yield for last 4 years:

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

$$1+Y_2 = \frac{D_2+P_2}{P_1} = \frac{Rs.1+Rs.11.50}{9.75} = 1.2821$$

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

$$1+Y_4 = \frac{D_3+P_3}{P_3} = \frac{Rs.1.25+Rs.10.60}{11} = 1.0772$$

Geometric mean:

$$K_e = \left[(1+Y_1)\times(1+Y_2)\times....(1+Y_n)\right]^{\frac{1}{n}} - 1$$

$$K_e = \left[1.1944 \times 1.2821 \times 1.0609 \times 1.0772\right]^{\frac{1}{4}} - 1 = 0.15 = 15\%$$

Answer for Q.NO.24.

(i) Cost of Equity Capital (Ke):

$$Ke = \frac{\text{Expected dividend per share}(D_1)}{\text{Market price per share}(P_0)} + \text{Growth rate}(g)$$

$$= \frac{Rs.2 \times 1.06}{Rs.25} + 0.06 = 0.1448 \text{ or } 14.48\%$$

(ii) Cost of Debenture (Kd):

Using Present Value method (YTM)

Identification of relevant cash flows

Year	Cash flows
0	Current market price (P_0) = Rs.96
1 to 12	Interest net of tax [I(1-t)] = 10% of Rs.100 (1 – 0.5) = Rs.5
12	Redemption value (RV) = Rs.100 (1.12) = Rs.112

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

Year	Cash flows(Rs.)	Discount factor @ 5%(L)	Present Value(Rs.)	Discount factor @ 10% (H)	Present Value (Rs.)
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 = $IRR = L + \frac{NPV_L}{NPV_L - NPV_H}(H - L)$

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

Therefore, K_d = 6.45%

Answer for Q.NO.25.

To determine the interest rate we compute YTm of this bond using IRR method:

1125.75 = 95 x PVIFA (x% for 9 years) + 1000 (PVIF x % for 9 years)

0 = 95 x PVIFA + 1000 - 1125.75

(x%, 9 yrs) (x%, 9 yrs)

Calculation of NPV at discount ratios:

Year	CF	PVF @ 6%	PVARIABLE COSTF	PVF @ 8%	PVARIABLE COSTF
0	(1125.75)	1	(1125.75)	1	(1125.75
1 – 9	95	6.801	646.095	6.246	593.37
9	1000	0.592	592	0.5	500
			112.345		-32.38

$$= 6\% \frac{+112.345 \times 2}{144.325}$$

= 6% + 1.958 = 70.550% (or) 8%

CHAPTER 03: FINANCING DECISIONS - LEVERAGES

Answer for Q.NO.1.

	(Rs.)
Sales	24,00,000
Less: Variable cost	12,00,000
Contribution	12,00,000
Less: Fixed cost	10,00,000
EBIT	2,00,000
Less: Interest	1,00,000
EBT	1,00,000
Less: Tax (50%)	50,000
EAT	50,000
No. of equity shares	10,000
EPS	5

(a) Operating Leverage = $\frac{Rs.12,00,000}{Rs.2,00,000} = 6$ times

(b) Financial Leverage $\frac{Rs.2,00,000}{Rs.1,00,000} = 2$ times

(c) Combined Leverage = OL × FL = 6 × 2 = 12 times.

(d) ROI $= \frac{Rs.50,000}{Rs.10,00,000} \times 100 = 5\%$

Here ROI is calculated as ROE i.e. $\frac{EAT - Pref.Dividend}{Equityshareholders'fund}$

(e) Operating Leverage = 6

$6 = \frac{\Delta EBIT}{0.25}$

$\Delta EBIT = \frac{6 \times 1}{4} = 1.5$

Increase in EBIT = Rs. 2,00,000 × 1.5

= Rs. 3,00,000

New EBIT = Rs. 5,00,000

Answer for Q.NO.2.

Operating Leverage (OL)

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

Financial Leverage (FL)

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

Combined Leverage (CL)

= 1.05 x 2.25 = 2.3625

Percentage Change in Earnings per share

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

$\therefore$% change in EPS = 23.625%

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

Answer for Q.NO.3.

Income statement:

Particulars	A	B	C
Sales	3600	8000	12000
$\frac{(-)\text{VC}}{\text{CN}}$	$\frac{(2400)}{1200}$	$\frac{(6000)}{2000}$	$\frac{(6000)}{6000}$
$\frac{(-)\text{FC}}{\text{EBIT}}$	$\frac{(900)}{300}$	$\frac{(1600)}{400}$	$\frac{(4000)}{2000}$
$\frac{(-)\text{Int}}{\text{EBT}}$	$\frac{(200)}{100}$	$\frac{(300)}{400}$	$\frac{(1000)}{1000}$
$\frac{(-)\text{Tax @45\%}}{\text{EBT}}$	(45) / 55	(45) / 55	(450) / 550

Including Note:

Particulars	A	B	C
Sales	Contribution / PVR	Contribution / PVR	Contribution / PVR
$\frac{(-)\text{VC}}{\text{CN}}$	$\frac{\text{Sales} \times \text{VCratio}}{4 = \frac{\text{C}}{\text{EBIT}}(300)}$	$\frac{\text{Sales} \times \text{VCratio}}{5 = \frac{\text{C}}{400} = 2000}$	$\frac{\text{Sales} \times \text{VCratio}}{3 = \frac{\text{C}}{2000} = 600}$
$\frac{(-)\text{FC}}{\text{EBIT}}$	$3 = \frac{\text{E}}{\text{E} - 200}\text{E} = 300$	$4 = \frac{\text{E}}{\text{E} - 200} = 400$	$2 = \frac{\text{E}}{\text{E} - 1000}\text{E} = 2000$
$\frac{(-)\text{Int}}{\text{EBT}}$	$\frac{\text{Given}}{100}$	$\frac{\text{Given}}{100}$	$\frac{\text{Given}}{1000}$

(–)Tax @45% EBT	45% on EBT (45) / 55	(45) / 55	(450) / 550

Comment: Hint = Average and Interest coverage ratio

Answer for Q.NO.4.

Income statement

Particulars	Amount (Rs.)	Workings
Sales	12,10,000	
(–)variable cost Cn	629200 580800	1.5 x 4,84,000 – 96800 1484000 + 96800
(–)FC EBIT	96800 484000	Given (4,00,000 + 84000)
(–) Int EBT	(84000) 4,00,000	(7,00,000 x 12%) (280000 ÷ 100%)
(–)Tax@30% EAT 70	(120000) 280000	(280000 ÷ 100% x 30) Given
(–)PD EFE	(50000) 230000	5,00,000 x 10%
(–)ED RE	(120000) 110000	(8,00,000 x 15%)

i. Operating leverage = $\frac{580800}{484000} = 1.2 \text{times}$

ii. Financial leverage = $\frac{EBIT}{EBT} = \frac{484000}{4,00,000} = 1.21 \text{times}$

or

Financial leverage = $\frac{EBIT}{EBIT - Int - \frac{PD}{(1-tax)}} = \frac{484000}{4,00,000 - \frac{50,000}{0.7}} = \frac{484000}{328571} = 1.473 \text{times}$

Note: Any one of the 2 formulas can be used in exam

ii. PD coverage ratio = $\frac{EAT}{PD} = \frac{280000}{50000} = 5.6 \text{times}$

Equity coverage ratio = $\frac{EFE}{ED} = \frac{230000}{120000} = 1.917 \text{ times}$

iii. Earnings yield ratio: = $\frac{EPS}{MPS} = \frac{230000 \div 80000}{23} = \frac{2.875}{23} = 0.125 = 12.5\%$

Price yield ratio = $\frac{MPS}{EPS} = \frac{23}{2.875} = 8 times$

iv. Net fund flow = EAT (+) Depn (-) PD (-) ED

= 280000 + 96800 – 50000 – 120000

= 206800

Answer for Q.NO.5.

(i) Operating Leverage (OL)

	Situation-I	**Situation-II**
	(Rs.)	**(Rs.)**
Sales (3000 units @ Rs. 30 per unit)	90,000	90,000
Less: Variable Cost (@ Rs. 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) = $\frac{C}{EBIT}$	$= \frac{Rs.45,000}{Rs.30,000}$	$= \frac{Rs.45,000}{Rs.25,000}$
	= 1.5	= 1.8

(ii) Financial Leverage (FL)

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

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

(iii) Combined Leverage (CL)

	A	B
Situation-I		
CL = FL x OL	1.5×1.07 = 1.61	1.5 × 1.034 = 1.55
Situation-II		
CL = FL x OL	1.8 × 1.09 = 1.96	1.8 × 1.04 = 1.872

Answer for Q.NO.6.

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

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

$$DFL = \frac{Rs.2,20,000}{Rs.1,60,000} = 1.38$$

DCL = DOL x DFL = 1.27 x 1.38 = 1.75

(b) Earnings per share at the new sales level

	(i) Increase by 20%	(ii) Decrease by 20%
	(Rs.)	(Rs.)
Sales level	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 = Rs. 60,000 (total cost - depreciation)

(ii) Variable Costs at:

(a) Sales level of Rs. 4,08,000 = Rs. 72,000 (increase by 20%)

(b) Sales level of Rs. 2,72,000 = Rs. 48,000 (decrease by 20%)

Answer for Q.NO.7.

Contribution = 12500, Fixed cost = 50000

$Bt = \frac{EC}{PVR}$ $28000 = \frac{FC}{35.714\%}$

Fixed cost = 10000

Contribution = 12500

$\frac{(10000)}{EBIT2500} = 5$ $\frac{15000}{5000} = 3$

Fixed cost = BEP x Contribution p.u

Fixed cost = 2000 units x Rs.

FIXED COST = Rs.10,000

Particulars	2500 units	3000 units
Sales 14	35000	42000
$(-)\frac{VC\ (9)}{Cn}$	$\frac{(22500)}{12500}$	$\frac{(27000)}{15000}$
$(-)\frac{FC}{EBIT}$	$\frac{(10000)}{2500}$	$\frac{(10000)}{5000}$
OL = $\frac{Cn}{EBIT}$	5 times	3 times

Comment:

1. At sales volume of 3000 units the operating leverage is 3 times. Any change in sales from this level will result in a 3 times change in EBIT
2. At sales volume of 2500 units the operating leverage is 50. Any change iin sales from this level the change in EBIT 5 times.

Answer for Q.NO.8.

Income Statement with required calculations

Particulars	(Rs.)	(Rs.)
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 $= \frac{EBIT}{EBT}$	$= \frac{Rs.2,80,000}{Rs.1,80,000}$ = 1.56	$= \frac{Rs.2,00,000}{Rs.1,00,000}$ = 2
(ii) Operating leverage $= \frac{Contribution}{EBIT}$	$= \frac{Rs.4,80,000}{Rs.2,80,000}$ = 1.71	$= \frac{Rs.4,00,000}{Rs.2,00,000}$ = 2
(iii) Earnings per share (EPS) $= \frac{PAT}{No.of shares}$	$= \frac{Rs.1,26,000}{Rs.10,000}$ = Rs. 12.6	$= \frac{Rs.70,000}{Rs.10,000}$ = Rs. 7
Decrease in EPS	= Rs. 12.6 – Rs. 7 = Rs. 5.6	
	% decrease in EPS $= \frac{5.6}{12.6} x\ 100$ = 44.44%	

Answer for Q.NO.9.

Calculation DOL:

Particulars	A	B	C	D
Sales	1,00,000	1,60,000	2,50,000	3,50,000
$(-)\frac{VC}{Cn}$	$\frac{(30000)}{70000}$	$\frac{(80000)}{80000}$	$\frac{(1,00,000)}{1,50,000}$	$\frac{(2,50,000)}{1,00,000}$
$(-)\frac{FC}{EBIT}$	$\frac{(80,000)}{(10000)}$	$\frac{(40000)}{40000}$	$\frac{(2,00,00)}{(50,000}$	$\frac{(-)}{1,00,000}$
$OL = \frac{Cn}{EBIT}$	-7	2	-3	No leverage

Analysis:

i) OL exists only when there is fixed cost incase of firm D there is no magnifying effect on EBIT due to change in sales service there is no FIXED COST.

ii) In case of the other firms, OL exists. It is maximum in form A followed by firm C and minimum in firm B.

iii) The interpretation of DOC of is that 1% change in sales result in 7% change in EBIT. (the "+", "(-)" symbols have no meaning at all in leverages)

Answer for Q.NO.10.

Income Statement

Particulars	Company A (Rs.)	Company B (Rs.)
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

Financial Leverage = EBIT/(EBIT- Interest)

4 = EBIT/(EBIT- Rs. 3,000)

4EBIT – Rs. 12,000 = EBIT

3EBIT = Rs. 12,000

EBIT = Rs. 4,000

Company B

Financial Leverage = EBIT/(EBIT - Interest)

3 = EBIT/(EBIT – Rs. 2,000)

3EBIT – Rs. 6000 = EBIT

2EBIT = Rs. 6,000

EBIT = Rs. 3,000

ii. Company A

Operating Leverage = 1/Margin of Safety

= 1/0.20 = 5

Operating Leverage = Contribution/EBIT

5 = Contribution/Rs. 4,000

Contribution = Rs. 20,000

Company B

Operating Leverage = 1/Margin of Safety

= 1/0.25 = 4

Operating Leverage = Contribution/EBIT

4 = Contribution/Rs. 3,000

Contribution = Rs. 12,000

iii. Company A

Profit Volume Ratio = 25%(Given)

Profit Volume Ratio = Contribution/Sales x 100

25% = Rs. 20,000/Sales

Sales = Rs. 20,000/25%

Sales = Rs. 80,000

Company B

Profit Volume Ratio = 33.33%

Therefore, Sales = Rs. 12,000/33.33%

Sales = Rs. 36,000

Answer for Q.NO.11.

Workings:

Total Assets = Rs. 20 crores

Total Asset Turnover Ratio = 2.5

Hence, Total Sales = 20 x 2.5 = Rs. 50 crores

Computation of Profit after Tax (PAT)

	(Rs.) 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% ⍰ Rs. 10 crores)	1.50
PBT	12.00
Less: Tax @ 30%	3.60
PAT	8.40

(i) Earnings per Share

$$EPS = \frac{PAT}{\text{Number of Equity Shares}} = \frac{Rs.8.40\,crores}{50,00,000} = Rs.16.80$$

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

$$\text{Operating Leverage} = \frac{\text{Contribution}}{EBIT} = \frac{Rs.17.50crores}{Rs.13.50crores} = 1.296$$

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 aparticular level.

(iii) Financial Leverage

Financial Leverage = $\frac{EBIT}{PBT} = \frac{Rs.13.50crores}{Rs.12.00crores} = 1.125$

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

(iv) Combined Leverage

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

= Operating Leverage × Financial Leverage

= 1.296 x 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.

Answer for Q.NO.12.

i. Financial leverage

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

2.5 = 2 x FL

Or, FL = 1.25

Financial Leverage = 1.25

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

Operating leverage = $\frac{Contribution(C)}{Contribution - Fixed Cost\,(FC)}$

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

Or, C = 2 (C – 3,40,000)

Or, C = 2C – 6,80,000

Or, Contribution = Rs. 6,80,000

Now, P/V ratio = $\frac{Contribution(C)}{Sales(S)} \times 100$

= $\frac{6,80,000}{50,00,000} \times 100$ = 13.6%

Therefore, P/V Ratio = 13.6%

EBT = Sales – Variable Cost – Fixed Cost – Interest

= Rs.50,00,000 – Rs.50,00,000 (1-0.136) – Rs.3,40,000 – (8% × Rs.30,25,000)

= Rs. 50,00,000 – Rs. 43,20,000 – Rs. 3,40,000 – Rs. 2,42,000

= Rs. 98,000

PAT = EBT(1-T)= Rs. 98,000(1-0.3) = Rs. 68,600

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

$$EPS = \frac{Rs.68,600}{3,40,000\ shares} = Rs.0.202$$

iii. Assets turnover

$$\text{Assets turnover} = \frac{Sales}{Total Assets^*}$$

$$= \frac{Rs.50,00,000}{Rs.34,00,000 + Rs.30,25,000} = 0.78$$

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 Rs. 50,00,000 x (100 – 40) % = Rs. 30,00,000. Therefore, at Rs. 30,00,000 level of sales, the Earnings before Tax (EBT) of the company will be zero.

Alternatively

$$\text{Required sales when EBT is zero} = \frac{Fixed Cost + Interest + desired Profit}{P/V Ratio}$$

$$= \frac{Rs.3,40,000 + Rs.2,42,000 + Zero}{13.60\%}$$

$$= \frac{Rs.5,82,000}{13.60\%}$$

$$= Rs.\ 42,79,412$$

[**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.

Answer for Q.NO.13.

(i) Calculation of Fixed Cost

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

EBIT = Contribution – Fixed Cost

Rs. 4,00,000 = Rs. 10,00,000 – Fixed Cost

Fixed Cost = Rs. 10,00,000 - Rs. 4,00,000 = Rs. 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%.

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

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

DCL = DOL x DFL

4 = 2.5 x DFL

So, DFL = 1.6

(iv) Calculation of Interest and amount of Debt

$$DFL = \frac{EBIT}{EBIT - Int} \text{ or}, 1.6 = \frac{Rs.4,00,000}{Rs.4,00,000 - Int} \text{ or}, Int = 1,50,000$$

Debt x Interest rate = Amount of Interest

Debt x 16% = Rs. 1,50,000

Debt = Rs. 9,37,500

(v) Calculation of Earnings per share (EPS)

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

Answer for Q.NO.14.

Networth = 25,00,000

Debt equity = 3 : 1

$\therefore$ Debt = $25,00,000 \times \frac{3}{1} = 75,00,000$

= 75,00,000 x 12% = Rs.9,00,000

EBIT = 20,00,000

(-) Int = (9,00,000

EBIT 11,00,000

$$FC = \frac{20}{11} = 1.82 \text{ times}$$

Answer for Q.NO.15.

Statement showing Profitability of Alternative Schemes for Financing

(Rs.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 (Rs.) (Selling price - Variable Cost)	20	22	22	22
Contribution (Rs.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) (Rs.)	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., Rs. 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 Rs. 6.80 per share. In case of alternative (i), EPS is even lower than the existing option, hence not recommended.

CHAPTER 04: FINANCING DECISIONS - CAPITAL STRUCTURE

Answer for Q.NO.1.

At what level of EBIT

Alter – 1 and 2

↓

Will gave same TPS.

At what level EPS are same

↓

The point is indifferent

Financial plans

P – 1	P – 2
ESC = 6,00,000	ESC = Rs.4,00,000
12% Deb = 4,00,000	14% PSC = Rs.2,00,000
10,00,000	12% Peb = Rs.4,00,000
	Rs.10,00,000

$$EPS\ (P-1) = \frac{(EBIT - 48,000)(1-0.35)}{60,000}$$

$$EPS\ (P-2) = \frac{(EBIT - 48,000)(1-0.35) - 28,000}{40,000}$$

$$= \frac{(EBIT - 48,000)(1-0.35)}{60,000} = \frac{(EBIT - 48,000)(1-0.65) - 28,000}{40,000}$$

0.65EBIT – 31,200 = 0.65 EBIT – 31200 – 28000

2.6 EBIT – (24,800) = 3.9 EBIT – 3,55,200

230400 = 1.3 EBIT

EBIT = Rs.1,77,231

Answer for Q.NO.2.

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

(i) By issuing equity shares only worth Rs.9 crore or

(ii) By raising capital through taking a term loan of Rs.6 crores and Rs.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 Rs.72,00,000

Point of Indifference between the above two alternatives =

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

Or, $\frac{EBIT\ (1-0.30)}{90,00,000\ shares} = \frac{(EBIT - Rs.\ 72,00,000)\ x\ (1-0.30)}{30,00,000\ shares}$

Or, 0.7 EBIT = 2.1 EBIT – Rs.1,51,20,000

EBIT = Rs.1,08,00,000

EBIT at point of Indifference will be Rs.1.08 crore.

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

Answer for Q.NO.3.

Computation of Rate of Preference Dividend

$$\frac{(EBIT - Interest)(1-t)}{No.\ of\ Equity\ Shares\ (N_1)} = \frac{EBIT(1-t) - Preference Dividend}{No.\ of\ Equity\ Shares\ (N_2)}$$

$$\frac{(Rs.4,80,000 - Rs.48,000) \times (1-0.30)}{80,00,000 shares} = \frac{Rs.4,80,000(1-0.30) - Preference Dividend}{80,00,000 shares}$$

$$\frac{Rs.\ 3,02,400}{80,00,000\ shares} = \frac{Rs.\ 3,36,000\ - Preference\ Dividend}{80,00,000\ shares}$$

Rs.3,02,400 = Rs.3,36,000 – Preference Dividend

Preference Dividend = Rs.3,36,000 – Rs.3,02,400 = Rs.33,600

$$Rate\ of\ Dividend = \frac{Preference\ Dividend}{Preference\ share\ capital} \times 100$$

$$= \frac{Rs.33,600}{4,00,000} \times 100 = 8.4\%$$

Answer for Q.NO.4.

(a)

Particulars	**Alternatives**		
	Alternative - I: Take additional Debt	**Alternative- II: Issue 11% Preference Shares**	**Alternative - III: Issue further Equity Shares**
	Rs.	**Rs.**	**Rs.**
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 Rs.2,376 - Rs.1,500 = Rs.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)-

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

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

250EBIT = Rs.5,94,000

EBIT = Rs.2,376

Answer for Q.NO.5.

(i) Computation of Earnings per share (EPS)

Plans	A (Rs.)	B (Rs.)	C (Rs.)
Earnings before interest and tax (EBIT) Less: Interest charges	80,000 ---	80,000 (8,000) (8% × Rs.1 lakh)	80,000 ---
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% × Rs.1 lakh)
Earnings available for Equity	40,000	36,000	32,000

shareholders (A)			
No. of Equity shares (B)	10,000 (Rs.2 lakh ÷ Rs.20)	5,000 (Rs.1 lakh ÷ Rs.20)	5,000 (Rs.1 lakh ÷ Rs.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 Rs.8,000 and no preference dividend, hence, the Financial Break-even point will be Rs.8,000 (Interest charges).
Plan C:	Under this plan there is no interest payment but an after tax preference dividend of Rs.8,000 is paid. Hence, the Financial Break- even point will be before tax earnings of Rs.16,000 (i.e. Rs.8,000÷(1 - 0.5)= Rs.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 EBIT (5,000) = (0.5 EBIT – 4,000) (10,000)

0.5 EBIT = EBIT – 8,000

0.5 EBIT = 8,000

EBIT = Rs.16,000

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

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

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

0.25 EBIT = 0.5 EBIT – 8,000

0.25 EBIT = 8,000

EBIT = Rs.32,000

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

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

0.5 EBIT – 4,000 = 0.5 EBIT – Rs.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 Rs.8,000 but in case of latter it is

Rs.16,000. Further EPS of plan B is the highest.

Answer for Q.NO.6.

Sources of financing:

Capital structure of each plan:

Particulars	I	II	III	IV
Existing equity shares	1,00,000	1,00,000	1,00,000	1,00,000
New equity shares	60,000	40,000	30,000	30,000
Total ESC	1,60,000	1,40,000	1,30,000	1,30,000
Equity share capital	16L	14L	13L	13L
12% LTL	-	2,00,000	-	-
9% debt	-	-	3,00,000	-
6% Pref. shares	-	-	-	3,00,000
Total capital employed	16L	16L	16L	16L

Calculation of EPS and Financial leverage:

Particulars	I	II	III	IV
EBIT	4,00,000	4,00,000	4,00,000	4,00,000
(-) Int	-	(24,000)	(27,000)	-
EBT	4,00,000	3,76,000	3,73,000	4,00,000
(-) Tax @ 40%	(1,60,000)	(1,50,400)	(1,49,200)	(1,60,000)
EAT	2,40,000	2,25,600	2,23,800	2,40,000
(-) PD				(18,000)
FE	2,40,000	2,25,600	2,23,800	2,22,000
No. of equity shares	16L	14L	13L	13L
EPS (A : B)	1.5	1.611	1.72	1.71
FE (EBIT)	1	1.064	1.072	1.081
$EBIT - Int - \frac{PD}{(1-T)}$	$\left[\frac{4,00,000}{4L-0}\right]$	$\left[\frac{4,00,000}{(4L-24,000)0}\right]$	$\left[\frac{4,00,000}{(4L-24,000)}\right]$	$\left[\frac{4L}{(4L-0)}\frac{18000}{0.6}\right]$

Comment: Since EPS is higher in plan 3 the management should accept it

From ROE point of view alternative c has to be choosen. Since it has the highes ROE

Answer for Q.NO.7.

Calculation of ROE under the 3 alternatives

Particulars	A	B	C
EBIT (50L x 25%)	12.5	12.5	12.5
(-) Int	-		
On deb	-	2.8	2.1
On Loan	-	1.8	4.5
EBT	12.5	7.9	5.9
(-) Tax @ 50%	(6.25)	(3.95)	(2.95)
EAT / EFE	6.25	3.95	2.95
Equity share capital	50	20	10
ROE	12.5%	19.75%	29.5%

Answer for Q.NO.8.

In this question, EBIT after proposed extension is not given. Therefore, we can assume that existing return on capital employed will be maintained.

Working notes:

1. Return on Capital Employed $= \frac{EBIT}{CapitalEmployed} = \frac{Rs.52,00,000}{Rs.3,00,00,000} = 17.33\%$

Capital Employed = Debt + Equity

= Rs.1,00,00,000 + (Rs.80,00,000 + Rs.1,20,00,000)

= Rs.3,00,00,000

2. Proposed EBIT = Proposed Capital Employed x Return on capital employed

= (Rs.3,00,00,000 + Rs.40,00,000) x 17.33%

= Rs.58,92,200

(If you take return on capital employed in full digits then accurate EBIT will be Rs.58,93,333.)

3. Debt Equity Ratio $= = \frac{Debt}{Debt + Equity}$

<u>Option1: Loan option</u>

Debt = Rs.1,00,00,000 + Rs.40,00,000 = Rs.1,40,00,000

Equity = Rs.2,00,00,000

Deb Equity ratio= $\frac{1.4\,cr.}{1.4\,cr. + 2\,cr.} = 41.18\% = 41.18\%$

Debt equity ratio has crossed the limit of 35%, hence, PE ratio in this case will be 8 times and additional borrowing will be at the rate of 14%.

Option2: Equity option

Debt = Rs.1,00,00,000

Equity = Rs.2,00,00,000 + Rs.40,00,000 = Rs.2,40,00,000

Debt Equtiy ratio= $\frac{\text{Rs.1 cr.}}{\text{1 cr.} + \text{Rs.2.4 cr.}} = 29.41\%$

Debt equity ratio has not crossed the limit of 35% hence PE ratio in this case will remain at 10 times.

4. Number of equity shares to be issued in case of equity option @ Rs.25 per share = Rs.40,00,000 / Rs.25 = 1,60,000

Calculation of EPS and MPS under two financial options

Particulars	Financial Options	
	Option I 14% additional loan of 40,00,000 (Rs.)	**Option II 8,00,000 equity shares @ Rs.10 i.e 1,60,000 equity shares @ Rs.25 (Rs.)**
Profit before interest and Tax (PBIT)	58,92,200	58,92,200
Less: Interest on old debentures @ 12%	12,00,000	12,00,000
Less: Interest on additional loan (new) @ 14% on Rs.40,00,000	5,60,000	Nil
Profit before tax	41,32,200	46,92,000
Less: Taxes @ 50%	20,66,100	23,46,100
Earnings for equity shareholders (EAT/Profit after tax)	20,66,100	23,46,100
Number of Equity Shares	8,00,000	9,60,000
Earnings per Share (EPS)	2.58	2.44
Price/ Earnings ratio	8	10
Market price per share (MPS)	20.66	24.44

Decision: Though loan option has higher EPS but equity option has higher MPS therefore company should raise additional fund through equity option.

Answer for Q.NO.9.

Plan I = Raising Debt of Rs.2.5 lakh + Equity of Rs.22.5 lakh

Plan II = Raising Debt of Rs.10 lakh + Equity of Rs.15 lakh

Plan III = Raising Debt of Rs.15 lakh + Equity of Rs.10 lakh

Calculation of Earnings per share (EPS):

Particulars	FINANCIAL PLANS		
	Plan I	Plan II	Plan III
	Rs.	Rs.	Rs.
Expected EBIT	5,00,000	5,00,000	5,00,000
Less: Interest [a]	(25,000)	(1,37,500)	(2,37,500)
Earnings before taxes	4,75,000	3,62,500	2,62,500
Less: Taxes @ 50%	(2,37,500)	(1,81,250)	(1,31,250)
Earnings after taxes (EAT)	2,37,500	1,81,250	1,31,250
Number of shares [b]	15,000	10,000	8,000
Earnings per share (EPS)	15.83	18.13	16.41

Financing Plan II (i.e. Raising debt of Rs.10 lakh and issue of equity share capital of Rs.15 lakh) is the option which maximises the earnings per share.

Working Notes:

(a) Calculation of interest on Debt

Plan		Rs.	Rs.
I	(Rs.2,50,000 x 10%)		25,000
II	(Rs.2,50,000 x 10%)	25,000	
	(Rs.7,50,000 x 15%)	1,12,500	1,37,500
III	(Rs.2,50,000 x 10%)	25,000	
	(Rs.7,50,000 x 15%)	1,12,500	
	(Rs.5,00,000 x 20%)	1,00,000	2,37,500

(b) Number of equity shares to be issued

$$\text{Plan I} = \frac{\text{Rs.}22,50,000}{\text{Rs.}150\ (\text{Market price of share})} = 15,000 \text{ shares}$$

$$\text{Plan II} = \frac{\text{Rs.}15,00,000}{\text{Rs.}150} = 10,000 \text{ shares}$$

$$\text{Plan III} = \frac{\text{Rs.}10,00,000}{\text{Rs.}125} = 8,000 \text{ shares}$$

Answer for Q.NO.10.

(i) Statement showing Market value of equity and value of firm

	Rs.
EBIT	5,00,000
Less: Interest on debentures (10% of Rs.20,00,000)	(2,00,000)
Earnings available for equity holders i.e. Net Income (NI)	3,00,000
Equity capitalization rate (Ke)	16%
Market value of equity (S) = $\frac{NI}{K_e} = \left(\frac{3,00,000}{16} \times 100\right)$	18,75,000
Market value of debt (D)	20,00,000
Total value of firm V = S + D	38,75,000

(ii) Overall cost of capital = $\frac{EBIT}{Value\ of\ firm} = \frac{Rs.5,00,000}{Rs.38,75,000}$ = 12.90%

Answer for Q.NO.11.

Part – I

VE = 1,00,000 x 50 = Rs.50,00,000

$V_d = 0$

$V_f = V_E + V_d$

V_f = Rs.50,00,000

$V_f = \frac{EBIT}{K_o}$

50,00,000 = $\frac{4,00,000}{K_o}$ (Given)

K_o = 8%

Since A ltd. Is financed entirely by equity

$K_e = K_o$

$\therefore K_e$ = 8%

Part – II:

Under NI approach K_e and K_d will remain constant

EBIT = 4,00,000

(-) Int = (60,000)

EBIT / EFE 3,40,000

K_e = 8%

Value of equity = Rs.42,50,000

$\left(\frac{EFE}{8\%}\right)$

Value of debt ($\left(\frac{Int}{Kd}\right)$ = Rs.10,00,000

V_f = Rs.52,50,000

52,50,000 = $\frac{EBIT}{Ko}$ (4,00,000)

K_o = 7.619% (or) 7.62%

Answer for Q.NO.12.

Particulars	I	II	III
Debt	4,00,000	7,00,000	10,00,000
Equity	16,00,000	13,00,000	10,00,000
Total	20,00,000	20,00,000	20,00,000
EBIT	4,00,000	4,00,000	4,00,000
(-) Int 8%	(32,000)	(50,000)	(80,000)
EBT / EFE EAT	3,68,000	3,44,000	3,20,000
K_o 10%	10%	10%	10%
Value of firm	40,00,000	40,00,000	40,00,000
Value of equity	36,00,000	33,00,000	30,00,000
K_e	10.22%	10.424%	10.67%
$\left(\frac{EFE}{VE}\right)$	$\left(\frac{3,68,000}{36L}\right)$	$\left(\frac{3,44,000}{33L}\right)$	$\left(\frac{3,20,000}{30L}\right)$

Note: Under NOI V_f always he constant in all the debt equity proportion

Answer for Q.NO.13.

Particulars	Situation (0% Debt)	OP – 1 (30% Debt)	OP – 2 (50% Debt)
Debt	0	6,00,000	10,00,000
Equity	20,00,000	14,00,000	10,00,000
Debt Capital	20,00,000	20,00,000	20,00,000
K_e	16%	17%	20%
K_d	-	10%	12%
EBIT	3,00,000	3,00,000	3,00,000
(-) Interest	-	(60,000)	(1,20,000)

EBT / EAT / EFE	3,00,000	2,40,000	1,80,000
Value of equity (EFE : K_e)	18,75,000	14,11,765	9,00,000
Value of firm	18,75,000	20,11,765	19,00,000
K_o (EBIT ÷ value of firm)	16%	14.91%	15.789%

Comment: Option – 1 is the best alternative service V_f is maximum and K_o is minimum

Answer for Q.NO.14.

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:

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

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

Answer for Q.NO.15.

EBIT = 3L

Given data:

	X Ltd. (Levered)	**Y Ltd. (Unlevered)**
Debt	Rs.9,00,000	-
Interest @ 10%	Rs.90,000	
EBIT (15L x 20%)	3,00,000	23,00,000
Tax rate	50%	50%
K_e	-	15%
V_p	?	?

Step 1: Income statement

Particulars	**Company X Ltd. (Levered)**	**Company Y Ltd. (Unlevered)**
EBIT	3,00,000	3,00,000
(-) Interest	(90,000)	-

EBT	2,10,000	3,00,000
(-) Tax @ 50%	(1,05,000)	(1,50,000)
EAT / EFE	1,05,000	1,50,000

Since company Y is an unlevered Company $K_e = K_o = 15\%$

Value of unlevered EFE ÷ K_e

Firm = 1,50,000 ÷ 15% = Rs.10,00,000

As per mm approach with tax

Value = NUL + Debt. X Tax rate

= 10,00,000 + (9,00,000 x 50%)

= 10,00,000 + 4,50,000

Value of levered (X) = Rs.14,50,000

Answer for Q.NO.16.

	Existing (Unlevered)	**After BB (Levered)**
K_e	21%	$V_{d\ =\ 5,00,00}$
V_f	25,00,000	
V_e	25,00,000	
Tax rate	30%	30%
Interest Rate		15%

Step 1: Calculation of EBIT

Before buy rate

$$V_e = \frac{EFE}{K_e}$$

$$25,00,000 = \frac{EFE}{21\%}$$

EFE = 5,25,000

Income statement:

EBIT 7,50,000

(-) Int -

EBT (100) 7,50,000

(-) Tax @ 30% 2,25,000 (5,25,000 ÷ 70 x 30)

EAT / EFE (70) 5,25,000

Since EBIT is the same at any capital structure EBIT after buy back = Rs.7,50,000

Step 2: Income statement (after buy back)

EBIT	7,50,000
(-) Int	(75,000) (5,00,000 x 15%)

EBT	6,75,000
(-) Tax @ 30%	(2,02,500)
EAT / EFE	4,72,500

Step 3: Value of RES (after buy back) (value of levered firm)

V_L = VULf (+) (Debt x Tax rate)

= 25,00,000 (+) (5,00,000 x 30%)

= Rs.26,50,000

Step 4: Calculation of K_e after BB:

V_f = VE (+) Vd

26,50,000 = Ve + 5,00,000

Ve = 21,50,000

$$K_e = \frac{EFE}{V_e} = \frac{4,72,500}{21,50,000} = 21.976\%(or)22\%$$

Step 5: WACC (After BB)

K_o = Kewe + Kdwd = 15% (1 – tax rate)

= 22% x 0.8 (+) 15% x 0.2

= 19.81%

Comment: Before BB After BB

K_o 21% 19.8%

Because of the BB the K_o is reduced from 21% to 19.8% which is good for the company.

Answer for Q.NO.17.

	Company	
	M Ltd.	**N Ltd.**
EBIT (NOI)	Rs.20,000	Rs.20,000
Debt (D)	Rs.1,00,000	--
Ke	11.50%	10%
Kd	7%	--

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

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

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

Value of Firm (V) = S + D

V_M = Rs.1,13,043 + Rs.1,00,000 = Rs.2,13,043

V_N = Rs.2,00,000

Answer for Q.NO.18.

Particulars	Company	
	U Ltd.	**L Ltd.**
NOI (EBIT)	Rs.20,000	Rs.20,000
Debt (D)	–	Rs.1,00,000
K_d	–	7%
K_e	10%	18%
Value of equity capital (S)	Rs.2,00,000	Rs.72,222
$\left(\frac{EBIT - Interest}{K_e}\right)$	$\left(\frac{20,000}{0.10}\right)$	$\left(\frac{20,000 - 7,000}{0.18}\right)$
Total value of the firm (V) = S + D	Rs.2,00,000	Rs.1,72,222 (Rs.72,222 + Rs.1,00,000)

Arbitrage Process:

If you have 10% shares of unlevered firm i.e. investment of 10% of Rs.2,00,000 = Rs.20,000 and Return @ 10% on Rs.20,000. Investment will be 10% of earnings available for equity i.e. 10% × Rs.20,000 = Rs.2,000.

Alternative strategy will be:

Sell your shares in unlevered firm for Rs.20,000 and buy 10% shares of levered firm's equity plus debt.

10% equity of levered firm Rs.7,222

10% debt of levered firm Rs.10,000

Total investment in levered firm Rs.17,222

Your resources are Rs.20,000

Surplus cash available = Surplus – Investment = Rs.20,000 – Rs.17,222 = Rs.2,778

Your return on investment is:

7% on debt of Rs.10,000 Rs.700

10% on equity i.e. 10% of earnings available for equity holders (10% × Rs.13,000) Rs.1,300

Total return Rs.2,000

In both the cases the return received is Rs.2,000 and still you have excess cash of Rs.2,778.

Hence, you are better off by doing arbitrage i.e. you will start selling unlevered company shares and buy levered company's shares thereby pushing down the value of shares of unlevered firm and increasing the value of levered firm till equilibrium is reached.

Answer for Q.NO.19.

Part – 1: value of firms under NI approach

Particulars	P (Levered)	Q (Unlevered)
EBIT (30L x 20%)	6,00,000	6,00,000

(-) Interest (18L x 10%)	(1,80,000)	-
EBT	4,20,000	6,00,000
(-) Tax @ 50%	(2,10,000	(3,00,000)
EFE	2,10,000	3,00,000
$VE = \frac{EFE}{K_e}$	$= \frac{2,10,000}{15\%} = 14,00,000$	20,00,000
Nd	18,00,000	-
Vf	Rs.32,00,000	Rs.20,00,000

= K_e is the same for both co under NI approach

Part – II: Value of firms under NOI approach: (mm approach with Tax)

$VUL = 20,00,000 = \frac{(EBIT) \times (-1 - Tax)}{K_o}$

Where EBIT (1 – tax) = EFE

$K_o = K_e$

VL = Vu + (Debt x Tax Rate)

VL = 20L + (18L x 15%)

= Rs.29,00,000

Answer for Q.NO.20.

Part – I: Amount of debt to the employed as per traditional approach

	Debt (Rs.)	**Equity**	**Ke**	**We**	**Kd**	**Wd**	**Ko**
50L	0	50L	10	1	-	-	10%
50L	5L	45L	10.5	0.9	6%	0.1	10.05%
50L	10L	40L	11	0.8	6%	0.2	10%
50L	15L	35L	11.3	0.7	6.2%	0.3	9.77%
50L	20L	30L	12.4	0.6	7%	0.4	10.24%
50L	25L	25L	13.5	0.5	7.5%	0.5	10.5%
50L	30L	20L	16	0.4	8%	0.6	11.2%
	50L						

∴ the amount of debt to he employed is Rs.15L which K_o is minimum at this level of point 19.77%

Part – II: mm approach:

Calculation of Ke

As per mm approach K_o remains constant and K_e increases linear with debt.

Mm (without tax)

Vf = EBIT / Ko

50,00,000 = 5,00,000 / Ko

Ko = 10%

Under mm approach Ke = Ko + (Ko – Kd) x Debt / equity

Statement of Ke under mm approach:

Debt	Equity	Ko	Kd	(Ko – Kd)	D/E	Ke
0	50L	10%	-	10%	0	0
5L	45L	10%	6%	4%	0.11	10.44
10L	40L	10%	6%	4%	0.25	11%
15L	35L	10%	6.2%	3.8%	0.42	11%
20L	30L	10%	7%	3%	0.667	62%
25L	25L	10%	7.5%	2.5%	1	12.5%
30L	20L	10%	8%	2%	1.5	13%

Answer for Q.NO.21.

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

i. Return on Equity shares of Alpha Ltd.

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

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

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

(b)

i. Calculation of Implied rate of return on equity of Beta Ltd.

	Rs.
Total value of company	20,00,000
Market value of debt (20% × Rs.20,00,000)	4,00,000
Market value of equity (80% × Rs.20,00,000)	16,00,000
	Rs.

Net operating income	3,60,000
Less: Interest on debt (8%× Rs.4,00,000)	32,000
Earnings available to shareholders	3,28,000

Implied required rate of return on equity

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

(ii) Implied required rate of return on equity of Beta Ltd. is lower than that of Alpha Ltd. because Beta Ltd. uses less debt in its capital structure. As the equity 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.

Answer for Q.NO.22.

Workings:

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

$$\text{Rs.1,750 lakhs} = \frac{\text{Net income (NI) for equity holders}}{0.20}$$

Net Income to equity holders/EAT = Rs.350 lakhs

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

Income Statement

	All Equity (Rs.In lakhs)	**Equity & Debt (Rs.In lakhs)**
EBIT (as calculated above)	500	500.00
Interest on Rs.275 lakhs @ 15%	-	41.25
EBT	500	458.75
Tax @ 30%	150	137.63
Income available to equity holders	350	321.12

(i) Market value of the company

Market value of levered firm = Value of unlevered firm + Tax Advantage

= Rs.1,750 lakhs + (Rs.275 lakhs x 0.3)

= Rs.1,832.5 lakhs

Change in market value of the company = Rs.1,832.5 lakhs – Rs.1,750 lakhs

= Rs.82.50 lakhs

The impact is that the market value of the company has increased by Rs.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

= Rs.1,832.50 lakhs – Rs.275 lakhs = Rs.1,557.50 lakhs

Cost of Equity (K_e) $= \frac{\text{Net Income to equity holders}}{\text{Market value of equity}} \times 100$

$= \frac{\text{Rs.32112lakhs}}{\text{Rs.1,557.50lakhs}} \times 100 = 20.62\% = 20.62\%$

Cost of debt (Kd) = I (1 - t) = 15 (1 - 0.3) = 10.50%

Components	Amount (Rs.In lakhs)	Cost of Capital %	Weight	WACC (K_o) %
Equity Debt	1,557.50	20.62	0.85	17.53
	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_o 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% - 20%) due to the presence of financial risk i.e. introduction of debt in capital structure.

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

Cost of Capital (K_o) = K_{eu} [1 – (t x L)]

Where,

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

t = Tax rate

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

So, $K_0 = 0.20\left[1 - \left(0.3 \times \frac{\text{Rs.275 lakhs}}{\text{Rs.1,832 .5lakhs}}\right)\right] = 0.191 \text{ or } 19..10\% (\text{Approx.})$

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

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

Answer for Q.NO.23.

Break Even Sales = Rs.68,00,000×0.75 = Rs.51,00,000

Income Statement

	Original Rs.	**Calculation of Interest at BEP (backward calculation) Rs.**	**Now at present level Rs.**
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 = Rs.3,93,714, EPS = Rs.3.1733, Amount of debt = 3,93,714/12% = Rs.32,80,950

Answer for Q.NO.24.

Calculation of Equity Share capital and Reserves and surplus:

Alternative 1:

Equity Share capital = $Rs.20,00,000 + \frac{Rs.2,00,000 \times 100}{133.3333} = Rs.21,50,000$

$\text{Reserves} = Rs.10,00,000 + \frac{Rs.2,00,000 \times 33.3333}{133.3333} = Rs.10,50,000$

Alternative 2:

Equity Share capital = $Rs.20,00,000 + \frac{Rs.9,00,000 \times 100}{125} = Rs.27,20,000$

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

Capital Structure Plans

(Amount in Rs.)

Capital	Alternative 1 Rs.	Alternative 2 Rs.
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 (Rs.)	21
No. of equity shares	20,000
Earnings for equity shareholders (I x II) (Rs.)	4,20,000
Profit Before Tax (III/75%) (Rs.)[	5,60,000
Interest on long term loan (1500000 x 10%) (Rs.)	1,50,000
EBIT (IV + V) (Rs.)	7,10,000

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

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

(Amount in Rs.)

Particulars	Alternative I	Alternate II
EBIT	9,10,000	9,10,000
Less: Interest: 10% on long term loan	(1,50,000)	(1,50,000)
14% on Debentures	(1,12,000)	Nil
8% on Irredeemable Debentures	Nil.	(8000)
PBT	6,48,000	7,52,000
Less: Tax @25%	(1,62,000)	(1,88,000)
PAT	4,86,000	5,64,000
No. of equity shares	21,500	27,200
EPS	**22.60**	**20.74**
Applicable P/E ratio (Working Note 1)	7	8.5
MPS (EPS X P/E ratio)	**158.2**	**176.29**
Financial Leverage EBIT/PBT	**1.40**	**1.21**

Working Note 1

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

Calculation of Cost of equity and various type of debt

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

Calculation of Weighted Average cost of capital (WACC)

	Alternative 1			Alternative 2		
Capital	**Weights**	**Cost (%)**	**WACC**	**Weights**	**Cost (%)**	**WACC**

Equity Share Capital	0.3909	9.43	3.69%	0.4945	7.76	3.84%
Reserves and Surplus	0.1909	9.43	1.80%	0.2145	7.76	1.66%
10% Long term Debt	0.2727	7.50	2.05%	0.2727	7.50	2.05%
14% Debenture	0.1455	10.95	1.59%			
8% Irredeemable Debentures	-			0.0182	6	0.11%
			9.12%			**7.66%**

Calculation Marginal Cost of Capital (MACC)

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

Summary of solution:

	Alternate I	**Alternate II**
Earning per share (EPS) Rs.	22.60	20.74
Market price per share (MPS) Rs.	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.

Answer for Q.NO.25.

Workings:

(a) Value of Debt $= \frac{\text{Interest}}{\text{Cost of debt } (K_d)}$

$$= \frac{Rs.7,50,000}{0.08} = Rs.93,75,000$$

(b) Value of equity capital $= \frac{Operating profit . Interest}{Cost of equity (K_e)}$

$$= \frac{Rs.34,50,000 - Rs.7,50,000}{0.16}$$

$$= \textbf{Rs.1,68,75,000}$$

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

$$= \frac{Increased\ Operating profit . Interest\ on Increased\ debt}{Equity\ capital}$$

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

$$= \frac{Rs.48,75,000 - Rs.13,50,000}{Rs.1,68,75,000}$$

$$= \frac{Rs.35,25,000}{Rs.1,68,75,000}$$

= 0.209 or 20.9%

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

Sources	(Rs.)	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 thenew proposal

Sources	(Rs.)	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 or14.45 %**

CHAPTER 05: INVESTMENT DECISIONS

Answer for Q.NO.1.

Depreciation = Rs.1,00,000 ÷ 4 = Rs.25,000

Amount in (Rs.)

	Years			
	1	**2**	**3**	**4**
Earnings before tax and depreciation	45,000	30,000	25,000	35,000
Less: Depreciation	(25,000)	(25,000)	(25,000)	(25,000)
Earnings before tax	20,000	5,000	0	10,000
Less: Tax @20%	(4,000)	(1,000)	0	(2,000)
Earnings after tax	16,000	4,000	0	8,000
Add: Depreciation	25,000	25,000	25,000	25,000
Net Cash flow	41,000	29,000	25,000	33,000

Answer for Q.NO.2.

In this case the rate of return can be calculated as follows:

$$\frac{\text{Total Profit} \div \text{No. of years}}{\text{Average investment / Initial Investment}} \times 100$$

(a) If Initial Investment is considered then,

$$= \frac{\text{Rs.4,60,000} \div 5\,\text{years}}{\text{Rs.10,00,000}} \times 100 = \frac{\text{Rs.92,000}}{\text{Rs.10,00,000}} \times 100 = 9.2\%$$

This rate is compared with the rate expected on other projects, had the same funds been invested alternatively in those projects. Sometimes, the managementcompares this rate with the minimum rate (called-cut off rate). For example, management may decide that they will not undertake any project which has an average annual yield after tax less than 20%. Any capital expenditure proposal which has an average annual yield of less than 20%, will be automatically rejected.

(b) If Average investment is considered, then,

$$= \frac{\text{Rs.92,000}}{\text{Averageinvestment}} \times 100 = \frac{\text{Rs.92,000}}{\text{Rs.5,40,000}} \times 100 = 17.04\%$$

Where,

Average Investment = ½ (Initial investment – Salvage value) + Salvage value

= ½ (Rs.10,00,000 – Rs.80,000) + Rs.80,000

= Rs.4,60,000 + Rs.80,000 = Rs.5,40,000

Answer for Q.NO.3.

Year	Net CashFlows (Rs.)	PVIF @ 10%	Discounted Cash Flows (Rs.)
0	(1,00,000)	1.000	(1,00,000)
1	55,000	0.909	49,995
2	80,000	0.826	66,080
3	15,000	0.751	11,265
Net Present Value			27,340

Recommendation: Since the net present value of the project is positive, the company should accept the project.

Answer for Q.NO.4.

Calculation of net present value:

Period	PV factor	Project A (Rs.)	Project B (Rs.)	Project C (Rs.)	Project D (Rs.)
0	1.000	(2,00,000)	(1,90,000)	(2,50,000)	(2,10,000)
1	0.893	44,650	35,720	66,975	66,975
2	0.797	39,850	39,850	59,775	59,775
3	0.712	35,600	49,840	42,720	42,720
4	0.636	31,800	47,700	50,880	25,440
5	0.567	28,350	42,525	56,700	11,340
Net Present Value		(19,750)	25,635	27,050	(3,750)

Answer for Q.NO.5.

Calculation of Net Cash flow

Contribution = (3.00 – 1.75) x 50,000 = Rs.62,500

Fixed costs = 40,000 – [(1,25,000 – 30,000)/5] = Rs.21,000

Year	Capital (Rs.)	Contribution (Rs.)	Fixed costs (Rs.)	Adverts (Rs.)	Net cash flow (Rs.)
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 (Rs.)	10% discount factor	Present value (Rs.)
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 Rs.31,712.

Answer for Q.NO.6.

(a) Calculation of annual cash flows **(Rs.in lakh)**

Year	Sales	VARIABLE COST	FIXED COST	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	26.565	61.985	48.25	110.235

(b) Calculation of Depreciation:

- On Initial equipment = $\frac{\text{Rs.350lakh}}{8\text{years}} = 43.75\text{lakh}$

- On additional equipment = $\frac{(\text{Rs.25} - \text{Rs.2.5})\text{lakh}}{5\text{years}} = 4.5\text{lakh}$

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

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

(d) Calculation of Initial cash outflow

	Rs.in lakh
Cost of New Equipment	350
Add: Working Capital	40

Outflow	390

Calculation of NPV (Rs.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 equipmentsalvage value
Net Present Value			161.11	

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

Answer for Q.NO.7.

Calculation of NPV

Project	Investment Required	Present value ofFuture Cash Flows	Net Present value
	Rs.	Rs.	Rs.
1	2,00,000	2,90,000	90,000
2	1,15,000	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
1 and 3	4,40,000	6,90,000	2,50,000
2 and 3	3,85,000	6,20,000	2,35,000
1, 2 and 3 (Refer Workingnote)	6,80,000*	9,10,000	2,30,000

Working Note:

(i) Total Investment required if all the three projects are undertakensimultaneously:

	(Rs.)
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 undertakensimultaneously:

	(Rs.)
Project 2 & 3	6,20,000
Project 1	2,90,000
Total	9,10,000

Projects 1 and 3 should be chosen, as they provide the highest netpresent value.

Answer for Q.NO.8.

The desirability factors for the three projects would be as follows:

1. $= = \frac{\text{Rs.6,50,000}}{\text{Rs.5,50,000}} = 1.18$

2. $= \frac{\text{Rs.95,000}}{\text{Rs.75,000}} = 1.27$

3. $= \frac{\text{Rs.1,00,30,000}}{\text{Rs.1,00,20,000}} = 1.001$

Answer for Q.NO.9.

Determination of Cash inflows

Particulars	**(Rs.)**
Sales Revenue	1,20,000
Less: Operating Cost	22,500
	97,500
Less: Depreciation (Rs.2,00,000 – Rs.18,000)/8	22,750
Net Income	74,750
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 8th 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 (Rs.)**	**PV Factor@10%**	**Present Value ofCash inflows (Rs.)**
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

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 profitabilityindex is also greater than 1, the hospital may purchase the machine.

Answer for Q.NO.10.

First of all, we shall find an approximation of the payback period:

$= \frac{10,00,000}{2,50,000} = 4$

Now, we shall search this figure in the PVAF table corresponding to 6-year row.

The value 4 lies between values 4.111 and 3.998, correspondingly discounting ratesare 12% and 13% respectively

NPV @ 12% and 13% is:

$NPV_{12\%}$= (10,00,000) + 4.111 × 2,50,000 = +27,750

$NPV_{13\%}$= (10,00,000) + 3.998 × 2,50,000 = -500

The internal rate of return is, thus, more than 12% but less than 13%. The exact ratecan be obtained by interpolation:

$IRR = 12\% + \frac{27,750}{27,750 - (-500)} \times (13\% - 12\%)$

$= 12\% + \frac{27,750}{28,250} = 12.978\%$

IRR = 12.978%

Answer for Q.NO.11.

Let us discount cash flows by 10%.

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

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

Year	Cash Inflows (Rs.)	Discounting factor at 12%	Present Value (Rs.)
1	30,000	0.893	26,790
2	40,000	0.797	31,880
3	60,000	0.712	42,720
4	30,000	0.636	19,080
5	20,000	0.567	11,340
Total present value			1,31,810
Less: Initial Investment			1,36,000
NPV			- 4,190

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

$$\text{IRR} = \text{LR} + \frac{\text{NPV at LR}}{\text{NPV at LR - NPV at HR}} \times (\text{HR - LR})$$

$$= 10 + \frac{\text{Rs.2,280}}{\text{Rs.2,280} - (-4,190)} \times (12 - 10)$$

$$= 10 + \frac{\text{Rs.2,280}}{\text{Rs.6,470}} \times (12 - 10) = 10 + 0.704$$

IRR = 10.704%

Answer for Q.NO.12.

Computation of Cash inflow per annum Rs.

Particulars	(Rs.)
Net operating income per annum	68,000
Less: Tax @ 45%	(30,600)

Profit after tax	37,400
Add: Depreciation (Rs.3,60,000 / 5 years)	72,000
Cash inflow	1,09,400

The IRR of the investment can be found as follows:

NPV = - Rs.3,60,000 + Rs.1,09,400 ($PVAF_5$, r) = 0

or PVAF5,r (Cumulative factor) = $= \frac{Rs.3,60,000}{Rs.1,09,400} = 3.29$

As 3.29 falls between Discounted rate 15 & 16, the computation is as below :

Computation of Internal Rate of Return

	Discounting Rate	
	15%	**16%**
Cumulative factor	3.35	3.27
PV of Inflows (Rs.)	3,66,490 (Rs.1,09,400 x 3.35)	3,57,738 (Rs.1,09,400 x 3.27)
Less: Initial outlay (Rs.)	3,60,000	3,60,000
NPV (Rs.)	6,490	(2,262)

IRR = $15 + \left[\frac{6,490}{6,490 + 2,262}\right] \times (16 - 15) = 15 + 0.74 = 15.74\%$

Answer for Q.NO.13.

(a) Computation of NPV at 15% discount rate

Year	**Cash flow**	**Discount Factor (15%)**	**Present value**
	(Rs.)		**(Rs.)**
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 (10%)**	**Present value**
	(Rs.)		**(Rs.)**
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 = Rs.2,51,450 is positive, hence the project would be acceptable.

(c) Calculation of IRR:

$$\text{IRR} = LR + \frac{NPV\,at\,LR}{NPV\,at\,LR - NPV\,at\,HR} \times (HR - LR)$$

$$= 10\% + \frac{Rs.2,51,450}{Rs.2,51,450 - (-)1,18,200} \times (15\% - 10\%)$$

= 10% + 3.4012 or 13.40%

(d) Computation of Pay-back period of the project:

Payback Period = 6 years:

- Rs.7,00,000 - Rs.10,00,000 + Rs.2,50,000 + Rs.3,00,000 + Rs.3,50,000 + Rs.4,00,000 + Rs.4,00,000 = 0

Answer for Q.NO.14.

i. Cost of the Project

At 12% internal rate of return (IRR), the sum of total cash inflows = cost ofthe project i.e initial cash outlay

Annual cash inflows = Rs.1,00,000

Useful life = 4 years

Considering the discount factor table @ 12%, cumulative present value ofcash 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:

Rs.1,00,000 × 3.038 = Rs.3,03,800

Hence, Cost of the Project = Rs.3,03,800

ii. Cost of Capital

$$\text{Profitability index} = \frac{\text{Sum of Discounted Cash inflows}}{\text{Cost of the project}}$$

$$1.064 = \frac{\text{Sum of Discounted Cash inflows}}{Rs.3,03,800}$$

$\therefore$ Sum of Discounted Cash inflows = Rs.3,23,243.20

Since, Annual Cash Inflows = Rs.1,00,000

Hence, cumulative discount factor for 4 years = $\frac{\text{Rs.3,23,24 2.20}}{\text{Rs.1,00,000}}$ = 3.232

From the discount factor table, at discount rate of 9%, the cumulativediscount 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

= Rs.3,23,243.20 – Rs.3,03,800 = Rs.19,443.20Rs.

iv. Payback Period

Payback period $= \frac{\text{Cost of the Project}}{\text{Annual Cash Inflows}} = \frac{\text{Rs.3,03,800}}{\text{Rs.1,00,000}} = 3.038 \text{ years}$

Answer for Q.NO.15.

Year 0 – Cash outflow = Rs.1,36,000

The MIRR is calculated on the basis of investing the inflows at the cost of capital. The table below shows the value of the inflows, if they are immediately reinvested at 8%.

Year	**Cash flow**	**@ 8% reinvestment rate factor**	**(Rs.)**
1	30,000	1.3605*	40,815
2	40,000	1.2597	50,388
3	60,000	1.1664	69,984
4	30,000	1.0800	32,400
5	20,000	1.0000	20,000
			2,13,587

* Investment of Rs.1 at the end of the year 1 is reinvested for 4 years (at the end of 5 years) shall become $1(1.08)^4$ = 1.3605. Similarly, reinvestment rate factor for remaining years shall be calculated. Please note that the investment at the end of 5^{th} year shall be reinvested for zero year, hence, reinvestment rate factor shall be 1.

The total cash outflow in year 0 (Rs.1,36,000) is compared with the possible inflowat year 5 and the resulting figure = $\frac{1,36,000}{2,13,587}$ = 0.6367 is the discount factor in year 5. By looking at the year 5 row in the present value tables, you will see that thisgives a return of 9%. This means that the Rs.2,13,587 received in year 5 is equivalentto Rs.1,36,000 in year 0 if the discount rate is 9%. Alternatively, we can compute MIRR as follows:

Total return $= \frac{2,13,587}{1,36,000} = 1.5705$

MIRR= $\sqrt[1/5]{1.5705} - 1 = 9\%$

Answer for Q.NO.16.

Net Present Value (NPV) of Projects

Year	Cash Inflows ofProject A (Rs.)	Cash Inflows ofProject B (Rs.)	Present Value Factor @ 10%	PV of Project A (Rs.)	PV of Project B (Rs.)
0	(1,00,000)	(3,00,000)	1.000	(1,00,000)	(3,00,000)
1	50,000	1,40,000	0.909	45,450	1,27,260
2	60,000	1,90,000	0.826	49,560	1,56,940
3	40,000	1,00,000	0.751	30,040	75,100
NPV				25,050	59,300

Internal Rate of Returns (IRR) of projects

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

Year	Cash Inflows ofProject A (Rs.)	Cash Inflows ofProject B (Rs.)	Present Value Factor @20%	PV of Project A (Rs.)	PV of Project B (Rs.)
0	(1,00,000)	(3,00,000)	1.000	(1,00,000)	(3,00,000)
1	50,000	1,40,000	0.833	41,650	1,16,620
2	60,000	1,90,000	0.694	41,640	1,31,860
3	40,000	1,00,000	0.579	23,160	57,900
NPV				6,450	6,380

Even by discounting cash flows at 20%, we are getting values far from zero.Therefore, let us discount cash flows using 25% discounting rate.

Year	Cash Inflows ofProject A (Rs.)	Cash Inflows ofProject B (Rs.)	Present Value Factor @ 25%	PV of Project A (Rs.)	PV of Project B (Rs.)
0	(1,00,000)	(3,00,000)	1.000	(1,00,000)	(3,00,000)
1	50,000	1,40,000	0.800	40,000	1,12,000
2	60,000	1,90,000	0.640	38,400	1,21,600
3	40,000	1,00,000	0.512	20,480	51,200
NPV				(1,120)	(15,200)

The internal rate of return is, thus, more than 20% but less than 25%. The exact ratecan be obtained by interpolation:

$$IRR_A = 20\% + \frac{6,450}{6,450-(1,120)} \times (25\% - 20\%) = 20\% + \left(\frac{6,450}{7,570} \times 5\%\right) = 24.26\%$$

$$IRR_B = 20\% + \frac{6,380}{6,380-(15,200)} \times (25\% - 20\%) = 20\% + \left(\frac{6,380}{21,580} \times 5\%\right) = 21.48\%$$

Overall Position

	Project A	Project B
NPV @ 10%	Rs.25,050	Rs.59,300
IRR	24.26%	21.48%

Thus, there is contradiction in ranking by two methods.

Answer for Q.NO.17.

Net Present Value of Projects

Year	Cash Inflowsof Project X (Rs.)	Cash Inflowsof Project Y (Rs.)	Present Value Factor @ 10%	PV of Project X(Rs.)	PV of Project Y (Rs.)
0	(2,50,000)	(3,00,000)	1.000	(2,50,000)	(3,00,000)
1	2,00,000	50,000	0.909	1,81,800	45,450
2	1,00,000	1,00,000	0.826	82,600	82,600
3	50,000	3,00,000	0.751	37,550	2,25,300
NPV				51,950	53,350

Internal Rate of Returns of projects

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

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

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

Year	Cash Inflows ofProject X (Rs.)	Present Value Factor@ 25%	PV of Project X (Rs.)	Cash Inflows of Project Y (Rs.)	Present Value Factor @ 15%	PV of Project Y (Rs.)
0	(2,50,000)	1.000	(2,50,000)	(3,00,000)	1.000	(3,00,000)
1	2,00,000	0.800	1,60,000	50,000	0.870	43,500

2	1,00,000	0.640	64,000	1,00,000	0.756	75,600
3	50,000	0.512	25,600	3,00,000	0.658	1,97,400
NPV			(400)			16,500

The internal rate can be obtained by interpolation:

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

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

$$IRR_B = 15\% + \frac{16,500}{16,500 - (15,250)} \times (25\% - 15\%)$$

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

Overall Position

	Project A	**Project B**
NPV @ 10%	Rs.51,950	Rs.53,350
IRR	24.87%	17.60%

Thus, there is contradiction in ranking by two methods.

Answer for Q.NO.18.

Net Present Value of Projects

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

Internal Rate of Returns of projects

Let us discount cash flows using 50% discounting rate.

Year	**Cash Inflows ofProject A (Rs.)**	**Cash Inflows of Project B (Rs.)**	**Present Value Factor @50%**	**PV of Project A (Rs.)**	**PV of Project B (Rs.)**
0	(5,00,000)	(5,00,000)	1.000	(5,00,000)	(5,00,000)
1	7,50,000	2,00,000	0.667	5,00,250	1,33,400
2	0	2,00,000	0.444	0	88,800

3	0	7,00,000	0.296	0	2,07,200
NPV				250	(70,600)

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

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

The internal rate can be obtained by interpolation:

$$IRR_B = 15\% + \frac{2,85,800}{2,85,800 - (70,600)} \times (50\% - 15\%)$$

$$= 15\% + \left(\frac{2,85,800}{3,56,400} \times 35\% \right) = 43.07\%$$

Overall Position

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

Thus, there is contradiction in ranking by two methods.

Answer for Q.NO.19.

Computation of NPVs per Rs.1 of Investment and Ranking of the Projects

Project	**Investment**	**NPV @ 15%**	**NPV per Rs.1invested**	**Ranking**
	Rs.'000	**Rs.'000**		
A	(50)	15.4	0.31	5
B	(40)	18.7	0.47	2
C	(25)	10.1	0.40	3
D	(30)	11.2	0.37	4
E	(35)	19.3	0.55	1

Building up of a Programme of Projects based on their Rankings

Project	**Investment**	**NPV @ 15%**	
	Rs.000	**Rs.000**	(2/3 of project total)
E	(35)	19.3	

B	(40)	18.7
C	(25)	10.1
D	(20)	7.5
	120	55.6

Thus, Project A should be rejected and only two-third of Project D be undertaken.If the projects are not divisible then other combinations can be examined as:

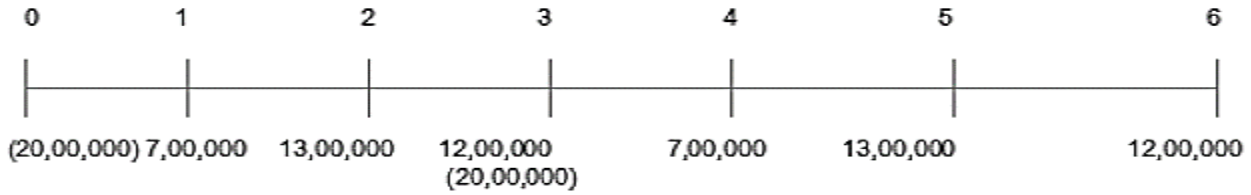
	Investment	**NPV @ 15%**
	Rs.000	**Rs.000**
E + B + C	100	48.1
E + B + D	105	49.2

In this case E + B + D would be preferable as it provides a higher NPV despite Dranking lower than C.

Answer for Q.NO.20.

Although from NPV point of view, Project A appears to be better but from IRR point of view, Project B appears to be better. Since, both projects have unequal lives, selection on the basis of these two methods shall not be proper. In such situation,we shall use any of the following method:

(i) Replacement Chain (Common Life) Method: Since the life of the Project Ais 6 years and Project B is 3 years, to equalize lives, we can have second opportunity of investing in project B after one time investing. The position of cash flows in such situation shall be as follows:



NPV of extended life of 6 years of Project B shall be Rs.8,82,403 and IRR of 25.20%. Accordingly, with extended life NPV of Project B it appears to be more attractive.

(ii) Equivalent Annualized Criterion: The method discussed above has one drawback when we have to compare two projects with one has a life of 3 years and other has 5 years. In such case, the above method shall require analysis of a periodof 15 years i.e. common multiple of these two values. The simple solution to this problem is use of Equivalent Annualised Criterion involving following steps:

(a) Compute NPV using the WACC or discounting rate.

(b) Compute Present Value Annuity Factor (PVAF) of discounting factor usedabove for the period of each project.

(c) Divide NPV computed under step (a) by PVAF as computed under step (b)and compare the values.

Accordingly, for proposal under consideration:

	Project A	**Project B**
NPV @ 12%	Rs.6,49,094	Rs.5,15,488
PVAF @12%	4.112	2.402
Equivalent Annualized Criterion	Rs.1,57,854	Rs.2,14,608

Thus, Project B should be selected.

Answer for Q.NO.21.

a.

i. Payback Period

Project A: Rs.10,000/Rs.10,000 = 1 year

Project B: Rs.10,000/Rs.7,500 = $1\frac{1}{3}$ years

Project C: $2\,\text{years} + \frac{\text{Rs.10,000} - \text{Rs.6,000}}{\text{Rs.12,000}} = 2\frac{1}{3}\,\text{years}$

Project D: 1 year

ii. ARR (Figures in Rs.)

Project A: $\frac{(10{,}000 - 10{,}000)1/2}{(10{,}000)1/2} = 0$

Project B: $\frac{(15{,}000 - 10{,}000)1/2}{(10{,}000)1/2} = \frac{2{,}500}{5{,}000} = 50\%$

Project C: $\frac{(18{,}000 - 10{,}000)1/3}{(10{,}000)1/2} = \frac{2{,}667}{5{,}000} = 53\%$

Project D: $\frac{(16{,}000 - 10{,}000)1/3}{(10{,}000)1/2} = \frac{2{,}000}{5{,}000} = 40\%$

Note: This net cash proceed includes recovery of investment also.Therefore, net cash earnings are found by deducting initial investment.

iii. IRR

Project A:	The net cash proceeds in year 1 are just equal to investment.Therefore, r = 0%.
Project B:	This project produces an annuity of Rs.7,500 for two years.Therefore, the required PVAF is: Rs.10,000/Rs.7,500 = 1.33. This factor is found under 32% column.Therefore, r = 32%
Project C:	Since cash flows are uneven, the trial and error method will be followed. Using 20% rate of discount, the NPV is + Rs.1,389. At 30% rate of discount, the NPV is - Rs.633. The true rate of return should be less than 30%. At 27% rateof discount, it is found that the NPV is - Rs.86 and + Rs.105at 26%. Through interpolation, we find r = 26.5%

Project D:	In this case also by using the trial and error method, it is found that at 37.6% rate of discount, NPV becomes almost zero. Therefore, r = 37.6%.

iv. NPV

Project A:

at 10% -10,000+10,000×0.909 = -910

at 30% -10,000+10,000×0.769 = -2,310

Project B:

at 10% -10,000+7,500(0.909+0.826) = +3,013

at 30% -10,000+7,500(0.769+0.592) = +208

Project C:

at 10% -10,000+2,000×0.909+4,000×0.826+12,000×0.751= +4,134

at 30% -10,000+2,000×0.769+4,000×0.592+12,000×0.455 =-633

Project D:

at 10% -10,000+10,000×0.909+3,000×(0.826+0.751) =+ 3,821

at 30% -10,000+10,000×0.769+3,000×(0.592+0.455) =+ 831

The projects are ranked as follows according to the various methods:

Projects	PBP	ARR	IRR	NPV (10%)	NPV (30%)
A	1	4	4	4	4
B	2	2	2	3	2
C	3	1	3	1	3
D	1	3	1	2	1

(a) Payback and ARR are theoretically unsound method for choosing between the investment projects. Between the two time-adjusted (DCF) investment criteria, NPV and IRR, NPV gives consistent results. If the projects are independent (and there is no capital rationing), either IRR or NPV can be used since the same set of projects will be accepted by any of the methods. In the present case, except Project A all the three projects should be accepted if the discount rate is 10%. Only Projects B and D should be undertaken if the discount rate is 30%.

If it is assumed that the projects are mutually exclusive, then under the assumption of 30% discount rate, the choice is between B and D (A and C are unprofitable). Both criteria IRR and NPV give the same results – D is the best. Under the assumption of 10% discount rate, ranking according to IRR and NPV conflict (except for Project A). If the IRR rule is followed, Project D should be accepted. But the NPV rule tells that Project C is the best. The NPV rule generally gives consistent results in conformity with the wealth maximization principle. Therefore, Project C should be accepted following the NPV rule.

Answer for Q.NO.22.

Workings:

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

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

2. Calculation of Profit before tax as per books

Particulars	**Old machine(Rs.)**	**New machine(Rs.)**	**Difference(Rs.)**
PBT as per books	3,24,750	3,87,250	62,500
Add: Depreciation as perbooks	24,000	41,500	17,500
Profit before tax anddepreciation (PBTD)	3,48,750	4,28,750	80,000

Calculation of Incremental NPV

Year	**PVF @ 10%**	**PBTD (Rs.)**	**Dep. @ 7.5% (Rs.)**	**PBT (Rs.)**	**Tax @ 30% (Rs.)**	**Cash Inflows (Rs.)**	**PV of Cash Inflows (Rs.)**
	(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 (Rs.35,000 ? 0.386)							13,510.00
Total PV of incremental cash inflows							3,94,612.44
Less: Cost of new machine							3,50,000.00
Incremental Net Present Value							44,612.44

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

Answer for Q.NO.23.

Working:

Calculation of Cash -outflow at year zero

Particulars	A (Rs.)	B (Rs.)
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(Rs.)	Discounted value of inflows (Rs.)	Cash Inflows (Rs.)	Discounted value of inflows (Rs.)
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	1,18,440	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 bothare acceptable.

(b) Discounted Pay-back Period **(Amount in Rs.)**

Year	Machine A		Machine B	
	Discountedcash inflows	Cumulative Discounted cash inflows	Discountedcash 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:

Profitability Index (PI) =

$$\text{Machine A} = \frac{\text{Rs.}5,42,580}{\text{Rs.}5,00,000} = 1.08; \qquad \text{Machine B} = \frac{\text{Rs.}5,98,140}{\text{Rs.}5,80,000} = 1.03$$

(i) 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 thenet 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 betterto choose Machine A.

Answer for Q.NO.24.

(i) Calculation of Net Initial Cash Outflows:

	Rs.
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		**Rs.**
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	42,240	1,61,040
WDV of Existing Machine (i)		**1,68,960**
Depreciation base of New Machine		
Cost of new machine		10,00,000
Add: WDV of existing 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	**Existingmachine**	**New Machine**	**Differential**
(1)	**(2)**	**(3)**	**(4)=(3)–(2)**
Annual output	30,000 units	75,000 units	45,000 units
	Rs.	**Rs.**	**Rs.**
(A) Sales revenue @ Rs.15 perunit	4,50,000	11,25,000	6,75,000
(B) Less: Cost of Operation			
Material @ Rs.4 per unit	1,20,000	3,00,000	1,80,000
Labour			
Old = 3,000 □ Rs.40	1,20,000		90,000
New = 3,000 □ Rs.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 (Rs.40,000 x 0.567)							22,680.00
Less: Initial Cash Outflow							8,00,000.00
NPV							3,28,964.45

Advice: Since the incremental NPV is positive, existing machine should bereplaced.

Answer for Q.NO.25.

Statement Showing the Evaluation of Two Machines

	Particulars	**Machine 'X'**	**Machine 'Y'**
(i)	Purchase Cost	Rs.15,00,000	Rs.10,00,000
(ii)	Life of Machine	3 years	2 years
(iii)	Running Cost of Machine per year	Rs.4,00,000	Rs.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)}	Rs.10,12,400	Rs.10,55,400
(vi)	Cash outflows of Machine {(i) + (v)}	Rs.25,12,400	Rs.20,55,400
(vii)	Equivalent PV of Annual Cashoutflow {(vi)/(iv)}	Rs.9,92,651	Rs.11,68,505

Recommendation: Ae Bee Cee Ltd. should buy Machine 'X' since equivalentannual cash outflow is less than that of Machine 'Y'.

Answer for Q.NO.26.

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

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

$$\text{NPV (in Rs.)} = -1,00,000 + \frac{36,000}{(1.1)} + \frac{36,000}{(1.1)^2} + \frac{36,000}{(1.1)^3} + \frac{20,000}{(1.1)} + \frac{25,000}{(1.1)^3}$$

= - 1,00,000 + 36,000 (0.9091 + 0.8264 + 0.7513) – (20,000 x 0.9091) + (25,000 x 0.7513)

= - 1,00,000 + (36,000 x 2.4868) – 18,182 + 18,782.5

= - 1,00,000 + 89,524.8 – 18,182 + 18,782.5

NPV= - 9,874.7

Since, Net Present Value is negative; therefore, this option is not to beconsidered.

If Supplier gives a discount of Rs.10,000, then:

NPV (in Rs.) = + 10,000 – 9,874.7 = + 125.3

In this case, Net Present Value is positive but very small; therefore, this optionmay not be advisable.

Option II: Purchase Machinery and Replace Part at the end of Year 2.

$$\text{NPV (in Rs.)} = -1,00,000 + \frac{36,000}{(1.1)} + \frac{36,000}{(1.1)^2} + \frac{36,000}{(1.1)^3} + \frac{30,800}{(1.1)^2} + \frac{54,000}{(1.1)^4}$$

= - 1,00,000+ 36,000 (0.9091 + 0.8264 + 0.7513) – (30,800 x 0.8264) + (54,000 x 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

NPV = + 953.68

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

If the Supplier gives a discount of Rs.10,000, then:

NPV (in Rs.) = 10,000 + 953.68 = 10,953.68

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

Answer for Q.NO.27.

Statement of Operating Profit from processing of waste

(Rs.in lakh)

Year	**1**	**2**	**3**	**4**
Sales (A)	966	966	1,254	1,254
Material consumption	90	120	255	255
Wages	180	195	255	300
Other expenses	120	135	162	210
Factory overheads (insurance only)	90	90	90	90
Loss of rent on storage space (opportunity cost)	30	30	30	30
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

(Rs.in lakh)

Year	**0**	**1**	**2**	**3**	**4**
Cost of Machine	(600)				
Material stock	(60)	(105)	-	-	165
Compensation for contract	(90)	-	-	-	-
Contract payment saved	-	150	150	150	150
Tax on contract payment	-	(45)	(45)	(45)	(45)
Incremental profit	-	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(net)	-	-	-	-	15
Total incremental cash flowsPresent value factor	(750)	364.2	416.4	453.6	562.2
	1.00	0.877	0.769	0.674	0.592
Present value of cash flows	(750)	319.40	320.21	305.73	332.82
Net present value	528.16				

Advice: Since the net present value of cash flows is Rs.528.16 lakh which ispositive 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 chargesof this project are relevant.
4. Sale of machinery - Net income after deducting removal expensestaken. Tax on Capital gains is ignored.
5. Saving in contract payment and income tax thereon is considered in thecash flows.

Answer for Q.NO.28.

Evaluation of Alternatives: Savings in disposing off the waste

Particulars	**(Rs.)**
Outflow (50,000 × Rs.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 (Rs.)**	**Amount (Rs.)**
Sale value of waste (Rs.10 × 50,000 gallon)		5,00,000
Less: Variable processing cost (Rs.5 × 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

= Rs.1,30,000 + Rs.25,000 = Rs.1,55,000

Calculation of Net Present Value

Year	**Particulars**	**Amount (**Rs.**)**
0	Investment in new equipment	(6,00,000)
1 to 10	Total Annual benefits × PVAF (10 years, 15%)	
	Rs.1,55,000 × 5.019	7,77,945
	Net Present Value	1,77,945

Recommendation: Processing of waste is a better option as it gives a positiveNet Present Value.

Note- Research cost of Rs.60,000 is not relevant for decision making as it issunk cost.

Answer for Q.NO.29.

A. Computation of CFAT (Year 1 to 5)

Particulars		**Amount (Rs.)**
(a) Savings in existing Tea & Coffee charges	(120 × 10 ×3) + (40 ×15 × 3) + (40 ×10 × 1) x 200 days	11,60,000
(b) AMC of machine		(75,000)
(c) Electricity charges	500 ×12 ×12	(72,000)
(d) Coffee Beans	(W.N.) 144 × 90	(12,960)
(e) Tea Powder	(W.N.) 480 × 70	(33,600)
(f) Sugar	(W.N.) 1248 × 50	(62,400)
(g) Milk	(W.N.) 12480 × 50	(6,24,000)
(h) Paper Cup	(W.N.) 1,37,280 × 0.2	(27,456)
(i) Depreciation	10,00,000/5	(2,00,000)
Profit before Tax		**52,584**
(-) Tax @ 25%		(13,146)
Profit after Tax		**39,438**
Depreciation		2,00,000
CFAT		**2,39,438**

B. Computation of NPV

Year	**Particulars**	**CF**	**PVF @ 12%**	**PV**
0	Cost of machine	(10,00,00)	1	(10,00,000)
1-5	CFAT	2,39,438	3.6048	8,63,126
Net Present Value				**(1,36,874)**

Since NPV of the machine is negative, it should not be purchased. Working Note:

Computation of Qty of consumable

No. of Tea Cups = [(120 × 3 × 200 days) + (40 × 1 × 200 days) × 1.2 = 96,000

No. of Coffee cups = 40 × 3 × 200 days × 1.2 = 28,800

No. of coffee beans packet = $\frac{28,800}{200} = 144$

No. of Tea Powder Packets = $\frac{96,000}{200} = 480$

Qty of Sugar = $\frac{(96,000 + 28,800)6,000}{1,000g}$ = 1248 kgs

Qty of Milk = $\frac{(96,000 + 28,800)6,000}{1,000ml} = 12,480 litres$

No. of paper cups = (96,000 + 28,800) × 1.1 = 1,37,280

Answer for Q.NO.30.

A & Co.

Equivalent cost of (EAC) of new machine

		Rs.
(i)	Cost of new machine now	90,000
	Add: PV of annual repairs @ Rs.10,000 per annum for 8years (Rs.10,000 x 4.4873)	44,873
		1,34,873
	Less: PV of salvage value at the end of 8 years(Rs.20,000 x 0.3269)	6,538
	Equivalent annual cost (EAC) (Rs.1,28,335/4.4873)	1,28,335
		28,600

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

Scenario	**Year**	**CashFlow**	**PV @ 15%**	**PV**
		(Rs.)		**(Rs.)**
Replace Immediately	0	(28,600)	1.00	(28,600)
		40,000	1.00	40,000
				11,400
Replace in one year	1	(28,600)	0.870	(24,882)
	1	(10,000)	0.870	(8,700)
	1	25,0000	0.870	21,750
				(11,832)
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	11,340
				(34,102)
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	6,580
				(55,799)
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	(22,880) (82,799)

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

Answer for Q.NO.31.

i. **Calculation of Adjusted Present Value of Investment (APV)**

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

Base Case NPV for the project:

(-) Rs.270 lakhs + (Rs.42 lakhs / 0.14) = (-) Rs.270 lakhs + Rs.300 lakhs

= Rs.30

Issue costs = Rs.10 lakhs

Thus, the amount to be raised = Rs.270 lakhs + Rs.10 lakhs

= Rs.280 lakhs

Annual tax relief on interest payment = Rs.280 X 0.1 X 0.3

= Rs.8.4 lakhs in perpetuity

The value of tax relief in perpetuity = Rs.8.4 lakhs / 0.1

= Rs.84 lakhs

Therefore, APV = Base case PV – Issue Costs + PV of Tax Relief on debt interest

= Rs.30 lakhs – Rs.10 lakhs + 84 lakhs = Rs.104 lakhs

ii. **Calculation of Adjusted Discount Rate (ADR)**

Annual Income / Savings required to allow an NPV to zero

Let the annual income be x.

(-) Rs.280 lakhs X (Annual Income / 0.14) = (-) Rs.104 lakhs

Annual Income / 0.14 = (-) Rs.104 + Rs.280 lakhs

Therefore, Annual income = Rs.176 X 0.14 = Rs.24.64 lakhs

Adjusted discount rate = (Rs.24.64 lakhs / Rs.280 lakhs) X 100

= 8.8%

iii. **Useable circumstances**

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

CHAPTER 06: DIVIDEND DECISIONS

Answer for Q.NO.1.

Since r > Ke , the optimum dividend pay-out ratio would 'Zero' (i.e. D = 0),Accordingly, value of a share:

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

$$P = \frac{0 + \frac{0.12}{0.10}(10 - 0)}{0.10} = Rs.120$$

The optimality of the above payout ratio can be proved by using 25%, 50%, 75%and 100% as pay-out ratio:

At 25% pay-out ratio

$$P = \frac{2.5 + \frac{0.12}{0.10}(10 - 2.5)}{0.10} = Rs.115$$

At 50% pay-out ratio

$$P = \frac{5 + \frac{0.12}{0.10}(10 - 5)}{0.10} = Rs.110$$

At 75% pay-out ratio

$$P = \frac{7.5 + \frac{0.12}{0.10}(10 - 7.5)}{0.10} = Rs.105$$

At 100% pay-out ratio

$$P = \frac{10 + \frac{0.12}{0.10}(10 - 10)}{0.10} = Rs.100$$

Answer for Q.NO.2.

(i) As per Walter's model:

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

Where,

P = Market price per share.

E = Earnings per share = Rs.5

D = Dividend per share = Rs.3

R = Return earned on investment = 15%

K_e = Cost of equity capital = 12%

$$P = \frac{3 + \frac{0.15}{0.12}(5-3)}{0.12} = \text{Rs.}45.83$$

(ii) According to Walter's model, when the return on investment is more than the cost of equity capital, 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:

$$P = \frac{3 + \frac{0.15}{0.12}(5-0)}{0.12} = \text{Rs.}52.08$$

Answer for Q.NO.3.

	Rs. in lakhs
Net Profit	30
Less: Preference dividend	12
Earning for equity shareholders	18
Earning per share	18/3 = Rs.6.00

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

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

$$Rs.42 = \frac{D + \frac{0.20}{0.16}(5-D)}{0.16}$$

$$6.72 = \frac{0.16D + 1.2 - 0.20D}{0.16}$$

0.04D = 1.2-1.0752

D = 3.12

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

So, the required dividend payout ratio will be = 52%

Answer for Q.NO.4.

(i) The EPS of the firm is Rs.10 (i.e., Rs.2,00,000/ 20,000), r = Rs.2,00,000/ (20,000shares × Rs.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 Rs.1,50,000 among 20,000 shares,giving a dividend per share of Rs.7.50. the value of the share as per Walter'smodel may be found as follows:

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

The firm has a dividend payout of 75% (i.e., Rs. 1,50,000) out of total earnings of Rs. 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 sucha situation, the market price would be:

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

So, theoretically the market price of the share can be increased byadopting 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 effecton 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:

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

Answer for Q.NO.5.

	Rs. in lakhs
Net Profit	30
Less: Preference dividend	12
Earning for equity shareholders	18
Earning per share	18/3 = Rs.6.00

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

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

(i) When dividend pay-out is 25%

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

(ii) When dividend pay-out is 50%

$$P_o = \frac{6 \times 0.5}{0.16 - (0.5 \times 0.2)} = \frac{1.5}{0.16 - 0.15} = 50$$

(iii) When dividend pay-out is 100%

$$P_o = \frac{6 \times 1}{0.16 - (0 \times 0.2)} = \frac{1.5}{0.16} = 37.50$$

Answer for Q.NO.6.

i) Situation-1: Growth Firm r > Ke

$$p_0 = \frac{10(1-0.6)}{0.10 - 0.15 \times 0.6} = \frac{4}{0.10 - 0.09} = \text{Rs.}400$$

ii) Situation-2: Normal Firm r = Ke

$$p_0 = \frac{10(1-0.6)}{0.10 - 0.10 \times 0.6} = \frac{4}{0.10 - 0.06} = \text{Rs.}100$$

iii) Situation-2: Normal Firm r < Ke

$$p_0 = \frac{10(1-0.6)}{0.10 - 0.08 \times 0.6} = \frac{4}{0.10 - 0.048} = \text{Rs.}76.92$$

If the retention ratio (b) is changed from 0.6 to 0.4, the new share price will be asfollows:

Growth Firm

$$p_0 = \frac{10(1-0.4)}{0.10 - 0.15 \times 0.4} = \frac{6}{0.10 - 0.06} = \text{Rs.}150$$

Normal Firm

$$p_0 = \frac{10(1-0.4)}{0.10 - 0.10 \times 0.4} = \frac{6}{0.10 - 0.04} = \text{Rs.}100$$

Declining Firm

$$p_0 = \frac{10(1-0.4)}{0.10 - 0.08 \times 0.4} = \frac{6}{0.10 - 0.032} = \text{Rs.}88.24$$

From the above analysis, it can be concluded that:

When r > k, the market value increases with retention ratio.

When r < k, the market value of share stands to decrease.

When r = k, the market value is not affected by dividend policy.

The conclusion of the Gordon's model is similar to that of Walter's model.

Answer for Q.NO.7.

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

Particulars	Amount in Rs.
Net Profit	50 lakhs
Less: Preference dividend	15 lakhs
Earnings for equity shareholders	35 lakhs
Earnings per share	35 lakhs/5 lakhs = Rs.7.00

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

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

Here, $E_1 = 7$, $K_e = 16\%$

(i) When dividend pay-out is 25%

$$P_0 = \frac{7 \times 0.25}{0.16 - (0.75 \times 0.2)} = \frac{1.75}{0.16 - 0.15} = \text{Rs.}175$$

(ii) When dividend pay-out is 50%

$$P_0 = \frac{7 \times 0.5}{0.16 - (0.5 \times 0.2)} = \frac{3.5}{0.16 - 0.10} = \text{Rs.}58.33$$

(iii) When dividend pay-out is 100%

$$P_0 = \frac{7 \times 1}{0.16 - (0 \times 0.2)} = \frac{1.75}{0.16} = \text{Rs.}43.75$$

Answer for Q.NO.8.

Market Price per share by

(i) Walter's model

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

(ii) Gordon's model

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

$$P_0 = \frac{10(1-0.40)}{0.20 - (0.4 \times 0.25)}$$

$$= \frac{6}{0.1} = \text{Rs.}60$$

Answer for Q.NO.9.

$$P_0 = \frac{D}{K_e} = \frac{5}{0.10} = \text{Rs.}50$$

Answer for Q.NO.10.

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

$$= \frac{2(1+0.02)}{0.15 - 0.02} = \text{Rs.}15.69$$

Answer for Q.NO.11.

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

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

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

(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 × 0.60 = 0.06

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 earnings (r) is same.

With previous Growth Rate of 7.5% and r =10%, the retention ratiocomes out to be:

0.075 = b_1 × 0.10

b_1 = 0.75 and payout ratio = 0.25

With 0.25 payout ratio the EPS will be as follows:

$$\frac{Rs.20}{0.25} = Rs.80$$

With new 0.40 (1 – 0.60) payout ratio, the new dividend will be

D_1 = Rs.80 × 0.40 = Rs.32

Accordingly, new K_e will be

$$K_e = \frac{32}{1{,}460} + 6.0\%$$

or, K_e = 8.19%

Answer for Q.NO.12.

In the present situation, the current MPS is as follows:

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

$$P = \frac{2(1+0.05)}{0.15-0.05} = Rs.21$$

(i) The impact of changes in growth rate to 8% on MPS will be as follows:

$$P = \frac{2(1+0.08)}{0.15-0.08} = Rs.30.86$$

(ii) The impact of changes in growth rate to 3% on MPS will be as follows:

$$P = \frac{2(1+0.03)}{0.15-0.03} = Rs.17.17$$

So, the market price of the share is expected to vary in response to change inexpected growth rate of dividends.

Answer for Q.NO.13.

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

$$P = \frac{D_1}{(1+K_e)^1} + \frac{D_2}{(1+K_e)^2} + \frac{D_3}{(1+K_e)^3} + \frac{D_4}{(1+K_e)^4} + \frac{D_5}{(K_e - g)} \times \frac{1}{(1+K_e)^5}$$

Where,

P = Price per share

K_e = Required rate of return on equity

g = Growth rate

$$P = \frac{Rs.120 \times 1.15}{(1+0.2)^1} + \frac{Rs.138 \times 1.15}{(1+0.2)^2} + \frac{Rs.158.7 \times 1.15}{(1+0.2)^3} + \frac{Rs.182.5 \times 1.15}{(1+0.2)^1} + \frac{Rs.120 \times 1.15}{(1+0.2)^4} + \frac{Rs.209.88 \times 1.15}{(0.2-0.05)^1} \times \frac{1}{(1+0.2)^5}$$

P= 115 + 110.2 + 105.6 + 101.2 + 590.42 = Rs.1,022.42

Intrinsic value of share is Rs. 1,022.42 as compared to latest market price of Rs. 3,122. Market price of a share is overpriced by Rs. 2,099.58.

Answer for Q.NO.14.

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

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

Where,

P = Market Price of the share.E = Earnings per share.

D = Dividend per share.

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

r = Internal rate of return/ return on investment

Applying the above formula, price per share

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

$$\text{or}, P = \frac{18 + 70}{0.15} = Rs.586.67$$

(ii) As per Gordon's model, when r > K_e, optimum dividend payout ratio is'Zero'.

Answer for Q.NO.15.

CASE 1: Value of the firm when dividends are not paid.

Step 1: Calculate price at the end of the period

Ke= 10%, P_o= 100, D_1= 0

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

$100 = \frac{P_1 + 0}{1 + 0.10}$ ➔ $P_1 = 110$

Step 2: Calculation of funds required for investment

Earning	Rs. 1,00,000
Dividend distributed	Nil
Fund available for investment	Rs. 1,00,000
Total Investment	Rs. 2,00,000
Balance Funds required	Rs. 2,00,000 - Rs. 1,00,000 = Rs. 1,00,000

Step 3: Calculation of No. of shares required to be issued for balance funds

$$\text{No. of shares} = \frac{\text{Funds required}}{\text{Price at end}(P_1)}$$

$$\Delta_n = \frac{1,00,000}{110}$$

Step 4: Calculation of value of firm

$$nP_o = \frac{(n + \Delta n)P_1 - I + E}{1 + K_e}$$

$$nP_o = \frac{\left(10,000 + \frac{Rs.1,00,000}{Rs.110}\right) \times Rs.110 - Rs.2,00,000 + Rs.1,00,000}{(1 + 0.10)}$$

= Rs.10,00,000

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

Step 1: Calculate price at the end of the period

K_e = 10%, P_o= 100, D_1= 5

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

$$100 = P_o = \frac{P_1 + 5}{1 + 0.10} \Rightarrow P_1 = 105$$

Step 2: Calculation of funds required for investment

Earning	Rs.1,00,000
Dividend distributed	Rs. 50,000
Fund available for investment	Rs. 50,000
Total Investment	Rs.2,00,000
Balance Funds required	Rs.2,00,000 - Rs.50,000 = Rs.1,50,000

Step 3: Calculation of No. of shares required to be issued for balance fund

$$\text{No. of shares} = \frac{\text{Funds required}}{\text{Price at end}(P_1)}$$

$$\Delta_n = \frac{Rs.1,50,000}{Rs.105}$$

Step 4: Calculation of value of firm

$$nP_o = \frac{(n+\Delta n)P_1 - I + E}{1+K_e}$$

$$nP_o = \frac{\left(10{,}000 + \frac{Rs.1{,}50{,}000}{Rs.105}\right) \times Rs.105 - Rs.2{,}00{,}000 + Rs.1{,}00{,}000}{(1+0.10)} = Rs.10{,}00{,}000$$

Answer for Q.NO.16.

Given,

Cost of Equity (K_e)	12%
Number of shares in the beginning (n)	10,000
Current Market Price (P_0)	Rs.100
Net Profit (E)	Rs.5,00,000
Expected Dividend (D_1)	Rs.10 per share
Investment (I)	Rs.10,00,000

Computation of market price per share, when:

i) No dividend is declared:

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

$$100 = \frac{P_1 + 0}{1+0.12}$$

$$P_1 = 112 - 0 = Rs.112$$

ii) Dividend is declared:

$$100 = \frac{P_1 + 10}{1+0.12}$$

$$P_1 = 112 - 10 = Rs.102$$

Calculation of number of shares required for investment

	Rs.
Earning	5,00,000
Dividend distributed	1,00,000
Fund available for investment	4,00,000
Total Investment	10,00,000
Balance Funds required	10,00,000 - 4,00,000 = 6,00,000

$$\text{No. of shares} = \frac{\text{Funds required}}{\text{Price at end}(P_1)}$$

$$\Delta n = \frac{6{,}00{,}000}{102} = 5{,}882.35 \text{ or } 5{,}883 \text{ shares}$$

Answer for Q.NO.17.

Given,

Cost of Equity (K_e)	10%
Number of shares in the beginning (n)	25,000
Current Market Price (P_0)	Rs.100
Net Profit (E)	Rs.2,50,000
Expected Dividend (D_1)	Rs.5 per share
Investment (I)	Rs.5,00,000

Case 1 - When dividends are paid	**Case 2 - When dividends are notpaid**
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 = [Total Investment – (Net profit -Dividend)] = 5,00,000 - (2,50,000 - 1,25,000) = 3,75,000	**Step 2** Calculation of funds required = [Total Investment – (Net profit -Dividend)] = 5,00,000 - (2,50,000 - 0) = 2,50,000
Step 3 No. of shares required to be issuedfor balance fund 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 issuedfor balance fund 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 $V_f = \frac{(n + \Delta n)P_1 - I + E}{(1 + K_e)}$ $V_f = \frac{\left(25,000 + \frac{3,75,000}{105}\right)105 - 5,00,000 + 2,50,000}{(1 + 0.10)}$ =Rs.25,00,000	**Step 4** Calculation of value of firm $V_f = \frac{(n + \Delta n)P_1 - I + E}{(1 + K_e)}$ $V_f = \frac{\left(25,000 + \frac{3,75,000}{110}\right)110 - 5,00,000 + 2,50,000}{(1 + 0.10)}$ Rs.25,00,000

Answer for Q.NO.18.

(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) = Rs.150

Expected dividend per share (D_1) = Rs.8

Capitalization rate (k_e) = 0.10

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

(a) If expected dividends are declared, then

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

$$\therefore P_1 = Rs.157$$

(b) If expected dividends are not declared, then

$$Rs.150 = \frac{P_1 + 0}{1 + 0.10}$$

$$\therefore P_1 = Rs.165$$

(ii) Calculation of number of shares to be issued

	(a) Dividends are declared (Rs.lakh)	**(b) Dividends arenot Declared (Rs.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 (Rs.per share)	157	165
No. of new shares to be issued (in lakh)(Rs.380 ÷ 157; Rs.300 ÷ 165)	2.42	1.82

(iii) Calculation of market value of the shares

	(a) Dividends aredeclared	**(b) Dividends are notDeclared**
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 (Rs.)	157	165
Total market value of shares at the end of the year (Rs.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.

Answer for Q.NO.19.

Ex-dividend price is Rs. 40 (50-10).

The total amount of dividend received is Rs. 10,00,000 which is re-invested atthe rate of Rs.40 per share.

Hence additional shares purchased would be 25,000.

Total holding would be 1,25,000 shares (1,00,000 + 25,000)

Answer for Q.NO.20.

Current Market price = 20x25 = 500 per share

Book value of the company before repurchase = Rs. 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 = Rs. 2.75 cr (4cr – 1.25cr)

No of shares after repurchase = 75,000 shares

Book value per share = 367 per share.

CHAPTER 07: FINANCIAL ANALYSIS AND PLANNING –RATIO ANALYSIS

Answer for Q.NO.1.

Computation of Ratios		
Ratio	**2021-22 (Rs.)**	**2022-23 (Rs.)**
1. Gross profit ratio (Gross profit/sales)	$\frac{64,000 \times 100}{3,00,000}$ =21.3%	$\frac{76,000 \times 100}{3,74,000}$ =20.3%
2. Operating expense to sales ratio (Operating exp/ Total sales)	$\frac{49,000 \times 100}{3,00,000}$ =16.3%	$\frac{57,000 \times 100}{3,74,000}$ =15.2%
3. Operating profit ratio (Operating profit/ Total sales)	$\frac{15,000 \times 100}{3,00,000}$ = 5%	$\frac{19,000 \times 100}{3,74,000}$ =5.08%
4. Capital turnover ratio (Sales / capital employed)	$\frac{3,00,000}{1,00,000}$ =3	$\frac{3,74,000}{1,47,000}$ = 2.54
5. Stock turnover ratio (COGS/ Average stock) (Refer to W.N.1	$\frac{2,36,000}{50,000}$ = 4.72	$\frac{2,98,000}{77,000}$ = 3.87
6. Net Profit to Net worth ratio (Net profit / Net worth)	$\frac{15,000 \times 100}{1,00,000}$ = 15%	$\frac{19,000 \times 100}{1,17,000}$ =16.24%
7. Receivables collection period (Average receivables / Average daily credit sales) (Refer to W.N. 2)	$\frac{50,000}{739.73}$ = 67.6 days	$\frac{82,000}{936.99}$ = 87.5 days
Working notes (W.N.):		
1. Average Stock = (opening stock + closing stock)/2	(40,000 + 60,000) / 2 = 50,000	(60,000 + 94,000) / 2 = 77,000
2. Average daily sales = Credit sales / 365	$\frac{2,70,000}{365}$ = 739.73	$\frac{3,42,000}{365}$ = 936.99

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

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

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

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

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

Answer for Q.NO.2.

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

Calculation of Assets

Total liabilities = Total Assets

Rs.2,00,000 = Total Assets

Fixed Assets = 60% of total fixed assets and current assets

= Rs.2,00,000 × 60/100 = Rs.1,20,000

Current Assets = Total Assets – Fixed Assets

= Rs.2,00,000 – Rs.1,20,000 = Rs.80,000

Calculation of additions to Plant & Machinery

	Rs.
Total fixed assets	1,20,000
Less: Land & Buildings	80,000
Plant and Machinery (after providing depreciation)	40,000
Less: Existing Plant & Machinery (after extra depreciation of ₹ 5,000) i.e. 50,000 – 20,000	30,000
Addition to the Plant & Machinery	10,000

Calculation of stock

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

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

Rs.50,000 = Rs.80,000 – Stock

Stock = Rs.80,000 - Rs.50,000

= Rs.30,000

Receivables	=	4/5th of quick assets		
	=	(Rs.80,000 – Rs.30,000) x 4/5		
	=	Rs.40,000		
Receivables turnover	=	$\frac{\text{Receivables}}{\text{Credit Sales}} \times 12\,\text{months}$ = 2 months		
	=	$\frac{40{,}000 \times 12}{\text{Credit Sales}}$ = 2 months		
2×credit sales	=	4,80,000		
Credit sales	=	4,80,000/2		
	=	Rs.2,40,000 = Total Sales (As there were no cash sales)		
Gross profit	=	15% of sales = Rs.2,40,000 x 15/100 = Rs.36,000		
Return on net worth (net profit)				
Net worth	=	Rs.1,00,000 + Rs.30,000		
	=	Rs.1,30,000		
Net profit	=	Rs.1,30,000 x 10/100	=	Rs.13,000
Debenture interest	=	Rs.20,000 x 5/100	=	Rs.1,000

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

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

Projected Balance Sheet as at 31st March, 2023

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

Answer for Q.NO.3.

The net profit is calculated as follows:

Particulars	Rs.
Sales (150% of Rs.4,80,000)	7,20,000
Direct costs	(4,80,000)
Gross profit	2,40,000
Operating expenses	(80,000)
Profit before Interest and Tax (EBIT)	1,60,000
Interest changes (8% of Rs.4,00,000)	(32,000)
Profit before taxes	1,28,000
Taxes (@ 50%)	(64,000)
Net profit after taxes	64,000

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

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

(iii) Return on assets = $\frac{\text{EBIT}(1-t)}{\text{Assets}} = \frac{\text{Rs.1,60,000}(1-0.5)}{8,00,000} = 0.10 \text{ or } 10\%$

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

(v) Return on equity = $\frac{\text{Net Profit after taxes}}{\text{Owners' equity}} = \frac{\text{Rs.64,000}}{50\% \text{ of Rs.8,00,000}}$

$= \frac{\text{Rs.64,000}}{\text{Rs.4,00,000}} = 0.16 \text{ or } 16\%$

Answer for Q.NO.4.

Workings:

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

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

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

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

(iii) $\frac{\text{Capital}}{\text{Total liabilities}} = \frac{1}{2}$

Or, Total liabilities = Rs.32,00,000 × 2 = Rs.64,00,000

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

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

Or, Net Profit = Rs.32,00,000 × 1/5 = Rs.6,40,000

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

Or, Sales = Rs.6,40,000 × 5 = Rs.32,00,000

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

(vii) $\text{Stock Turnover} = \frac{\text{Cost of Goods Sold (i.e. Sales - Gross profit)}}{\text{Average Stock}} = 10$

$= \frac{\text{Rs.32,00,000} - \text{Rs.8,00,000}}{\text{Average Stock}} = 10$

Or, Average Stock = Rs.2,40,000

Or, $\frac{\text{Opening Stock} + \text{Rs.4,00,00 0}}{2}$ = Rs.2,40,000

Or, Opening Stock = Rs.80,000

Trading Account

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

Profit and Loss Account

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

Balance Sheet

Capital and Liabilities	(Rs.)	Assets	(Rs.)
Capital	32,00,000	Fixed Assets	40,00,000
Liabilities	64,00,000	Current Assets:	

		Closing Stock	4,00,000
		Other Current Assets (Bal. figure)	52,00,000
	96,00,000		96,00,000

Answer for Q.NO.5.

Ratios	**2020-21**	**2021-22**	**2022-23**
Current ratio (Current Assets / Current Liabilities)	1.19 (Rs.6,30,000 / Rs.5,30,000)	1.25 (Rs.7,60,000 / Rs.6,10,000)	1.20 (Rs.8,95,000 / Rs.7,45,000)
Acid-test ratio (Quick Assets / Current Liabilities)	0.43 (Rs.2,30,000 / Rs.5,30,000)	0.46 (Rs.2,30,000 / Rs.6,10,000)	0.40 (Rs.2,95,000 / Rs.7,45,000)
Receivables turnover ratio (Sales/ Average Receivables) (Refer Working Notes)	20 (Rs.40,00,000 / Rs.2,00,000)	18.70 (Rs.43,00,000 / Rs.2,30,000)	13.82 (Rs.38,00,000 / Rs.2,75,000)
Average collection period (365 / Receivables turnover ratio)	18.25 (365/20)	19.52 (365/18.70)	26.41 (365/13.82)
Inventory turnover ratio (COGS / Average Inventory) (Refer Working Notes)	8 (Rs.32,00,000 / Rs.4,00,000)	8.18 (Rs.36,00,000 / Rs.4,40,000)	6.11 (Rs.33,00,000 / Rs.5,40,000)
Total debt to net worth (Short term + Long term Debt) / (Common stock + Retained earnings)	1.38 (Rs.8,30,000 / Rs.6,00,000)	1.40 (Rs.9,10,000 / Rs.6,50,000)	1.61
Long-term debt to total capitalization	0.33 (Rs.3,00,000 / Rs.9,00,000)	0.32 (Rs.3,00,000 / Rs.9,50,000)	0.32 (Rs.3,00,000 / Rs.9,50,000)
Gross profit margin (Gross Profit / Sales) {Gross profit = Sales – Cost of Goods sold}	0.20 (Rs.8,00,000 / Rs.40,00,000)	0.16 (Rs.7,00,000 / Rs.43,00,000)	0.13 (Rs.5,00,000 / Rs.38,00,000)
Net profit margin (Net Profit / Sales)	0.075 (Rs.3,00,000 / Rs.40,00,000)	0.047 (Rs.2,00,000 / Rs.43,00,000)	0.026 (Rs.1,00,000 / Rs.38,00,000)
Total Asset turnover (Sales / Total Assets)	2.80	2.76	2.24

	$\left(\frac{Rs.40,00,000}{Rs.14,30,000}\right)$	$\left(\frac{Rs.43,00,000}{Rs.15,60,000}\right)$	$\left(\frac{Rs.38,00,000}{Rs.16,95,000}\right)$
Return on assets (Net profit/ Total Assets)	0.21 $\left(\frac{Rs.3,00,000}{Rs.14,30,000}\right)$	0.13 $\left(\frac{Rs.2,00,000}{Rs.15,60,000}\right)$	0.06 $\left(\frac{Rs.1,00,000}{Rs.16,95,000}\right)$
Working Notes			
Average receivables {(Opening + closing)/2}	(Rs.2,00,000 + Rs.2,00,000)/2 = Rs.2,00,000	(Rs.2,00,000 + Rs.2,60,000)/2 = Rs.2,30,000	(Rs.2,60,000 + Rs.2,90,000)/2 = Rs.2,75,000
Average Inventory {(Opening + closing)/2}	(Rs.4,00,000 + Rs.4,00,000)/2 = Rs.4,00,000	(Rs.4,00,000 + Rs.4,80,000)/2 = Rs.4,40,000	(Rs.4,80,000 + Rs.6,00,000)/2 = Rs.5,40,000

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

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

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

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

Answer for Q.NO.6.

Ratios	**Navya Ltd.**	**Industry Norms**
1. Current Ratio = $\frac{\text{Current Assets}}{\text{Current Liabilities}}$	$\frac{Rs.52,80,000}{Rs.19,80,000} = 2.67$	2.50
2. Receivable Turnover Ratio = $\frac{\text{Sales}}{\text{Debtors}}$	$\frac{Rs.1,10,00,000}{Rs.11,00,000} = 10.0$	8.00
3. Inventory turnover ratio = $\frac{\text{Sales}}{\text{Stock}}$	$\frac{Rs.1,10,00,000}{Rs.33,00,000} = 3.33$	9.00

4. Total Asset Turnover ratio = $\frac{\text{Sales}}{\text{Total Assets}}$	$\frac{\text{Rs.1,10,00,000}}{\text{Rs.77,00,000}}$ =1.43	2.00
5. Net Profit Ratio = $\frac{\text{Net Profit}}{\text{Sales}}$	$\frac{\text{Rs.2,31,000}}{\text{Rs.1,10,00,000}}$ = 2.10%	3.50%
6. Return on Total Asset = $\frac{\text{EBIT}}{\text{Total Assets}}$	$\frac{\text{Rs.5,54,000}}{\text{Rs.77,00,000}}$ = 7.19%	7%
7. Return on Net worth = $\frac{\text{Net Profit}}{\text{Net Worth}}$	$\frac{\text{Rs.2,31,000}}{\text{Rs.48,00,000}}$ = 4.81%	10.5%
8. $\frac{\text{Total Debt}}{\text{Total Assets}}$	$\frac{\text{Rs.29,00,000}}{\text{Rs.77,00,000}}$ = 37.66%	60%

Comments:

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

Answer for Q.NO.7.

(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 × Rs.6,40,000 = Rs.5,44,000.

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

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

(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:

	Rs.	**Rs.**
Current assets (2.5 of current liabilities)		2,40,000
Less: Inventories	48,000	

Cash	16,000	64,000
∴ Receivables		1,76,000

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

So, Average collection period = $\frac{Rs.1,28,000}{Rs.6,40,000} \times 360$ = 72 days

Answer for Q.NO.8.

(a) Dividend yield on the equity shares

$$= \frac{\text{Dividend per share}}{\text{Market price per share}} \times 100 = \frac{Rs.2 (i.e. 0.20 \times Rs.10)}{Rs.40} \times 100 = 5\%$$

(b) Dividend coverage ratio

(i) $$\text{Preference} = \frac{\text{Profit after taxes}}{\text{Dividend payable to preference shareholders}}$$

$$= \frac{Rs.2,70,000}{Rs.27,000 (i.e. 0.09 \times Rs.3,00,000)} = 10 \text{ times}$$

(ii) $$\text{Equity} = \frac{\text{Profit after taxes - Preference share dividend}}{\text{Dividend payable to equity shareholders at current rate of Rs.2 per share}}$$

$$= \frac{Rs.2,70,000 - Rs.27,000}{Rs.1,60,000 (i.e. 80,000 \text{ shares} \times Rs.2)} = 1.52 \text{ times}$$

(c) Earnings per equity share = $\text{Earnings per equity share} = \frac{\text{Earnings available to equity shareholders}}{\text{Number of equity shares outstanding}}$

$$= \frac{Rs.2,43,000}{80,000} \text{ Rs.3.04 per share}$$

(d) Price-earning (P/E) ratio=

$$\text{Price - earning (P/E) ratio} = \frac{\text{Profit after taxes} - \text{Preference shares dividend}}{\text{Dividend payable to equity shareholders at current rate of Rs 2 per share}}$$

$$\frac{\text{Market price per share}}{\text{Earnings per share}} = \frac{Rs.40}{Rs.3.04} = 13.2 \text{ times}$$

Answer for Q.NO.9.

(a) Working Notes:

(i) $$\text{Calculation of sales} = \frac{\text{Fixed assets}}{\text{Sales}} = \frac{1}{3}$$

$$\therefore \frac{26,00,000}{\text{Sales}} = \frac{1}{3} \Rightarrow \text{Sales} = Rs.78,00,000$$

(ii) Calculation of Current Assets

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

$$\therefore \frac{26,00,000}{\text{Current Assets}} = \frac{13}{11} \Rightarrow \text{Current Assets} = \text{Rs.}22,00,000$$

(iii) Calculation of Raw Material Consumption and Direct Wages

	Rs.
Sales	78,00,000
Less: Gross Profit @ 15%	11,70,000
Works Cost	66,30,000

Raw Material Consumption (20% of Works Cost) = Rs.13,26,000

Direct Wages (10% of Works Cost) = Rs. 6,63,000

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

$$= 13,26,000 \times \frac{3}{12} = \text{Rs.}3,31,500$$

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

$$= 66,30,000 \times \frac{6}{100} = \text{Rs.}3,97,800$$

(vi) Calculation of Current Liabilities

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

$$\therefore \frac{22,00,000}{\text{Current liabilities}} = 2 \Rightarrow \text{Current Liabilities} = \text{Rs.}11,00,000$$

(vii) Calculation of Receivables

$$\text{Average collection period} = \frac{\text{Receivables}}{\text{Credit sales}} \times 365$$

$$\frac{\text{Receivables}}{78,00,000} \times 365 = 0$$

Receivables = Rs.12,82,191.78 or Rs.12,82,192

(viii) Calculation of Long term Loan

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

$$\frac{\text{Long term Loan}}{11,00,000} = \frac{2}{1} \Rightarrow \text{Long Term Loan} = \text{Rs.}22,00,000$$

(ix) Calculation of Cash Balance

	Rs.
Current assets	22,00,000

Less: Receivables	12,82,192	
Raw materials stock	3,31,500	
Finished goods stock	3,97,800	20,11,492
Cash balance		1,88,508

(x) Calculation of Net worth

Fixed Assets		26,00,000
Current Assets		22,00,000
Total Assets		48,00,000
Less: Long term Loan	22,00,000	
Current Liabilities	11,00,000	33,00,000
Net worth		15,00,000

Net worth = Share capital + Reserves = 15,00,000

Also, $\frac{1}{4} = \frac{\text{Share Capital}}{\text{Reserves and Surplus}}$

So, Share capital $= 15,00,000 \times \frac{1}{5} = \text{Rs.}3,00,000;$

Reserves and Surplus $= = 15,00,000 \times \frac{4}{5} = \text{Rs.}12,00,000;$

Profit and Loss Account of PQR Ltd.

for the year ended 31st March, 2023

Particulars	Rs.	Particulars	Rs.
To Direct Materials	13,26,000	By Sales	78,00,000
" Direct Wages	6,63,000		
" Works (Overhead) (Balancing figure)	46,41,000		
" Gross Profit c/d	11,70,000		
	78,00,000		78,00,000
" Selling and Distribution Expenses (Balancing figure)	5,46,000	" Gross Profit b/d	11,70,000
" 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	Rs.	**Assets**	Rs.
Share Capital	3,00,000	Fixed Assets Current Assets:	26,00,000
Reserves and Surplus	12,00,000	Stock of Raw Material	
Long term loans	22,00,000	Stock of Finished Goods	3,31,500
Current liabilities	11,00,000	Receivables Cash	3,97,800
			12,82,192
			1,88,508
	48,00,000		48,00,000

Answer for Q.NO.10.

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

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

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

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

Rs.3,75,000 should be equivalent to 25% of the networth.

Net worth x $\frac{25}{100}$ = Rs.3,75,000

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

The ratio of share capital to reserves is 7:3

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

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

(ii) Debentures

Interest on Debentures @ 15% = Rs.60,000

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

(iii) Current Assets

Current Ratio = 2

Payables = Rs.2,00,000

$\therefore$ Current Assets = 2 Current Liabilities = 2 x 2,00,000 = Rs.4,00,000

(iv) Fixed Assets

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

(v) Composition of Current Asset

Inventory Turnover = 12

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

Closing stock = $\frac{Rs.18,00,000}{12}$ = Rs.1,50,000

Composition	**Rs.**
Stock	1,50,000

Receivables	2,00,000
Cash (balancing figure)	50,000
Total Current Assets	4,00,000

Answer for Q.NO.11.

Working Notes:

(i) Long term Debt

$$0.5 = \frac{\text{Long - term debt}}{\text{Net worth}} = \frac{\text{Long - term debt}}{\text{Rs.1,00,00 0} + \text{Rs.1,00,00 0}}$$

$\therefore$ Long term debt = Rs.1,00,000

(ii) Total assets

Total liabilities and Equity = Notes and payables + Long-term debt + Common stock + Retained earnings

= Rs.1,00,000 + Rs.1,00,000 + Rs.1,00,000 + Rs.1,00,000 = Rs.4,00,000

$\therefore$ Total assets = Total liabilities and Equity = Rs.4,00,000

(iii) Sales and Cost of Goods sold

$$\text{Total asset turnover} = 2.5 = \frac{\text{Sales}}{\text{Total assets}} = \frac{\text{Sales}}{\text{Rs.4,00,00 0}}$$

$\therefore$ Sales= Rs.10,00,000

Cost of goods sold = (100% - Gross Profit margin) x Sales

= (100% - 10%) x Rs.10,00,000 = Rs.9,00,000.

(iv) Current Assets

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

$\therefore$ Inventory = Rs.1,00,000

$$\text{Average collection period} = 18 = \frac{\text{Receivables} \times 360}{\text{Sales}} = \frac{\text{Receivables} \times 360}{\text{Rs.10,00,0 00}}$$

$\therefore$ Accounts receivables = Rs.50,000 SalesRs.10,00,000

$$\text{Acid-test ratio} = 1 = \frac{\text{Cash} + \text{Accounts Receivable}}{\text{Notes and Payables}} = \frac{\text{Cash} + \text{Rs.50,000}}{\text{Rs.1,00,00 0}}$$

$\therefore$ Cash = Rs.50,000

(v) Plant and equipment Notes and PayablesRs.1,00,000

= Total Assets - Current Assets

= Rs.4,00,000 - (Rs.1,00,000 + Rs.50,000 + Rs.50,000) = Rs.2,00,000

Balance Sheet

	Rs.		Rs.
Cash	50,000	Notes and payables	1,00,000
Accounts receivable	50,000	Long-term debt	1,00,000

Inventory	1,00,000	Common stock	1,00,000
Plant and equipment	2,00,000	Retained earnings	1,00,000
Total assets	4,00,000	Total liabilities and equity	4,00,000

Answer for Q.NO.12.

Working notes:

(i) Computation of Current Assets and Current Liabilities

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

Current assets = 2.5 Current liabilities

Now, Working capital = Current assets - Current liabilities

Rs.4,80,000 = 2.5 Current liability - Current liability

Or, 1.5 Current liability = Rs.4,80,000

∴ Current Liabilities = Rs.3,20,000

So, Current Assets = Rs.3,20,000 x 2.5 = Rs.8,00,000

(ii) Computation of Inventories

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

$$1.5 = \frac{\text{Current assets - Inventories}}{\text{Rs3,20,000}}$$

1.5 x Rs.3, 20,000 = Rs.8,00,000 - Inventories

Inventories = Rs.8,00,000 – Rs.4, 80,000 = Rs.3,20,000

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

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

∴ Fixed Assets = 0.75 Proprietary fund

Proprietary fund = Fixed Assets + Net Working Capital –Long Term Debt

= 0.75 Proprietary fund + Rs.4,80,000 – 0

∴ Proprietary fund = Rs.19,20,000

and Fixed Assets = 0.75 proprietary fund

= 0.75 X Rs.19,20,000 = Rs.14,40,000

Capital = Proprietary fund - Reserves & Surplus

= Rs.19,20,000 - Rs.3,20,000 = Rs.16,00,000

Sundry Creditors = Current liabilities - Bank overdraft

= Rs.3,20,000 - Rs.80,000 = Rs.2,40,000

Balance Sheet as on 31st March, 2023

Liabilities	Rs.	Assets	Rs.
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

Answer for Q.NO.13.

Workings Notes:

(i) Computation of Current Assets & Current Liabilities & Total Assets

Net Working Capital = Current Assets – Current Liabilities

= 2.5 – 1 = 1.5

Thus, Current Assets = $\frac{\text{Net Working Capital} \times 2.5}{1.5}$

$= \frac{\text{Rs.}13,50,000 \times 25}{1.5} = \text{Rs.}22,50,000$

Current Liabilities (CL) = Rs.22,50,000 – Rs.13,50,000 = Rs.9,00,000

Total Assets = Current Assets + Fixed Assets

= Rs.22,50,000 + Rs.30,00,000 = Rs.52,50,000

(ii) Computation of Sales & Cost of Goods Sold

Sales = Total Assets Turnover × Total Assets

= 2 x (Fixed Assets + Current Assets)

= 2 × (Rs.30,00,000 + Rs.22,50,000)

= Rs.1,05,00,000

Cost of Goods Sold = (100% – 20%) of Sales = 80% of Sales

= 80% × Rs.1,05,00,000 = Rs.84,00,000

(iii) Computation of Stock & Quick Assets

Average Stock = $\frac{\text{Cost of Good Sold}}{\text{Stock Turnover Ratio}} = \frac{\text{Rs.}84,00,000}{7}$

= Rs.12,00,000

Closing Stock = (Average Stock × 2) – Opening Stock

= (Rs.12,00,000 × 2) – Rs.11,40,000

= Rs.12,60,000

Quick Assets = Current Assets – Closing Stock

= Rs.22,50,000 – Rs.12,60,000

= Rs.9,90,000

(iv) Computation of Proprietary Fund

Debt-Equity Ratio = $\frac{\text{Debt}}{\text{Equity}} = \frac{1}{5}$

Or, Equity = 1.5 Debt

Total Assets = Equity + Preference capital + Debt + CL

Rs.52,50,000 = 1.5 Debt+ Rs.6,00,000 + Debt + Rs.9,00,000

Thus, Debt = $\frac{\text{Rs.37,50,000}}{2.5}$ =Rs.15,00,000

Equity = Rs.15,00,000 × 1.5

= Rs.22,50,000

So, Proprietary Fund = Equity + Preference Capital

= Rs.22,50,000 + Rs.6,00,000

= Rs.28,50,000

(v) Computation of Profit after tax (PAT)

= Total Assets × Return on Total Assets

= Rs.52,50,000 × 15%

= Rs.7,87,500

(a) Quick Ratio

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

(b) Fixed Assets Turnover Ratio

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

(c) Proprietary Ratio

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

(d) Earnings per Equity Share (EPS)

Earnings per Equity Share = $\frac{\text{PAT - Preference Share Dividend}}{\text{Number of Equity Shares}}$

= $\frac{\text{Rs.7,87,500 - Rs.54,000 (9\% of Rs.6,00,000)}}{\text{1,80,000}}$

= Rs.4.075 per share

Answer for Q.NO.14.

(i) Change in Reserve & Surplus = Rs.25,00,000 – Rs.20,00,000 = Rs.5,00,000

So, Net profit = Rs.5,00,000

Net Profit Ratio = 8%

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

(ii) Cost of Goods sold

= Sales – Gross profit Margin

= Rs.62,50,000 – 20% of Rs.62,50,000

= Rs.50,00,000

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

(iv) Stock = $\frac{\text{Cost of Goods Sold}}{\text{Stock Turnover ratio}} = \frac{50,00,000}{4}$ = Rs.12, 50, 000

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

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

Balance Sheet as on 31st March 2023

Liabilities	(Rs.)	Assets	Rs.)
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 (Balancing Figure)	14,37,500	Cash in hand	6,25,000
	1,09,37,500		1,09,37,500

Answer for Q.NO.15.

i) Determination of Sales and Cost of goods sold:

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

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

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

Cost of Goods Sold = Sales – Gross Profit

= Rs.16,00,000 - Rs.4,00,000 = Rs.12,00,000

ii) Determination of Sundry Debtors:

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

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

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

$= \frac{\text{Rs.16,00,000}}{\text{Bills Receivable} + \text{Sundry Debtors}} = 4$

Or, Sundry Debtors + Bills receivable = Rs.4,00,000

Sundry Debtors = Rs.4,00,000 – Rs.25,000 = Rs.3,75,000

iii) Determination of Sundry Creditors:

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

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

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

$= = \frac{\text{Rs.12,10,0 00}}{\text{Sundry Creditors} + \text{Bills Payables}} = 6$

So, Sundry Creditors + Bills Payable = Rs.2,01,667

Or, Sundry Creditors + Rs.10,000 = Rs.2,01,667

Or, Sundry Creditors = Rs.2,01,667 – Rs.10,000 = Rs.1,91,667

iv) Determination of Closing Stock

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

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

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

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

Or, Opening Stock = Rs.7,95,000=8,00,000

So, Closing Stock = Rs.7,95,000 + Rs.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, $= \frac{\text{Rs.12,00,0 00}}{\text{Fixed Assets}} = 4$

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

Workings:

***Calculation of Credit purchases:**

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

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

Rs.12,00,000 + Rs.10,000 = Purchases

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

Assumption:

(i) All sales are credit sales

(ii) All purchases are credit purchase

(iii) Stock Turnover Ratio and Fixed Asset Turnover Ratio may be calculated either on Sales or on Cost of Goods Sold.

Answer for Q.NO.16.

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 = Rs.5,00,000

CA = 3 x 5,00,000

CA = Rs.15,00,000

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

$$\frac{15,00,000 - Stock}{5,00,000} = 1$$

15,00,000 – stock = 5,00,000

Stock = Rs.10,00,000

3. Stock Turnover ratio (on sales) = 5

$$\frac{Sales}{Avg\ stock} = 5$$

$$\frac{Sales}{10,00,000} = 5$$

Sales = Rs.50,00,000

4. Gross Profit = 50,00,000 x 40% = Rs.20,00,000 Net profit (PBT) = 50,00,000 x 10% = Rs.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 = Rs.6,00,000

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

6. Average collection period = 30 days

Receivables = $\frac{30}{360}$ x 50.00.000 = 4,16,667

7. Fixed Assets Turnover Ratio = 0.8 50,00,000/ Fixed Assets = 0.8 Fixed Assets = Rs.62,50,000

Income Statement

	(Rs.**)**
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	**(**Rs.**)**	**Assets**	**(**Rs.**)**
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	15,00,000
	77,50,000		77,50,000

Answer for Q.NO.17.

Balance Sheet of Rudra Ltd.

Liabilities	**(**Rs.**)**	**Assets**	**(**Rs.**)**
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	2,00,000		
Current Liability (Other			
STCL)			
Outstanding Interest	3,00,000		
	75,00,000		75,00,000

Working Notes:

Let sales be Rs. x

Balance Sheet of Rudra Ltd.

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

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

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

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

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

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

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

4. Debt: Equity = 1 : 1

$\frac{\text{LognTerm Loan}}{\text{NetWorth}} = \frac{1}{1}$

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

5. Gross Profit to Cost = 20%

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

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

GP = 0.2 x – 0.2 GP

1.2 GP = 0.2 x

G P $= \frac{0.2x}{1.2}$

G P $= x/6$

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

6. COGS to creditors = 10:1

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

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

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

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

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

8. Current Ratio = 3 : 1

$$\frac{Stock + Debtors + Cash}{Current\ Liabilities} = \frac{3}{1}$$

$$\frac{\frac{x}{6} + \frac{x}{6} + 50,00,000}{Current\ Liabilities} = 3$$

$$\frac{\frac{x}{3} + 50,00,000}{3} = CL$$

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

9. CA = 3CL

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

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

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

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

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

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

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

x = Rs.1,20,00,000

11. Now, from above calculations, we get,

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

Stock = $\frac{x}{6} = \frac{Rs.1,20,00,000}{6} = Rs.20,00,000$

Debtor = $\frac{x}{6} = \frac{Rs.1,20,00,000}{6} = Rs.20,00,000$

Net Worth = x / 4 = Rs.30,00,000

Now, Capital to Reserve is 1 : 2

Capital = Rs.10,00,000

and, Reserve = Rs.20,00,000

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

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

Creditor= $\frac{x}{12} = \frac{Rs.1,20,00,000}{12} = Rs.10,00,000$

Current Liabilities = Creditors + Other STCL + Outstanding Interest

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

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

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

Other STCL = Rs.2,00,000

CHAPTER 08: MANAGEMENT OF WORKING CAPITAL

Answer for Q.NO.1.

Effect of Alternative Current Assets Policies

	Conservative (Rs.)	Moderate (Rs.)	Aggressive (Rs.)
Sales	20,00,000	20,00,000	20,00,000
Earnings before Interest and Taxes (EBIT)	2,00,000	2,00,000	2,00,000
Current Assets	5,00,000	4,00,000	3,00,000
Fixed Assets	5,00,000	5,00,000	5,00,000
Total Assets	10,00,000	9,00,000	8,00,000
Return on Total Assets (EBIT÷ Total Assets)	20%	22.22%	25%
Current Assets/Fixed Assets	1.00	0.80	0.60

The aforesaid calculation shows that the conservative policy provides greater liquidity (solvency) to the firm, but lower return on total assets. On the other hand, the aggressive policy gives higher return, but low liquidity and thus is very risky. The moderate policy generates return higher than Conservative policy but lower than aggressive policy. This is less risky than aggressive policy but riskier than conservative policy. It also reflects inverse relationship between Current Assets / Fixed Assets ratio and Return on Total Assets.

In determining the optimum level of current assets, the firm should balance the profitability – solvency tangle by minimizing total costs – Cost of liquidity and cost of illiquidity.

Answer for Q.NO.2.

a. Calculation of Net Operating Cycle period of XYZ Ltd.

$$\text{Raw Material storage period (R)} = \frac{\text{Average stock of raw material}}{\text{Average Cost of Raw Material Consumption per day}}$$

$$= \frac{\text{Rs.}50{,}000}{\text{Rs.}6{,}00{,}000 \div 360\text{days}} = \frac{\text{Rs.}50{,}000}{1{,}667} = 30\text{days}$$

Work-in-progress inventory holding period (W)

$$= \frac{\text{Average Work-in-progress inventory}}{\text{Average Cost of Production per day}}$$

$$= \frac{\text{Rs.}30{,}000}{\text{Rs.}5{,}00{,}000 \div 360\text{days}} = \frac{\text{Rs.}30{,}000}{1{,}389} = 22\text{days}$$

Finished Goods storage period (F)

$$= \frac{\text{Average stock of finished goods}}{\text{Average Cost of Goods Sold per day}}$$

$$= \frac{\text{Rs.}40{,}000}{\text{Rs.}8{,}00{,}000 \div 360\text{days}} = \frac{\text{Rs.}40{,}000}{2{,}222} = 18\text{days}$$

Receivables (Debtors) collection period (D) = 45 days

Credit Period allowed by creditors (C) = 30 days

Net Operating Cycle = R + W + F+ D – C = 30 + 22 + 18 + 45 – 30 = 85 days

(a) Number of Operating Cycles in a year $= \frac{\text{No.of daysinayear}}{\text{OperatingCycleperiod}}$

$$= \frac{360\text{days}}{85\text{days}} = 4.23\text{times}$$

Answer for Q.NO.3.

Cost Structure for 52,000 units	
Particulars	**Amount (**Rs.**)**
Raw Material @ Rs.400P	2,08,00,000
Direct Wages @ Rs.150	78,00,000
Manufacturing Overheads @ Rs.200	1,04,00,000
Selling and Distribution OH @ Rs.100	52,00,000
Total Cost	4,42,00,000
Sales @ Rs.1,000	5,20,00,000

Particulars	**Calculation**	**Amount (**Rs.**)**
A. Current Assets:		
Raw Material Stock	$2{,}08{,}00{,}000 \times \frac{4}{52}$	16,00,000
Work in Progress(WIP) Stock**	$2{,}08{,}00{,}000 + \frac{(78{,}00{,}000 + 1{,}04{,}00{,}000)}{2} \times \frac{4}{52}$	23,00,000
Finished Goods Stock	$4{,}42{,}00{,}000 \times \frac{8}{52}$	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.

Answer for Q.NO.4.

Working Notes:

1. **Raw material inventory:** The cost of materials for the whole year is 60% of the Sales value.

   Hence it is 60,000 units × Rs.5 × $\frac{60}{100}$ =Rs.1,80,000 . The monthly consumption of raw material would be Rs.15,000. Raw material requirements would be for two months; hence raw materials in stock would be Rs.30,000.

2. **Work-in-process:** (Students may give special attention to this point). It is stated that each unit of production is expected to be in process for one month).

		(Rs.)
(a)	Raw materials in work-in-process (being one month's raw material requirements)	15,000
(b)	Labour costs in work-in-process (It is stated that it accrues evenly during the month. Thus, on the first day of each month it would be zero and on the last day of month the work-in-process would include one month's labour costs. On an average therefore, it would be equivalent to ½ of the month's labour costs) $\left(\frac{10\%\text{ of }(60{,}000\times \text{Rs.}5)}{12\text{ months}}\times 0.5\text{month}\right)$	1,250
(c)	Overheads (For ½ month as explained above) $\left(\frac{20\%\text{ of }(60{,}000\times \text{Rs.}5)}{12\text{ months}}\times 0.5\text{month}\right)$	2,500
	Total work-in-process	18,750

3. **Finished goods inventory:** (3 month's cost of production)

Raw Materials $\left(\frac{60\%\text{ of }(60{,}000\times \text{Rs.}5)}{12\text{ months}}\times 3\text{months}\right)$	45,000
Labour $\left(\frac{10\%\text{ of }(60{,}000\times \text{Rs.}5)}{12\text{ months}}\times 3\text{months}\right)$	7,500
Overheads $\left(\frac{20\%\text{ of }(60{,}000\times \text{Rs.}5)}{12\text{ months}}\times 3\text{months}\right)$	15,000
Total finished goods inventory	67,500
Alternatively, (60,000 units x Rs.5 x 90%) x 3/12	67,500

4. **Debtors:** The total cost of sales = 2,70,000.

   Therefore, debtors = Rs.2,70,000 × $\frac{3}{12}$ = Rs.67,500

Where, Total Cost of Sales = RM + Wages + Overheads + Opening Finished goods inventory – Closing finished goods inventory.

= Rs.1,80,000 + Rs.30,000 + Rs.60,000 + Rs.67,500 – Rs.67,500 = Rs.2,70,000.

5. **Creditors:** Suppliers allow a two months' credit period. Hence, the average amount of creditors would be two months consumption of raw materials i.e.

$$\left(\frac{60\%\text{ of }(60{,}000\times \text{Rs.}5)}{12\text{ months}}\times 2\text{ months}\right) = \text{Rs.}30{,}000$$

6. **Direct Wages payable:** $\left(\frac{10\%\text{ of }(60{,}000\times \text{Rs.}5)}{12\text{ months}}\times 1\text{ month}\right) = \text{Rs.}2{,}500$

7. **Overheads Payable:** $\left(\frac{20\%\text{ of }(60{,}000\times \text{Rs.}5)}{12\text{ months}}\times 1\text{ month}\right) = \text{Rs.}5{,}000$

Here it has been assumed that inventory level is uniform throughout the year, therefore opening inventory equals closing inventory.

Statement of Working Capital Required

	(Rs.)	(Rs.)
Current Assets or Gross Working Capital:		
Raw materials inventory (Refer to working note 1)	30,000	
Working–in-process (Refer to working note 2)	18,750	
Finished goods inventory (Refer to working note 3)	67,500	
Debtors (Refer to working note 4)	67,500	
Cash	20,000	2,03,750
Current Liabilities:		
Creditors (Refer to working note 5)	30,000	
Direct wages payable (Refer to working note 6)	2,500	
Overheads payable (Refer to working note 7)	5,000	(37,500)
Estimated working capital requirements		1,66,250

Answer for Q.NO.5.

Statement of Working Capital requirements (cash cost basis)

	(Rs.)	(Rs.)
A. Current Assets		
Inventory:		
-Raw materials $\left(\frac{\text{Rs.}9{,}00{,}000}{12\text{ months}}\times 1\text{ month}\right)$	75,000	
-Finished Goods $\left(\frac{\text{Rs.}25{,}80{,}000}{12\text{ months}}\times 1\text{ month}\right)$	2,15,000	

Receivables (Debtors) $\left(\frac{Rs.29,40,000}{12\,months}\times 2\,months\right)$	4,90,000	
Sales Promotion expenses paid in advance $\left(\frac{Rs.1,20,000}{12\,months}\times 3\,months\right)$	30,000	
Cash balance	1,00,000	9,10,000
Gross Working Capital		9,10,000
B. Current Liabilities:		
Payables:		
-Creditors for materials $\left(\frac{Rs.9,00,000}{12\,months}\times 2\,months\right)$	1,50,000	
Wages outstanding $\left(\frac{Rs.9,00,000}{12\,months}\times 1\,month\right)$	60,000	
Manufacturing expenses outstanding $\left(\frac{Rs.9,60,000}{12\,months}\times 1\,month\right)$	80,000	
Administrative expenses outstanding $\left(\frac{Rs.2,40,000}{12\,months}\times 1\,month\right)$	20,000	3,10,000
Net working capital (A - B)		6,00,000
Add: Safety margin @ 20%		1,20,000
Total Working Capital requirements		7,20,000

Working Notes:

(i) Computation of Annual Cash Cost of Production	**(Rs.)**
Material consumed	9,00,000
Wages	7,20,000
Manufacturing expenses	9,60,000
Total cash cost of production	25,80,000
(ii) Computation of Annual Cash Cost of Sales:	(Rs.)
Total Cash cost of production as in (i) above	25,80,000
Administrative Expenses	2,40,000
Sales promotion expenses	1,20,000
Total cash cost of sales	29,40,000

Answer for Q.NO.6.

This question can be solved using two approaches:

(i) To assess the impact of double shift for long term as a matter of production policy.

(ii) To assess the impact of double shift to mitigate the immediate demand for next year only.

The first approach is more appropriate and fulfilling the requirement of the question.

i) Assessment of impact of double shift for long term as a matter of production policy:

Comparative Statement of Working Capital Requirement

	Single Shift (24,000)			Double Shift (48,000)		
	Unit	**Rate (Rs.)**	**Amount (Rs.)**	**Unit**	**Rate (Rs.)**	**Amount (Rs.)**
Current Assets						
Inventories:						
Raw Materials	6,000	6.00	36,000	12,000	5.40	64,800
Work-in-Progress	2,000	11.00	22,000	2,000	9.40	18,800
Finished Goods	4,500	16.00	72,000	9,000	12.40	1,11,600
Sundry Debtors	6,000	16.00	96,000	12,000	12.40	1,48,800
Total Current Assets: (A)			2,26,000			3,44,000
Current Liabilities						
Creditors for Materials	4,000	6.00	24,000	8,000	5.40	43,200
Creditors for Wages	1,000	5.00	5,000	2,000	4.00	8,000
Creditors for Expenses	1,000	5.00	5,000	2,000	3.00	6,000
Total Current Liabilities: (B)			34,000			57,200
Working Capital: (A) – (B)			1,92,000			2,86,800

Additional Working Capital requirement = 2,86,800 – 1,92,000 = Rs.94,800

Workings:

(1) Statement of cost at single shift and double shift working

	24,000 units		48,000 Units	
	Per unit (Rs.)	**Total (Rs.)**	**Per unit (Rs.)**	**Total (Rs.)**
Raw materials	6.00	1,44,000	5.40	2,59,200
1. Wages - Variable	3.00	72,000	3.00	1,44,000
Fixed	2.00	48,000	1.00	48,000
Overheads - Variable	1.00	24,000	1.00	48,000

Fixed	4.00	96,000	2.00	96,000
Total cost	16.00	3,84,000	12.40	5,95,200
Profit	2.00	48,000	5.60	2,68,800
	18.00	4,32,000	18.00	8,64,000

(2) Sales in units 2020-21= $\frac{\text{Sales}}{\text{Unit selling price}} = \frac{\text{Rs.4,32,000}}{\text{Rs.18}}$ = 24,000 units

(3) Stock of Raw Materials in units on 31.3.2021

$$= \frac{\text{Value of Stock}}{\text{Cost per unit}} = \frac{\text{Rs.36,000}}{6} = 6{,}000 \text{ units}$$

(4) Stock of work-in-progress in units on 31.3.2021

$$= \frac{\text{Value of work-in-progress}}{\text{Prime Cost per unit}} = \frac{\text{Rs.22,000}}{(\text{Rs.6} + \text{Rs.5})} = 2{,}000 \text{ units}$$

(5) Stock of finished goods in units 2020-21

$$= \frac{\text{Value of Stock}}{\text{Total Cost per unit}} = \frac{\text{Rs.72,000}}{\text{Rs.16}} = 4{,}500 \text{ units}$$

ii) Assessment of the impact of double shift to mitigate the immediate demand for next year only & not as part of policy implementation.

In this approach, working capital shall be computed as if we are calculating the same for the next / second year with double production. Whereas, in the first approach to implement double-shift as part of policy implementation, we calculated comparative analysis of working capital requirement for single & double shift within the same year.

Workings:

(1) Calculation of no. of units to be sold:

No. of units to be Produced	48,000
Add: Opening stock of finished goods	4,500
Less: Closing stock of finished goods	(9,000)
No. of units to be Sold	43,500

(2) Calculation of Material to be consumed and materials to be purchased in units:

No. of units Produced	48,000
Add: Closing stock of WIP	2,000
Less: Opening stock of WIP	(2,000)
Raw Materials to be consumed in units	48,000
Add: Closing stock of Raw material	12,000
Less: Opening stock of Raw material	(6,000)
Raw Materials to be purchased (in units)	54,000

(3) Credit allowed by suppliers:

$$= \frac{\text{No. of units to purchased} \times \text{Cost per unit}}{12 \text{ months}} \times 2 \text{months}$$

$$= \frac{54,000 \times \text{Rs.}5.40}{12 \text{ months}} \times 2 \text{ months} = \text{Rs.}48,600$$

Comparative Statement of Working Capital Requirement

	Single Shift (Current Year – 24,000 units)			Double Shift (Next Year – 48,000 units)		
	Unit	**Rate (Rs.)**	**Amount (Rs.)**	**Unit**	**Rate (Rs.)**	**Amount (Rs.)**
Current Assets						
Inventories:						
Raw Materials	6,000	6.00	36,000	12,000	5.40	64,800
Work-in-Progress	2,000	11.00	22,000	2,000	9.40	18,800
Finished Goods	4,500	16.00	72,000	9,000	12.40	1,11,600
Sundry Debtors	6,000	16.00	96,000	12,000	12.40	1,48,800
Total Current Assets: (A)			2,26,000			3,44,000
Current Liabilities						
Creditors for Materials	4,000	6.00	24,000	9,000	5.40	48,600
Creditors for Wages	1,000	5.00	5,000	2,000	4.00	8,000
Creditors for Expenses	1,000	5.00	5,000	2,000	3.00	6,000
Total Current Liabilities: (B)			34,000			62,600
Working Capital: (A) – (B)			1,92,000			2,81,400

Additional Working Capital requirement = 2,81,400 – 1,92,000 = 89,400

Notes:

a. The quantity of material in process will not change due to double shift working since work started in the first shift will be completed in the second shift.

b. It is given in the question that the WIP is valued at prime cost hence, it is assumed that the WIP is 100% complete in respect of material and labour.

c. In absence of any information on proportion of credit sales to total sales, debtors quantity has been doubled for double shift. Hence, the units have been taken as 12,000 only.

d. It is assumed that all purchases are on credit.

e. The valuation of work-in-progress based on prime cost (i.e. material & labor) as per the policy of the company is as under.

	Single shift (Rs.)	**Double shift (Rs.)**
Materials	6.00	5.40

Wages – Variable	3.00	3.00
Fixed	2.00	1.00
	11.00	9.40

Answer for Q.NO.7.

(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
	(Rs.)	**(Rs.)**
Sales revenue (A) (Sales unit × Rs.96)	4,80,000	8,16,000
Cost of production:		
Materials cost (Units produced × Rs.40)	2,40,000	3,60,000
Direct labour and variable expenses (Units produced × Rs.20)	1,20,000	1,80,000
Fixed manufacturing expenses (Production Capacity: 12,000 units × Rs.6)	72,000	72,000
Depreciation (Production Capacity : 12,000 units × Rs.10)	1,20,000	1,20,000
Fixed administration expenses (Production Capacity : 12,000 units × Rs.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 ataverage cost (year 1: 1000 units, year 2 : 1500 units) (Cost of Production × Closing stock/ unitsproduced)	(1,00,000)	(1,32,000)
Cost of Goods Sold	5,00,000	7,48,000
Add: Selling expenses – Variable (Salesunit × Rs.4)	20,000	34,000
Add: Selling expenses -Fixed (12,000units × Rs.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 (Rs.)	**Year 2 (Rs.)**
Materials consumed during the year	2,40,000	3,60,000
Add: Closing stock (2.25 month's average consumption)	45,000	67,500
	2,85,000	4,27,500
Less: Opening Stock	---	45,000
Purchases during the year	2,85,000	3,82,500
Average purchases per month(Creditors)	23,750	31,875

2. Creditors for expenses:

	Year 1 (Rs.)	**Year 2 (Rs.)**
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 (Rs.)	**Year 2 (Rs.)**
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) (includingprofit)	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 Requirements: (A-B)	1,48,583	2,16,792

Projected Statement of Working Capital Requirement(Cash Cost Basis)

	Year 1 (Rs.)	Year 2 (Rs.)
(A) Current Assets		
Inventories:		
- Stock of Raw Material (6,000 units x Rs.40 x 2.25/12); (9,000 units x Rs.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 Liabilities		
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)	1,24,583	1,84,042

Working Note:

1. Cash Cost of Production:

	Year 1 (Rs.)	Year 2 (Rs.)
Cost of Production as per projectedStatement 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 $\left(\frac{Rs.4,80,000 \times 1,000}{6,000}\right);\left(\frac{Rs.7,40,000 \times 1,500}{10,000}\right)$	(80,000)	(1,11,000)
Cash Cost of Goods Sold	4,00,000	6,29,000

2. Receivables (Debtors)

	Year 1 (Rs.)	Year 2 (Rs.)
Cash Cost of Goods Sold	4,00,000	6,29,000
Add : Variable Expenses @ Rs.4	20,000	34,000

Add : Total Fixed Selling expenses (12,000 units × Rs.1)	12,000	12,000
Cash Cost of Debtors	4,32,000	6,75,000
Average Debtors	36,000	56,250

Answer for Q.NO.8.

Calculation of Net Working Capital requirement:

	(Rs.)	**(Rs.)**
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

	(Rs.)
Raw material requirements {(1,04,000 units × Rs.80)+ Rs.3,20,000}	86,40,000
Direct wages {(1,04,000 units × Rs.30) + Rs.60,000}	31,80,000
Overheads (exclusive of depreciation) {(1,04,000 × Rs.60)+ Rs.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(Rs.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

	(Rs.)
Raw material requirements (4,000 units × Rs.80)	3,20,000
Direct wages (50% × 4,000 units × Rs.30)	60,000
Overheads (50% × 4,000 units × Rs.60)	1,20,000
	5,00,000

3. Raw material stock

It is given that raw material in stock is average 4 weeks consumption. Since, the company is newly formed, the raw material requirement for production and work in progress will be issued and consumed during the year.

Hence, the raw material consumption for the year (52 weeks) is as follows:

	(Rs.**)**
For Finished goods (1,04,000 × Rs.80)	83,20,000
For Work in progress (4,000 × Rs.80)	3,20,000
	86,40,000

Raw material stock $\frac{\text{Rs.}86,40,000}{52\text{weeks}} \times 4\text{weeks}$ i.e. Rs. 6,64,615

4. **Finished goods stock:** 8,000 units @ Rs.170 per unit = Rs. 13,60,000

5. Debtors for sale: $1,63,20,000 \times \frac{8}{52} = \text{Rs.}25,10,769$

5. Creditors for raw material:

Material Consumed (Rs. 83,20,000 + Rs. 3,20,000)	Rs. 86,40,000
Add: Closing stock of raw material	Rs. 6,64,615
Purchases of Raw Material	Rs. 93,04,615

Credit allowed by suppliers = $\frac{\text{Rs.}93,04,615}{52\text{weeks}} \times 4\text{weeks}$ = Rs. 7,15,740

6. Creditors for wages

Outstanding wage payment = $\frac{\text{Rs.}31,80,000}{52\text{weeks}} \times 1.5\text{weeks}$ = Rs. 91,731

Answer for Q.NO.9.

Preparation of Statement of Working Capital Requirement for Trux Company Ltd.

	(Rs.)	**(Rs.)**
A. Current Assets		
(i) Inventories:		
Material (1 month)		

$\left(\frac{Rs.6,75,000}{12\,months}\times 1month\right)$	56,250	
Finished goods (1 month) $\left(\frac{Rs.21,60,000}{12\,months}\times 1month\right)$	1,80,000	2,36,250
(ii) Receivables (Debtors)		
For Domestic Sales $\left(\frac{Rs.15,17,586}{12\,months}\times 1month\right)$	1,26,466	
For Export Sales $\left(\frac{Rs.7,54,914}{12\,months}\times 3months\right)$	1,88,729	3,15,195
(iii) Prepayment of Selling expenses $\left(\frac{Rs.1,12,500}{12\,months}\times 3months\right)$		28,125
(iii) Cash in hand & at bank (net of overdraft)		1,75,000
Total Current Assets		7,54,570
B. Current Liabilities:		
(i) Payables (Creditors) for materials(2 months) $\left(\frac{Rs.6,75,000}{12\,months}\times 2months\right)$		1,12,500
(ii) Outstanding wages (0.5 months) $\left(\frac{Rs.5,40,000}{12\,months}\times 0.5month\right)$		22,500
(iii) Outstanding manufacturing expenses $\left(\frac{Rs.7,65,000}{12\,months}\times 1month\right)$		63,750
(iv) Outstanding administrative expenses $\left(\frac{Rs.1,80,000}{12\,months}\times 1month\right)$		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 (Rs.)	Export (Rs.)	Total (Rs.)
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 (Workingnote-3)	77,586	34,914	1,12,500
Cash Cost of Sales	15,17,586	7,54,914	22,72,500

1. Calculation of gross profit on Export Sales

Let domestic selling price is Rs. 100. Gross profit is Rs. 20, and then costper unit is Rs. 80

Export price is 10% less than the domestic price i.e. Rs. 100–(1-0.1)= Rs. 90Now, gross profit will be = Rs. 90 - Rs. 80 = Rs. 10

So, Gross profit ratio at export price will be = $\frac{Rs.10}{Rs.90}$ x100 = 11.11%

2. Apportionment of Selling expenses between Domestic and Exports sales:

Apportionment on the basis of sales value:

Domestic Sales = $\frac{Rs.1,12,500}{Rs.26,10,000} \times Rs.18,00,000 = Rs.77,586$

Exports Sales = $\frac{Rs.1,12,500}{Rs.26,10,000} \times Rs.8,10,000 = Rs.34,914$

3. Assumptions

(i) It is assumed that administrative expenses is related to productionactivities.

(ii) Value of opening and closing stocks are equal.

Answer for Q.NO.10.

Since WIP is 100% complete in terms of material and 50% complete in terms of other cost, the same has been considered for number of days for WIP inventory i.e. 10 days for material and 5 days for other costs respectively.

Particulars	For RawMaterial	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	$\frac{10}{360}\times 600 = 16.67$	$\frac{5}{360}\times 200 = 2.78$	19.45
Finished Goods Stock Holding	$\frac{45}{360}\times 600 = 75$	$\frac{45}{360}\times 200 = 25$	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

	Rs. in lakhs
Raw Material Stock	33.33
WIP	19.45
Finished Goods stock	100.00
Receivables	66.67
Advance to Suppliers	8.33
Cash	10.00
	237.78
Less: Payables (Creditors)	100.00
Working capital	133.78

Answer for Q.NO.11.

Working Notes:

(i) Cost of Goods Sold = Sales – Gross Profit (35% of Sales)
= Rs.90,00,000 – Rs.31,50,000
= Rs.58,50,000

(ii) Closing Stock = Cost of Goods Sold / Stock Turnover
= Rs.58,50,000/6 = Rs.9,75,000

(iii) Fixed Assets = Cost of Goods Sold / Fixed Assets Turnover
= Rs.58,50,000/1.5
= Rs.39,00,000

(iv) Current Assets and Current Liabilities

Current Ratio = 2.5 and Liquid Ratio = 1.5

CA / CL= 2.5 … (i)

(CA – Inventories) / CL = 1.5 … (ii)

By subtracting equation (ii) from (i), we get,

Inventories / CL = 1

Current Liabilities = Inventories (stock) = Rs. 9,75,000

∴ Current Assets = Rs.9,75,000 x 2.5 = Rs. 24,37,500

Or

Current Ratio / Quick Ratio = Current Assets / Quick Assets

2.5 / 1.5 = Current Assets / (Current Assets – Inventory)

2.5/1.5 Current Assets – 2.5/1.5 x Rs.9,75,000 = Current Assets

Hence, Current Assets = Rs. 24,37,500

(v) Liquid Assets (Receivables and Cash)

= Current Assets – Inventories (Stock)

= Rs. 24,37,500 – Rs. 9,75,000

= Rs.14,62,500

(vi) Receivables (Debtors)= Sales × Debtors Collection period /12

= Rs. 90,00,000 × 1/12

= Rs. 7,50,000

(vii) Cash = Liquid Assets – Receivables (Debtors)

= Rs.14,62,500 – Rs. 7,50,000 = Rs. 7,12,500

(viii) Net worth = Fixed Assets /1.3

= Rs. 39,00,000/1.3 = Rs. 30,00,000

(ix) Reserves and Surplus

Reserves and Surplus / Share Capital = 1/1.5

Share Capital= 1.5 Reserves and Surplus… (i)

Now, Reserves and Surplus + Share Capital = Net worth … (ii)

From (i) and (ii), we get,

2.5 Reserves and Surplus = Net worth

Reserves and Surplus = Rs. 30,00,000 / 2.5 = Rs. 12,00,000

(x) Share Capital = Net worth – Reserves and Surplus

= Rs. 30,00,000 – Rs. 12,00,000

= Rs. 18,00,000

(xi) Long-term Debts

Capital Gearing Ratio = Long-term Debts / Equity Shareholders' FundLong-term Debts = Rs. 30,00,000 × 0.7875 = Rs.23,62,500

a. Balance Sheet of the Company

Particulars	Figures asthe end of 31-03-2021 (Rs.)	Figures asthe end of 31-03-2020 (Rs.)
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	23,62,500	-
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**	**-**

(a) Statement Showing Working Capital Requirement

	(Rs.)	**(Rs.)**
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

Answer for Q.NO.12.

Statement showing the requirements of Working Capital

Particulars	**(Rs.)**	**(Rs.)**
A. Current Assets:		
Inventory:		
Stock of Raw material (Rs.96,600 × 2/12)	16,100	
Stock of Work-in-progress (As per Working Note)	16,350	
Stock of Finished goods (Rs.1,46,500 × 10/100)	14,650	
Receivables (Debtors) (Rs.1,27,080 × 2/12)	21,180	

Cash in Hand	8,000	
Prepaid Expenses:		
Wages & Mfg. Expenses (Rs.66,250 × 1/12)	5,521	
Administrative expenses (Rs.14,000 × 1/12)	1,167	
Selling & Distribution Expenses (Rs.13,000 × 1/12)	1,083	
Advance taxes paid {(70% of Rs.10,000) × 3/12}	1,750	
Gross Working Capital	85,801	85,801
B. Current Liabilities:		
Payables for Raw materials (Rs.1,12,700 × 1.5/12)	14,088	
Provision for Taxation (Net of Advance Tax)(Rs.10,000 × 30/100)	3,000	
Total Current Liabilities	17,088	17,088
C. Excess of CA over CL		68,713
Add: 10% for unforeseen contingencies		6,871
Net Working Capital requirements		75,584

Working Notes:

i) Calculation of Stock of Work-in-progress

Particulars	(Rs.)
Raw Material (Rs.84,000 × 15%)	12,600
Wages & Mfg. Expenses (Rs.62,500 × 15% × 40%)	3,750
Total	16,350

ii) Calculation of Stock of Finished Goods and Cost of Sales

Particulars	(Rs.)
Direct material Cost [Rs.84,000 + Rs.12,600]	96,600
Wages & Mfg. Expenses [Rs.62,500 + Rs.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	**(**Rs.**)**
Raw material consumed	96,600
Add: Closing Stock	16,100
Less: Opening Stock	-
Purchases	1,12,700

Answer for Q.NO.13.

Workings:

Collection from debtors:

(Amount in Rs.)

	February	**March**	**April**	**May**	**June**	**July**	**August**	**September**
Total sales	1,20,000	1,40,000	80,000	60,000	80,000	1,00,000	80,000	60,000
Credit sales (80% of total sales)	96,000	1,12,000	64,000	48,000	64,000	80,000	64,000	48,000
Collections:								
One month		72,000	84,000	48,000	36,000	48,000	60,000	48,000
Two months			24,000	28,000	16,000	12,000	16,000	20,000
Total collections			1,08,000	76,000	52,000	60,000	76,000	68,000

Monthly Cash Budget for Six months, April to September, 2022

(Amount in Rs.)

	April	**May**	**June**	**July**	**August**	**September**
Receipts:						
Opening balance	20,000	20,000	20,000	20,000	20,000	20,000
Cash sales	16,000	12,000	16,000	20,000	16,000	12,000
Collection from debtors	1,08,000	76,000	52,000	60,000	76,000	68,000
Total cash available (A)	1,44,000	1,08,000	88,000	1,00,000	1,12,000	1,00,000
Payments:						
Purchases	48,000	64,000	80,000	64,000	48,000	80,000
Wages & salaries	9,000	8,000	10,000	10,000	9,000	9,000
Interest on debentures	3,000	---	---	3,000	---	---
Tax payment	---	---	---	5,000	---	---

Total payments (B)	60,000	72,000	90,000	82,000	57,000	89,000
Minimum cash balance desired	20,000	20,000	20,000	20,000	20,000	20,000
Total cash needed (C)	80,000	92,000	1,10,000	1,02,000	77,000	1,09,000
Surplus - deficit (A-C)	64,000	16,000	(22,000)	(2,000)	35,000	(9,000)
Investment / financing Temporary Investments	(64,000)	(16,000)	----		(35,000)	-----
Liquidation of temporary investments or temporary borrowings	----	----	22,000	2,000	----	9,000
Total effect of investment / financing (D)	(64,000)	(16,000)	22,000	2,000	(35,000)	9,000
Closing cash balance (A+D-B)	20,000	20,000	20,000	20,000	20,000	20,000

Answer for Q.NO.14.

WORKING

		Rs. in '000		
		Jan.	**Feb.**	**March**
(1)	Payments to creditors:			
	Cost of goods sold	1,635	1,405	1,330
	Add: Closing Stocks	1,200	1,100	1,000
		2,835	2,505	2,330
	Less: Opening Stocks	1,300	1,200	1,100
	Purchases	1,535	1,305	1,230
	Add: Trade Creditors, Opening balance	2,110	2,000	1,950
		3,645	3,305	3,180
	Less: Trade Creditors, closing balance	2,000	1,950	1,900
	Payment	1,645	1,355	1,280
(2)	Receipts from debtors:			
	Debtors, Opening balances	2,570	2,600	2,500
	Add: Sales	2,100	1,800	1,700
		4,670	4,400	4,200
	Less: Debtors, closing balance	2,600	2,500	2,350
	Receipt	2,070	1,900	1,850

CASH BUDGET

(a) 3 months ending 31st March, 2022

(Rs. **in 000)**			
	January, 2022	**February, 2022**	**March, 2022**
Opening cash balances	545	315	65
Add: Receipts:			
From Debtors	2,070	1,900	1,850
Sale of Investments	---	700	----
Sale of Plant	---	---	50
Total (A)	2,615	2,915	1,965
Deduct: Payments			
Creditors	1,645	1,355	1,280
Expenses	255	210	195
Capital Expenditure	---	800	---
Payment of dividend	---	485	---
Purchase of investments	400	---	200
Total payments (B)	2,300	2,850	1,675
Closing cash balance (A-B)	315	65	290

(b) Statement of Sources and uses of Funds for the three month period ending 31st March, 2022

	Rs. '000	**Rs. '000**
Sources:		
Funds from operation:		
Net profit (150+125+115)	390	
Add: Depreciation (60×3)	180	570
Sale of plant		50
		620
Decrease in Working Capital (Refer Statement of changes in working capital)		665
Total		1,285
Uses:		
Purchase of plant		800
Payment by dividends		485
Total		1,285

Statement of Changes in Working Capital

	January,22	March,22	Increase	Decrease
	Rs.' 000	Rs.' 000	Rs.' 000	Rs.' 000
Current Assets				
Cash in hand and at Bank	545	290		255
Short term Investments	300	200		100
Debtors	2,570	2,350		220
Stock	1,300	1,000		300
	4,715	3,840		
Current Liabilities				
Trade Creditors	2,110	1,900	210	---
Other Creditors	200	200	---	---
Tax Due	320	320	---	---
	2,630	2,420		
Working Capital	2,085	1,420		
Decrease	-	665	665	
	2,085	2,085	875	875

Answer for Q.NO.15.

Projected Profit and Loss Account for the year 3

	Year 2 Actual (Rs. in lakhs)	Year 3 Projected (Rs. in lakhs)		Year 2 Actual (Rs. in lakhs)	Year 3 Projected (Rs. in lakhs)
To Materials consumed	350	420	By Sales	1,000	1,200
To Stores	120	144	By Misc. Income	10	10
To Mfg. Expenses	160	192			
To Other expenses	100	150			
To Depreciation	100	100			
To Net profit	180	204			
	1,010	1,210		1,010	1,210

Cash Flow:

	(Rs. in lakhs)
Profit	204
Add: Depreciation	100
	304

Less: Cash required for increase in stock	50
Net cash inflow	254

Available for servicing the loan: 75% of Rs. 2,54,00,000 or Rs. 1,90,50,000

Working Notes:

(i) Material consumed in year 2: 35% of sales.

Likely consumption in year 3: $\text{Rs.}1{,}200 \times \frac{35}{100}$ or Rs.42 (lakhs)

(ii) Stores are 12% of sales, as in year 2.

(iii) Manufacturing expenses are 16% of sales.

Note: The above also shows how a projected profit and loss account is prepared.

Answer for Q.NO.16.

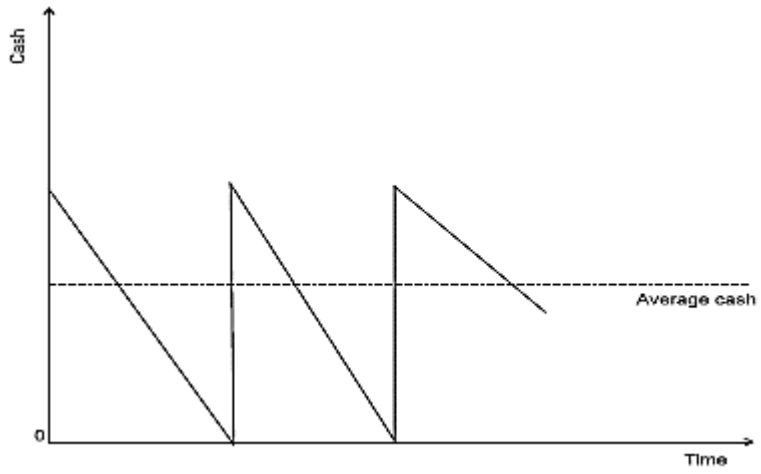
Cleared Funds Forecast

	9 Aug (Saturday) Rs.	10 Aug (Sunday) Rs.	11 Aug (Monday) Rs.	12 Aug (Tuesday) Rs.	13Aug (Wednesday) Rs.
Receipts					
W Ltd	1,30,000	0	0	0	0
X Ltd			0 0 0	1,80,000	0
(a)			**1,30,000 0 0**	**1,80,000**	**0**
Payments					
A Ltd	45,000	0	0	0	0
B Ltd	0	0	75,000	0	0
C Ltd	0	0	95,000	0	0
Wages	0	0	0	0	12,000
Salaries	56,000	0	0	0	0
Petty Cash	200	0	0	0	0
Stationery	0	0	300	0	0
(b)	**1,01,200**	**0**	**1,70,300**	**0**	**12,000**
Cleared excess Receipts over payments (a) – (b)	28,800	0	(1,70,300)	1,80,000	(12,000)
Cleared balance b/f	2,00,000	2,28,800	2,28,800	58,500	2,38,500
Cleared balance c/f (c)	**2,28,800**	**2,28,800**	**58,500**	**2,38,500**	**2,26,500**
Uncleared funds float					
Receipts	1,80,000	1,80,000	1,80,000	0	0
Payments	(1,70,000)		(1,70,300) 0	(6,500)	(6,500)
(d)	**10,000**	**9,700**	**180,000**	**(6,500)**	**(6,500)**

Total book balance c/f **(c)+ (d)**	**2,38,800**	**2,38,500**	**2,38,500**	**2,32,000**	**2,20,000**

Answer for Q.NO.17.

The optimum cash balance C $= C = \sqrt{\frac{2 \times Rs.12,60,000 \times Rs.20}{0.08}} = Rs.25,100$



The limitation of the Baumol's model is that it does not allow the cash flows to fluctuate. Firms in practice do not use their cash balance uniformly nor are they able to predict daily cash inflows and outflows. The Miller-Orr (MO) model, as discussed below, overcomes this shortcoming and allows for daily cash flow variation.

Answer for Q.NO.18.

(a) Cash cycle = 45 days + 75 days – 30 days = 90 days (3 months) Cash turnover = 12 months (360 days)/3 months (90 days) = 4.

(b) Minimum operating cash = Total operating annual outlay/cash turnover, that is, 120 lakhs/4 = Rs. 30 lakhs.

(c) Cash cycle = 45 days + 45 days – 30 days = 60 days (2 months).
Cash turnover = 12 months (360 days)/2 months (60 days) = 6.
Minimum operating cash = Rs. 120 lakhs/6 = Rs. 20 lakhs.
Reduction in investments = Rs. 30 lakhs – Rs. 20 lakhs = Rs. 10 lakhs.
Savings = 0.10 × 10 lakhs = Rs. 1 lakh.

Answer for Q.NO.19.

A. Statement showing the Evaluation of Debtors Policies (Total Approach)

Particulars		Present Policy 30 days	Proposed Policy A 40 days	Proposed Policy B 50 days	Proposed Policy C 60 days	Proposed Policy D 75 days
		Rs.	Rs.	Rs.	Rs.	Rs.
A.	**Expected Profit:**					
	(a) Credit Sales	6,00,000	6,30,000	6,48,000	6,75,000	6,90,000
	(b) Total Cost other than Bad Debts					
	(i) Variable Costs [Sales × 2/ 3]	4,00,000	4,20,000	4,32,000	4,50,000	4,60,000
	(ii)Fixed Costs	50,000	50,000	50,000	50,000	50,000
		4,50,000	4,70,000	4,82,000	5,00,000	5,10,000
	(c) Bad Debts	6,000	9,450	12,960	20,250	27,600
	(d) Expected Profit [(a) – (b) – (c)]	1,44,000	1,50,550	1,53,040	1,54,750	1,52,400
B.	**Opportunity Cost of Investments in Receivables**	7,500	10,444	13,389	16,667	21,250
C.	**Net Benefits (A – B)**	1,36,500	1,40,106	1,39,651	1,38,083	1,31,150

Recommendation: The Proposed Policy A (i.e. increase in collection period by 10 days or total 40 days) should be adopted since the net benefits under this policy are higher as compared to other policies.

Working Notes:

(i) Calculation of Fixed Cost = [Average Cost per unit – Variable Cost per unit] × No. of Units sold

= [Rs. 2.25 - Rs. 2.00] × (Rs. 6,00,000/3)

= Rs. 0.25 × 2,00,000 = Rs. 50,000

Calculation of Opportunity Cost of Average Investments

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection period}}{360} \times \frac{\text{Rate of Return}}{100}$$

Present Policy $= 4,50,000 \times \frac{30}{360} \times \frac{20}{100} = 7,500$

Policy A $= 4,70,000 \times \frac{40}{360} \times \frac{20}{100} = 10,444$

Policy B $= 4,82,000 \times \frac{50}{360} \times \frac{20}{100} = 13,389$

Policy C = $5,00,000 \times \frac{60}{360} \times \frac{20}{100} = 16,667$

Policy D = $5,10,000 \times \frac{75}{360} \times \frac{20}{100} = 21,250$

A. Another method of solving the problem is **Incremental Approach**. Here we assume that sales are all credit sales.

Particulars		Present Policy 30 days	Proposed Policy A 40 days	Proposed Policy B 50 days	Proposed Policy C 60 days	Proposed Policy D 75 days
		Rs.	**Rs.**	**Rs.**	**Rs.**	**Rs.**
A.	**Incremental Expected Profit:**					
	(a) Incremental Credit Sales	---	30,000	48,000	75,000	90,000
	(b) Incremental Costs					
	(i) Variable Costs	---	20,000	32,000	50,000	60,000
	(ii)Fixed Costs	---	-	-	-	-
	(c) Incremental Bad Debt Losses	---	3,450	6,960	14,250	21,600
	(d) Incremental Expected Profit (a – b –c)]		**6,550**	**9,040**	**10,750**	**8,400**
B.	**Required Return on**					
	Incremental Investments:					
	(a) Cost of Credit Sales	4,50,000	4,70,000	4,82,000	5,00,000	5,10,000
	(b) Collection period	30	40	50	60	75
	(c) Investment in Receivable (a × b/360)	37,500	52,222	66,944	83,333	1,06,250
	(d) Incremental Investment in Receivables	---	14,722	29,444	45,833	68,750
	(e) Required Rate of Return (in %)		20	20	20	20
	(f) Required Return on Incremental Investments (d× e)	---	**2,944**	**5,889**	**9,167**	**13,750**
C.	**Net Benefits (A – B)**	---	3,606	3,151	1,583	- 5,350

Recommendation: The Proposed Policy A should be adopted since the net benefits under this policy are higher than those under other policies.

B. Another method of solving the problem is by computing the **Expected Rate of Return**.

$$\text{Expected Rate of Return} = \frac{\text{Incremental Expected Profit}}{\text{Incremental Investment in Receivables}} \times 100$$

$$\text{For Policy A} = \frac{\text{Rs.}6,550}{\text{Rs.}14,722} \times 100 = 44.49\%$$

$$\text{For Policy B} = \frac{\text{Rs.}9,040}{\text{Rs.}29,444} \times 100 = 30.70\%$$

$$\text{For Policy C} = \frac{\text{Rs.}10,750}{\text{Rs.}45,833} \times 100 = 23.45\%$$

$$\text{For Policy D} = \frac{\text{Rs.}8,400}{\text{Rs.}68,750} \times 100 = 12.22\%$$

Recommendation: The Proposed Policy A should be adopted since the Expected Rate of Return (44.49%) is more than the Required Rate of Return (20%) and is highest among the given policies compared.

Answer for Q.NO.20.

Statement showing the Evaluation of Debtors Policies

Particulars	Present Policy	Proposed Policy I	Proposed Policy II
	Rs.	Rs.	Rs.
A Expected Profit:			
(a) Credit Sales	50,00,000	60,00,000	67,50,000
(b) Total Cost other than Bad Debts:			
(i) Variable Costs	35,00,000	42,00,000	47,25,000
(c) Bad Debts	1,50,000	3,00,000	4,50,000
(d) Expected Profit [(a) – (b) – (c)]	13,50,000	15,00,000	15,75,000
B Opportunity Cost of Investments in Receivables	2,18,750	3,50,000	4,92,188
C Net Benefits (A – B)	11,31,250	11,50,000	10,82,812

Recommendation: The Proposed Policy I should be adopted since the net benefits under this policy are higher as compared to other policies.

Working Note: Calculation of Opportunity Cost of Average Investments

$$\text{Opportunity Cost} = = \text{Total cost} \times \frac{\text{Collection period}}{12} \times \frac{\text{Rate of Return}}{100}$$

Collection Period in months = 12 / Accounts Receivable Turnover Ratio

Present Policy = Rs. 35,00,000 × 3/12 × 25% = Rs. 2,18,750

Proposed Policy I = Rs. 42,00,000 × 4/12 × 25% = Rs. 3,50,000

Proposed Policy II = Rs. 47,25,000 × 5/12 × 25% = Rs. 4,92,188

Answer for Q.NO.21.

Working Notes:

(i) Calculation of Cash Discount

Cash Discount = Total credit sales × % of customers who take up discount × Rate

Present Policy = $\frac{12,00,000 \times 50 \times 0.01}{100} = Rs.6,000$

Proposed Policy = 16,00,000 × 0.80 × 0.02 = Rs. 25,600

(ii) Opportunity Cost of Investment in Receivables

Present Policy = 9,36,000 x (30/360) x (70% of 15)/100 = 78,000 x 10.5/100 = Rs. 8,190

Proposed Policy = 12,48,000 x (20/360) x 10.50/100 = Rs. 7,280

Statement showing Evaluation of Credit Policies

Particulars	Present Policy	Proposed Policy
Credit Sales	12,00,000	16,00,000
Variable Cost @ 78%* of sales	9,36,000	12,48,000
Bad Debts @ 1.5% and 2%	18,000	32,000
Cash Discount	6,000	25,600
Profit before tax	2,40,000	2,94,400
Tax @ 30%	72,000	88,320
Profit after Tax	1,68,000	2,06,080
Opportunity Cost of Investment in Receivables	8,190	7,280
Net Profit	1,59,810	1,98,800

*Only relevant or variable costs are considered for calculating the opportunity costs on the funds blocked in receivables. Since 22% is contribution, hence the relevant costs are taken to be 78% of the respective sales.

Advise: Proposed policy should be adopted since the net benefit is increased by (Rs.1,98,800 − Rs.1,59,810) Rs. 38,990.

Answer for Q.NO.22.

Working notes:

Average level of receivables = Rs. 360 lakhs $\times \frac{30}{360}$ = 30 lakhs

Factoring Commission = 1% of Rs. 30,00,000	=	Rs. 30,000
Reserve = 10% of Rs. 30,00,000	=	Rs. 3,00,000
Total (i)	=	Rs. 3,30,000

Thus, the amount available for advance is	
Average level of receivables	Rs. 30,00,000
Less: Total (i) from above	Rs. 3,30,000
(ii)	Rs. 26,70,000
Less: Interest @ 15% p.a. for 30 days	Rs. 33,375
Net Amount of Advance available.	Rs. 26,36,625

Evaluation of Factoring Proposal

	Particulars	Rs.	Rs.
A.	**Savings (Benefit) to the firm**		
	Cost of Credit administration	Rs. 1,40,000	Rs. 1,40,000
	Cost of bad-debt losses	(0.02 × 360 lakhs)	Rs. 7,20,000
	Total		Rs. 8,60,000
B.	**Cost to the Firm:**		
	Factoring Commission [Annual credit Sales × % of Commission (or calculated annually)]	Rs. 30,000$\times \frac{360}{30}$	Rs. 3,60,000
	Interest Charges	Rs. 33,375$\times \frac{360}{30}$	Rs. 4,00,500
	Total		Rs. 7,60,500
C.	**Net Benefits to the Firm: (A-B)**		Rs. 99,500

Advice: Since the savings to the firm exceeds the cost to the firm on account of factoring, therefore, the proposal is acceptable.

Answer for Q.NO.23.

New level of sales will be 15,00,000 x 1.15 = Rs. 17,25,000

Variable costs are 80% x 75% = 60% of sales

Contribution from sales is therefore 40% of sales

Fixed Cost are 20% × 75% = 15% of sales

Particulars	Rs.	Rs.
Proposed investment in debtors = Variable Cost + Fixed Cost* = (17,25,000 × 60%) + (15,00,000 × 15%)		

$= (10,35,000 + 2,25,000) \times \frac{60}{360}$		2,10,000
Current investment in debtors = [(15,00,000 x 60%)		
$+ (15,00,000 \times 15\%)] \times \frac{30}{360}$		93,750
		1,16,250
Increase in investment in debtors		90,000
Increase in contribution = 15% x 15,00,000 x 40%	69,000	
New level of bad debts = (17,25,000 x 4%)	15,000	
Current level of bad debts (15,00,000 × 1%)		(54,000)
Increase in bad debts		(13,950)
Additional financing costs = 1,16,250 x 12% =		22,050
Savings by introducing change in policy		

* Fixed Cost is taken at existing level in case of proposed investment as well

Advise: Mosaic Limited should introduce the proposed policy.

Answer for Q.NO.24.

Statement showing the Evaluation of Proposal

Particulars	Rs.
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

Opportunity Cost = Total Cost of Credit Sales ×

$$\frac{\text{Collection period}}{12} \times \frac{\text{Required Rate of Return}}{100} = \text{Rs.}80,000 \times \frac{1.5}{12} \times \frac{25}{100} = \text{Rs.}2,500$$

Statement showing the Acceptable Degree of Risk of Non-payment

Particulars	Required Rate of Return		
	30%	40%	60%
Sales	1,00,000	1,00,000	1,00,000

Less: Production and Sales Expenses	80,000	80,000	80,000
Profit before providing for Bad Debts	20,000	20,000	20,000
Less: Bad Debts (assume X)	X	X	X
Profit before tax	20,000 – X	20,000 – X	20,000 – X
Less: Tax @ 50%	(20,000 – X) 0.5	(20,000 – X) 0.5	(20,000 – X) 0.5
Profit after Tax	10,000 –0.5X	10,000 –0.5X	10,000 –0.5X
Required Return (given)	30% of 10,000*	40% of 10,000*	60% of 10,000*
	= Rs.3,000	= Rs.4,000	= Rs.6,000

*Average Debtors = Total Cost of Credit Sales $\times \frac{\text{Collection period}}{12}$

$= \text{Rs. } 80{,}000 \times \frac{1.5}{12} = \text{Rs.}10{,}000$

Computation of the value and percentage of X in each case is as follows:

Case I 10,000 – 0.5x = 3,000

0.5x = 7,000

X = 7,000/0.5 = Rs. 14,000

Bad Debts as % of sales = Rs. 14,000/Rs.1,00,000 × 100 = 14%

Case II 10,000 – 0.5x = 4,000

0.5x = 6,000

X = 6,000/0.5 = Rs.12,000

Bad Debts as % of sales = Rs.12,000/Rs.1,00,000 ×

Case III 10,000 – 0.5x = 6,000

0.5x = 4,000

X = 4,000/0.5 = Rs.8,000

Bad Debts as % of sales = Rs. 8,000/Rs.1,00,000 × 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.

Answer for Q.NO.25.

Statement showing the Evaluation of Debtors Policies

Particulars	**ProposedPolicy Rs.**
A. Expected Profit:	
(a) Credit Sales	15,00,000
(b) Total Cost	

(i) Variable Costs	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 netbenefits 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 ofReturn	24%	24%	24%	24%	
D. Opportunity Cost (A × B × C)	4,305	19,517	25,831	19,134	68,787

Answer for Q.NO.26.

If the company does not avail the cash discount and pays the amount after 45 days, the implied cost of interest per annum would be approximately:

$$\left(\frac{100}{100-2}\right)^{\frac{365}{35}} - 1 = 23.5\%$$

Now let us assume that ABC Ltd. can invest the additional cash and can obtain an annual return of 25% and if the amount of invoice is Rs. 10,000. The alternatives areas follows:

	Refuse discount	**Accept discount**
	Rs.	**Rs.**
Payment to supplier	10,000	9,800
Return from investing Rs. 9,800 between day 10 and day 45: $\frac{35}{365}$ × Rs. 9,800×25%	(235)	
Net Cost	9,765	9,800

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

Answer for Q.NO.27.

(a) Rohit's argument of comparing 2% discount with 12% bank loan rate is not rational as 2% discount can be earned by making payment 5 days in advance i.e. within 10 days rather 15 days as payments are made presently. Whereas12% bank loan rate is for a year.

Assume that the purchase value is Rs.100, the discount can be earned by making payment within 10 days is Rs.2, therefore, net payment would be Rs.98 only. Annualized benefit

$$=\frac{\text{Rs.2}}{\text{Rs.98}}\times\frac{\text{365days}}{\text{5days}}\times 100=149\%$$

This means cost of not taking cash discount is 149%.

(b) If the bank loan facility could not be available, then in this case the companyshould resort to utilise maximum credit period as possible.

Therefore, payment should be made in 30 days to reduce the interest cost.